SUPPLIER SELECTION IN THE MALAYSIAN TELECOMMUNICATIONS INDUSTRY

A Thesis Submitted for the Degree of Doctor of Philosophy by:

Suzari Abdul Rahim

Brunel Business School
Brunel University London

ABSTRACT

Supplier selection plays an important role in any organisation. This study investigates and examines supplier selection criteria and the impacts on buying firm performance; specifically focusing on the telecommunications industry in Malaysia. Previous studies in this area have focussed on the criteria such as quality, price, delivery, supplier relationship management and decision making tools and techniques. However, little research has been undertaken to include government policies and business ethics as elements in the supplier selection criteria.

After a literature review and interviews, the development of conceptual frameworks and a number of hypotheses were put forward. To achieve an in-depth study, four major telecommunications service provider companies in Malaysia were chosen as a case study. A questionnaire was used as the main instrument in gathering data. The questionnaire is principally concerned with the understanding of supplier selection and its criteria; based upon the variables that are used for the model and hypothesis testing. The study also investigates the relationship between supplier selection and the impact of supplier selection to the company performance. This model was tested using Structural Equation Modelling (SEM) technique with the AMOS software application. Results indicated all of the criteria include quality, price, delivery, supplier relationship management, decision making tools and techniques, government policy and business ethics as valid constructs. A good model fit was also established.

The findings of this research conclude that the influencing criteria to supplier selection in the telecommunications industry in Malaysia are supplier delivery performance standards and supplier relationship management even when considering the remainder of the above mentioned elements.The price factors were found to be less important due to this factor possibly leading to unhealthy competition in the market in terms of price wars among the suppliers in order to win the business. Most of the criteria are also interrelated to each other and affect the supplier selection decision.

This model has added new perspectives to the study of supplier selection in the supply chain management field. As for future research it is suggested that intangible elements such as political, cultural and social influences are included in the conceptual framework;

as this would offer important insight for management bodies in organisation, academia and public policy fields alike.

Keywords: Supply Chain Management, Supplier Selection Criteria, Supplier Relationship, Business Ethics, Government Policy and Telecommunications industry.

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ABBREVIATIONS

AGFI	Adjusted Goodness of Fit Index
AMOS	Analysis of Moment Structure
BTS	Barlett Test of Sphericity
CAPEX	Capital Expenditure
CR	Critical Ratio
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CV	Convergent validity
DEL	Delivery
df	Degree of Freedom
DM	Decision Making
DV	Discriminant validity
EFA	Exploratory Factor Analysis
ETC	Ethics
GFI	Goodness of Fit Index
GLC	Government Link Company
HSBB	High Speed Broadband
M	Mean
MANOVA	Multi Analysis of Variances
MCMC	Malaysian Communications and Multimedia Commission
MOF	Ministry of Finance
ML	Maximum Likelihood
NFI	Normated Fit Index
NNFI	Non Normated Fit Index
OPEX	Operational Expenditure
PC	Price
POL	Policy
QLTY	Quality and Technology
RFQ	Request for Quotation
RMSEA	Root Mean Square Error Approximation
RM	Ringgit Malaysia
SCM	Supply Chain Management
SEM	Structural Equation Modelling
SLA	Service Level Agreement
SOR	Schedule of Rate
SRM	Supplier Relationship Management
SS	Supplier Selection
SSIM	Supplier Selection Impact
Sig.	Significant
SMC	Squared Multiple Correlations
SPSS	Statistical Package for Social Sciences
TELCO	Telecommunications Company
TLI	Tucker Lewis Index
VIF	Variance Inflation Factor
VO	Variation Orders
α	Cronbach's alpha
x^2	Chi square

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CHAPTER 1: INTRODUCTION

1.1 Introduction

The focus of this research is on gaining an understanding of what are the critical criteria that influence the organisation when selecting the supplier and its impact to the overall company performance for Telecommunication service provider companies in Malaysia.

More and more, business organisations view suppliers as virtual extensions of their firm and in doing so, they have significantly increased their reliance on suppliers. Thus understanding and determining the critical criteria of supplier selection is increasingly important to buying firms and researchers.

The principal aim of the present study is therefore, to investigate and examine the relationships between the supplier selection criteria and supplier selection decision as well as the impact of the supplier selection to the company performance in Telecommunication service provider companies in Malaysia. A brief description of the background and scope of the study is provided in this chapter, followed by the aim and objectives of the study. It then moves on to issues and concerns, supplier selection challenges, briefly expected research contribution, limitation of study and finally the structure of the thesis.

1.2 Background of Research

The procurement and purchasing function in an organisation is viewed as a critical component of supply chain management (Sarkis and Talluri, 2002).Business organisations are placing high importance on the acquisition of goods and services since such activities can have an impact on organisational goals and objectives. Procurement is an important part of supply chain management such that successful organisations have developed comprehensive procurement strategies which are aligned to the companies' business objectives with the purpose of helping the companies boost their business performance in the long term.

The management and integration of supply chain activities and organisation is called Supply Chain Management (SCM). Through effective business process, cooperative organisation relationship and excellent sharing of information, SCM creates high-performing value systems that give organisations the sustainable competitive advantage (Handfield, 2002).The main purpose of supply chain management is to achieve effectiveness in supply chain activities at the supplier, manufacturer, warehousing and storage levels. Without effective coordination among the related parties in the supply chain, the company will suffer losses. Three important issues in the management of supply chains are its purpose, the impact of cost control application and the quality of services to customers (Handfield, 2006).

Understanding the key objectives of procurement organisations will shed some light into the significant role of procurement in an organisation (Monczka 2011). Firstly, the traditional objective of a procurement department is to support the operational requirements of a company. The department ensures that its internal customers, for instance all other departments within the organisation, are able to function well by providing sufficient supply of products and services that meet their requirements during day-to-day operations.

Secondly, purchasing departments are responsible for managing the procurement process and supply base efficiently and effectively. This can be achieved through proper selection and evaluation of suppliers in compliance with set standards and criteria to fulfil organisational requirements. Maintaining a pool of competitive suppliers helps organisations to leverage on their resource requirements.

The third key objective is to foster a close working relationship with other functional groups in an organisation. As procurement activities encompass all departments in a company, a strong interdepartmental relationship will encourage teamwork which results in smoother operations and better company performance. Feedback from other departments on supplier performance will also provide the procurement personnel with ways to improve the company's supplier selection criteria (Theodorakioglu, Gotzamani and Tsiolvas, 2006).

Finally, procurement strategies developed by the purchasing department must be integrated with overall business strategies which support the goals and objectives of the organisation. Continuous evaluation to develop alternative supply options and competitive suppliers as well as monitoring market trends on critical products and services help organisations to achieve an effective procurement process (Monczka, 2011).

The process of supplier selection is commonly regarded as a multiple aspect cause for consideration due to its inclusion of both tangible and intangible criteria (Dickson, 1966). Price, supplier standards, product reliability and delivery time are all factors that often play an imperative role when it comes to supplier selection. As a result of this, finding the ideal supplier that is able to satisfy customer requirements would sometimes mean a trade-off between the above mentioned criteria.

Selecting the right supplier capable of providing the right product with the right quality at the right price, technology and scalability in a timely and effective manner is of crucial importance to any organisation because it will have an impact on the company's business performance (Tracey and Chong, 2001). Hence an appropriate supplier selection will ensure that business operations can run smoothly and produce satisfactory results to customers. Varying internal and external factors have to be considered because entities along the supply chain belong to different market sectors (manufacturers, distributors, retailers) (Vonderembse and Tracey, 1999). Among these influencing criteria are quality of product, service delivery, price, supplier relations, decisions making and alignment with company and government procurement policy and business ethics. These criteria have the potential to affect the supplier selection process of entities along the supply chain.

This thesis focuses on the supplier selection criteria for telecommunications service providers in Malaysia as well as the impact of supplier selection on the firms' business performance. The telecommunications industry in Malaysia is chosen as the scope of study due to the industry's prominence in Malaysia's economy.

The full range of supply chain management starting from initial technical requirements to deployment of service is a major issue for telecommunication service providers in Malaysia. These companies need to ensure on time delivery of their services to avoid

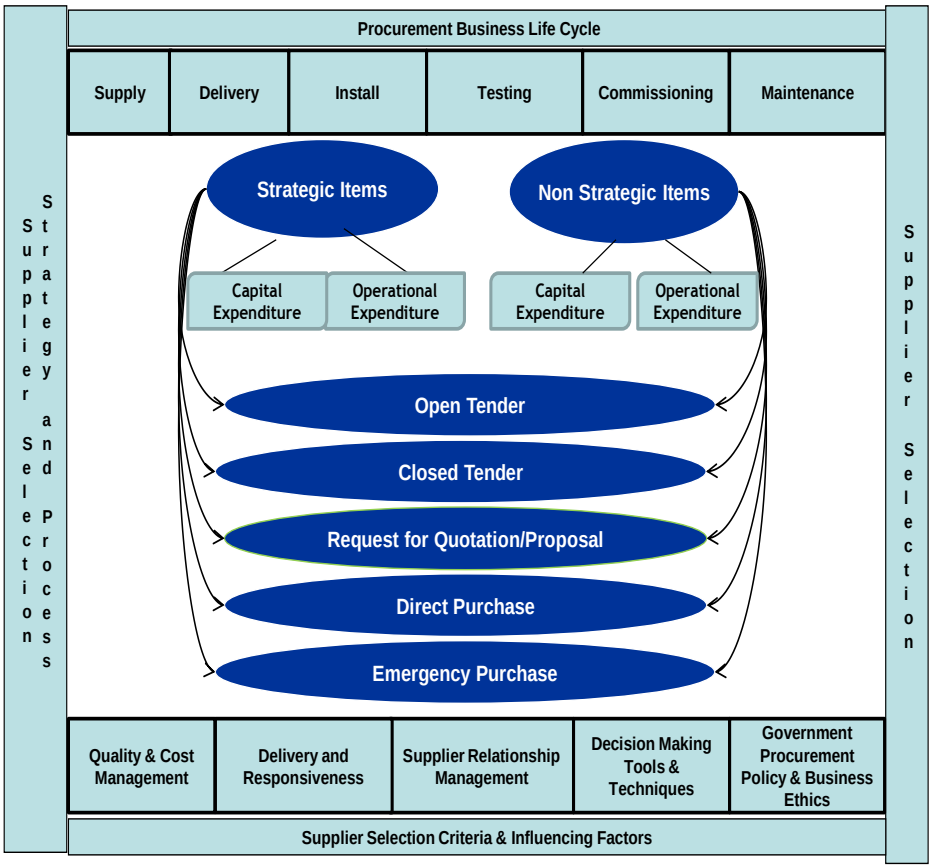
complaints from end customers. Frequent service interruptions could result in poor rating of service by end users, which will eventually affect companies' efficiency and overall business performance (Ernst, Kamrad and Ord, 2005).

Product quality and life cycle have a direct relationship to the supplier selection of equipment procured for the telecommunication industry in Malaysia. For example, the nature of telecommunications infrastructure products and heavy equipment to be procured requires purchasing departments of the service providers to be very accurate in their evaluation of items and selection of suppliers. Most of this equipment has a long product life span which requires maintenance and availability of spare parts throughout its working life. Thus, it is important to ensure that suppliers which are appointed to undertake the project are able to provide efficient after-sales service in terms of maintenance, parts replacements and components supply (Joseph, Francis and Jones, 2006). The supplier must be able to show their capability and have sufficient capacity to continuously maintain and supply the products during their expected lifespan.

Therefore, selection of the most suitable supplier through recognition of the supplier selection criteria can significantly contribute to the company performance as a whole. A reduction of total cost on the outset can help to achieve this, alternatively maintenance standards can be considered so that the need for replacement is less frequent (Lee, 2002). Despite this, separating the supplier selection criteria from the overall supplier selection process is difficult as they all share an interrelating link.

Hence, the company or organisation needs to determine the relevant influencing factors to accommodate for its necessary requirements and ensure supplier selection scope coverage. These include the company's nature of business, product type, category of purchase and customer requirements. Thus, to successfully determine the appropriate criteria and influencing factors of the supplier selection, an understanding of the overall business view and procurement business life cycle is advised. This is demonstrated in Figure 1.1 below.

Figure 1.1: Procurement Business Cycle



(Source from Telekom Malaysia Standard operation procedure)

The above table displays and explains the overall scenarios of the procurement business life cycles in the telecommunications industry in Malaysia. The Procurement Business Life Cycle involves a co-ordination of multiple disciplines. It is a process of acquiring supplies, services and works for the use of the company. The procurement life cycle for telecommunications service providers requires the supplier to handle the entire range of the supply chain that starts with fulfilling the technical specification requirements, delivery management, proof of concept and testing, installation, commissioning and the maintenance and provision of an after sales service as well as engineering services. It also includes training and any other associated activities related to the product.

The provision of infrastructure and equipment as well as the maintenance of equipment is what telecommunication industries in Malaysia keep in check as a way of ensuring a high quality service is delivered to customers. As a result, any costs these incur for the service provider will need to be taken into account when calculating the capital expenditure. Equally, operational expenditure includes and covers the cost of equipment. It is of paramount importance for telecommunication service providers in Malaysia to hold high significance to supply chain management effectiveness and supplier selection. This is to secure the service and cost objectives being met and effectively managed

Selection of which supplier will provide the telecommunication system and the needed equipment is a definitive process for telecommunication companies. This is because both the telecommunication system and the equipment necessary area long term investment thus making the company directly affected by the supplier selection decision. To add to this, business personnel are becoming increasingly more demanding with refined needs. Decreased prices with an improved quality are amongst the simultaneous expectations they have, making a competitive market for telecommunication service providers on an international level. This means that in order to keep up with the competitors telecom service providers need to continue to offer new services and products to maintain customer interest and satisfaction.

Technologies may be acquired to enable the provision of these new services; often including network equipment and systems that are procured from local and international suppliers within the telecommunication industry. The strategic positioning of the company can be affected by the choice of these equipment and systems, as some can last for at least five to ten years. Therefore, the selection of the supplier is an elaborate multi-person and multi-criteria decision (such as: quality, support services, system capabilities, supplier expertise, delivery lead time, price, supplier reputations, warranty period etc) that is crucial to a telecommunications company's ability to meet customer needs (Tummala *et.al*, 2001).

Like supplier selection, the chosen telecommunications system and equipment is equally important and can involve a range of different criteria for consideration. These include technical requirement specifications, service and cost. With regards to the cost, the

equipment price itself is not the only thing that needs to be taken into account. The operation of the equipment as well as maintenance, upgrade and supporting costs are all aspects that need to be considered when selecting the supplier of required equipment and system. Furthermore, criteria that are directly relevant to performance levels are a cause for consideration. Equipment reliability, scalability and serviceability have to be assessed to meet the service standards as set in the service specifications, as well as to increase customer satisfaction.

Additionally, technical criteria is important as system features, upgradability, future development, compliance with technology standards and interfacing with existing systems can all be advantageous elements. They need careful analysis along with the network management capabilities. Supplier capability is essential due to a likely need to include supplier delivery lead time, quality of support services, reputation and experience in the thought process. Examination of all of these relevant factors is of importance when deciding on a telecommunications system and the equipment supplier who designs and delivers these systems and equipment.

The supplier selection that is decided upon needs to be a reflection of the elements in supplier selection criteria as well as the systematic process. If the criteria analysis is improper, the company could suffer the cost of engineering design changes, causing a delay on product launches. The financial objectives may also not be met due to the investment made towards the systems and equipment. Hence, development of a systematic supplier selection process is required for the identification and prioritisation of relevant criteria. This systematic selection process also needs to help evaluate the tradeoffs between technical, performance and economic criteria.

Based on the competitive nature of business in the field of telecommunications, which requires high technology and expertise to respond to rapid changes in the market, the selected suppliers must possess the competitive edge and capacity to supply telecommunication products and services that meet customer requirements. It is the aim of telecommunications service providers company to procure (goods/services/works) from suppliers who provide the best in terms of quality, technology, price and delivery performance to ensure higher returns to the company. In addition, most of the equipment

are procured from international manufacturers which require foreign expertise in product handling and maintenance; therefore, the approach to selecting the right supplier must be given due attention.

To achieve procurement efficiency, the number of suppliers considered for any particular contract should be kept at an optimum level. Terms of negotiation with suppliers should not be confined to just securing the best purchase price but must also include delivery cycle time, after-sales support, shipping terms and other value-added provisions. It is indicative to take into consideration the total lifecycle of purchase, delivery, maintenance and engineering services before final selection of the supplier.

1.3 Telecommunications Industry in Malaysia

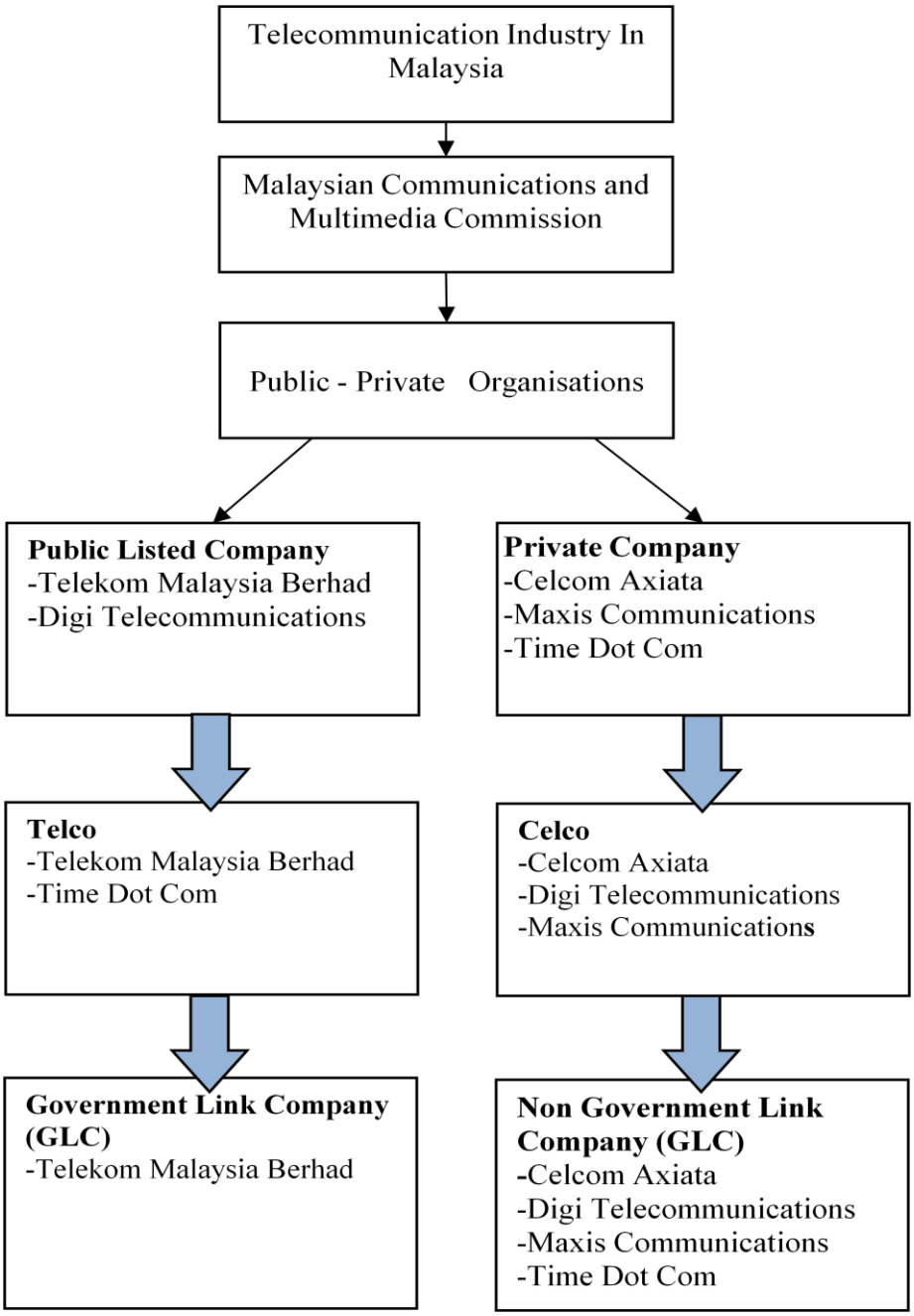
The Malaysian government started to privatize the telecommunications industry in 1987. Through the privatization exercise, the government hopes to relieve their administrative and financial burden, and at the same time improve the efficiency and service delivery of the industry. Privatization will also allow the telecommunications industry in Malaysia to become more competitive and liberal (Mohd. Ali., 1998).

This industry is being administered by the Ministry of Energy, Water and Communications (MEWC) which serves as a policy formulator and service regulator for the communications sector. It is regulated by the Malaysian Communications and Multimedia Commission (MCMC), an independent agency that coordinates and facilitates activities and competition among market players in both the telephony and the broadband sectors. While the MCMC has no power to issue licenses, published advice from members of the MCMC is sought by the Minister before making decisions on issuance of licenses (Lee.C., 2002).

Due to the imbalance of economic equity and wealth distribution among the different ethnicities in the country, the Malaysian Government has taken steps to increase the participation of Malaysian-based companies and the indigenous community called "Bumiputra" in the economic mainstream activities. These measures are taken to protect the local business and to support and improve local business participation in the country. To balance the conflict between these two objectives (distributive issues and the service

efficiency), the Malaysian government has come out with the concept of Government-linked companies (GLC). A GLC is basically a large public-private company which is partly owned by the Malaysian government via Khazanah Nasional Berhad, an investment holding arm of the Malaysian government. With the government as its major shareholder, the company's business is run with some supervision from the government. Some examples of major GLCs in Malaysia are Telekom Malaysia Berhad, Malaysian Airlines (Malaysia premier airline company) and Tenaga Nasional Berhad (the country's power provider). The following diagram depicts the overview of the telecommunications industry in Malaysia.

Telecommunications industry in Malaysia: An Overview



The diagram shows that the telecommunications business in Malaysia can be grouped under two categories – cellular (Celco) and non-cellular (Telco). Cellular services include voice, mobile data and wireless internet broadband services while non-cellular refers to fixed, leased line, data and internet broadband services.

In Malaysia, Telekom Malaysia is the incumbent telecommunications service provider. The Telco business is monopolized by Telekom Malaysia (TM) and being the only GLC in the telecommunications industry, TM is entrusted to deliver major national projects such as the High Speed Internet Broadband (HSBB) services to better serve the country's internet broadband requirements. TM also offers a wide range of products and services encompassing the retail, wholesale and global business services. Meanwhile, other major players in the industry are mobile operators such as Celcom Axiata, Maxis and Digi telecommunications. All of the mobile operators have launched the 3G mobile services which enable consumers to connect to the internet via mobile devices. Celcom Axiata and Maxis have the widest mobile broadband coverage in Malaysia, covering more than 70% of the populated area as well as being the two largest mobile broadband providers in Malaysia. Mobile broadband offers the convenience of surfing the internet anywhere and anytime but with a very limited bandwidth up to 5GB, compared to internet via wired services which group to 20MB provided by Telekom Malaysia.

Both GLC and non-GLC service providers play a key role in spurring the growth of the telecommunications industry in Malaysia. However, the marked difference between these two categories of service providers is in their business operations. The products and services of GLC companies are leaning towards meeting public needs and fulfilling the aspirations of the government while at the same time achieving a balance in their profitability. Non-GLCs, however, give higher priority to making the most profit for the company by offering the best products and services to the consumers.

The appointment of suppliers/contractors by GLC telecommunications service providers must be in line with government aspirations to ensure that local interest or Malaysian-based or Bumiputra companies are given priority in the selection decision. Consequently, the government hopes to achieve a balance in wealth distribution among the diverse ethnic groups in Malaysia. Such arrangement is also established to create opportunities for Bumiputra civil and telecommunications suppliers to actively participate in the telecommunications industry in Malaysia (The Red Book, GLC Procurement Guidelines 2006).

However, most of the suppliers and industry leaders in the telecommunications industry are international companies. If selected to run a project, these companies are expected to provide a complete cycle of supply chain starting from supply, delivery, installation, testing and commissioning of equipment and services. Therefore, these international players need support from local partners in order to deal with the local authorities as well as adapting to the local business culture in the course of doing business in the country. Hence, local based suppliers including Bumiputra companies are given priority especially by the GLC service providers during the selection decision. But in line with the business requirement, each appointed local or Bumiputra company must first meet the minimum requirements in order be selected. Most importantly, they must be competent and have the necessary capability as well as sufficient expertise to execute the tasks as required.

The Malaysia government also strives to turn the country into a telecommunications hub within the Southeast Asian region. In doing so, the government must fulfil certain WTO requirements and open up the market to other international players in the industry. Therefore, to achieve a balance between meeting national aspirations and international requirements, the approach of protecting the local business is the best way to ensure that this objective is successfully achieved. Telekom Malaysia, being the only GLC within the telecommunications industry, shoulders the government's mandate to assist local and Bumiputra companies to excel in this sector.

In the telecommunication industry, supply chain management starts from the request for service by customers to meeting customer satisfaction. Requirement for infrastructure includes construction of civil works such as underlying cable (overhead and underground), power station, radio network transmission equipment, tower development and etch. Building an infrastructure and purchasing telecommunications equipment will be costly for a company. However, without adequate infrastructure and equipment, the company will not able to sell its telecommunications products and services. Therefore, in this case, supply chain management can also play a role in conglomeration, making it an integral part of the business. Several well-known telecommunications suppliers are Nokia, Sony Ericsson, Alcatel Lucent, Huawei, ZTE Corp, Samsung, Motorola, Cisco and Nortel Network.

In terms of competitor orientation, telecommunication companies gather as much market information in order to help reduce their operating cost, increase innovation and achieve higher profit. This explains why telecommunications companies try to find the best and most demanded telecommunications and cost effective suppliers. The competitor orientation plays a role in terms of how each telecommunications company depicted others' strategies to survive in the market. The companies depict how their competitors employ the supply chain from the beginning of deploying the equipment till final service to the customers (A Market Research Report of the Insight Research Corporation, 2007).

According to statistics from the Malaysian Ministry of Information, Communications and Culture, the telecommunications sector contributed 4.9% to the country's GDP in 2009. The Malaysian telecommunications sector has been growing at a rapid pace over the last 15 years as the country continues to heavily promote itself as an information technology hub in the Asian region. With major players such as Telekom Malaysia, Maxis Communications, Celcom Axiata and Digi Telecommunications fiercely competing for bigger share of the lucrative and growing telecommunications market, procurement activities from this sector are expected to remain robust as these companies will consistently introduce new products and services via an upgrade in existing infrastructure.

As the landscape of the telecommunications sector continues to change in line with the fast-changing global technology, the telecommunications service provider companies have shifted their business operations strategy from merely being traditional network operators to application and content providers as well (World Economic Forum, 2009). Hence, it is critical that procurement departments of these companies adopt effective and efficient supplier selection strategies in order to reduce production cost and optimize their profit margin in this competitive industry.

Malaysia's telecommunications industry is growing rapidly in response to changes in the global business environment as well as local and global market needs. The growth is also in line with the country's aspirations to achieve industrialised nation status by the year 2020. The development of sophisticated equipment and services via global technology advancement and the improvement of telecommunications infrastructure in the country act as catalyst to the growth of the sector. The integration of telecommunications and computer technology further fuels the industry, creating vast opportunities in line with the

modernization of world telecommunications services and technology. Major industry players which contribute to the country's economic development in this Telecommunications sector are Telekom Malaysia Berhad, Maxis Communications Berhad, Celcom Axiata, Digi Telecommunications and Time Telecommunications.

Compared to other countries in the South-east Asian region, Malaysia's telecommunications network is more advanced than others with the exception of Singapore. In 2006, the number of fixed telephone lines for every 1,000 Malaysians was 400, more than twice the number in Thailand (Malaysian Communications and Multimedia Commission, 2008). In comparison to Indonesia and Philippines, the number is six to eight times more. Cellular phone usage is steadily increasing in all Asian countries. In 2008, Malaysia had 12.8 million fixed-line subscribers and 10.5 million cellular subscribers. The country's rate of telephone penetration increased from 10% to 25 % between 2000 and 2007 while fixed lines in the rural areas also rose from 5.2 % in 2000 to 11 % in the same period (Malaysian Communications and Multimedia Commission, 2008). Telephone penetration rate is normally used to measure readiness of ICT readiness of the country.

The rapid growth of the industry in Malaysia is spurred mainly by the cellular segment, followed by the broadband market which has seen increased usage among the public. Encouraging growths in these segments are at the expense of the fixed line business which recorded substantial decline in subscribers' rate in recent years.

Competition is far more intense in the more liberalised cellular phone sector which has grown by more than 50% due to the saturation of the fixed telephone line market in Malaysia. Mobile telecommunications services noted high growths over the last 10 years and has gained prominence in Malaysia. In this mobile services market, growth is spearheaded by prepaid services which have injected large revenue into the industry. By end of 2008, approximately 81% of mobile users in Malaysia were prepaid subscribers (Malaysian Communications and Multimedia Commission, 2008).

In its quest to steer the country into becoming a knowledge-based society, the Malaysian government plans to embark on an ambitious initiative to roll out high-speed broadband

services throughout the country. It has developed the National Broadband Plan with aims to create broadband penetration rates of 10% or 2.8 million connections by the year 2008. Under the 5-year Ninth Malaysian Plan (2006-2010), with the objective to turn Malaysia into an international information technology hub, USD 4.03 billion has been allocated by the government to improve and increase broadband connectivity throughout the country. The current, on-going high speed broadband (HSBB) project introduced by Telekom Malaysia in 2010 is expected to increase the nation's broadband penetration rates to 50% (Malaysian Communications and Multimedia Commission, 2008).

With rapid growth in the telecommunications sector seen in other economies as well, Malaysia is projected to experience continued growth in this sector over the next 5 years. Having a well-developed infrastructure in place coupled with continuous government initiatives to support the growth of the industry will ensure that this sector continues to remain dynamic and robust. Thus, supplier selection and procurement of goods or services is supportive of these national agenda.

1.4 Problem Statement

Supplier selection has emerged to be one of the most significant stages in the procurement process. Finding the optimal supplier which best suits the company's requirements and contributes to the realisation of the company's business objectives can be a quite demanding task. Companies have to consider multiple criteria when evaluating potential suppliers, not necessarily looking at the price and product quality factors alone (Nydick and Hill, 1992).

The supplier selection problem is commonly thought to be a multi-criteria decision making problem containing both tangible and intangible criteria (Dickson, 1966). Usually the criteria found during this research include quality, cost, speed of delivery and product reliability. In order to reach an outcome that combines to satisfy customer requirements, the solution to this supplier selection problem often resorts to a tradeoff between the criteria mentioned above.

The telecommunication industry in Malaysia is characterised by rising complexity, high uncertainty, instability and volatility. As such, all companies are facing self-similar issues of addressing the pressures of rapidly changing conditions and competition in the local and global market, drastic technological changes and shorter lifecycle of products (Bartlett and Ghoshall, 1987). Within the telecommunications industry in Malaysia, there is no specific technique or approach that is widely adopted in the selection of suppliers. Instead, there are a multitude of techniques which depend on particular business requirements; meaning there are limited generic approaches which are practiced. In addition, the current Malaysian telecommunications business environment requires that the evaluation of suppliers be aligned to the latest and current initiatives with regards to the development of Information Communication and Technology (ICT) infrastructures.

In Malaysia, government rules and regulations control the running of telecommunication service provider business companies (Lee.2002). A watchful eye is kept on both public and private companies, ensuring businesses abide by the guidelines in place that attempt to maintain fair trade practice. Companies are still able to work and compete in a free market but are influenced by government procedural standards. Because of this, it is anticipated that these policies and procedural standards implemented by the Malaysian government will impact on the selection of the supplier. Examples of these guidelines include the promotion of the use of local content, facilities and supporting local Malaysian/Bumiputra based companies.

However, the researcher believes that there are other key criteria in the supplier selection such as government procurement policy and business ethics that need to be given due consideration when selecting the suppliers, especially in the context of the Malaysian business environment. These criteria have not yet been extensively explored by previous studies as the review of the literature in chapter two shows that very limited work has been carried out in this area.

Taking the above points into consideration, in this study, the researcher has sought to incorporate additional criteria of business ethics and government policy as well as price, quality, delivery, decision making tools and technique and supplier relationship management into this study. All the criteria are integrated into a model and tested to

determine their merit as major criteria in the supplier selection decision process. Subsequently, these criteria are then empirically tested to determine their impact on overall organisational performance.

1.5 Research Aim

The primary aim of this research is to investigate and determine critical criteria which influence the supplier selection decision and to study the impact of supplier selection on firm performance within the telecommunications sector in Malaysia. This includes examining and analysing the complexity of these criteria as well as the underlying mechanism that influences the supplier selection decision in the Malaysian business context which eventually affects overall company efficiency and performance.

1.6 Research Objectives

It is generally accepted that in selecting the right supplier to meet company goals and objectives, it is important to investigate the criteria which influence supplier selection in the buying firm. Thus, the objectives of this research areas follows:

1. To identify and examine the critical criteria and factors that influence supplier selection by conducting an extensive literature review which establishes the gap in the literature.
2. Use the literature review as well as input from the interview to analyse interrelationships which exist among critical criteria and their relative importance to the supplier selection.
3. To develop a model to explain the criteria that lead to supplier selection.
4. Use all gathered data and analysis that has been retrieved from the interviews and main questionnaire to investigate the impact of supplier selection on firm performance.
5. To examine and test the model of supplier selection criteria in a major telecommunications service provider companies in Malaysia by looking at the questionnaire survey data collection using a Structural Equation Model (SEM) technique.

Through conducting this research, the gap in literature is filled by applying two new elements of government procurement policy and business ethics to the study of supplier selection criteria. In addition to the common variables such as price, quality and technology, decision making, delivery performance and supplier relationship management, this study also looks at government procurement policies and business ethics. The supplier selection decisions are influenced by these two criteria in a Malaysian business context. In adding these two constructs, an attempt is made to develop a multi-dimensional supplier selection criteria model. This is done through a systematic process with Confirmatory Factor Analysis (CFA) that validates and tests the model in the telecom service providers in Malaysia. Using Structural Equation Model (SEM) method via AMOS application system tools to test the entire model, the impact on overall company business performance is also examined.

This will help the researcher to look into the internal and external criteria which relate to supplier selection. To achieve the above objectives, hypotheses have been proposed to guide the direction of this study.

1.7 Research Questions

A number of studies Dickson (1966), Elram (1999), Tracey and Chan (2006) and others alike have examined the relationships between criteria/influencing factor within the supplier selection and contribution towards the company level of efficiency and overall performance. By focussing on the company's purchasing processes, these studies have demonstrated a significant impact for the purchaser in terms of determining and examining the criteria/influencing factor for the supplier selection. Having an appropriate supplier selection criteria will lead to the selecting the right supplier which eventually impact in company efficiency and performance.

Given the significance of the supplier selection, the questions below have been identified with a need to be addressed. From the procurement perspective, this study intends to answer the following research questions:

1) What are the critical supplier selection criteria for major telecommunications service providers in the context of the Malaysian business environment?

2) Do the interrelationships which exist among the critical criteria affect supplier selection?

3) What is the relationship, if any, between government procurement policies and business ethics with the supplier selection?

4) Do government procurement policies and business ethics influence the supplier selection?

5) Does the supplier selection decision have an impact on overall company efficiency and performance (i.e. worker productivity, operational cost savings, etc)?

To address the above research questions, a few hypotheses are developed. Details of the hypotheses development are discussed further in Chapter Three. The analyses of the main data as well as the results of testing the hypotheses enable possible answers to cover the content of the questions above.

1.8 Scope of the Study

The scope of this study is major telecommunications service providers in Malaysia such as Telekom Malaysia Berhad, Celcom Axiata, Maxis Communications and Digi Telecommunications. In tandem with the current healthy growth of the Malaysian telecommunications industry in the last decade and its positive future outlook for the next few years the procurement activities in this sector are also expected to increase.In developing this research, first of all the author outlines and defines supplier selection criteria/influencing factors within the telecommunications industry which are pertinent to this study.

1.9 Issues and Concerns in the Malaysian Telecomminication industry

The telecommunications industry is a prominent sector in Malaysia and is one of the major contributors to the country. Therefore, the Malaysian Government takes a proactive role in developing and supporting the sector in ensuring that the country's telecommunications industry is at par with that of other developing and developed

countries in the world. To project Malaysia's image as a progressive centre for the telecommunications industry, both the government and private sector need to step up their participation in the international and regional arena. Thus, Malaysia will need to contribute to and participate actively in research and development in order to spearhead development of the telecommunications industry in the Asian region.

Although the Malaysian government aspires to provide a healthy competitive environment and equal opportunities to all players in the industry, enhancing competition in the telecommunications industry will be implemented in stages, starting with providing value-added services and subsequently with infrastructure and other services. Even though competition is encouraged, the government of Malaysia has the authority to decide on the number of economically viable competitors for identifiable telecommunications systems and services.

The telecommunications industry is regulated by the Malaysian Communications and Multimedia Commission (MCMC), an independent agency that coordinates and facilitates activities and competition among market players in both the telephone and the broadband sectors. The government will continue to be responsible for the supervision of the telecommunications service sector to ensure that the interests of telecommunications service providers and consumers are balanced and protected. The government will continue to ensure that the interests of the nation are given priority over others.

In order to achieve sustainable competitive advantage in the international arena, the Malaysian telecommunications service providers need to consistently address pertinent issues and challenges in their business operations. For instance, shortening the cycle time of their procurement process will result in lower revenue losses and higher customer satisfaction as well as minimal corruption and value destruction. Improvement of the supplier selection decision and supplier management function leads to a better buyer-seller relationship, resulting in the security of getting long term supply of higher quality products at competitive prices. This will also synchronize with the support of national development objectives including supplier development.

Accomplishing effective strategic procurement to achieve sustainable competitive advantage is no easy feat for any company. However, adopting a well-defined set of supplier selection criteria and strategies will assist to provide a clear path towards effective and efficient procurement activities. Certain factors may either enhance or suppress the positive consequences of supplier selection which will finally affect company performance.

With that in mind, in this research, supplier selection criteria are examined based on the primary supplier selection process. Quality and technology, price and cost management, delivery and responsiveness, supplier relationship management and decision making tools and techniques are key criteria in this supplier selection decision. Two new constructs, government procurement policies and business ethics, will be incorporated into this model and tested in the Malaysian telecommunications industry. In addition, interrelationships which exist among the criteria will be analysed to relate their influence on the supplier selection. It is fairly important and necessary to thoroughly understand and evaluate all criteria and challenges. By leveraging all the criteria and resources, it is possible to have more insights of the research areas.

In addition to the above, the telecommunications sector also needs to balance traditional supplier selection requirements with intangible aspects. These relate to the justified and reasonable implementation of government procurement policy, including the application of responsible procurement ethics i.e. transparency in decision making regarding local suppliers. The relationship between supplier selection and supplier relationship management in the telecoms procurement scenario is also vitally important in order to build trust and increase co-operation across all parties.

The challenge for organisations in telecommunication industries in Malaysia such as private and government link companies in their particular context is to balance and marry the requirement for local as well as external supplier capabilities within a continuum of relationships.

1.10 Supplier Selection Challenges

In the cooperation between buying organisation and suppliers, purchasing is the most fundamental in corporate management, and one of the most important responsibilities of the purchasing department is to perform supplier selection and evaluation (Stainer *et al.*, 1996). Purchasing operations are most important activities in corporate operations and significantly influential to product cost, organisational finance, competitiveness and overall performance. Therefore, having a set of good supplier selection factors is of critical significance for enterprises in supply chain management.

Olhager and Selldin (2004) proposed that in the selection of supply chain partners, quality performance should be a prioritised criterion, while delivery reliability, cost efficiency, quantity flexibility and delivery speed are also important factors. Talluri and Narasimhan (2004), argued that strategic purchasing is a primary task that enterprises need to carry out in supply chain management, as its main purpose is to enhance quality, promote punctual delivery, reduce lead time, develop long-term relationships with critical suppliers and obtain internationally competitive price offers.

This research focuses on posing and answering questions related to the supplier selection criteria/influencing factors and its impact on company performance. In this context, it also looks into the relationship between goverment procurement policy and business ethics , if any, and how they relate to the supplier selection decision and the impact to the company's overall performance.Of principal interest to the researcher is the identification of how government procurement policy as well as business ethics influence and determine the supplier selection decision. Nevertheless, the main objectives of the study are to investigate and determine the supplier selection criteria/influencing factors which can lead the decision and eventual selection of telecommunications suppliers.

Simultaneously, the research tests the model within Malaysia's telecommunications industry which helps the researcher examine the external validity of existing developed theories. This is in terms of testing the model with regards to the factors relating to the supplier selection decision.

1.11 Significance of the Study

Since an effective procurement process is detrimental to achieving good company performance, organisations are required to take an appropriate strategic approach to procurement in order to mitigate long term risks in terms of availability of supply and volatility of prices. Effective procurement, while ensuring continuous supply of products and services, also have a bearing on the company's bottom line by reducing its cost and increasing its profit margin.

Therefore, the assessment of critical criteria which influence supplier selection must be given due emphasis since this measure can help determine the success of an organisation. Hence, selecting the right suppliers, local or overseas, may provide both direct and indirect impact on an organisation's business performance. In brief the significance of the study outline as follows:

- Provision of enablement to determine the main supplier selection criteria for telecommunications industries and service provider companies.
- The ability analyse the direct relationship and the interrelationship amongst criteria which has an influence to supplier selection.
- Testing the model with the addition of two criteria that are not as commonly regarded to be crucial, which is specified in the novelty of the research.
- The ability to test the supplier selection criteria model by evaluating the model fit using the Structural Equation Model (SEM) technique.

Stringent supplier selection criteria and proper evaluation by purchasing departments can help ensure that procurement activities can be implemented effectively (Gonzalez *et al.*, 2004). Previous studies have attempted to examine the relationship between determining variables which influence supplier selection and business performance (Tracey and Chong, 2001). In selecting the right supplier, many studies have critically examined criteria such as product quality, price, supplier relationship management, delivery, decision making tools and techniques Hokey Min (1994),Wu Bei *et al.*, (2006), Weber (1991).

From a theoretical perspective, this study has sought to further the understanding of these points and add new knowledge to the field of supplier selection. It identifies critical criteria which lead to supplier selection and understands how the supplier selection affects an organisation's business performance.

1.12 Contribution of the Research

Although many studies related to supplier selection have been conducted in the past, these studies focussed more on commonly known variables such as price, product quality, delivery, technology and relationship management when evaluating strategic matches between supplier selection and firm performance.

Maintaining effective supplier selection is crucial to the success of the Malaysian telecommunications sector, so this research explores current knowledge and contributes by including government procurement policy and business ethics as additional perspectives. It is worthy to note that such knowledge contribution provides meaningful insights for interested parties, particularly procurement managers and organisational policy makers.

1.13 Novelty of the Research

The novelty of this research is that it includes business ethics and government procurement policy as two new dimensions that can be explored in the supplier selection criteria model within the telecommunications industry in Malaysia.

1.14 Limitations of the Study

In undertaking this research, several limitations have been identified.

1.14.1 Study Sample

Since the study is conducted in Malaysia, the population sample is limited to major telecommunications service providers in the country. Criteria which influence the results

of this study may only be applicable in the Malaysian business context. Therefore, results of the study may not be generalised at the global level because telecommunications service providers in other parts of the world may be operating in different business climates.

1.14.2 Limited Literature

Even though numerous researches have been conducted to study supply chain management, there are very limited related literature available which touch on government policies and business ethics as contributing criteria for supplier selection. Hence, the researcher is not able to compare the result of this study to that of previous research.

1.14.3 External Factors

This study does not take into account other external factors which may also have an influence on the supplier selection decision such as political interferences and multi-cultural effects. Besides, the study also focuses only on the aspects of procuring telecommunications infrastructure products and services as well as tools and major equipment.

1.15 Structure of the Thesis

This thesis consists of seven chapters.

Chapter 1 is an introductory chapter that discusses the background and scope of the study, as well as stating aims and objectives, problem statement, challenges and concerns and limitations involved in the contribution to the study.

In Chapter 2, a review of the existing literature on supply chain management, procurement method, supplier selection criteria and related disciplines in the organisation is provided.

Chapter 3, discusses the development of a conceptual approach, conceptual framework and research hypothesis.

In Chapter 4, the research methodology is explained. This includes the research approach and design, respondent sampling and population, data collection, data analysis procedure, pilot study and the analysis method. The data collection section is described including data collection, sample selection and participation, developing the survey questionnaire, item measurement scales and pilot study.

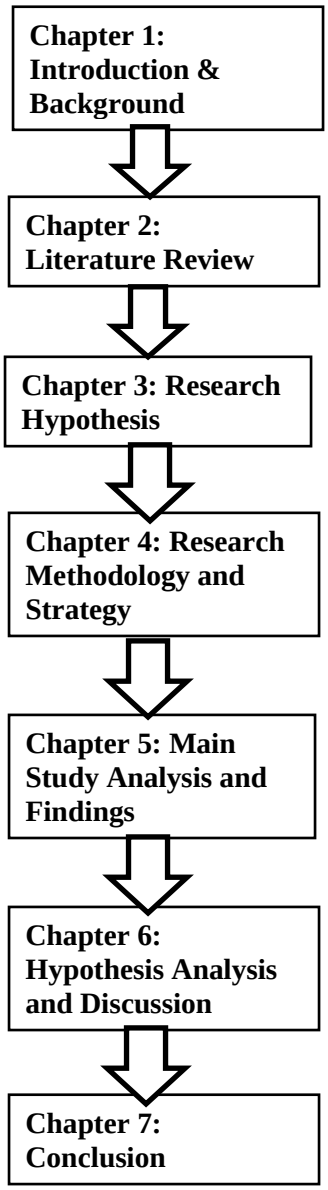
Chapter 5, presents the main study, analysis and findings. The chapter begins survey questionnaire data analysis and Structural equation Model (SEM) data analysis. This includes data management, data screening, demographic characteristics, factor loading, exploratory factor analysis, structural equation model assessment and analysis and testing the model fit. The chapter ends by showing the outcomes of hypotheses testing.

Chapter 6, discusses and reviews the result of all hypotheses testing and the findings discovered.

Chapter 7 will conclude the thesis with a summary and the limitations of the study; contribution and novelty of the study. In addition, recommendations can be found for practitioners and academics.

As discussed above, Figure 1.2 below describes and summarises the structure of the thesis.

Figure 1.2: Structure of the Thesis



1.16 Conclusion

Within this chapter, the background and scope of study of critical criteria in the supplier selection process is highlighted, with particular relevance to the Telecommunications industry in Malaysia. For telecommunications service provider companies in Malaysia, the establishment of supplier selection criteria and the impact these have on the company performance is paramount to the maintenance of business efficiency and effective results.To extend on the established common supplier selection criteria such as high quality and technology, price, delivery performance, supplier relationship management and decision making tools and techniques, this study will also examine government procurement policies and business ethics as a further additional perspective. This study also looks into the direct and indirect relationships amongst these criteria which also has an impact on the eventual supplier selection decision.

Four major Telecommunications service provider companies are focused upon in this research for the provision of cellular and non-cellular business to customers in Malaysia which is also stated in this chapter. Finally, an outline or the structure of the thesis is given, with chapter two continuing on to review more literature and prior studies.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter begins with a discussion of the different general concepts. This specifically includes: supply chain management, procurement and purchasing scope, definitions and characteristics of supplier selection criteria and associated concepts. The discussion will also contain past empirical studies and the results of such studies.

The focus of this chapter is the review of literature on the supplier selection criteria and its impact on company performance. It will examine the contents of related studies in supplier selection influencing factors and criteria such as: Quality and Technologies, Price, delivery and responsiveness, supplier relationship management, decision making tools and techniques, government procurement policy and business ethics.

2.2 Supply Chain Management

Supply Chain Management (SCM) and the supplier chain selection processes have been subject to much attention from operations management literature in the last 30 years (Miller *et al.,* 1981). Furthermore, supplier management has become more critical during recent years due to the expansion of information sharing across supply chains (e.g. Fine, 2000; Handfield, 1999; Kaplan and Sawhney, 2000; Simchi-Levi *et al.,* 2000). Several of the studies also demonstrate that managers do feel the role of the supplier to be beneficial to the quality of the business performance (e.g. Flynn *et al.,* 1994; Choi and Hartley, 1996; Vonderembse and Tracey, 1999; Gonzalez *et al.,* 2004).

Organization, planning and management of all activities involved in discovering and providing products and services are amongst the things covered by Supply chain management. It also covers collaboration and coordination with supply chain channel partners. These can be suppliers, intermediaries, third party service providers and customers. The above displays that supply chain management deals with management of supplies and demands that range from within and throughout other companies. It enables

a model of business that is of a high standard performance level by linking major business functions within companies.

Supply chain management also holds together the organization and activities of the companies by maintaining a cooperative, organized relationship, sharing information that will create high standard value systems that give those involved a lasting competitive advantage (Handfield, 1999). However, three crucial issues from supply chain management include the purpose it holds, the result of cost control and the quality of services offered to customers (Handfield, 2009).

The main purpose of the supply chain management is to effectively run taking into account starting from the supplier, manufacturer, distributor and warehouse. One of the effects is described by Handfield (2002) as the "Bullwhip Effect". This occurs when there is lack of coordination in the information being passed between the retailer, distributors, and company. The bullwhip effect has a negative effect on performance at every stage and hurts the relationship between different stages of the supply chain.

This causes the bullwhip effect to lead to a loss of trust between differing stages of the supply chain, making any further coordination attempts increasingly difficult. The impact this effect has on the supply chain performances is an increase in the costs for manufacturing, inventory, transportation and shipping and receiving. It also causes a replenishment of lead time, a decrease in level of product availability and a reduction in profitability.

Supply chain management field profession is conducted in the environment that has characteristic: (1) Focus on the cooperation of Global Economy became a major concern. (2) Supplier selection is based on the mutual relationship; the mutual relationship is related to the best worldwide supplier; (3) Heading forwards and has global long-term relationship. (4) SCM orientation on the supplier selection and relationship management issue come from traditional business perspective "buyer-seller" which related to worldwide system (Burt, Dobler, and Starling, 2004).

A supply chain displays the journey from the supplier to the end customer. The related parties involved in supply chain management are the buying firm, supplier, manufacturer, distributor and end customer.

2.3 Supplier Selection overview

While the academic literature is very comprehensive, the effective evaluation and selection of suppliers for important raw materials continues to be challenging in many industries. In this context, the past research shows that firms use price and a number of other dimensions such as quality, flexibility, delivery, and service in the supplier selection decision (e.g. Dickson, 1966; Hirakubo and Kublin, 1998; Li *et al.*, 2006; Sarkis and Talluri, 2002; Verma and Pullman, 1998; Wilson, 1994).

The vast literature on supplier selection discusses the properties that are worth considering during the decision-making process leading to supplier selection (Ellram 1990, Weber *et al*., 1991, Cook 1992, Choi and Hartley 1996, Verma and Pullman 1998). First, the criteria may have quantitative and qualitative dimensions, which may conflict; any approach to solving the supplier selection problem should consider multiple criteria. Second, several decision-makers are often involved in supplier selection. Third, in practice, decision making s often influenced by uncertainty; an increasing number of supplier decisions can be characterized as dynamic and unstructured, since situations change rapidly and decision variables are often difficult or impossible to quantify (Cook 1992).

Supplier selection generally tends to involve several sets of criteria, a combination of different decision models, group decisions and areas of uncertainty. Many of these factors affect how a firm goes about supplier selection. To begin with, in order to determine the best suitable supplier selection criteria, there are various areas or issues that need to be considered before the criteria of supplier selection. These issues may include: (1)The procurement method i.e. direct or emergency purchase,(2) the purchase and product category such as critical or noncritical product/purchase and (3) the stage or phase of purchase i.e. new buy or rebuy. The above 3 issues are further discussed and elaborated upon in section 2.4, 2.5 and 2.6 of this chapter.

Previously, supplier selection factors often focused on a "technical output evaluation, taking into account quality, reliability, delivery speed and the price offered. For many types of business enterprises, major aspects of the purchasing process are the acquisition of necessary materials, selection of the supplier and equipment and services (Weber *et al.*, 1991). However, as time goes on and the working relationship becomes closer, there are more selection criteria than those mentioned above, with supplier predominantly being selected based on their performances on a global level. These global evaluations range from total cost analysis (Roodhooft and Konings, 1996; Ellram, 1996; Tagaras and Lee, 1996) to the view of suppliers' capacity in production planning (Ho and Carter, 1988), what their future holds in terms of manufacturing ability (Ellram, 1990) or the continuous improvement potential and closeness of relation (Choi and Hartley, 1996).

Taking the above points into consideration, it seems that with the current competitive market it is impossible to produce products that are high quality and low cost without well-chosen suppliers. Therefore the selection of competent suppliers is one of the most important purchasing decisions, as well as the maintenance of suppliers (Weber *et al*., 1991).

2.4 Procurement Method

There are countless methods which can be adopted by procurement organisations to achieve procurement efficiency, depending heavily on the companies' goals and policies (Hibberd and Basden, 1996). Make-or-buy decisions, supplier selection should not be performed by manufacturing managers alone but rather by a procurement steering committee including top executives, product designers, marketing experts, purchasing managers and engineers, all of those who establish competitive strategy (Venkatesen, 1992), but it does not tell us who should lead and develop this decision process. The following methods are standard practice for the purpose of procuring goods, services or works (Telekom Malaysia Procurement Standard Operating Procedure).

The role of procurement has extended far beyond merely sourcing products and services to meet internal organisational needs (Cousins and Lawson, 2007). In today's business environment, procurement has taken a more strategic role whereby qualified personnel with expertise in all areas of the companies' business operations are entrusted with the

tasks to ensure that the firms' supply chain management is effectively managed in order to contribute maximum savings to the organisations (Tassabehji and Moorhouse, 2008). Besides reduction in business operations and administrative costs, purchasing departments are also expected to add value to organisations by improving products and services quality and attaining quality suppliers (Degraeve and Roodhooft, 2000).

2.4.1 Procurement by Quotation

Within the telecommunications industry in Malaysia, the Quotation method is commonly used for procuring goods/services/works by requesting quotations from suppliers/contractors for a specific amount that is not exceeding certain amount such as Malaysia ringgit 250,000.00 or equal to British Pound 50,000.00. This method is used mainly to cover short term, ad hoc supplies but it can still involve purchasing items categorised under capital or operational expenditure. This method is often used in situations where there is a shortage or any ad hoc requirement which needs to be dealt with urgently. When using this method of procurement, companies need to ensure that the procurement decision is made in the best interests of the company, taking into consideration all related factors such as those associated with finance, quality, supplier experience, item usage and supply duration.

There will be an evaluation committee consisting of representatives from the technical and commercial departments that will evaluate the submitted quotations and make recommendations based on the principle of 'cheapest technically acceptable bid'.

2.4.2 Procurement by Tender (Open/Closed)

Procurement by Tender is defined as a method of procuring goods, services or works for specific amounts which is varies from each company's policy authority limits. There are two types of tender available – Open Tender or Closed Tender. An Open Tender is a procurement offer made to the general public through advertisements in newspapers or relevant trade publications. A Closed Tender is a procurement offer made to selected suppliers/contractors only.

When applying this method, the company will ask the relevant Technical Division to prepare the technical specifications and Bill of Quantity to be forwarded to the Procurement Division. The Procurement Division will then seek further information and clarification from the relevant departments in order to determine whether to offer an Open or Closed Tender. Upon determining the type of tender, the Procurement Division will forward the request to the next stage which is advertising of the tender.

For Open Tenders, the offer will be advertised in daily newspapers for a certain period of time. For International Open tenders, however, there is a longer time limit allowed as the tender should be sent to all individual foreign Commissions and Embassies. For tenders that require highly specialised skills or technical expertise, the division's General Manager may determine the need for a 'Request for Proposal' (RFP) with the agreement of the General Manager of Procurement Division.

For Closed Tenders, a committee consisting of representatives from the user department and the Procurement Division will make recommendations to higher level management for approval of a list of short-listed companies.

2.4.3 Procurement by Direct Purchase or Negotiation

Direct Purchase or Negotiation is defined as a procurement method that supersedes the previous Quotation or Tender procedures. Direct Purchases or Negotiation is only made under the following circumstances:

- When the supplier of the proprietary equipment is acquired solely as the representative of the goods/services/work that is needed.
- When services of the government, statutory bodies, local authorities and councils will be directly affected by the contract due to it being for them.
- When there is no foreseeable alternative to renting or leasing.
- While awaiting the renewal of an existing central contract or the formation of a new central contract.
- When a strategic procurement of goods/services/works is needed.
- For services have a company appointed selection of suppliers for the procurement process.

- For goods/services that are decided upon by the clients of the company.
- When fulfilling a previously contracted requirement whereby particular companies are appointed as the supplier/contractor.

All applications are made via a proposal/working paper prepared by the requesting division. The contents of the proposal should contain the justifications for awarding procurement by Direct Purchase/Negotiation including any technical evaluation reports if necessary.

2.4.4 Emergency Purchase Procurement

Emergency Purchase is defined as immediate procurement allowed for the purpose of restoration of the company's situation due to the following critical situations:

- Telecommunications system/infrastructure damage caused by cable theft, power failure, or accidences.
- Force majeure caused by natural disasters such as war, riot, earthquake, flood, fire, tempest or other natural disasters.
- Obliteration.

Upon the occurrence of an emergency situation, priority shall be given for restoration works where the person in charge of restoration shall obtain either verbal or written approval from the head of department or higher level of management, dependent on the nature of the emergency. All documentation pertaining to restoration work during an emergency situation must be recorded. All verbal instructions must be followed up by written instructions. A supplier or contractor that is qualified and able to do the restoration work shall be contacted as soon as possible upon approval. Dependent on the emergency situation, the order to start restoration work may be either verbal or written.

Procurement of strategic equipment may be carried out either through closed tender or direct negotiations with existing suppliers, if the following requirements are fulfilled:

- Tenders for specialised equipment that relate to network services, in example those made through an open tender will require considerable time for technical testing and interworking.
- Tenders that are specifically for equipment that requires specialised skills for operations as well as maintenance.
- When supplier performance and equipment supplied are satisfactory.
- Where the supplier can provide the proof that prices given are relevant to current market prices.

2.4.5 E-Procurement

Recently, there has been a rapid increase in the adoption of 'e-procurement' concept in supply chain management. The potential of e-procurement has already been proven in a number of studies (Eyholzer and Hunziker, 2000; Arthur Andersen Business Consulting, 2001). According to these studies, higher supply chain transparency provided by e-procurement enables companies to decentralise operational procurement processes yet further develop a centralised strategic procurement process.

However, in the case of the telecommunications sector and high speed broadband industry in Malaysia, e-procurement implementation may only be used up to a certain level such as the evaluation of suppliers based on technologies and pricing offered via the electronics system.Particularly in Malaysia context as most of the recent studies of e-procurement project in Malaysia government are limited to the readiness stage rather than implementation stage (Kaliannan and Awang, 2008; Hashim, 2007; Kassim and Hussin, 2010). Despite that, Subramaniam and Shaw (2002) indicate legal and administration procedures as key challenges in system specification due to multiple legacy system, different data formats and complex processes. In addition, Scholl and Klischewski (2007) highlight that legal, policy, economic foundations and long-term funding are the main barriers in e-government project.

Both of these studies have further supporting evidence based on a recent study on Malaysia e-government, displaying the way tight legal and administrative procedures cause a system incompatibility with existing online procurement legal requirements (Kassim and Hussin, 2010). Furthermore, another study on Malaysia e-government (Kaliannan and Awang, 2008) discovered that it is most often smaller suppliers that face problems with poor computing, weak bandwidth support and information systems design. This particularly applies to Malaysia in context, as most of the recent studies of the e-procurement project in Malaysian government are limited to the primed stage is appose to the implementation stage (Kaliannan and Awang, 2008; Hashim, 2007; Kassim and Hussin, 2010).

However, e-procurement is yet to be tested as a comprehensive tool that can enable supplier selection activities to be incorporated into the government procurement policy and factors involving business ethics.

2.5 Supplier Selection phase and purchase Category

The increasing importance of supplier selection is interrelated with the nature of the company business. Normally, 'direct procurement' refers to purchases of components, raw materials, inventory items and is mostly used in manufacturing processes such as semiconductors and petrochemical products (Lamming, 1993). Indirect procurement, however, relates to equipment and services for its maintenance, repair and operation. This focus on the product and its services are not part of the end company product (Zenz, 1994).It is important to consider product-based factors carefully to procure the right quality of product in the right quantity at the right time. Judging supplier quality is also important to meet the service levels as set in service specifications and to increase customer satisfaction (Tam and Tummala, 2001).

Kahraman *et al*., (2003) stated that selection criteria conventionally fall into one of the four following categories: supplier criteria, product performance criteria, service performance criteria, and cost criteria.This shows that supplier selection is a multi-objective decision to both minimise some criteria and maximise others (Luo *et al.*, 2009).

In their research on the purchase decision, supplier selection and supplier relation; Ellram and Olsen (1997) discussed the portfolio model that provides the categorisation of purchase groups. This model provides a categorisation of the products in the four following groups: (1) leverage category (2) noncritical category (3) Strategic category and (4) bottleneck category.

1. The leverage category includes purchases that are easy to manage but important to the company on a strategic level. During the management of these purchases, high importance is held in identifying the particular value of the purchase and leverage volume across product lines and suppliers; in order to lower the materials costs. The aim is to create a supplier relationship that holds mutual respect and allows the communication of requirements further into the future. This good, two-way relationship should be established and could be handled through system contracting. Getting a low total cost is paramount, as the total value of purchases in this category is high.

2. The noncritical category involves purchases that are easy to manage and hold a low strategic value. Standarisation and consolidation are the two key words when managing these purchases. Standardising means the company should reduce the number of suppliers and the number of repeated products/services. The supplier relationships should be maintained by establishing a relationship that is able to manage itself. The company could use blanket order, system contracting, and/or small purchase order charge card (SPOCC). The main target of this category is to reduce administrative costs.

3. The Strategic category covers the purchases that are difficult to manage and represent high strategic importance to the company. Again, establishing a close relationship with the supplier is one of the crucial things that will help the company manage the purchases. In addition to this, joint development of products and services by gaining early supplier involvement is important as well as keeping a long term value focus and lowering the cost of poor performance. The supplier should be regarded and entrusted as a natural extension of the firm.

4. Lastly, the bottleneck category involves purchases that are difficult to manage although they hold a low strategic value to the company. Finding possible substitutes or standardizing the purchases is amongst the ways they can be effectively managed. The company should also attempt to establish some form of a relationship that focuses on concurrent engineering and involves the supplier in value analysis. This should effectively lower the cost of operations (Ellram and Olsen R.F, 1997).

The process of determining the supplier selection criteria as well selecting the supplier also often relates to the phase and classification scheme of the purchase. Commonly, this classification scheme identifies three differing purchasing situations which are categorised as straight rebuy, modified rebuy and new buy (Robinson *et al.*,1967). A straight rebuy often means that the purchasing agent does not need to seek out or acquire any further information in order to reach a purchase decision. This is because the straight rebuy is basically a situation whereby the product is repurchased from a previous supplier.

A modified rebuy on the other hand, includes significant changes to the usual purchasing patterns. Examples of these changes would include a change of suppliers, alterations to products specifications and or soliciting bids. As a result, all of these would need collection of new information before a purchase decision could be made.

A new situation is a self-explanatory situation occurring when a buy would be totally new for the purchasing agent. This means that in order to reach a final decision, extensive research and gathering of information would be essential. These three categories provide an outline of all the basic purchase situations in a classification scheme. To summarise, straight rebuys require the least amount of additional information, a moderate amount of additional research is required for modified rebuys, and new buys need the most extensive research to provide new information.

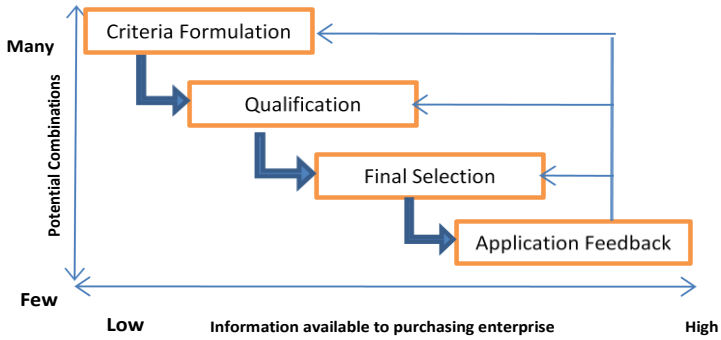
The supplier selection decisions will depend on the situation and categories of the purchasing requirement. They also depend on the degree of complexity and the level of uncertainty associated with purchasing. Centred on the work of De Boer *et al.,* (2001) and Robinson *et al*., (1967), a group of three typical scenarios are categorised: modified re-

buy, straight re-buy and new task. With a modified re-buy, a different product is purchased from a supplier that already exists and is known to the company, or an existing product that is perhaps modified is purchased. It holds a moderate level of uncertainty when this is taken into account. The straight re-buy holds the least uncertainty as the purchasing agent has already previously attained much information regarding the supplier and product specification. Finally, the new task scenario is that of a completely new product or service. Due to the fact that there is no previous experience to base anything on, it holds a high sense of uncertainty. Supplier selection could sometimes involve and require a single or multiple suppliers which are based on the product category and work category.

Based on the product and work category, in some cases supplier selection requires a sequence or series of phases. The initial phase contains a pre-qualification list upon which suppliers are assessed in order to make an eventual short-list of the suppliers that would be preferable. The common criteria assessed during this stage are usually of a generic nature and look into issues like: innovation, product expertise, process knowledge, architectural experience and dedication to continuous improvement potential. The evaluation stage uses the well-known categorical approach in labelling a supplier's performance on any particular criteria as either "positive", "neutral" or "negative". De Boer *et al.,* (2001) describe a similar approach. During the second phase, the design indications are evaluated. The design criteria identified will be specific to the product and cover or meeting the product technical criteria. The system enables the benchmarking of internal suppliers' design criteria against those belonging to external suppliers.

The diagram below shows that the y axis represents the level of complexity of the business environment criteria and x axis is related to the information availability. The higher or the more complex business environment would require more comprehensive criteria formulation. It will be followed by the qualification process before final selection, eventually feeding back or monitoring the supplier progress. When all of the necessary information is made easily available on a diagram like this, the selection process is eased and the process of evaluating the supplier is less complicated. Figure 2.1 below shows the phase of supplier selection framework (source adopted from De Boer et. al., 2001).

Figure 2.1: Phase of supplier selection framework



The phase of supplier selection Framework (DeBoer *et. al*., 2001 and Luo *et. al*, 2009)

(Source: Adopted from DeBoer et. al., 2001).

To further simplify the process, there are companies that have taken an initiative to introduce process in the selection of suppliers that contains two stages. The initiative behind this is to allow the procurement team a reduction in how many suppliers need to be assessed as a result of the decreasing amount of suppliers progressing from the first phase to the next.

Cross-functional groups from the companies become involved in exploring and choosing the model attributes initially, and through an exercise involving bench-marking, the best design profiles for suppliers are identified. Effective communication between staff in an evaluation team will enhance their understanding of the areas that function which are a part of the design process. It can also improve the cohesiveness of a company's procurement team.

Product development times need to be measured in months when it comes to the telecommunications industry. Companies are constantly striving to find ways of compressing the time it takes to market so that they can increase their speed of response to clients and customers. Prior to introducing the new system, teams would spend several days having extensive discussions with manufacturing, design, marketing, accounting, and finance professionals so that they could decide upon the most fitting supplier. By

simplifying the process, the amount of time put into conducting the evaluation and assessment process has been significantly reduced.

However due to technological evolvements the buying firm would be required to continue upgrading the equipment and system in order to be able to compete in the business. This is how the supplier selection became a strategic function in procurement and purchasing field.

Since the supplier selection decision is a very important task, firms usually try to find ascertained criteria and factors that are associated with supplier selection. The selection of supplier is usually considered to be a five stage process, beginning with a realisation that a new supplier is needed. This is followed by the determination of decision making criteria, then the pre-qualification process. The final supplier selection then needs to happen and ultimately, monitoring of the selected supplier to ensure maintenance of high quality standards (Sonmez, 2006; De Boer and Van der Wegen, 2003).

2.6 Supplier Selection Criteria

Supplier selection is complicated because various criteria must be taken into consideration when decision-making and during the eventual selection process. During his early research on supplier selection, Dickson (1966) established more than 20 attributes of supplier which purchases or procurement managers trade off when choosing suppliers. The real challenge here is whether to "go or not to go" when selecting the best available supplier.

With this in mind, it is definitely important to remember that the purchasing agents do a lot more than to merely "buy things". Their responsibilities encompass the management of relationships as well as accommodating for making the decisions by grouping together the crucially important internal and external personnel in the organisation (Ellram and Cooper, 1993). The important responsibility of choosing the right suppliers within the structure of gaining system wide goals, instead of minimising cost and price, is something that is left to them (Degraeve and Roodhooft, 1999; Krause, 1997; Mason, 1996; Roos, 1998).The literature on supplier selection and buyer-seller relationship began sometime in

the mid 1960's with Dickson (1966). During his earlier research on supplier selection, he identified over 23attributes of suppliers that cause managers to trade off when having to choose between the short listed suppliers.

The determination of the criteria is the initial step in the supplier selection process. The 23 different criteria discovered by Dickson (1966) were actually based on a questionnaire that was sent to 273 Canadian and American purchasing agents and managers. Amongst the 23 differing criteria he discovered, so included price, warranties policy, quality, punctual delivery, performance history, technical ability, financial stability, and many more. On the other hand Ellram (1990) applied hierarchy structural framework that included performance, financial, technology, strategy and organistational culture, with a few other factors as the most critical criteria for the supplier selection process.

The supplier selection criteria of Dickson study shown in the Table 2.2 below:

Table 2.1 : Dickson supplier selection criteria

Dickson's vendor selection criteria [a]

Rank	Factor	Mean rating	Evaluation
1	Quality	3.508	Extreme importance
2	Delivery	3.417	
3	Performance history	2.998	
4	Warranties and claim policies	2.849	
5	Production facilities and capacity	2.775	Considerable importance
6	Price	2.758	
7	Technical capability	2.545	
8	Financial position	2.514	
9	Procedural compliance	2.488	
10	Communication system	2.426	
11	Reputation and position in industry	2.412	
12	Desire for business	2.256	
13	Management and organization	2.216	
14	Operating controls	2.211	Average importance
15	Repair service	2.187	
16	Attitude	2.120	
17	Impression	2.054	
18	Packaging ability	2.009	
19	Labor relations record	2.003	
20	Geographical location	1.872	
21	Amount of past business	1.597	
22	Training aids	1.537	
23	Reciprocal arrangements	0.610	Slight importance

[a] See Dickson (1966).

Other literature about supplier selection also emerged around that time, for example the initial writings on aircraft co-production and procurement strategy from the Rand Corporation which focused on defence procurement. Later, other studies which touched on procurement strategy, sourcing and supplier selection, supply chain management, supplier performance and company performance came into view.

Supplier selection aims to identify and distinguish suppliers that are at an acceptable cost whilst displaying the best potential for continuously meeting a company's needs (Kahraman, Cebeci, and Ulukan, 2003). A pool of suppliers is settled upon in the supplier selection process, in accordance to a previously defined criteria group (Aissaoui, Haouari, and Hassini, 2007). Companies are unable to do anything other than offering better quality services and products as the customer demands have to be met if they are going to survive in the competitive market. These companies are therefore inclined to select the most appropriate suppliers to ensure this production of better quality services and products. A considerable amount of time to assess and select the most appropriate supplier is consequently needed by the company.

Supplier selection includes the attainment of needed material, services and equipment for all types of firms, making it a major aspect of the purchasing function (Ghodsypour and O'Brien 1998). The source of the supplier selection decision contains a number of interrelated decisions relevant, with regards to negotiations, distribution, finance, product quality and procurement. Therefore the supplier selection decision is not something trivial (Hokey Min 1994).

For a supplier to be able to meet business needs the supplier selection process involves the assessment of a number of suppliers based on a list of common criteria, making is a multi-criteria decision making situation. The selection of the correct upstream suppliers is a paramount factor for success for service or manufacturing businesses. This is because it will affect the customer satisfaction whilst significantly reducing the cost, as well as improving the company's competitive abilities. Measurable of immeasurable items can be a part of the evaluation criteria.

In order to evaluate suppliers, various different lists of criteria have been offered. The principle scheme of Dickson's (1966), 23 criteria were surveyed by Weber, Current, and Benton (1991), discovering that delivery, quality, productive ability and price are most commonly used to determine a supplier's performance. Quality, price and delivery were put forward as the most significant criteria for assessing suppliers by (Waber *et al.*, 1991). Similarly, those put forward by Shipley (1985) were the three criteria delivery lead, quality and price. The ability to solve problems, price, quality, experience and expertise, delivery time and reputation were offered by Tam and Tummala (2001) as the

criteria for choosing a vendor for the telecommunications system. Pi and Low (2006) suggested punctual, cost, service and quality for supplier selection criteria and evaluation. A contingency plan approach for supplier selection was suggested by Masella and Rangone (2000), in accordance to the extent of co-operation in supplier/customer relationships and the time frame. On the other hand, Prahinski and Benton (2004) looked into how suppliers view the purchasing firm's communication skills in the supplier assessment process and how it impacts on the suppliers' performance. Araz and Ozkarahan (2007) concentrated on the long-term effects in selecting suppliers.

In more recent times, the emergence of the idea of supplier selection has caused an increasing amount of scholars and practitioners to realise that supplier selection and management was in actually a method that could be used to make the entire supply chain more competitive (Petroni and Braglia 2000).

It is obvious that priorities in the supplier selection assessment can differ from positive to negative as the operating aims and targets will vary amongst industries and companies. Suppliers have a direct and indirect effect, whether positive or negative, on the price, technology, quality, flexibility, delivery and profits made by the companies that have the suppliers' outputs included in their final product (D. R. Krause, and T. V. Scannell, 2002).

Bharadwaj (2004) stated that a range of supplier selection research has verified that the definitive purchasing criteria that a business customer uses to assess a supplier will differ across different types of products. Supplier based criteria include supplier reputation, punctual delivery, and the standard of support services. While product based criteria consists of operation costs, net price and potential defects. High importance is held carefully considering the product-based factors to ensure procurement of the best quality of product with the correct quantity at the correct time. Evaluating the supplier quality also holds significance in order to ensure the service levels that were set in service specifications are met. It is also important in increasing customer satisfaction as stated by Tam and Tummala (2001).

An expert system was developed by Vokurka and Choobineh (1996) that encompasses a number of stages in the supplier selection process, the formulation of supplier selection criteria being amongst these stages.

For the purchasing manager, selection of the correct supplier is commonly a challenging task. With the incorporation of a range of different unpredictable and uncontrollable elements, supplier selection can be a very complex thing, the above factors having a direct effect on the decisions made. Decisions on supplier selection are complicated due to the fact that this range of criteria has to be thought about during the decision-making process (Weber *et al.,* 1991). Qualitative as well as quantitative dimensions may be involved in the criteria and can often be conflicting.

Incomplete information, further qualitative factors preferences that lack detail are amongst the reasons that it becomes complicated to make these decisions. A case by case assessment is done on the cost, quality, delivery and service, the preference of the supplier generally being dependent on the outcome of this. The list of criteria and the number should be in accordance to customer requirements as well as the service/product.

On a general basis, there are two simple types of criteria considered when deciding upon which suppliers to choose: qualitative and quantitative. A definite quantitative dimension like cost can be used to measure quantitative, but the same cannot be said for quality of design. Something that also complicates the decision is the fact that some criteria may be conflicting with one another. Possible contradictions were identified by Wind and Robinson (1968). For example the supplier that offers the lowest price will not always have the highest quality or that with the highest standards of quality may not deliver punctually. It is consequently necessary to invoke a trade-off between the qualitative and quantitative elements that are conflicting, in order ensure the best suppliers are found.

Following the study conducted by Dickson, several researchers have distinguished lists of supplier selection criteria that vary in accordance to industry and purchasing scenarios, as demonstrated in this chapter. They include Liu and Hai (2005), Bharadwaj (2004), Tam and Tummala (2001), Motwani *et al., (*1999), Ghodsypour and O'Brien (1998), Humphreys *et al.*,(1998), Vokurka *et al.,* (1996), Min (1994) and Chaudhry *et al.*,(1993).

49 selection criteria that are regarded as important during the supplier selection decision were established by S.Sen *et al.*, 2008. The Table 2.3 below shows the structure of integration of quantitative and qualitative supplier selection criteria:

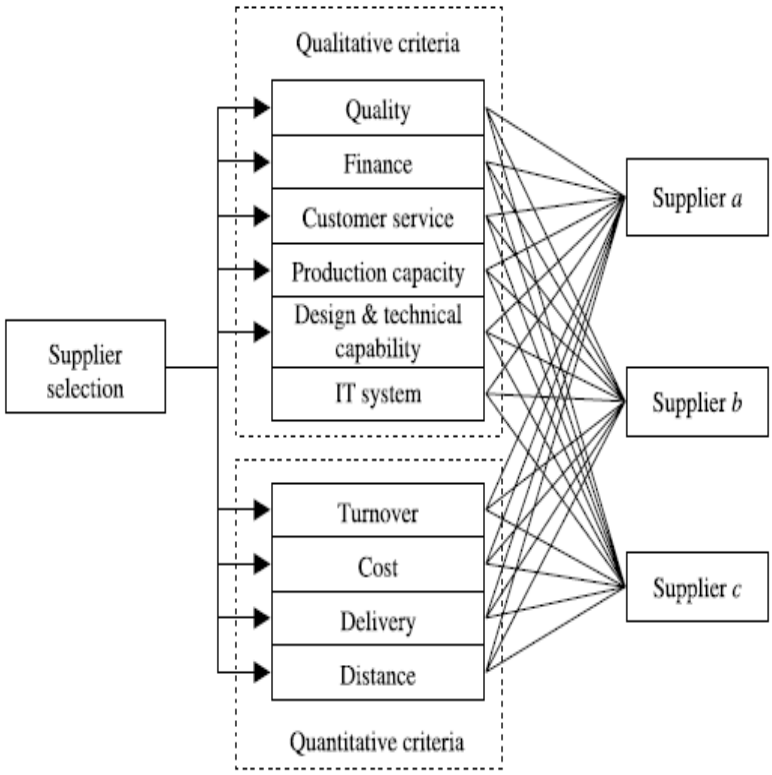
Table 2. 2: A framework for both quantitative and qualitative supplier selection criteria.

Criteria	Reference
Net price	Dickson 1966
Delivery	
Quality	
Production facilities and capacities	
Geographical location	
Technical capacity	
Management and organization	
Reputation and position in industry	
Financial position	
Performance history	
Repair service	
Attitude	
Packing ability	
Operational controls	
Training aids	
Bidding procedural compliance	
Labour relation record	
Communication system	
Reciprocal arrangements	
Impression	
Desire for business	
Amount of past business	
Warranties and claims	
Price breaks	Chaudhry *et al.* 1993
Quality team visits	Min 1994
Foreign exchange rate	
Cultural similarity	
Reliability	Vokurka *et al*. 1996
Technology	
Future manufacturing capabilities	
Speed in development	
Design/process improvement	Humpreys *et al.* 1998
Cost	Ghodsypour and O'Brien 1998
Service	
Defects	
Process capability	
Response to changes	
Process flexibility	
Export taxes	Motwani *et al*. 1999
Future technology development	Tam and Tummala 2001
Quality of support services	
Supplier's expertise	
Supplier's technological system	
Quality system used by supplier	
Operating cost	
Maintenance cost	
Order cycle time	Bharadwaj 2004
Ability to fill emergency orders	
Product range	Liu and Hai 2005

(Source: Adopted from S.Sen *et al*., 2008)

However, ranging buying behavioral patterns have been displayed by companies as it is affected by the circumstantial situation, these varying behaviours are also included in their selection criteria and supplier management process. As stated by Gonzalez (1996), "supplier selection process is a multi-criteria problem which includes both qualitative and quantitative factors. In order to select the best supplier for the organisation, it is necessary to make a trade-off between intangible and tangible factors, some of which may conflict". The Figure 2.2 below also shows the multi-criteria problem which includes both qualitative and quantitative factors.

Figure 2.2: Supplier selection multi-criteria problem-qualitative and quantitative factors



(Source: Adopted from Yang and Chen 2006)

The scenario for assessing suppliers and how they are going to deliver is complicated, consisting of large levels of uncertainty and ambiguity, complex relationships caused by several conflicting objectives and competing stakeholder values (Watt *et al*., 2009).Supplier choice and assessment is the process of seeking out the right suppliers

who can give the buyer the best quality products or services with the correct price at the right time and in the correct quantities (Zhang *et al*., 2006).

Choosing the right supplier can lower purchase price on a significant level as well as enhancing the firm's nature of competiveness. For this reason a lot of specialists held it in deep belief that supplier selection is the most significant activity undertaken by the buying department (Ghodsypour and O'Brien 2001).

Four definitive dimensions for customer satisfaction can be achieved for organisations by effective selection and assessment of suppliers alongside the management of their inclusion in the supply chain. These include: product quality, competitive pricing, delivery of service and variety (Narishman and Jayaram, 1998, Vonderembse and Tracey, 1999).

Generally, in telecommunication industry the telecom services range from the provision of telephone line services to quite advanced services like videoconferencing, data, as well as internet broadband of a high speed and in some cases interactive multi-media services. Sophisticated needs are becoming increasingly more popular for business users, with the simultaneous want for better quality with lower price. Alongside the deregulation of the telecommunications industry, in a lot of countries market competition has become very fierce. To be able to survive the competitive environment, the firms are inclined to offer new services and products regularly to satisfy the increasing needs of their customers, sometimes requiring the use of necessary technologies. These products and services quite often consist of network systems and services, and are procured from suppliers within the telecommunications industry. Commonly, the life span of these systems could last for 5 to10 years, possibly effecting the strategic placement of the firm.

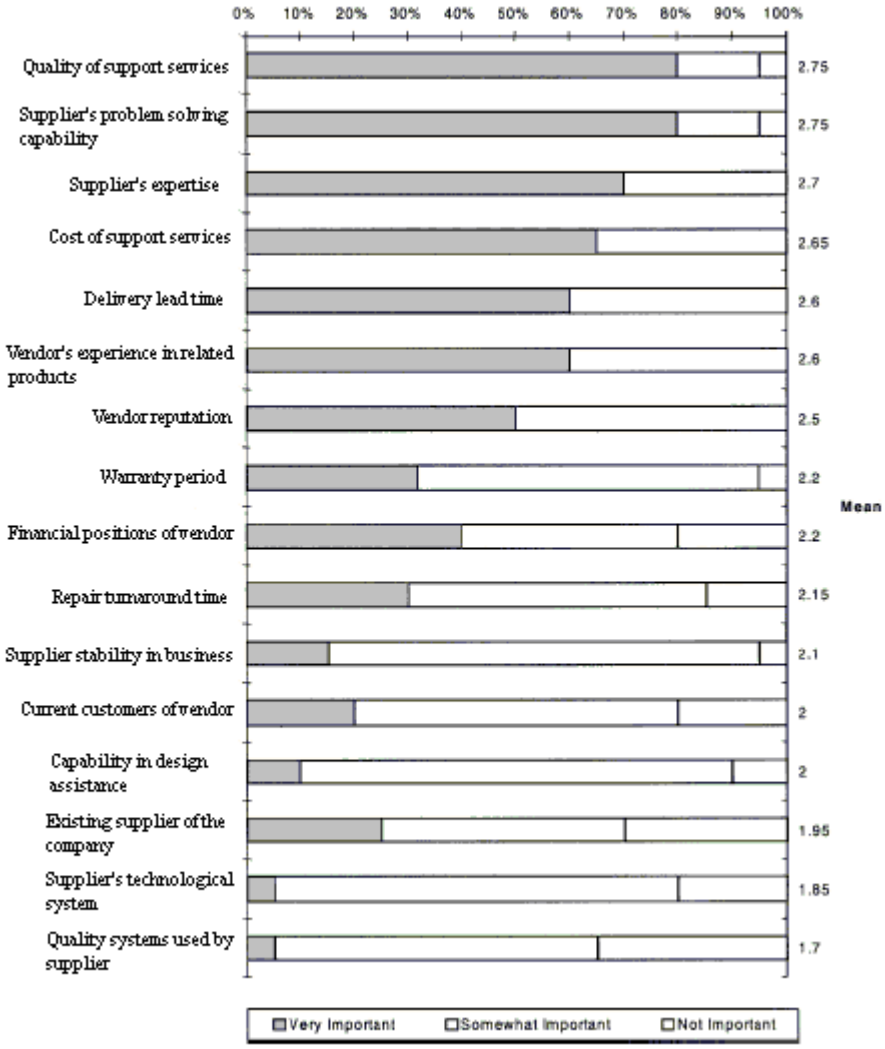
Hence, the choice of vendors is a crucial process to a telecom company in being able to meet customer needs. In addition to this, the choice of a telecom system is just as important and can potentially involve a lot of criteria; this includes the technical needs of cost and service specifications. Not just the cost of equipment, but the price of equipment operation, equipment maintenance, support and upgrade costs need to be taken into account when selecting a specific system. Careful consideration of these factors is of high

importance in order to ensure the low cost delivery of service. Equally, criteria related to performance like availability, reliability, and serviceability also need to be assessed in order to ensure service levels set in the service specifications are met and increase customer satisfaction. Also, technical criteria that include future development, upgradability, system features, compliant with technology standards, network management abilities, and interfacing with existing systems need to be analysed accurately. Assessing vendor quality is of equal importance. The criteria for this may include reputation, security, delivery punctuality, accessibility and quality of support services. Examination of all of these relevant factors in selecting a telecommunications system as well as a supplier who formulates and delivers the system is essential.

The above elements can be categorised into three major groups of technical, cost, and operational success factors. The factors relating to cost include electronics management system, operating capital investment, unit cost, cost of the network management system, cost of the billing system and maintenance cost. On the other hand, the technical elements include technical characteristics and features, system capacity, system reliability and availability, system performance, system redundancy, interoperability with other systems, interface system, compliance with international standards, upgradability on hardware and software, and the potential for development of future technology. The operational factors alike include: ease of configuration, statistical data reporting abilities, ease of operations, performance monitoring capabilities, fault diagnosisabilities, accurate accounting information, customer network management components, customised reports generation, system security features, and the flexibility of the billing system.

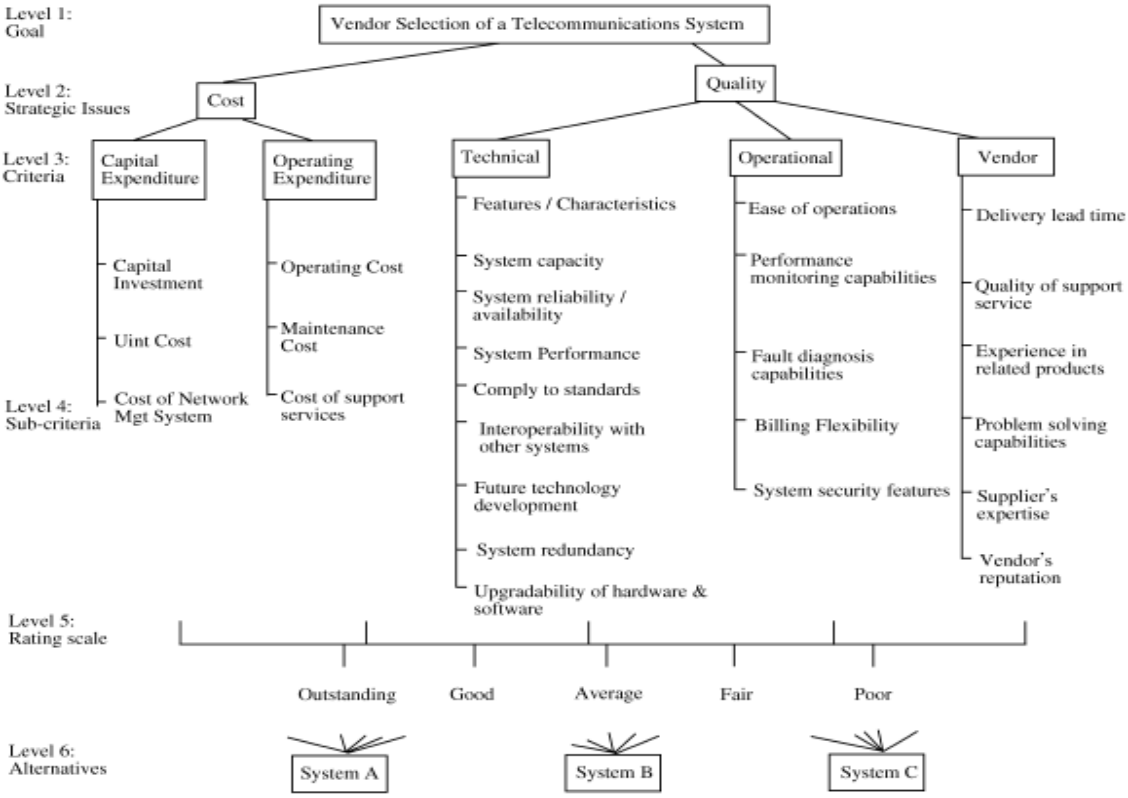
The Figure 2.3 and 2.4 below shows the study of Tam and Tummala 2001, displaying how they proposed the supplier selection criteria and model for telecommunications system to be:

Figure 2.3: Factor affecting supplier selection for telecommunications system



(Source: Adopted from Tam and Tummala 2001)

Figure 2.4: AHP Model for supplier selection for telecommunications system



AHP model for vendor selection of a telecommunications system.

(Source: Adopted from Tam and Tummala 2001)

To enable understanding of the trade-offs during the supplier selection process, it is important to consider the characteristics that purchasers attach to differing roles of their current supplier, taking into account the other competitors. Executives and procurement or purchasing managers commonly consider features of suppliers that they have already become accustomed to as well as new characteristics potential suppliers can off when it comes to the task of supplier selection decision (Bettman *et al.*, 1975, Lynch *et al.*, 1988). On a general basis it is also not possible for a supplier to excel in all criteria taken into account by the purchaser at the lowest given price (Li *et al.*, 2006). This is why the purchaser has no choice but to make trade-offs between the current existing supplier and the potential switch to a new supplier when put in the scenario of having to pick one.

Undoubtedly the supplier selection research history has definitively identified that the main purchasing criteria used by a firm customer to assess a supplier is likely to vary across different types of products. Whether the structure and content of the selection criteria is utilized to assess a supplier within a given product category however, is something that remains largely unexplored.

Nevertheless, besides striving to obtain products/services with the lowest possible price in order to manage operational costs at the optimal level, delivery performance of suppliers must be given due consideration. Getting low priced items may not benefit an organisation at all if the delivery capability of those items is questionable and the supplier quality is unreliable.

2.6.1 Supplier Selection Criteria associate to High Quality Technology product, Price and Delivery performance Factor

As noted by Waber *et al*., (1989), quality is seen to be the most important attribute followed by cost and delivery performance. Commonly, quality is accounted as a criterion that is most decisive for the supplier selection process (Weber *et al.,* 1991). On the other hand, quality on its own will not offer an assurance that the suppliers can offer the correct quality and standards whilst avoiding unnecessary costs. The ‘‘right parts at the right time in the right condition” from their suppliers is what manufacturers have to be able to rely upon when attempting to decrease their inventory of bought materials (Lyn, Unni, and Frank, 1994). Therefore, managing personnel should not be selecting suppliers merely based on low price and costs but are also inclined to think about delivery performance, quality and other attributes that are relevant.

Suppliers first need to meet the performance standards expected of them (Rossoumme, 2003); (Schellhase *et al., 1999*), particularly the ones relevant to delivery dates and quality standards (Tellefsen, 2002). However they also need to assess other factors that are not directly relevant to the product (e.g. cooperation and effective communication).It was suggested by Ellram (1990) that in supplier selection the company needs to think about the quality of the product, the price that is offered, the time of deliver and the quality of service.

In the manufacturing and auto assemblers industry, when selecting the suppliers a higher level of importance is placed on technological ability as well as for financial situations. Meeting delivery deadlines and conformance to specifications still proved to be held as the criteria with the most importance across all stages in theirs supplier selection, as a part of the consistency element. However quality philosophy and prompt delivery detail a required situation that can ensure uninterrupted production is able to take place. Disruptions in the purchasers manufacturing operations can be minimised by reliable performance from the supplier in areas of delivery and quality. Manufacturing industries discovered that delivery and quality are among the crucial underlying constructs for consistency in the context of supplier selection, making them the most significant factors in selection of the supplier.

As said by Amoribieta *et al.,* (2001), potential suppliers ought to be assessed primarily on their displayed ability to contribute the expertise that is required. They also found in the study that the initial criterion is that the supplier has to be able to provide the company with the necessary amount of the service and components at the correct time and in the correct place. Suppliers that are able to meet the availability criteria are then analysed judging upon their competence on a technical level and their capabilities as a whole. This is as appose to the view that the initial most important criterion in getting components full of innovation is based on technological capabilities of the supplier (Hoetker, 2005).

The consistency factor with regards to meeting delivery deadlines still seemed to be the most significant criterion on all stages, as well as the ability to abide by the specifications (Choi and Hartley 1996). Supplier performance that is consistent in the categories of delivery and quality can still minimise the disruptions in the buyers manufacturing operations. Furthermore, in marketing products an important element is warranty due to the fact that a warranty policy that is better usually signifies a greater quality of product which gives assurance to the customers. (Wu, Lin *et al.*, 2006).

In past research and literature it is also agreed that in selecting a supplier; cost, delivery punctuality and quality are the elements that hold the most significance (Verma and Pullman, 1998). In general, the purchasing criterion that has been most important is that of cost. In an era of increasing international competition, it has become even more

significant as these days the suppliers can be internationally soured as well as on a national level. It does need to be considered, however, that exclusion from the corporate views and agendas can be caused by single minded focus solely on the cost.

The price of the purchase is in practice quite significant for the buying firm. In the buying firm organisation, buyers tend to place a price factor as one of their top priorities and responsibilities. Almost as many respondents stated that in order to select a supplier, cost continues to be a crucial criterion they use (Kotler and Keller, 2006). Millen (1991), stated that manufacturers should be focusing on two organizational systems of the supplier: (1) evaluation systems that are based on process, including price, quality, delivery, technology and technology, and management (2) Evaluation systems based on performance, involving supplier's delivery and quality performance.

It is stated by Xia and Wu (cited in Che and Wang 2007) that a lot of manufacturers maintained that suppliers able to offer the most reduced unit prices were not necessarily able to provide the finest quality performance or service. They highlighted the fact that supplier evaluation can attempt to seek out multi-purpose decisions of the most reduced price, highest standard service and performance levels (Che and Wang 2007). This is demonstrated by the fact that in competing suppliers, the supplier who is able to give a product or item for the lowest price per unit does not necessarily have the highest standard service performance or quality. Therefore supplier selection is a multi-objective inherent decision that attempts to increase high quality, lower the procurement price, and service performance effectively (XiaWeijun and WuZhiming, 2007).

Some buying firms however, consider all of the costs related to each of the suppliers and the cheapest supplier is chosen based on the calculations made (Timmerman, 1986). Companies that use this approach are referred to as choosers of a 'cost leadership strategy' (Porter 1980). As shown by Verma and Pullman (1998), despite the fact that company managers state quality is the most important criterion, a large amount of companies choose their suppliers based on price or delivery punctuality. Emphasis should be put on the fact that decision making personnel should select the suppliers on the basis of quality, delivery standards and other qualitative elements as well as the cost (Luo, Wu and Rosenberg, 2009).

The relevant significance of varying supplier element criteria against the choice of actual suppliers, do not the match the generally perceived significance of the criteria. An example of this is when managers regard quality as the criteria with the highest value yet more dependence is put on delivery standards or price when it comes to the selection of the supplier. This suggests that despite the face the managers feel that a number of attributes are essential for supplier selection, when put into practice the lowest priced supplier is chosen.

Wind and Robinson (1968), recognised potential contradictory factors, like the supplier offering to give the lowest price might not possess the highest quality or the supplier that has the best quality might not be able to deliver punctually. Consequently, a trade-off between the conflicting quantitative and qualitative factors in order to find the best suppliers is necessary.

An issue with strategy for companies at the lower levels can be that they are still putting a large emphasis on cost due to the fact that they seem more inclined to be buying necessary feature items from the open market. However, according to (Choi and Hartley 1996), a higher significance on low cost was not placed. In fact, low cost was constantly classed as being one of the criteria that holds the least importance by respondents, without any regard to the position held within the supply chain. Thus some organisations and firms consider the cost factor to be one of the selection items that hold the least importance, despite its positioning in the supply chain.

Varying ways of pricing and buying out comes proved to be linked with elements shaping the interrelating exchanges of customer sizes both large and small. As increasingly closer supply chain exchanges progress from small customers to large customers, the verification is that percent product imperfections, lowest cost and delayed deliveries decrease in significance. Within the smaller team, it seems the necessity for late delivery and lowest cost as well as product fault improvements can cause the customers' dedications to a relating strategy. Although for the bigger team, the sole result progressing towards importance for less purchasing resources displays that bigger

customers are more influenced by resource improvements of their own than supplier pricing or performance.

The sole application of low cost discovery could have damaging impact on companies' performance in the supply chain. A lot of companies' implementing recent low-cost initiatives in various industries have failed as a result to produce predicted outcomes due to a lack of sufficient supply chain evaluations and sourcing strategies that were unfitting (Levi, 1995, Christoper and Towill, 2002, Trent and Monczka, 2003).

The supplier's potential in successfully pursuing relational exchange strategies with smaller clients can be affected by its ability to suggest the lowest price and its reduction in product faults and inaccurate deliveries. Competitive bidding or tender is still a means of supplier selection mainly in a lot of industry sectors. This is contradictory to the fact that partnership progression is adopted to increase purchasing efficiency. Competitive bidding is regarded as adversarial, due to it undermining relationships or partnerships that are collaborative, with the concentration usually being on cost.

In the scope of the total cost of ownership philosophy indicated that the cheapest supplier does not always have to be the most preferable choice if all of the potential additional costs generated through the supply chain are taken into account (Anderson and Katz, 1998, Degraeve and Roodhooft, 1999). As such, the management of quality and cost continue to be important underlying factors within the procurement and supplier selection processes. Progressions in quality are noticeable (Sriram and Mummalaneni, 1990) when the supplier proves able to manage the operations in a more efficient way and acquires further knowledge in creating solutions for technical, logistical and other problems (Clayton 1998).

From past study it is also discovered that generally all the managers considered the suppliers' flexibility the most high in value, particularly the elements of product ranges, expertise with the use of alloys manufacturing tolerances and acceptance of small orders. This was then followed by the price aspect in significance; particularly respondents from Italy (with the UK and France as considerably less significant) suggested that the cost

was of high importance during the process of supplier selection (Van der Rhee *et al.,* (2009).

A company's profits can be largely affected by the loss of profitable customers. Thus, service quality and satisfaction is a significantly crucial factor in the ability to survive within a competitive market. Where the companies that have achieved most success are regarding total customer satisfaction as a main target, it is also of high importance to consider the quantification of service quality and standard (Kotler and Keller, 2006). Two modified service standard loss functions to measure service achievement were put forward by Li (2003). The delivery performance such as delivery availability, reliability and serviceability should equally be assessed in order to reach the service levels that are set in particular service specifications and to heighten the level satisfied customers (Tam and Tummala, 2001).

Fundamental to many supplier selection decisions especially for companies that are concerned about meeting the ready for service date in their operations, priority is given to the timely delivery of the products, services or equipment. Poor delivery performance disrupts the production operations and results in poor sales performance and poor customer satisfaction index. Vonderembse and Tracey (1999) stated that punctuality of delivery is imperative for a supplier. If the suppliers steadily and always be able to meet on time delivery requirement, such delivery capability helps the planning and implementation team to meet the ready for service date in accordance with the requirements set by customer demand.

Shin *et al*., (2000) highlighted the fact that lead time is a significant indicator of delivery. Reasonable and short delivery lead time would also assist the growth of inventory turnover and the reduction of stock. Eltantawy *et al.,* (2003) and Sharland *et al*., (2003), examined the role of cycle time to performance and supplier selection. Once again, cycle time along with competitive price has been noted to be significant but not overruling elements during the initial selection process (Sharland *et al.*, 2003). As companies face on going pressure to outperform their competitors, company advantages may be achieved through cost effectiveness, innovation, ability and quality awareness in the management of the supply chain (Christoper and Towill, 2002; Juttner *et al.,* 2007).

It is commonly argued that for any given supplier to succeed and excel in all areas of performance is incredibly difficult and virtually impossible. An example displaying this is the fact that a top quality supplier may not have the components that are lowest in price. In some cases it also occurs that areas delivered by a specific supplier succeed in a few high quality areas for examples features and reliability, whereas another supplier might be better in other areas of quality like durability and scalability, to name a few.

An actual choice therefore generally may involve a tradeoff between the feature levels of varying suppliers (Akiva, M. and Lehman, S. R., 1991). A supplier that is able to excel itself in the majority of evaluation criteria is desirable for companies. However, it is highly unlikely that a given supplier can succeed in the majority of evaluation criteria or even all of them at a price that is reasonable. As a result, companies are inclined to trade-off between quality, cost and other valuable aspects when it comes to selecting suppliers.

Selection and evaluation of suppliers based on precise criteria including delivery, reliability quality and product performance enhance customer satisfaction and company performance (Michael Tracey and Tan, 2001). It was argued by (Muralidharan, Anantharaman, and Deshmukh, 2002), that buying the proper quality of products in the necessary quantity at the reasonable cost and from the right source is the main aim of the purchasing department. It was concluded by them that quality, price and punctual delivery are among the three essential criteria in selection of the supplier.

Weber, Current, and Benton (1991), chose delivery, cost, quality, capacity and facilities, technology ability and geographic location as the factors in supplier selection with the highest amount of importance. Ghodsypour and O'Brien (1998) mentioned that price, service, and quality have a definitive effect on the parameters of supplier selection.

According to Wilson (1994), the quality factors have increased in importance and price is relatively less important these days. Delivery is quite important and service is somehow is more significant. She put forward the fact that these changes could be due to the ever-changing relationship between buyers and sellers.

Previous studies have identified a number of crucial factors that are important in supplier selection. The main criteria used by buyers include: quality, flexibility, on time delivery and price (Verma and Pullman 1998). It is indicated within other studies that the relative significance of supplier selection criteria has in the past few years altered.

2.6.2 Supplier Selection Criteria related to Supplier Relationship Management

This study chose supplier relationship management for analysis among the variables, because supplier relationship social bonds is conceptualised as being regarded more critical in the buyer-seller relationship development stages and latent in the later part of the process (Smith, 1998; Wilson, 1994). Also, the supplier relationship encompasses "Search and selection of an appropriate partner" and "defining the purpose of the relationship" stages of development within buyer-seller relationships (Wilson, 1994). Social bonds could therefore apply to the evaluation of initial supplier selection and the maintenance of relationships with suppliers alike.

The decision that is most definitive in the supplier selection is determination of the integration level of the buyer-supplier (Masella and Rangone, 1995). The key criteria important for supplier selection are represented in accordance to this level, the company's corporate strategies and its and its competitive positioning (Ghodsypour and O'Brien, 1998). Historically, there are generally always two key types of relationships between suppliers and buyers, as described by the majority of researchers: 'adversarial competitive and collaborative partnership,' named researchers including (Imrie and Morris, 1992), (Gules and Burgess, 1996), Humphreys *et al.,* (2003). However the current style of relationships is progressing and evolving, as noted by Gules and Burgess (1996), into a form that is more collaborative, basing it on mutual benefit and trust, relational exchange and cooperation. Within the collaborative model, the purchasers' thought and choice of a preferred supplier is not solely linked price, but also to the areas that give a lot more to the suppliers' capability in distribution, production and post-purchase service. Also beneficial for suppliers is the ability to gain access to the business skill and knowledge of their purchaser partners (Imrie and Morris, 1992).

Vonderembse and Tracey (2006) researched selection criteria and supplier inclusion in manufacturing, pointed out the fact that manufacturing companies that took on selection criteria as a part of their choice of supplier processes were enabled to further enhance both supplier and manufacturing performance outcomes.

Supplier relationship management is a critical issue in supplier selection in any supply chain partnership (Fynes *et al.,* 2005; Guinipero *et al.,* 2006 Karpak *et al*., 2001), since relationships are dynamic and the commitment to multi-network and multi-tier partnerships is not necessarily permanent. This is due to the enterprises becoming engaged in switching their business partners to meet changing market conditions as well as the need to maintain or increase their firms' performance (Moshowitz, 1997). As an initial consideration, the synchronisation of cycle times across the buyer-seller relationship is an important predictor of relationship success, as it has a significant effect on high volume and long term, continuously repeated, trend purchases. For example, Krause *et al*., (2000) has suggested that buyers within product-based firms can improve supplier performance through direct involvement in activities that relate to and integrate with both organisations' business cycles.

Selection of suppliers based on the potential seen for a long-term cooperative relationship is just as significant to direct or indirect suppliers as it may be to the auto assemblers. Selection of supplier is among the critical functions in the management of the supplier relationship due to the fact that conducting business with appropriate suppliers is beneficial for the organisation in order to ensure the provision of a sufficient volume of production in a good quality.

A recent type of supply chains applications is supplier relationship management which is a part of the supplier selection process and subsequently heightens the competitive advantageous features of the manufacturer with the use three initial mechanisms: (1) supporting a progressive business processes throughout the supply chain, (2) architecture of the next generation that is able to deal with multiple aspect enterprise processes, (3) facilitating the very speedy product cycles and introduction of new product. Collectively, these mechanisms can give competitive benefits via significant reductions in the real

price of materials and parts, heightened flexibility to enable response to alterations in customer requirements, and cycle times that are quicker which can increase market share and customer satisfaction.

More reliable and durable products are a result of and increased chance of selecting the right suppliers. This is displayed in the significant lowering in the percentage figures relating to the lateness in delivery, quality beneath the expected standard and customer claims. In his research, Choi (2003) discovered that 90% punctual delivery time was obtained after selection of the supplier focused on the management of the supplier relationship. Furthermore, shipment statistics showed that delayed delivery of items reduced to 10%. With regards to the defective items report, it was revealed that the level of quality beneath the expected standard reduced from 30% to 15%. Lastly, evidence from the customer service department reports revealed that there was a reduction in customer complaints by 7%. The above evidences a strong progression in performance because of the correct selection of suppliers (Choy. *et al*., 2003).

Involvement of suppliers in the supply chain by involvement in product design teams and continuous improvement programs enhances the company's delivery service and overall performance (Tracey and Tan, 2001). The right supplier selection and infrastructure development also has an increasing impact on company performance (Kannan and Tan, 2006). Increased buyer-seller collaboration has caused enhanced seller participation in the process of design with the customer. Concurrent engineering is a strategy that is enabling the very effective implementation of product formulation Wu Wei Li (2011).

Supplier relationships also have to be managed in the context of a globalised and technically sophisticated environment, under constraints of cost reduction and quality improvement. In actual business practice, however, companies are assuming relationship management programs which aim to foster closer supplier relationship to achieve lower cost of product, reduction in cycle time, on time delivery, efficient inventory management, improved product quality, good after sales service and low maintenance cost. In this respect, the management of supplier relationships needs to include much deeper constructs than direct relational or operations-based factors alone.

Based on the literature in this area, the supplier relationship management involves the interaction level and the dedication to the relationship between the two parties forming the general construct (Anderson and Narus, 1990; Dwyer *et al.,* 1987; Frazier and Rody 1991; Handy, 1995; Nishiguchi 1994; Ring and Van der Ven, 1994; Cousin and Spekman, 2003). For instance, Gulati (1995) mentions that both suppliers and customers are less likely to have to use equity (fair play), sharing agreements as they gain more experience and trust with each other through the on-going development of their existing relationship.Morgan and Hunt (1995) mentioned that reliability and confidence can enable previously promised results in advance whilst maintaining integrity between the supplier and buyer. Dwyer *et al*., (1987), are also insistent on the fact that the credibility (confidence factor) and the structural goods elements (e.g., its interior, physical capacity, equipment, and geographical location) display examples of elements that can encourage the generation of fulfillment of purchaser's satisfaction.

An emphasis on building long term buyer-seller relationships may necessitate an improvement of not just the operational and business process aspect of the enterprise, but it also highlights the need to develop an effective communications process to be a key element of the supplier selection process (Kannan *et al.,* 2002).

Through the perspective of the purchaser, supply chain management ponders upon the recognition of potential suppliers, assessment of varying alternatives, the supplier selected, and the measurement of the true performance outcome achieved (Cambra and Polo-Redondo, 2007; Lo and Yeung, 2006 ; Turnbull et. al., 2002). Within this scenario, the supplier's ability to achieve reaching the customer's demands and its capacity to maintain management of varying relational aspects (such as cooperation and communication) become important factors, determining the long-term orientation potential with the supplier in question (Sila *et al.,* 2006).

On the other hand, management of supplier relationship research points out factors like trust, communication and cooperation to also have an impact the lengthy nature of industrial relationships.

Common ground between supplier selection studies and research related to enterprise is the heightened attention put into buyer-seller relationships (Lee and Hiemstra, 2001; Lee, Su, and Dubinsky, 2005; Weber2001). Despite this, few attempts have been made in the arena of convention to verify how meeting planners'/purchaser outlooks on decision features are differ between initial supplier selection and the maintenance of relationships with suppliers.

Dwyer and Schurr (1987) stated that the verification and maintenance of long-term relationships with suppliers is also imperative to purchaser/planners due to buyer-seller exchanges being ongoing relationships as appose to rare events. It was also pointed out by Dwyer *et al*., (1987) that purchaser/planners may decrease the time spent and resulting costs of sourcing and selection of new suppliers every time they need this service, and can also decrease the amount of uncertainty of successful achievements of suppliers by being able to rely upon established, long term relationships.

It is key that suppliers that are either maintaining relationships with purchasing departments or expanding into new markets understand which amongst the supplier selection criterion plays the biggest significant role for their purchasers (Baloglu and Love, 2003, 2005; Choi and Boger, 2000).

Dubois *et al*.,(2003) and Araujo *et al*., (1999) have studied buyer-seller relationships over long periods of time. They concluded that for the same product, over time, different supply strategies may be alternately used. They suggested that this probably occurs in accordance to the significance of factors that are contextual such as specification by final customer, structural changes in the supply market pressure for cost savings and a variety of other internal and external factors.

Proper supplier relationship management is the company's management of their suppliers across the whole supply chain (e.g. for faster delivery, reduced cost, decreased production lead time, and increased quality). When it is built on long-term, clan-like relationships, a company's supply chain creates "one of the strongest barriers to entry for competitors". Meaning, once a supplier becomes involved in an established and well-managed supply chain, it will have entire supply chain advantage.

A lot of suppliers rely predominantly on the on-going goodwill relationship of the organisation. The company usually has a grasp of the power in the relationship. Within the majority of industries, a variation of different suppliers can be found. The flexibility of the company puts pressure on the incumbent supplier to stick by the guideline rules of the company employing the supplier (Crane *et al.,* 2004). Although suppliers ought to look into company rules, they are not to be viewed as subservient in the relationship.

In his study Ellram (1995), pointed out that total cost ownership was interrelating to supplier relationship as it included the sharing of data on elements of cost-drivers. The eventual minimisation of production price can be achieved by the purchaser identifying the areas that need altering to reach the target cost. Giunipero and Pearcy (2000) stated that the buying occupation is moving concentration from tactical to strategic. The primary one lays stress upon putting in an order and price saving, yet the latter puts more attention on value-added functions and overall cost reduction. Hence, in relation to the cost leadership strategy (Porter 1980), manufacturing companies have to alter their targets and share them with the core supplier so that they can get this reduced overall cost.

In contrast to this opinion, some researchers take an opposite view and suggest that sourcing partners may tend to add rather than diminish value to the assortment of supplier relationships. However this can only occur when the buyer and supplier have the necessary capabilities or can be expected to develop such relationships with all their sourcing partners (Cannon and Perreault, 1999; Primo and Amundson, 2002; Zollo and Singh, 2002). This further serves to underline the complexity of buyer-supplier relationships and the inherent human aspects of the procurement process.

Marketing research from previous studies verified that the nature this sort of buyer-supplier relationship is similar to the concept of asocial relationship as appose to a relationship that is close and personal (Dwyer *et al.,* 1987; Hunt and Morgan, 1994; Smith 1998; Turnbull *et al.,* 1990, Ford and Cunningham, 1996). It was discovered by Smith that social bonds, the relationship management links of cooperation/communication and investment in relationship were a predicting representative of the quality of relationship in buyer-seller relationships. Turnbull *et al*., (1996), also maintained that social bonds come about that join parties when the outcomes

of the buyer seller relationship give satisfaction to both parties involved. For example, a long-term close relationship was regarded as highly important by companies at all levels. The orientation of the relationship was perceived to be a significant consideration for auto assemblers when they are deciding upon their suppliers. From his study (Choi and Hartley 1996), found that long term supplier relationships can give the company a quality increase, lower costs and improve delivery performance.

In a high-tech and manufacturing setting where quality is of pivotal importance, a supplier's quality level is often unknown (or imperfectly known) to the suppliers and purchasers. Furthermore, a supplier is often able to improve his quality by making investments in the relationship, for example, by training his employees or investing in new and better equipment. While the buyer would like the supplier to undertake costly investments in the relationship so as to improve his quality, the buyer is rarely willing to pay the supplier for these investments. Ideally, the buyer would be able to perfectly assess the suppliers' quality and select the optimal investment levels for the suppliers to undertake.

However, buyers who do not "fit the bill" for desired investments are rarely able to dictate and perfectly observe the suppliers' investments, i.e., the suppliers' investments are unobservable and unverifiable. This asymmetry information implies that a buyer who faces a set of suppliers of unknown quality and unobservable investments must design a sourcing arrangement that allows it to both extract some information about the suppliers and encourage (costly) investments on their part.

It has been seen more often that suppliers supporting customer quality improvement (which is known as continuous improvement), are working collectively in customer design development activities (this is called early supplier involvement) and in development within the customer production areas (known as the term modular consortium). Amongst the justifications for underscoring supplier roles is described by Prahalad and Hamel's (1990),view within which firms emphasise on their internal ability requiring better ties to suppliers in order to support activities that are non-central to the production system. This is where companies have the responsibility of managing

suppliers. Taking this into account, supplier selection specifically the verification of selection criteria, is something that has been structured at the firms.

In the circumstances of the supplier is underperforming, a purchaser can if they choose to, look for potential alternative suppliers or assist the current supplier in improving its performance levels (Krause and Ellram, 1997). The decision to do this will depend upon the selection of other suppliers that is available, the prices of seeking out and assessing unfamiliar sources, cost of switching the supplier and the level of importance of the purchase input (Krause and Ellram, 1997; Wagner, 2006).

Suppliers are likely to perceive these rituals as an indicator of relationship continuity and would not like to risk the relationship (Lai *et al.,* 2005). Collective product development initiatives that are successful are likely to expand the duration of the relationship by doing more new business future times. A positive effect of capital-specific supplier development found a positive effect to be commitment. The manufacturer is able to show commitment to the relationship through these investments, making the supplier react with a similar commitment in order to ensure the relationship is not ruined.

Within organisations, suppliers have participated in strategic roles. This is displayed in literature like those of Vonderembse and Tracey (1999) and Hsu *et al*., (2006), who maintain that suppliers have a crucial role in developing a competitive advantage. It was felt that their actions will always have a good impact on the organisation's performance levels.

Developing a collaborative relationship with supplier is the important function in purchasing strategy. Vonderembse and Tracey (1999) described supporting factors of buyer-supplier collaboration as a cultural element that is built on trust, information exchange, openness, communication and mutuality. An empirical study was done by Mentzer (1999) to examine the relationship magnitude with regards to trust, commitment and dependence, as independent variables helps contribute to relationship value. Relationship value had previously been acknowledged as the first step towards quantifying the measurement of the relationship outcome. Humphreys *et al*., (2001),

stated that collaborative relationships are demanding of commitment and trust in order to ensure long-term cooperation as well a shared willingness to take risks together.

Meanwhile, Chandra and Kumar (2001), stated that commitment, trust and collaboration between supplier and buyer were getting increasingly popular in supply chain relationships due to their ability to reduce friction and the sense uncertainty. Commitment from the buyer and supplier needs to be displayed through contributing resources to the relationship that are existing through the time, expense and amenities of an organisation (Zailani and Rajagopal, 2005). The formulation of respect, trust and commitment derive from honesty and openness (Whipple and Frankel, 2000). Subsequently, effective and meaningful partnerships between supplier and purchase were observed when both were willing to contribute their resources towards overall improvement. Buyers like to establish great networking relationships with suppliers via the collaborative relationship so that they can achieve price, time, and quality and delivery improvement. Bilateral interaction is a part of a sharing of findings which opens up further avenues of communication. Good communication can ensure valuable information is shared in a timely manner to avoid the purchaser being left out of the loop in the surrounding environments information and progress.

It is essential to share information so that chain members can maintain awareness of what is happening around them. Honesty and openness is a first impression that will be a crucial step in creating trust between the buyer and supplier. Therefore, the sharing of information sharing is not merely desirable but in fact absolutely essential in building an effective collaborative buyer-supplier relationship.

Supplier development as described by Krause is “any effort by a buying firm to improve a supplier’s performance and/or capabilities to meet the buying firm’s short-term and/or long-term supply needs” (Krause, 1999, p. 206). Therefore substantial effort is required from purchasers to support that the supplier development plan is in place to increase the chances of high performance (Humphreys *et al.*, 2001).

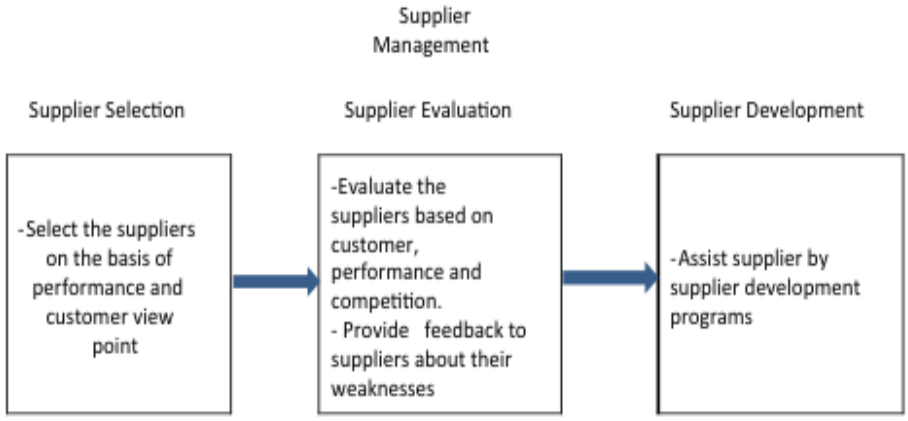
A lot of success stories have been establish, of customers formulating closer relationships within supplier exchanges in order to achieve the reduction of the price of acquiring raw materials and parts, improve the quality of goods, lessen the delivery time, have access to supplier expertise, manage uncertainty of complicated or technology based tasks and risk, and heighten the manufacturing flexibility and marketing time (e.g. Cusumano and Takeishi, 1991; Krause and Scannell, 2000; Casciaro, 2003;Johnston *et al.*, 2004).

Johnston *et al*., (2004), discovered a correlation amongst shared partner's flexibility and planning and the purchaser evaluation of performance on the basis of a list of several varying performance measures. The relationship amongst supply chain partner trust and innovation as well as reduced purchase price was also pointed out in (Corsten and Felde, 2005), study on collective movement in buyer-seller relationships. This includes between equipment manufacturers and suppliers.

As Ryu *et al*., (2007), stated that long-term inter-firm orientation has become more recognised as an essential factor that has driven firm competitiveness. Leonidou (2004) identified advantages that are strategically beneficial for firms that are involved in long-term relationships. The advantages are as follows: sellers can retrieve repeat buys from their customers enabling them new business opportunities, the chance of customers moving to other supplying companies can be reduced; useful market information can be gained from customers and the customers thoughts may be used with creative new designs of products, purchaser can ensure an uninterrupted flow of inputs is secured; suppliers' expertise knowledge and resources can be utilized; cost can be reduced; technological development can be exploited, wastage can be lessened and an improvement in efficiency can be gained. Taking all of this into account, the approach of supply relationships being long-term has become a tactical and strategic crucial element that it is essential for the succession of supply chain management (Rao *et al.*, 2006). In the development and maintenance of these positive relationships with capable suppliers, companies can formulate competitive advantages and give their customers a greater value in a way that the risk and uncertainty with the supply management is minimised (Zsidisin and Ellram, 2003).

The study of (Amin and Razmi 2009) however, suggested the integrated model framework for supplier management that includes three stages which are shown in Figure 2.5 below.

Figure 2.5: Supplier management framework



(Adopted from Amin and Razmi 2009)

Previous research has suggested that delivery (Kogut, 1988; Ulaga, 2003), defects (Buckley and Casson, 1976; Larson, 1994; Cannon *et al.*, 2000), efficiencies (Buckley and Casson, 1976; Harrigan, 1988), and purchasing cost reductions (Corsten and Felde, 2005) are realised by closer relationships. To example this, other elements verified in the research that could potentially be considered in the supplier selection criteria include: process expertise, supplier accessibility (co-location); product expertise; creativity; idea generation; degree of information exchange and buyer-supplier relationships (Sahay, 2003; Ragatz *et al.*, 2002; Rosseger, 1991).

2.6.3 Supplier Selection Criteria related to Decision-Making Tools and Techniques

Decisions of supplier selections are complex in that a range of different criteria need to be considered for the duration of the decision making process.Supplier selection requires strategic thinking and clear decision-making which is quite often time consuming.

To help decision makers to select the supplier during the decision making process, it is important for them to be equipped with certain tools and techniques. Degraeve *et al.*, (2000) in his study suggests the Total Cost of Ownership (TCO) method. The TCO purchase concept is equal to the purchase along with the cost of purchase and associated usable life costs. The TCO approach takes into consideration not just the price of purchase, but also other associated costs relating to the design, maintenance, transport and logistics, warranties and disposal and any other associated expenses related to its use (Labro and Roodhooft, 2000). The total cost of owning an asset during its usable life starts from the initial concept until its final disposal. A selection technique based on Total Cost of Ownership (TCO) is indeed relevant to ensure that the interests of the company and consumers are met.

A typical vendor selection model that has been used for well over 20 years to meet these sorts of challenges is embedded in the Total Cost of Ownership (TCO) perspective which proposes that all costs related to the purchasing process throughout the company's total value chain be quantified. The acquisition price and subsequent value of the service or product that needs to be purchased is decided upon and then discounted for the entire "life" of the investment in that item.

The approach used goes above and beyond price to take into account all costs that the item incurs related to quality, service, delivery, failure, communication, maintenance and administration (Ellram, 1994, 1995); costs related to the purchase and cost of services to be rendered are also determined.

Degraeve *et al*., (1999) further defined a hierarchical structure of purchasing activities relating to supplier level, order level and unit level activities. Of course, the most well-known approach for supplier selection is that of the Analytic Hierarchy Process (AHP) developed by Saaty (1980). This assists the analyst to organise the important elements of

a problem into a hierarchical decision tree. The Analytic Hierarchy Process methodology has been proven to not only arrive at a quantified and qualified decision under specific choice criteria, but also provide a clear rationale for the choices that are made (Chin *et al.*, 1999). The Analytic Hierarchy Process method appears to be a well-liked approach that tries to quantify judgments and opinions of humans with the method that alternative approaches might not consider.Nydick and Hill (1992), have examined the supplier selection decision making process using the Analytic Hierarchy Process method which can be useful in evaluating trade-offs in the presence of conflicting criteria related to offers from various suppliers.

Adopting a participative and flexible approach allows those involved in procurement decisions to explore differences of opinion and choices relating to the given suppliers. Developing consensus and evolving a ranking of alternatives for supplier rating purpose is extremely important (Muralidharan *et al.*, 2002).

Although the purpose of what can be termed traditional or 'crisp' as Analytic Hierarchy Process is designed to capture expert knowledge, this approach still requires a high degree of abstraction from the underlying criteria and is limited in the sense of not completely reflecting the human thinking style (Kahraman *et al.*, 2003). More recent developments in the field of AHP, such as that by Sevkli *et al.*,(2007), have applied additional approaches such as combined Data Envelopment Analysis (DEA) on top of the AHP approach (Ramanathan, 2006). Similarly, Yang and Chen (2006) have described another variation whereby a hybrid AHP-FLP (Fuzzy Linear Programming) method has been developed which claims to be more appropriate in the selection of output decisions, especially where high value components are involved and where stringent purchasing criteria are required.

Narasimhan, Nydick and Hill, and Barbarosoglu and Yazgac suggested usingAnalytic Hierarchy Process to apply is to the process of supplier selection. In short, Analytic Hierarchy Process circumvents the struggle in having to do point estimates for criteria levels alongside scores on performance with in the simple linear models. As appose to this, when applying the AHP the purchaser solely needs to provides qualitative statements with regards to the relative significance of a criterion against another criterion. At the same time, similarly with regards to the linked preference for a supplier against another

on a particular criterion. Tam and Tummala (2001), also propose the supplier selection criteria and decision making model for telecommunications companies via the Analytic Hierarchy Process approach.

A different team of scholars had put forward the idea of a range of statistical techniques to approach the imprecision when utilizing linear weighting models. Petroni and Braglia, (2000) used the "indifference trade-off" technique and principal component analysis for the exact same reason. Though the methods do differ from each other, in common they have the fact that the purchaser has no need to directly give accurately detailed numerical criteria weights. Evidently, using these statistical techniques will not be a straight-forward process for most users and can make things quite slow.

Several authors and scholars(Muralidharan and Deshmukh (2002), Handfield (2008), Pi and Low (2006),Chan, Kumar, Tiwari, Lau, and Choy (2008) propose the use of fuzzy sets theory to model a lack of precision and certainty within these situations of supplier choice. The Fuzzy sets theory proposes a mathematically method of modeling preferences that may be vague. An example is applying weights of performance scores on particular criteria.

There are also decision making techniques proposed to integrate specialised qualitative knowledge together with the experience of each evaluation and combine it with quantitative data in order to select the best supplier. Noting of these methods have so far been considered and used for generic business situations, there are few if any supplier selection or prioritisation methods aligned to the telecommunications industry.

Considering this factor, the Multi Attribute Utility Theory (MAUT) proposed by Min (1994) may appear to be more appropriate since it attempts to overcome the limitations of the AHP, Fuzzy linear approaches by accounting for both qualitative and quantitative factors in uncertain decision-making environments, rather than seeking to codify and translate them.

The verification of preference amongst criteria is predominantly based on judgments from senior management levels and a bit of quantitative business (Verma and Pullman 1998), field experts (Cheng and Li 2001) and project team (Ragatz *et al*., 2002). Regardless of

how professional they may be, results that are based upon the evaluation of the decision-makers are to a certain extent imprecise. To be able to overcome the challenges caused by this concept of human judgment, several authors and scholars attempted to create a computer program that linked expertise knowledge with previously published methodologies so that the selections and decisions made are deemed more accurate, professional and consistent.

For this, information technology holds the important role. Information technology, which includes the application of hardware, software and networking, is capable of increasing the flow of information and facilitating decision-making process.

Dealing with the decision making technique, it is very important that decision makers must be fully equipped with the tools such as computer technology, system database, information technology, security system technology and others to provide and integrate the information**.** Adopting the success in decision making techniques require appropriate planning tools, needed hardware, software, and network technology system. Information technology enables the company to sustain vital information that is more easily accessible, when it comes to operational decisions and planning.

The right and useful information would also need to be available and shared in the supplier company profile and product database**.** From the available data and information shared on the internet, it would help the buying firm access and evaluate the supplier information. Based on the information and the initiative to share the information with others including the supply chain partner, it would be helpful in terms of improving the potential of substantial performance, decreasing uncertainty and gaining benefits for the supply chain system as a whole.

According to De Boer *et al*., (1998), an evaluation of supplier selection techniques suggested that in a lot of cases the supplier criteria elements recognised could be interpreted in different ways, resulting in their reference to it as indetermination. To display an example they said that: “several attributes could be measured in order to assess the R&D capabilities of a supplier, but the interpretation of the term R&D capability just

as many other criteria is far from univocal. This would seem to suggest that there is a high degree of subjectivity in the decision making and evaluation process.

2.6.4 Supplier Selection Criteria related to Government Policies

The extent of the involvement that the government has is heightened for those in the international field as appose to those that trade local according to the research of Coyle, and Bardi *et al*., (1988). Different types of the involvement that the government has include: countertrade, tariff barriers, free trade agreements and pressures from them to make exchanges with the nations that are most favourable. These include China, where based on the government offset requirements, the purchaser is inclined to buy a certain percentage of services and products from the suppliers in this specified country. Therefore, due to the countertrade agreement, the ability to choose the supplier can be restricted when it comes to global trading.

Governments have been required to put in place the regulations to give a ground and set a standard of conduct that is deemed suitable to society. Legislations that protect the rights of shareholders as well as varying stakeholder interests increase within capitalist divisions, as well as the regulations and laws in place for the protection of enterprise consumers (Hoffman *et al.*,2003). The government legislation centres around the concept of 'fair competition'. Governments have the responsibility towards its people to ensure that business is a game that is played fairly in accordance to given guidelines which principally should be applied consistently to all parties involved. Past experiences of business indiscretions have resulted in these laws being enacted.

These government guidelines give them something that makes them responsible for stakeholders not to be taken advantage of during the actions of others, ensuring all parties are conducting their businesses in the manner and the spirit required by the legislation. Business in itself does not appear to be confident in the decision makers and the self-regulating community, therefore the ground rules were set for the pursuit of business conduct.

The telecommunications service providers in Malaysia are guided by government rules and regulations. The company procurement policy may vary from one to another; for instance, a partly government-owned company does not follow private sector approaches but has to adhere to the Malaysian government procurement guidelines.

In general, government policy encourages the buying firm to procure from businesses that are smaller and more local, this being a key method in contributing to sustainability by enabling local development and reducing the costs of transportation as the supplier is located closer to the purchaser. This encouragement of procurement from local businesses that are relatively small could indicate "favouritism" being used, which in prior research has associated the procurement process as inefficient (Vagstad, 1995; Brulhart and Trionfetti, 2004).

A concept of sustainable procurement has also been discussed broadly in the supply chain management scope. The entire procurement process can have sustainability incorporated into it ranging from the following: assessing options, defining the need, specification and design, supplier selection, award of contract and assessment of the tender. Usually, the sustainable procurement view incorporates and encompasses environmental, financial and social avenues. Subsequently, it is regarded a smart balancing element within the development with particular regards to the context of financial progression and the interest of public or social sectors.

The primary influencing factor puts a lot of emphasis on the function of considered benefits and costs to association with sustainable procurement. Sustainable approaches are commonly perceived as more costly, despite the fact the elimination of waste is amongst examples of how sustainability and financial means were accommodated for (Porter and Van de Linde, 1995). The way in which financial flexibility and cost effectiveness would be considered to fit in with the need for sustainable procurement is thought to play a vital role for how organisations may see things. This is due to their constraints with tight budgets and financial objectives of the companies. Research shows that concerns regarding cost are perceived to be the biggest obstacle when it comes to taking into account environmental elements throughout the process of purchase (Min and Galle, 2001). Reluctance for sustainable procurement may be displayed by companies

when the benefits are not clear and when it comes to conflicting views with directives, particularly with keeping up with competition and gaining the best value for money. Firms are therefore more inclined to take on sustainable procurement if they see potential no-loss-all-gain scenarios (Rao and Holt, 2005).

The influence that comes second concentrates on concerns regarding familiarity with sustainable procurement. It is important for organisations to be able to have knowledge of sustainable procurement and an understanding of relating government legislation before it can be effectively implemented. In order for organisations to be able to make sustainable procurement possible, it is important that they have the tools, competence and skills necessary. This is because in itself sustainability is a complicated concept; therefore professionals in procurement may not possess the skills that would enable them to apply it. A study conducted by (Brammer *et al.*, 2011), discovered that 83% of purchasing professional personnel thought of themselves as unprepared and lacking in ability to effectively apply sustainability. This is demonstrated in the example of the government procurement legislation of the USA where in line with the constitution, as well as purchasing that is environmental, a specific amount of concentration is put on giving equal opportunities and avoiding discrimination (McCrudden, 2004).

Further examples associated with government policy can also be demonstrated in the formulation of government policies that encourage the procurement to be from women business owned enterprise. Furthermore, they promote the purchasing from indigenous people and the use of procurement from minority owned business. The USA also developed non-discriminative policies for international procurement, pressurising the South African Government to avoid religious discrimination in order to end apartheid, as well as UK government discrimination towards Northern Ireland (McCrudden, 2004). Like Europe, the Canadian federal government has policies on procurement with regards to economically related aspects of purchasing, such as rules about gaining value for money and promoting competitive behaviour. In addition to these however, the Canadian procurement guidelines contain an encouragement of a non–discriminative approach and the assurance of opportunities of procurement from foreign businesses.

With regards to Australia, businesses that were local had support from schemes in differing states, such as “buy Queensland”. The necessity to empower smaller groups within society with regards to historical concerns is a significant part of the procurement policy in other countries alike.

In Japan however, environmental factors were deemed so high that the government put in place a law whereby green purchasing policies had to be developed by all governing bodies. This occurred in 2001 (European Coalition for Corporate Justice, 2007). In the post-apartheid South African world, public procurement was perceived as a highly significant policy. This particularly looked at the financial empowerment of the black community, encouraging public sectors to purchase from business with black owners, in an attempt to redress the upper hand had by the white-owned businesses as a result of the apartheid (Department of Trade and Industry South Africa, 2003).

Literature based on studies in the West indicates that differences between public and private sectors spring primarily from the different motivations guiding private and public sector organisations (Perry and Rainey 1988). Government organisations are managed for targets that do not hold the same attempted outcomes of the free market that characterises private-sector businesses. Social aims like the employment stability generally hold high precedence over return rates and profits in public-sector organisations (Kiran Karande, Rao *et al.,* 1999). Other reasons private-sector managers might operate more efficiently include monetary and non-monetary incentives to foster profit-maximising behaviour and closer monitoring by private shareholders (Perry and Rainey 1988; Ramaswamy, Renforth, *et al.*, 1995).

Western theoretical approaches used to explain differences such as varying motivations and social targets are even more applicable to emerging countries because the scope of the public sector is greater in many emerging countries. For example, the public interest theory, which postulates that state-owned enterprises bear an additional burden of being based on social objectives such as employment generation, regional development, (Ramaswamy, Renforth, *et al.,* 1995), is particularly applicable in many emerging countries. In India, for example, the public sector plays an aggressive role with a variety

of objectives, including transformation of the Indian economy by adopting the socialist pattern of society, redistribution of income and wealth to the weaker sections of society, and achievement of balanced regional development by locating in therefore ignored and economically backward areas (Uppal 1982). Also, the principal in the public sector, the government, does not monitor performance as closely as private shareholders do, and public-sector managers lack the monetary and non-monetary incentives used to encourage profit-maximising behaviour in the private sector, particularly in developing countries.

Among the government policy and guidelines is the concept of local co-ownership and the inclusion of Malaysians in public-private enterprises (the so-called "Bumiputera"). The goverment procurement policy therefore emphasises the promotion of competitive local input in order to ensure that the Bumiputera equity share in the nation's economic growth is balanced. All government-linked telecommunications service providers are encouraged to develop local Bumiputera vendor capabilities as part of a wider national economic and wealth creation agenda.

With this kind of policy in place, most high profile government or private business project opportunities available have to be awarded to local, Malaysian companies. Whilst this approach may appear to be wholly couched within the auspices of protectionism, these guidelines have been set up to give priority to locally-owned companies. Such measures are to help local Bumiputera companies, ensuring local participation and increasing the competitiveness level of those business communities in major business industries. The policy ensures that Bumiputera companies receive equal share in the nation's economic growth, thus promoting fair and equitable distribution of national wealth.

However, in the telecommunications industry, suppliers with high quality telecommunication products and standards are mostly foreign companies. Thus, with such government policies in place, this poses a predicament in the supplier selection decision for the Malaysian telecommunications service providers, especially government-linked companies (GLCs). As a result, these companies have to pay non-competitive, potentially higher prices for products and equipment procured locally because they have to go

through local Bumiputera vendors in order to procure products and equipment from international suppliers.

The issue of non-genuine Bumiputera vendors occasionally arises when local or foreign-owned companies represent themselves as Bumiputera status companies to gain business. Hence, the assessment and audit of vendor facilities and capability to provide goods and services will enable telecommunications service providers to identify and work with genuine Bumiputera vendors.

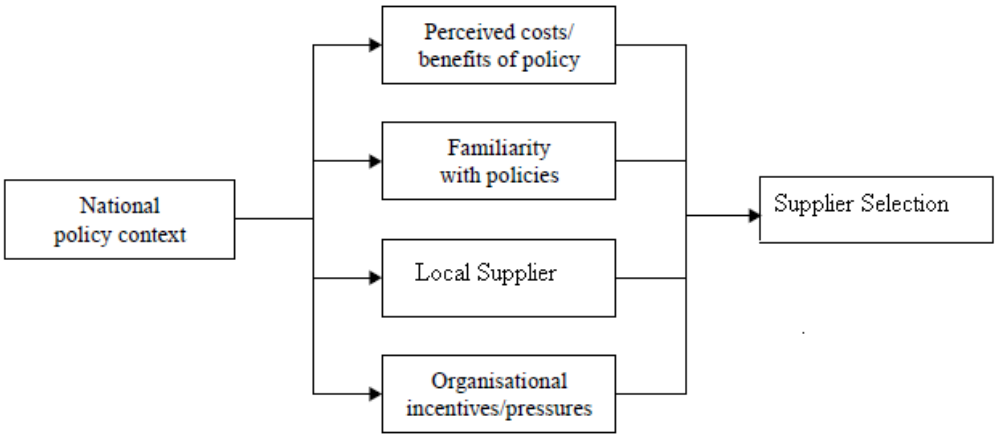
One of the Malaysian Government's major concerns is encouraging healthy competition in the telecommunications industry. The key objective is that through healthy competition within the sector, private enterprises operating the business will strive hard to furnish excellent, good quality, services and products to satisfy customers.

Across the globe, governments have attempted to face the difficulties of sustainable development by applying their influences as significant procurers of services and goods. In this study, we assume the function of alignment to the government policy would contribute to the factor influence in the supplier selection in the organisations. It is also displayed that although a lot of organisations in the public sector are implementing and embedding this criterion within their procurement, other parts of government procurement policy are significantly disregarded and there is a large range throughout regions in the nature and extent of involvement with public and private sector procurement practice as whole.

Moreover, barriers caused by the law were viewed as limiting to the involvement in procurement and purchasing activity. Governmental bodies are required to give comprehensive legislation and monitoring support to organisations and public sectors (Lundqvist, 2001), as well as adequate flexibility in budgeting to develop investments within organisations of the public sector. These may be efficient on a financial level when solely perceived from a long-term view, causing it to be a challenge when applying the office of governmental terms.

To be able to display this feature of the evaluation, we expand the model to also contain the significance of the local government legislation context, as well as the variation in it throughout regions, as an influence on the selection of the supplier. The Figure 2.6 shown below depicted the relationship of the government procurement policy and supplier selection.

Figure 2.6: Government procurement policy framework



Source: Adapted and Modified from Gelderman *et al.,* (2006)

2.6.5 Supplier Selection Criteria associate with Business Ethics

Carter and Jennings (2004) and Caroll (1991) developed definitions of ethical social responsibility which was further extended upon by Reham *et al*., (2009). These definitions give a detailed relation to purchasing functions: "managing the optimal flow of high quality, value-for-money materials, components or services from a suitable set of innovative suppliers in a fair, consistent, and reasonable manner that meets or exceeds societal norms, even though not legally required".

Eltantawy*et al*., (2009), discovered that responsibility of ethics does have an effect on performance that is indirect, by its good relationship with status perception. Significance is help in the exploration of ethical procurement, due to the fact that when organisations formulate their values and beliefs, strategic suppliers can be involved by them in these processed and procedures (Dyer *et al.,* 1998, Singh and Power, 2009).

The most fundamental part of organisational culture is its ethics. Business ethics promotes the successful integration of ethics into organisational culture, inculcating standards of excellence throughout the organisation, so that everyday decisions, attitudes and beliefs are subject to these ethical standards. In order to be a successful manager, the manager needs to be a good person with morals. Evidence displays that a person cannot do a successful job unless there are values in place that represent excellent leadership and ethical standards (Collins, 2001). The international method that is most accepted for implementing good ethics into organisations is via codes of conduct, codes of best practices or codes of ethics.

Taking the above into consideration, a commonly asked question is how managers can respond to the way that people from different nations regard different behaviours to be morally acceptable. It would be ideal to be able to decide upon whom is right in their moral code and all stick these accepted behaviours on a universal agreement. However, due to a range of different reasons, on a realistic level it is not feasible to do this. Furthermore, a lot of ethicists in business appear to be accepting of a little bit of international moral diversity, if not for anything else then in the least for the moral rules at the non-important levels (DeGeorge, Competing with Integrity; Donaldson, Ethics of International Business).

Managers that have social responsibility are inclined to do the correct thing just because of the fact that is the correct way to act in any given situation. The right way to respond and the right action to take is what society expects this person to do. According to Thomas *et al*., (2004, p 64), executives ought to:"act ethically not out of fear of being caught when doing wrong. Rather, they should embrace ethical behaviour in business because of the freedom, self-confirmation, and success that it brings". Often, it can be challenging to the manager to do the thing that is wrong due to the fact that a person's inner self can instinctively fight it, however, on some occasions doing the right thing can be even more difficult. Research has discovered that purchasing managers cannot always be sure of how social and ethical issues can be incorporated into their purchasing (Cooper *et al.*, 2000; Maignan *et al.*, 2002).

This debate focuses more on the ethics within organisation philosophy which goes above and beyond being morally comparative or regulatory. To be able to do this, it is put forward that theorising ethics as a type of regular practice can be most effectively understood. This approach is based on the ability to theorise ethics with regards to how managers conduct themselves on a day to day basis. It is argued that daily activity is imperative to the way ethical subjectivity can be formulated within organisations, as it is a representation of the organisations rules, guidelines, discourses and norms.

In developing countries, business conduct has to be approached under conditions that are deemed un-ideal. As well as diverse morals, managers have to deal with corruption, fraud, and other types of unethicality alongside poverty and instability. As a result, business ethicists are led to think about whether or not the multinational companies have a duty towards the people in the other developing countries in which they operate, with regards to assisting them and to what extent. This is among many things that they have to consider.

In conjunction with unethical purchasing behaviour, Dempsey, W.A *et al*., (1980) found that some additional elements that influence supplier selection is by which sellers can provide buyers with personal inducements. These include the 'bribes' that materialise as gifts, meals, entertainment and holidays as well as money payments. For reasons of convenience and confidentiality it is likely that the provision of these inducements involve some form of personal contact between buyers and sellers.

Bauman (1993) and Feldman (2004), looked upon ethics via hypothetical framework concentrating on the way ethics are played out in practice, not on a literal or practical level, but by emphasising on the interpretation and situation of ethics, their approach that is enacted and the relation they have in organisational firms. Having this idea of morals and ethics in practice, Bauman (1993) and Feldman (2004) are able to theorise the links arising between: rule abiding and rule breaking, the interaction between rule systems and subjects, and the expansive and active building of morals and the supremacy this conduct communicates. They knew about the risks involved within this approach, always attempting to avoid them, particularly the insult that the position determines a belief of ethics (Feldman, 2004). As appose to highlighting the relevance of ethical practices, it

was suggested that they would be performed during a scenario of ethical varieties, where moral decisions are made in a potentially uncertain scenario in which standards may conflict with one another (Bauman, 1993).

Bauman (1993) and Feldman (2004) therefore regard ethics in firms as continuous debating process and contests about ethical decisions as Bauman argues, "being moral means being bound to makes choices under conditions of acute and painful uncertainty" (Bauman and Tester, 2001, p. 46). Within the proposed morals as conduct framework, a lack of clarity and "bounded moral rationality" (Donaldson and Dunfee 1994), are vouched for as appose to being taken over by unwavering moralistic models dictating how companies and their personnel ought to behave for the sake of being "ethical", for example ritualizing a form of tradition that is unbalanced (Clegg and Feldman, 2005; Feldman, 2004).

In previous research on organisations, it has been attempted to establish whether ethics is an issue that is individual or organisational. Thoughts differ, some researching scholars arguing that ethics is a paramount responsibility to an individual (Ibarra-Colada, 2002; Watson, 2003), yet other researches maintain that ethics is to be anticipated throughout framework bureaucratic structures (du Gay, 2000, 2004). Current researches align themselves on a broad level with social scientists such as Gilligan, who concentrate on ethics and morals not as a case of the "moral agent acting alone on the basis of his principles" (Gilligan, 1987, p. 304), more viewing ethical behaviour as embedded within "daily experiences and moral problems of real people in their everyday life" (Tronto, 1993, p. 79).

With regards to how it relates to ethics within business, this proposes a necessity to identify the complex nature and jumble of true management conduct in life as well as taken on means of research and conceptual and theoretical frameworks that can accommodate this (Bartlett, 2003, p. 233, Maclagan, 1995). As stated by Bauman, we identify the challenges of being moral when we are faced with an ethical dilemma that does not provide any good choices or outcomes (Bauman, 1993, p. 248). It is the physical application of morals on a day to day basis within these situations that is paramount for having an understanding of the true conduct of ethics within companies.

Something crucial that argues with the above mentioned point of the extreme difficulty of being a moral person within business ethics is the suggestion that ethics or organisational conduct could be altered to the business targets and outcomes in specifications. Examples of these include competitive gain and profitability (Francis and Armstrong, 2003, Jones, 1995, Joyner and Payne, 2002, Raiborn and Payne, 1996). Matters like these refer back to Adam Smith's (1863) claim that through the use of actors who only have self-interest within the competitive market, the maximum amount of beneficial outcomes can be gained.

Realistically, it is maintained that the majorly consistent responses made by organisations in dealing with issues regarding ethics includes the formulation and embedding of guidelines through value statements and codes of conduct (Jackson, 2000, Kjonstad and Willmott, 1995, Stevens, 1994, Warren,1993, Weaver, Trevin˜o and Cochran, 1999). Another action taken is the appointment of 'ethics officers', who establish and apply the ethics (Donaldson, 2003).

All of this translation of morals into conduct and trending talk of guidelines originates from the modernist thought that universal ethical standards could and ought to be implemented into social groups so that moral codes are identified and adopted (Bauman, 1993). This sort of a view of morals commonly gets applied to conduct within an organisation, furthermore sufficient research displays that it also applies to the conduct and actions of managers within organisations, leaving them open to judgments from observers who decide whether or not they appear to be ethical (Brass, Butterfield and Skaggs, 1998, Gatewood and Carroll, 1991, Lewicki and Robinson, 1998). These conceptions weigh upon theoretical normalization that presumes that the ethical identification of right or wrong can be distinguished and applied so that it can show whether or not particular behaviours or conduct are perceived to be ethical. This would enable it to be a sole ruling that things either fall within or out of.

Known to us is that a lot of organisational conduct is shaped by bounded rationality, information that is not complete, and shambolic, 'garbage can' processes for decision making (Cohen, March and Olsen, 1972). Faced with these challenges, a miss-match

between business reality and ethical certainty appears to be difficult to avoid. In a situation where certainty like this is offered, it can often have little to do with ethics and more to do with Bauman's 1993 quotation of: "A promise of freedom from moral anxiety, when in fact, it is that anxiety that is the substance of morality".

As a result, ethics may be perceived as incompatible beyond any hope with management conduct (Jackson, 2000). They can be regarded also to interact with culture-specific and industry-specific scenarios (Donaldson and Dunfee, 1994).

By identifying how complex ethics can be in conduct, Jackall (1988) appears to have gone to the most extents to the context of ethics within day to day business practice. Jackall's approached the research by investigating occupational morals of managers with regards to ethical guidelines in place, formulated by managers to assist in their conduct at work (1988, p. 4). He argues that: "What matters on a day-to-day basis are the moral rules-in-use fashioned within the personal and structural constraints of one's organisation". Differing elements can significantly vary these rules, including staff or line responsibilities, a person's hierarchal positioning or proximity to the market. Therefore, moralities within organisations are in actuality situational, contextual, unarticulated and highly specific (Jackall, 1988, p. 6).

Czarniawska, (2001), on the other hand, proposes that morality and ethics conduct can be best comprehended with regards to how: In every individual instance of its use, it formulates its own different rules, verbs as appose to nouns are favourable, it concentrates on relationships instead of features and forms definitions based on this, meaning that the comprehension of things varies in accordance to their uses (Czarniawska, 2001, p. 256).

Ethics can be found in socially implemented enactment that is driven by contexts and scenarios (Thorne and Saunders, 2002). Codes possess a significant organisational role. According to Meyer and Rowan (1977), in the presence of formal ethics and systems, in examples moral codes, they may be perceived to operate as ritualistically fostered falsehoods used to obtain resources, legitimacy, stability, and to heighten the prospects of survival. The conduct of the operation goes above and beyond its dramatic statements.

Organisations use codes of conduct as a means of standards during their attempted attainment of legitimacy, enabling them to justify their actions (Brunsson *et al.,* 2000). Not only this but is assists them to feed their narcissistic fixation on maintaining appearances (Roberts, 2001, 2003). It is because of this that moral codes or codes of conduct are demeaned to become more of a public relations exercise than the initial purpose they once held (Munro, 1992, p. 98).

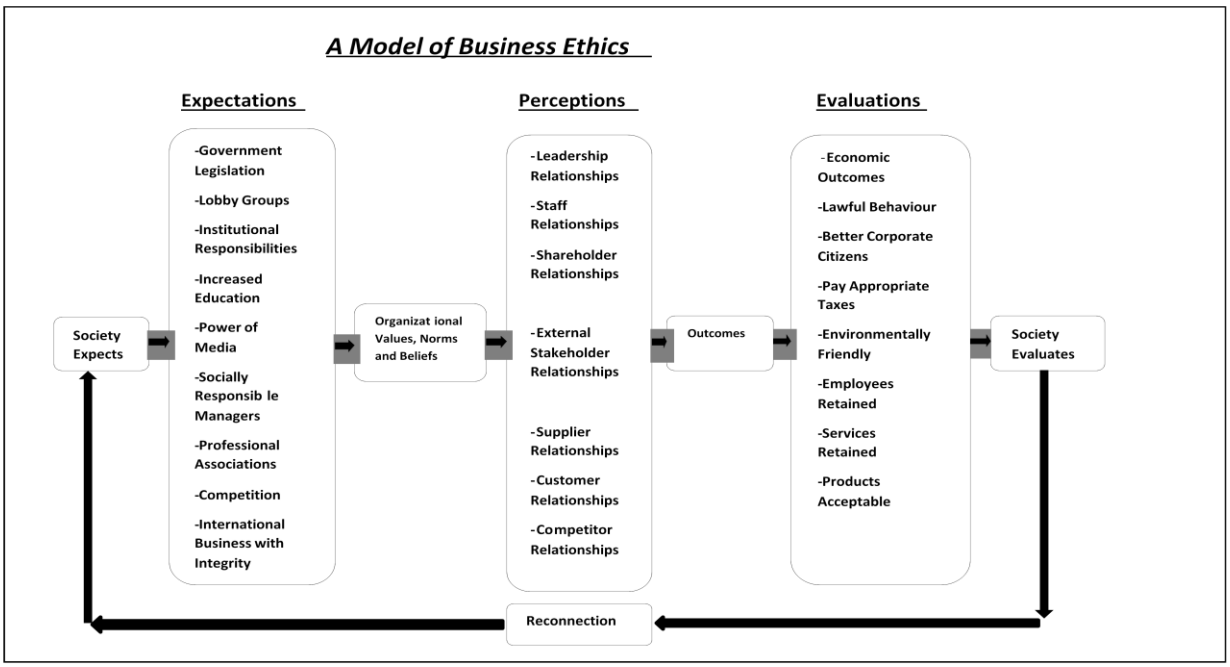
Practice viewpoints on ethics would consider the effect of broad and informal organisation of ethical knowledge as well as consequences of poor moral judgment during the decision making process. Ethics in conduct concentrate on the actions that formulate particular behaviour and commonly retrospectively refer to conducts as less or more ethical. This occurs where discourse is regarded something that builds frameworks and legitimises behaviour (including vocabulary) in order to justify actions.

In organisations, people can define situations and scenarios as well as decisions through the use of ethics, like the application of value judgments originating from society enabling them to determine how ‘good’ or ‘bad’ something is. The explorations of ethics within a business environment can be modified to display a concern for understanding varying frameworks used by personnel in companies to make valuable decisions.

The conduct of ethics relates discourse and subjectivity on an individual and organisational degree. The conduct of ethics is what determines the behaviours of the subject to be ethical or not, as the subject does not merely choose to behave ethically. Application of ethical conduct is therefore not a universal code that formulates subjectivity; instead it is implemented into general daily practices (Keleman and Peltonen, 2001). By evaluating what constitutes subjectivity in a working environment, ethics in practice answers the question of how people at work enact organisational practices and how those practices formulate their subjectivity and conduct. It takes into account how people conduct their practice and attempt to apply the conduct of other people.

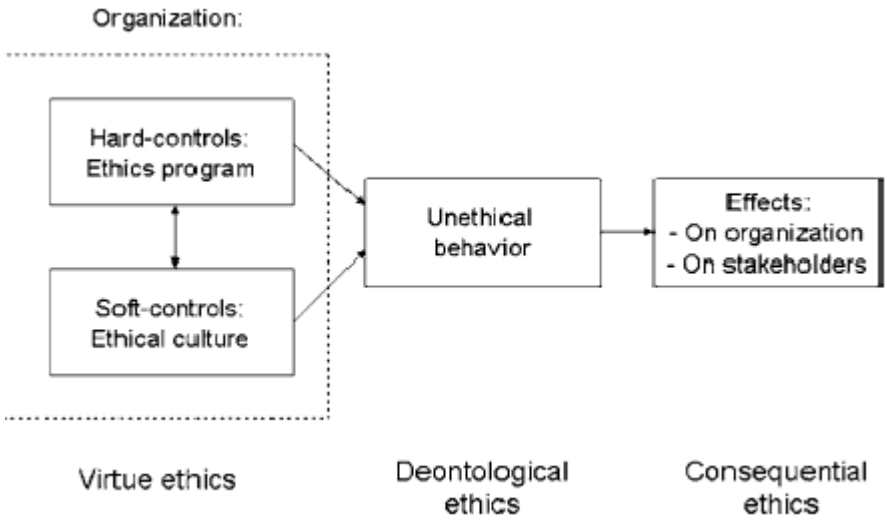
As discussed, ethics in practice can't be written in lists of guidelines that teach conduct; therefore, there cannot be a best way for good ethics to be assured via judgments, legislation or prescription. The idea of ethics and morals as conduct is unable to offer 'black and white' table or grid that clearly categorises what is bad and good; as it is not as simple as this. It is recommended by the ethics conducts for organisational members to do extensive and explorative research in order to gain the understanding of ethical predicaments they may come across in their working lives, and how to approach such scenarios (Stewart Clegg, Martin Kornberger, and Carl Rhodes 2007). To summarise, within the above articles the value of understanding business ethics as a form of practice has been elaborated upon. The model of business ethics and model for measuring the ethics in organizations are shown in Figure 2.7 and 2.8 below:

Figure 2.7: A Model of Business Ethics



(Source: adapted from Go¨ran Svensson and Greg Wood2008)

Figure 2.8: A model for measuring the ethics in organizations



(Source: adapted from Muel Kaptein 2010)

Staunch liberals, following John Stuart Mill and Milton Friedman, claim that business and society will thrive, only in a free market economy with as few restrictions and regulations as possible. In this sense, businesses are perceived as autonomous agents, self-directed and responsible for their decisions and actions. Corporate codes, then, would be preferable to outside intervention; anything stronger or externally imposed would simply get in the way.

As Milton Friedman claimed long ago on this view, ethics is both absent from and extraneous to this business cycle (Friedman, 1970). At best, ethics is introduced from the outside, in the form of codes and packages, supporting a triple bottom line or goals of corporate responsibility and citizenship.

However the other point of view claims that business ethics is an intrinsically ethical enterprise, and that ethics applies from the inside out, so we need to internally develop rather than externally impose. Ethics should incorporate both internal and external elements.

To further look into a broader view of the business ethics practice, some literature has expanded the view in comparison to USA and Japan organisations. In the US, because corporations cannot control managers' personal consciences and values, factors that prevent managers from bringing their personal conduct of behaviour into full play must be increased in order to decrease unethical business practices. The Japanese corporations on the other hand, found elements that enabled them to support ethical behaviour. These included ‘company philosophy with ethical content’ and ‘a punishment system for unethical behaviour,’ both of which have traditionally been very common among Japanese firms. A large portion of Japanese corporations also use informal methods for example: "CEO often mentions business ethics" and "to contribute a part of profits to social/cultural/chari table causes". However, corporations which employ formal methods (e.g., "code of ethics," "ethics committee," "employee training in ethics," and "social auditing") are much fewer than that within American corporations.

While American managers felt that increase in manager professionalism and education as well as ‘government regulation, legislation, and intervention’ were moderately important factors causing higher standards, Japanese managers felt that the most notable company policy is the critical factor influencing Japanese managers' decisions, whether ethical or unethical. The US Sentencing Guidelines of 1991 have penalties or punishments that are swayed by the ethical and moral procedures or processes companies have in place. This is an attempt to make certain that companies continue to maintain their ethical business conducts (McKendall *et al.,* 2002). Watchdogs are also appointed by governments in order to ensure the monitoring of business practices.

The main risk or threat to this relationship comes in the form of 'moral hazard'. If a moral hazard occurs, it can harm the beneficiary. This is the displayed possibility of abuse of power, conflict of interest, and bad faith, on the part of the trustee (Jamal and Bowie, 1995, pp. 703-704). Lobbying, canvassing, corruption and bribery are still important issues of concern in the areas of business ethics.

Codes of ethics, conduct, and best practice guidelines outside of business are designed to deal with the threat of this sort of moral hazard. Codes of ethics are the most general kind of code, setting out the principles and values, which govern the profession and its

activities. Codes of conduct are more specific, actually giving guidelines on specific issues like conflicts of interest or privacy. Codes of best practices are the most detailed of all, giving practical guidelines on a range of specific topics from bribery to gift acceptance and media relations (Cadbury Committee's Code of Best Practice, 1992). There are particular instructions when dealing with the following types of issues: legal compliance with security and legislation as well as regulations on exchanging/trading. That is of course if the company willingly abides by and accepts the legislation and regulations that govern its activities.

Confidentiality and privacy-This is the respected disclosure of information by employees and management. They must not reveal any private information to a third party without permission from individuals involved, this includes the discretion of corporate secrets.

Openness and transparency-The Company does not permit bribery, corruption, adulteration, or a lowering of standards in its dealings with other companies or countries. To demonstrate this, the company sets out its policy on gift-giving and taking (Gordon and Miyake, 2001).

Courtesy, honesty and trust-This involves dealings with the public, employees and competitors. Fairness, respect and dignity must be shown in the conduct of these dealings.

Conflict of interest–These conflicts should be avoided. The least amount of information possible should be disclosed to third parties, therefore inventions, procedures, discoveries and inside information should not be marketed nor revealed to them.

Most corporate employees are unaware of the details of their governing code and do not even have copies of these guidelines. They are also rarely given training on these. Most corporations do not monitor use of the code, nor reward compliance with it. Sanctions of codes are drawn on after pigeon holing and punishing bad behaviour.

A relationship that demotes suppliers to a position of insignificance or degradation ought not to be allowed within ethical inter-firm relationships. In any aspect that suppliers should be regarded as equals. They also need to be perceived as associates on a mutual

mission to formulate worth in the market place to all involved in the business partnership. Therefore it is recommended that the suppliers are involved in the firm's values and ethical conducts.

Transparency International publishes a Corruption Perception Index (CPI) and a Bribe-Payers Index (BPI) on a yearly basis. These display the lists of countries that have companies that are most likely to offer bribes as well as the countries with companies that have the most corruption (Pacini *et al.,* 2002). A list of possible areas of the world where businesses might like to select suppliers can be determines by investors use of these lists (Go¨ran Svensson and Greg Wood 2008).

In addition to this it is well understood that good ethical practices increase the reputation and integrity of organisations (Turner *et al.,* 1995). Companies that exercise exemplary business ethics will be able to engage increased commitment from their business partners, including suppliers. Similarly, suppliers that practice good ethical values tend to show higher accountability in their business operations by ensuring that contracts and commitments are executed as mutually agreed (Badenhorst, 1994) in an efficient manner. This will undoubtedly lead to the success of the firms' performance.

2.6.6 Impact of Supplier Selection on Company Performance

Selection of the supplier as the primary link of the supply chain, holds great significance to companies as it actually commits a firm's resources while effecting other activities at the same time such as production, implementation planning and control, inventory management, cost saving, work efficiency and product quality.

Many studies have been carried out by experts within the field to investigate supplier selection criteria which contribute to excellent firm performance (Vonderembse and Tracey 2006, Tan *et al*., 1999, Krause 1999 and Tan 2002). In addition, there have been numerous discussions on supplier selection which may have a potential impact on the company's management and performance. The development of strategic alliance with suppliers has become an important approach in rationalising business operations in order

to sustain competitive advantage (Ohmae 1989). A strategically planned commitment from suppliers is an important verification of business success (Kannan and Tan, 2002).

Based on previous research and through industry practices, it is clearly indicated that the implementation of particular supply chain strategies has an impact on organisational performance. Tan (2002) examined supply chain management and practices of supplier evaluation which had an influence on company performance. Tan *et al*., (1999) undertook a survey that evaluated the effect of customer relations practices, supply base management, and quality management on the performance of corporations. Their survey results indicated that in order to achieve growth and financial objectives, all three supply chain components (supplier, customer and manufacturer) must integrate effectively.

These strategized associates among a range of supplier and customers assist the creation of a supply chain that concentrate on the requirements of the final customer. Through getting suppliers involved in goods development and efforts for continuous improvement, suppliers have the potential to become familiar with customer needs, culture, and patterns in making decisions which can enable them to alter and implement their own resources in the most beneficial ways possible (Mark A. Vonderembse and Michael Tracey 1999).

Choosing the right suppliers possibly may lowers the material buying price as well as improving competitiveness, this being the reason that a lot of experts feel supplier selection to be the most crucial process of a given purchasing firm. As suppliers pick up the responsibility for the subsystems and parts of the end product; technological development, production costs and quality performance are incorporated, demonstrating their importance and selection in accordance to strategic and operational elements. It then becomes possible to match the goals and targets of the two parties, by instrumenting selection criteria that suite with the company's strategy.

Many other studies have used different performance measures to evaluate the supply chain management strategies' effectiveness. For instance, Li *et al*., (2005) applied delivery reliability as well as marketing time to assess the predictive value of the six supply chain management builds. They analysed several constructs including strategic partnership of suppliers, relationship with customers, sharing of information, quality of information, internal lean practices and postponement. Meanwhile, to assess connections

between customer responsiveness, supply management, financial performance and strategic purchasing of the purchasing company, Chen and Paulraj (2004) apply buyer and supplier performance as variables. Vickery *et al*., (2003) studied the implications related to performance of integrations of a supply chain strategy, using customer service performance and financial outcomes as the performance formulations. Narasimhan and Kirn (2002) studied the impact of supply chain management relationships between firm performance, integration and diversification. In their research, the elements are defined by profitability, growth and market share. As the associated measures of performance, Tan (2002) applied of customer service level, competitive position and total product quality.

Attempts by materials manager and purchasing managers ought to adopt an environment that improves performance quality by striving to produce manufacturing processes that are efficient with value-added, little work-in-process portfolios, regular punctual delivery and goods of a high standard (Giunipero and Brand 1996, Fitzgerald 1995, Krause 1997).

Supplier relation management and related practice are crucial for the improvement of company performance. In the supplier selection process the supplier relation criteria assists a company to establish supplier that will give excellent performance, quality of product, availability, and regular delivery that is punctual(Fawcett and Fawcett 1995, Mason 1996, Morgan 1994).

When suppliers get chosen with the above abilities, there is an expected increase in the supplier performance as well as the buying company's. Along with the supplier relation management supplier involvement in development of goods and regular continuous improvement is deemed to be respectable practice. An increased interaction and communication with clients, suppliers, and various other pivotal parts of the company are necessary to make certain that external and external capabilities can be adopted in areas that assist the overall success of the firm performance in all areas.

The eventual target that suppliers and their clients have is the provision of goods with the greatest value to the end customer. Getting suppliers involved in the companies design conduct and identifying a consistency of cooperation in the joint efforts for continuous

improvement aids this eventual outcome (Burt and Soukup 1985, Cocks 1996, Epatko 1994, Leenders 1994, Minahan 1996, Monczka and Trent 1991, Morgan and Hunt1994, Towler 1996). Kannan and Keah (2002) found that soft, non-quantifiable supplier selection criteria gave greater impact to a firm's business performance. Non-quantifiable criteria such as commitment of suppliers and sharing of information between the supplier and buyer brought about a significant impact on supplier selection and firm performance.

A definitive and well understood criteria list to choose and assess suppliers is something that can assist companies in the improvement of performance in manufacturing. Additionally, organisations may improve overall performance keeping suppliers involved in associates and partnerships in order to consistently better operations and increase efforts in the designing of goods (Vonderembse and Tracey 1999).

Companies who are aiming to increase supplier participation seem to be concentrating activities to assist continuous improvement. By doing this, they are taught how to share expertise and cooperate with one another, enabling them to achieve a great success before taking on the dilemma of maintaining involvement of suppliers in pursuits of development of goods.

Identifying supplier selection criteria and formulation supplier participation packages increases good communication and makes a trustworthy environment in which meaningful relationships with suppliers can be built. These relationships may further better performance by heightening punctual delivery, getting rid of raw material stock outs, lowering damage that may occur in transit, and bettering the quality of incoming goods.

Management has the responsibility of organizing, developing, and using external and internal supplier abilities using methods that can meet customer requirements. Effectiveness and efficiency from the supplier is what resulted in being able to meet final client requirements. A significant amount of supplier involvement in the designing goods teams that take on continuous improvement enables the strengthening of a company's position. It needs the facilitation of interaction amongst the firms and their suppliers. This highlights the importance of maintaining and managing relationships within groups

including mediation and communication holds more importance than the sole management of general assets. While companies build a set of strategic associates amongst suppliers and customers, the creation of strategic alliances is enabled, which unifies all the parties involved (Vonderembse and Tracey 1999).

Therefore the firms who develop associates throughout the supply chain can assist in achievement of effectiveness. In examples, as organisations start to formulate relationships that are long-term with their selected suppliers, it becomes a question of sustaining the relationship, maintaining competition and bettering performance.

The current literature will allow the inter-relation of the input of buying strategies concentrating on the selection of the supplier in relation to the performance of the firm. As pointed out by Brookshaw and Terziovski (1997) and Carter and Narasimhan (1994), the buying occupation definitively contribute to performance developing via innovation and standard improvement in the development of new goods. Moreover, (Das and Narasimhan 2000), stated that buying contributes a significant effect on manufacturing standard, delivery and cost. This is alongside exploration and formulation of new products.

Selecting a supplier includes elements that a firm utilizes when choosing and assessing crucial/preferred suppliers (Kannan and Tan, 2002). Due to the fact that over 50% of the prices of products sold internationally originate from bought materials, selection of the supplier continues to be significant strategic choice that will be advantageous to the company's competitive position (Simpson, Siguaw *et al.*, 2002). The supplier's capabilities also have a huge impact on the company's ability to develop a reasonably costing high quality product. Thus supplier performance is a key in determining the organisations success (Choi and Hartley, 1996, Krause *et al.*, 2000, Shin, Collier, and Wilson, 2000).

This means that the supplier selection criteria and factors influencing supplier selection need to be carefully considered. Through the supplier selection functions in particular, it needs to be recognised as the main driver for organisational enhancement, impacting on the overall company performance.

2.7 Literature Review Taxonomy

A lot exploration in the supplier selection process, buying management and supply chain management domain has been conducted within the last few decades like Dickson (1966), (Ellram *et al.,* 1999) and Handfield (2002). Ranging areas of supplier selection factors and supply chain management have been subject to analysis and observation via the application of varying philosophies, models, empirical and conceptual research. The research vouches for the fact that supplier selection criteria / influencing factor have been found to relate to the company performance (Tracey *et al*., 1999, Kannan *et al.,* 2002, Eltantawy R.*et al.,* 2009).

A significant variation of research has been discovered within the domain of supply chain management and operation management which has focused on various criteria of supplier selection perspectives. Further summary of the major literature review is displayed in taxonomy Table 2.1 below. In the taxonomy table shows the broader scope coverage of the literature on the supplier selection and its criteria as well as the impact of the supplier selection. In each column there is an indication of the scope of related information in the relevant areas, brief description of the literature study, type of industry, country of the conduction of the study, the methods employed and summary findings of each study.

Table 2.3: Taxonomy of supplier selection

Area	Brief Description	Industry	Country	Methods	Findings	Authors
Supplier selection	Study the supplier selection criteria by investigating possible quantitative and qualitative criteria according to the levels of buyer–supplier relationship, attempts to combine both qualitative and quantitative supplier selection criteria.	Electronics Manufacturing industry	Turkey	Survey/Questionnaire	Companies display different purchasing behaviour in different circumstances, including their selection criteria and supplier management buyer–supplier relationship, the company's competitive situation and its corporate strategies.	S. Şen, H. Başligil, C. G. Şen and H. BaraÇli 2008
Supplier selection	Every supplier is evaluated based on a set of predefined criteria which includes cost, delivery, management expertise, corporate background, plant capacity and financial stability.	Construction Civil works	Greek	Survey/Questionnaire	The most significant criterion is the Technically Approved and Suitable Material as main criteria for supplier selection.	G. N. Aretoulis and G. P. Kalfakakou and F. Z. Striagka 2010
Supplier selection Criteria	Attempt to understand 15 supplier selection criteria for initial supplier selection and maintaining supplier relationship.	Tourism service industry	USA	Survey/Questionnaire	For the initial supplier selection stage the most important factor is supplier ability to meet quality specification and in order to ensure the suppliers are able to meet specific delivery times, it is important to maintain relationships with them.	Miyoung Kim and Soyoung Boo 2010
Supplier selection Criteria and process	Examine the perceived importance of quality, cost, delivery, and flexibility attributes in the supplier selection process.	Manufacturing industry	USA	Survey/Questionnaire	Managers perceive quality to be the most important supplier attribute while delivery performance is rated to be more important than unit cost, but the delivery lead time is rated to be less important than unit Cost. However, flexibility in changing the order was perceived to be the least important among all the above attributes.	Verma, R. and Pullman Madeleine, E. 1998

Area	Brief Description	Industry	Country	Methods	Findings	Authors
Supplier selection Criteria	Attempt to develop a decision making tool to measure multi-criteria of supplier selection which includes both qualitative and quantitative factors where necessary; to make a trade-off between these tangible and intangible factors; some of which may conflict.	Manufacturing industry	China	Survey/Questionnaire	Found that volume price discount and supplier capacity constraints are an element in supplier selection criteria. Increasing attention towards supplier partnership not only raises the importance of supplier selection but also increases the significance of considering qualitative factors in this decision making process.	Weijun Xia and ZhimingWu 2007
Supplier selection Criteria	Examine the cycle time criteria on supplier selection and impact on performance outcomes.	Manufacturing industry	USA	Survey/Questionnaire	Quality along with capabilities is the most critical factor in the initial supplier selection, however cycle time and competitive price is an important but not dominant factor. Cycle time will have significant effects on high volume, long term and continuously repeated trend purchases.	Alex Sharland, Reham A. Eltantawy and Larry C. Guinipero, 2003
Supplier selection Criteria and supplier relationships management	This paper intends to study the selection of suppliers based on the potential for a cooperative, long-term relationship being just as important to direct and indirect suppliers.	Manufacturing industry	USA	Survey/Questionnaire	The study found the importance is placed on consistency (quality and delivery), reliability, relationship, flexibility, price, and service. However, the price factor is one of the least important selection items, regardless of position on the supply chain.	Thomas Y. Choi, Janet L. Hartley 1996
Supplier selection Criteria and supplier relationships management	Examine the supplier selection criteria and supplier involvement in product design activities and continuous improvement in use of supplier selection criteria.	Manufacturing industry	USA	Survey/Questionnaire	The study found that by establishing supplier selection criteria and developing supplier involvement programs, it enhances communication and creates an environment of trust that builds fertile relationships with suppliers.	Mark A. Vonderembse and Michael Tracey 1999

Area	Brief Description	Industry	Country	Methods	Findings	Authors
Supplier selection Criteria and supplier relationships management	This paper intends to analyse whether there is a relation between the level of environmental management maturity and the inclusion of environmental criteria in the companies' selection of suppliers.	Multinational Manufacturing industry	Brazil	Interview	Cost, quality and innovation are core criterion for supplier selection; however insertion of environmental criteria being incorporated into supplier selection process will depend on business needs and requirement.	Ana Beatriz L.S. Jabbour and Charbel J.C. Jabbour 2009
Supplier selection criteria, tools and techniques	Attempt to study the Total Cost of Ownership concept in supplier selection.	Manufacturing industry	Europe	Survey/Questionnaire	The study found that this approach goes beyond price to consider the whole cost related to item such as services, quantity, delivery, administration, communication, failure and maintenance.	Degraeve Zeger, Eva Labro and Filip Roodhooft, 1998
Supplier selection criteria, tools and techniques	Studies the supplier selection decision making technique fuzzy model. Attempts to combine both qualitative and quantitative supplier selection criteria.	Internet service provider	Iran	Survey/Questionnaire	The proposed model can rate both qualitative and quantitative criteria and select suitable suppliers effectively.	S.H. Amin, and J. Razmi 2009
Supplier selection criteria, tools and techniques	Attempt to study the analytic hierarchy process concept in supplier selection.	Telecommunications Industry	Hong Kong	Survey/Questionnaire	This study identified the three major categories of: cost, technical and operational success factors for vendor selection of a telecommunications system. The critical success factors will form the basis for identifying important criteria and sub criteria for vendor selection.	Maggie C.Y. Tam and V.M. Rao Tummala 2001
Supplier selection Criteria and government policy	Aims to explore supplier selection with integrating a government policies concern for broader social and environmental impacts within procurement undertaken by government or public sector bodies.	Government or public sector bodies	Europe, UK and China	Survey/Questionnaire	The study found the tendency of public procurement to favour relatively local companies over foreign suppliers and buying from small- and medium-sized companies.	Stephen Brammer and Helen Walker 2010

Area	Brief Description	Industry	Country	Methods	Findings	Authors
Supplier selection Criteria and business ethics	To study the ethics of organisations in which is operationalised not only as the frequency of unethical behaviour and the scope of ethics programs, but also as the ethical culture and the (potential) consequences of unethical behaviour.	Government and non Government organisations	USA	Survey/Questionnaire	The study found that the ethics of organisation improve while there is an increase in the scope of ethics programs such as code of ethics, policies on accountability, sanctions, and investigations which aimed at enhancing clarity leads to enhancement of the ethical culture. The unethical behaviour in and of organisations could also be attributed from other factors such as behaviour, discriminations, moral opinion etc.	Muel Kaptien 2010
Supplier selection Criteria and business ethics	This study focuses to determine the most common approaches used to promote compliance with ethical codes of conduct (specifically conflict of interest policies) in purchasing environment and supply management.	Fortune 500 Companies	USA	Survey/Questionnaire	Conflicts of interest should be defined clearly and should become integral parts of the organisation. Key terms in conflict of interest statements should be unambiguously defined and understandable to employees. Company ethical codes and conflict of interest statements should be easily accessible to employees and changes should be communicated promptly.	Robert B. Handfield and David L. Baumer
Supplier selection Criteria and impact on business performance	Attempt to study and identify the impact of supplier selection and assessment on the buying company's business performance. This study is to examine relationships between the perceived importance of supplier selection and assessment criteria and business performance.	Manufacturing industry	USA	Survey/Questionnaire	The study found the impact on buying firm business performance would require buyer and seller to place more emphasis on relationship building, increase strategic commitment from suppliers, developing long-term relationships with supplier, view suppliers as extensions or part of the buying firm and avoid arm's length concept relationship.	Vijay R Kannan and Keah Choon Tan 2002.

2.8 Conclusion

The most popular supplier selection criteria employed in practice as advocated by literature are in the scope of quality and technology, price, delivery performance, supplier relationship and decision making tools and technique. Some other elements such as government procurement policy and business ethics might also provide additional influence on supplier selection which potentially has an impact on the overall company business performance.

Supplier selection is a complicated process which involves numerous factors including tangible and intangible criteria. The supplier selection process consists of several phases: the initial realisation of product requirement and specifications, supplier sourcing, determination of the criteria to be used in decision making, pre-qualification negotiation, proof of concept trial, final supplier selection and pro-active monitoring of supplier performance.

CHAPTER 3: RESEARCH FRAMEWORK AND HYPOTHESIS

3.1 Introduction

In the supply chain management domain, various determinants of supplier selection criteria have already been explored to influence effective implementation of supplier selection activities in different types of business, environment and location. The conceptual approach for this research is based on a broad theoretical framework. This study focuses on the major criteria influencing supplier selection, including government procurement policies and business ethics, as well as the impact of the supplier selection on an organisation in the telecommunications industry in Malaysia.

The purpose of this chapter is to develop research hypotheses to assess supplier selection criteria which affect supplier selection decision and finally lead to impact the buying firm business efficiency and performance. For the hypotheses to be effectively addressed, the researcher reviews and integrates subject areas from the buying firm perspective. This will clarify the research area and development of a conceptual approach and a theoretical framework for this study.

3.2 Conceptual Approach

The telecommunication industry has grown rapidly and experienced tremendous demand in the Malaysian market. Hence, the criteria and factors in supplier selection for telecommunications service providers in Malaysia are very critical. Furthermore, the supplier selection has to synchronise with service deployment activities to the Malaysian consumer market, which create both direct as well as indirect impact on the company's business performance.

Supplier selection seems to be the variable that is most important as it helps to achieve the company's goals and objectives. Supplier selection choices are among those with highest importance, with aspects that companies must implement into their strategic process. Effective supplier selection and strategic sourcing will both enhance and improve company business efficiency and performance.

Competitive forces are putting companies under pressure to improve quality, delivery performance and responsiveness whilst simultaneously reducing costs. In response, companies are increasingly looking at supply chain leveraging methods, and in particular, systematically evaluating the suppliers' roles in their activities.

The purchasing function holds in high regard the selection of the supplier in this instance, with consideration towards the needed material. It represents a basic and crucial part of business management in nature. This is due to that fact that the current competitive operational market does not offer up the chance to be able to successfully achieve high quality goods at a decreased cost without well-chosen supplier. Henceforth, among the most crucial decisions purchasing departments have to make, is supplier selection and the continued maintenance of this group (Weber *et al*., 1991).

In making a decision on the choice of suppliers and their capabilities, companies have to do so, on complex grounds. This is due to the involvement of uncertainty in a lot of areas, putting values that conflict up against relationships that are complicated as a result of conflicting objectives (Watt *et al,*. 2009).Selection of the supplier and the assessment of it consist of seeking out the right suppliers who display the ability to give the purchaser the correct standard of goods with the delivery services at the desired cost, at the correct time and in the right quantities (Zhang *et al*., 2009).

By selecting the right supplier, companies can definitively increase the businesses competitive positioning and decrease the price of purchase. This is why a lot of those with expertise in the area felt that the most significant process a purchasing department under goes is the selection of the supplier (Ghodsypour and O'Brien 2001).

Further extensive research and literature has taken a broader approach within the last ten years, assessing the effect of choice of supplier and associates taking varying aspects into account. This includes reliability, flexibility and quality standards. To accommodate for the on-going developments and complex nature of international technology the economic climate, cycle time and business environments with guidelines propose a significant promise on a strategic level. Thus, alterations in firms that effect the cycle time by

lowering it when formulating and introducing goods, heightens the level of trust between suppliers and customers as well as increasing the delivery performance (Arena 2002).

To further ease the supplier selection decision, the appropriate tools and techniques of decision making to analyse the criteria is required. Quite a number of previous researches on supplier selection used various investigative methodologies including: programming of mathematical techniques (Pan, 1989 and Turner, 1988), weighted average methods (Timmerman, 1986 and Thompson, 1990) pay off matrices (Soukup, 1987) and the analytic hierarchy process (Narishman, 1983; Nydick and Hill, 1992; Barbarosglu and Yazgac, 1997).

At the operational level, the advantage of forming close relationships with major suppliers to a purchaser comes in the form of improvements in delivery service, quality, lowered price or a combination of any. At the strategic level, it should lead to cost efficiency, sustainable improvements quality of goods and innovation, increased competitiveness, increased profit and higher company business performance.

A large amount of current or recent research literature based on purchaser supplier relationships concentrates on either the attributes embedded into relationships or how these relationships may have an effect on the performance of the company. Relationships or the maintenance of ties with business associates has been identified in several different ways. To name some examples: strength of relationship (Carr and Pearson, 1999, Martin and Grbac, 2003, Benton and Maloni, 2005), closeness or physical proximity (Narasimhan and Nair, 2005, Larson and Kulchitsky, 2000). These purchaser and supplier relationships have also been studied from varying viewpoints, such as: supplier (Kalwani and Narayandas, 1995, Maloni and Benton, 2000), buyer (Carr and Pearson, 1999, Larson and Kulchitsky, 2000).

3.3 Conceptual Framework

Selecting suppliers involves an end-to-end process. In the literature written by Dickson (1966) and Waber *et al*., (1991), several dimensions are categorised as the main elements and critical criteria of vendor selection decision. These include net price, quality, delivery, performance history, capacity, communication system, supplier relationship management, service, financial and management capability, geographical location and a few others.

The determination of which criteria to take into account is usually the primary stage in the process of selecting a supplier. Dickson (1966) was able to verify 23 differing criteria through the results of a questionnaire that was conducted upon 273 purchasing managers and agencies from North American and the USA. Those that appeared the most significant included history of performance, delivery, quality, production capability and facilities, initial price, technical abilities and the warrant and claim policy. Ellram (1990), was able to apply hierarchy framework which included performance, financial, technology, organisational strategy and culture, as well as other elements alike. Weber, Current, and Benton (1991) chose cost, standard, delivery, facilities and capability, technology capacity and the geographic location as elements deemed most significant in selection of a supplier.

In the context of the telecommunications industry, particularly telecommunications service providers in Malaysia, supplier performance contributes to the performance of the companies, which subsequently has an implication on the quality of services experienced by end consumers. Therefore, it is very important to emphasise on supplier selection criteria which lead to the selection of the right suppliers. Selecting the right supplier will directly or indirectly contribute towards improvements in the business performance of telecommunications service providers in Malaysia.

Given the dynamic nature of supplier selection environment, the practice of supplier selection and evaluation has been widely recognised as a vital process in an organisation. Supplier selection is part of the supply chain management (SCM) system. According to Bechtel and Jayaram (1997) and Anderson and Lee (1999), several SCM core values must be embraced throughout the organisation by creating value through collaborating,

selecting and effectively utilizing the appropriate information technology, enhancing individual effectiveness and generating flexibility.

Early researchers study concentrated on ascertaining the criteria adopted by buying firms to select suppliers (Dickson, 1966; Lehmann and O'Shaughnessy, 1982). The studies have been extended to cover supplier selection under special buying circumstances; for instance, single versus multiple sourcing (Swift, 1995), direct versus indirect materials (American Machinery Manufacturers Assoc., 1985), strategic buyer supplier partnerships (Ellram, 1990), and strategic versus non-strategic purchases (Dempsey, 1978; Lehmann and O'Shaughnessy, 1982).

Numerous researchers have also examined the relative significance of varying selection criteria under varying purchasing situations (Evans, 1982; Lehmann and O'Shaughnessy, 1974, 1982; Wilson, 1994), whereas the element of cost and price, delivery of performance and quality have been always identified as being significant deciding criteria of supplier selection. At the same time, it is also relatively important that specific criteria and their significant relationship rely largely on the kind of goods or services procured.

A research undertaken by Verma and Pullman (1998), examined whether the criteria for supplier selection are coherent with their perceived significance in the purchasers' minds. Even though quality was established to be the most critical criteria for supplier selection, the actual selection deciding factors were more likely to be made based on cost and delivery of performance. Several studies have tackled the issue of supplier selection based on contemporary business pressures. Meanwhile, Choi and Hartley (1996) analysed supplier selection for organisations at various points in the supply chain.

A number of researchers have also addressed issues that are significant to global markets purchases (Min *et al.*, 1994; Deng and Wortzel, 1995; Thorelli and Glowacka, 1995; Katsikeas and Leonidou, 1996; Piercy *et al.*, 1997).Min and Galle (1997) and Dobilas and MacPherson (1997), recently studied the effect of environmental pressures on purchasing behaviour. In recent years, interest has increased in the study of supplier selection decisions in specific industry settings. Some examples are the electronic component

industry in Japan (Hirakubo and Kublin, 1998), systems/software sector (Gustin *et al.*, 1997) and healthcare industry (Lambert *et al.*, 1997) in the United States.

In research related to supplier selection, various methodologies have been applied including mathematical programming (Turner, 1988; Pan, 1989), methods of weighted average (Thompson, 1990; Timmerman, 1986), payoff matrices (Soukup, 1987) and the process of analytic hierarchy (Narasimhan, 1983; Nydick and Hill, 1992; Barbarosoglu and Yazgac, 1997). In addition, numerous studies have also investigated the selection criteria adopted by purchasing firms in their evaluation of supplier performance (Monczka and Trecha, 1988; Watts and Hahn, 1993; Giunipero and Brewer, 1993; Walton *et al.*, 1998; Carr and Pearson, 1999). Results from the studies indicate that although cost is the key criterion in supplier decision process, other criteria such as quality, delivery, and service are also frequently applied.

Vonderembse and Tracey (1999), studied supplier selection process in manufacturing companies with the intention of establishing the extent to which procurement managers practiced various tactics of supplier selection and their involvement, and in what ways these tactics affected performance of the manufacturing companies. Based on the study, they concluded that even though the supplier selection criteria were extensively used, the same could not be said for supplier involvement. However, both supplier involvement and selection impacted positively on performance of supplier as well as performance of the manufacturing firm.

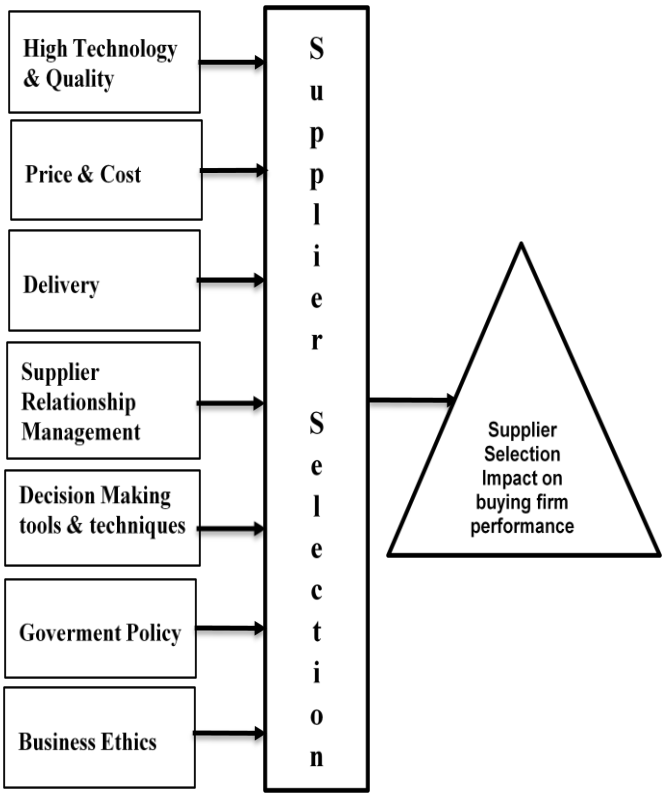
In his study, Mohanty (1990) has identified that nearly all purchasing managers regarded supplier selection as the most critical problem in the competitive business environment today. Most buying decisions are made or at least affected by numerous factors (Weele, 1994). Smytka and Clemens (1993) have come up with a total cost approach whereby they evaluate the risk factor such as delivery of performance and apply it in the process of supplier selection. The empirical work by Choi and Hartley (1996), Chapman (1993) and some other scholars have evaluated the relatively important factors of delivery performance, cost, quality and other supplier attributes

Previous researchers also indicate that although suppliers are assessed on a range of qualities, the primary ones that hold significance in the selection criteria are price, quality, and service (Crow, Olshavsky and Summers, 1980; Dempsey, 1978; Lehmann and O'Shaugnessy, 1974). Nevertheless, different criteria may be important with the initiation of relationship purchasing practices. Although there is abundant research available on the topic of supplier selection, very little attempt was made to include and examine government policy and business ethics as selection criteria in the supplier selection criteria.

This examination attempts to include and relate government procurement policy and business ethics as relevant selection criteria to existing factors of supplier selection in order to broaden the perspective and examine their impact on company performance. It tries to incorporate these two elements in addition to other key selection criteria into one supplier selection decision model and test them in the telecommunications industry in Malaysia. The objective is to relate the supplier selection criteria to the performance of telecommunications service providers in Malaysia.

A conceptual framework which draws together the previously cited literature and the specific business challenges noted below is shown in Figure 3.1.

Figure 3.1: Conceptual framework



The conceptual framework has been structured based upon the earlier discussion about the supplier selection criteria in chapter two. The left side of the above figure consists of seven main supplier selection criteria which potentially have an influence on supplier selection activity, namely high quality/technology, price, delivery, supplier relationship management, decision making tools and techniques, government policy and business ethics. The box in the centre is the supplier selection domain where all of the mentioned criteria will have an influence on the supplier selection. This means during the supplier selection those criteria need to be given due consideration where the criteria will affect the decision of selecting the supplier. Finally, the triangle box on the right hand side is the impact that the supplier selection has on the buying firm. The relationship can be defined in a way that shows selecting the supplier will in some way lead having an impact on the overall buying firm performance.

3.4 Hypothesis Developement

Based on the previous comprehensive review of literature, this chapter outlines the major constructs that form the theoretical framework for this study. These constructs include: (1) High technology and quality, (2) Price, (3) delivery, (4) supplier relationship management, (5) decision making tools and techniques, (6) government procurement policies and (7) business procurement ethics. This study also examines the effect supplier selection has on the efficiencies and performance of the purchasing firm.

3.4.1 High Technology and Quality Product/Service Criteria

High technological and high product/service quality is included as critical criteria in supplier selection decision in this study. Product/service technology and quality are perceived to be the most important attributes, followed by cost and delivery performance.

As commonly shared among SCM scholars, technological capability management is highly evolving. In an era characterised by rapid technological advancement and product development, selection of suppliers needs to be done based on their technological capability to cope with short and medium term product development life cycle. Furthermore, providing technological support to manufacturers (Ellram, 1990; Lehmann and O'Shaughnessy, 1974) and being involved in product development have gradually become more essential tendencies in supply chain management (Shin, Collier and Wilson, 2000).

However, having high quality products and technology alone will not guarantee business success if the product delivery performance is below par. Therefore, supplier product quality must also be carefully considered in the supplier selection decision as all these influencing factors are interrelated. Supplier quality mainly relates to product quality and capability to meet organisational requirements. Within the purchasing strategy, the standard of quality has always been something that plays a critical role (Dickson, 1966; Waber *et al.*, 1991). Dickson (1966) mentioned that three factors which include: (1) the quality standards being met, (2) the ability to deliver the product punctually, and (3), the history of performance are the most essential deciding factors in supplier choice. In their study, Schonberger and Gilbert (1983) stated that over 50% of issues with the standard of

goods, as highlighted by numerous businesses, may be down to the poor quality of the manufacturing materials supplied. The quality of the product has to meet customers' needs in the very least or even exceed the customer expectation level in order to gain and win the customers' trust for the product or goods. Taking this into account, this study includes high technological and quality product/service as a factor of supplier selection.

Given the above discussion and to address the research question one, the following hypothesis is posed:

H1: High product quality and technology are positively related to the supplier selection.

The interrelation of the criterion high quality of technology and product/service with the price of these criteria is what has an influence on the supplier selection. Thus the sub hypothesis (H1a) was developed based upon the argument that follows.

Comparing products within the same category or standard in the current economic climate is made more intense by the continuous capacity to improve research and retrieval of information. Businesses and clients begin to make international enquiries about pricing. Enterprises of manufacturers that have a production of similar products with a decreased content of technique have incredibly large requirements for the price of spare parts and raw materials. This is a result of the pressure involved within the competitive market. Raw materials of high standard as well as spare parts are sought out by businesses that produce goods of a high technique content where the costs do not differ.

A direct effect is had on the quality of goods, market reputation, product profits to firms and the evidence of product cost setting; by the development of the content of product technique. In upgrading the product technique standard, a significantly higher price of product is made achievable.

However, as the cost of the raw material could increase its quality level, this proves that the supplier selection decision not only depends on the price but also on the quality level of the raw material (Emre Alptekin and Gülfem Işıklar Alptekin (2009).

The standard of spare parts and raw materials directly affects the product standard of the company, impacting further on the reputation, market occupancy within the industry and the quantity of future orders. The standard of the raw materials and spare parts is also likely to impact upon the repairs and production, returns and recalls following sales alongside the potential law-influenced predicaments for the companies. These elements with the occurrence probability of a low significance will greatly impact upon market survivals and the corporate continuity of operation.

The companies have significantly large space of setting price products of a high quality standard. Subsequently, it can form the underlying ground of for receiving increased profits from sales, development of technique and corporate growth. Leading businesses will uphold the partner relationship with suppliers of spare parts and raw materials with differing cost and standards (Shu, T.S. Chen and B. L MacCarthy, 2007).

Xia and Wu (cited in Wang and Che 2007), stated that a lot of manufacturers maintained that suppliers proposing the most reduced unit costs were not always able guarantee the best service performance or highest quality and technology standard. They highlighted the fact that supplier evaluation can aim to make a decision that contains multiple objectives of the most reduced price, highest quality and best service performance (Wang and Che 2007). The production of low priced, high quality goods without a well-chosen supplier is virtually impossible (Charles A. Weber, John R**.** Current and W.C. Benton 1991.)

Quoting Anderson and Narus (p.5) value is "the worth in monetary terms of the economic, technical, service, and social benefits a customer firm receives in exchange for the price it pays for a quality product and services offering". Then again, a lot of consumers consistently consider price as a representation of the standard of product quality (Scitovszky, 1945). This is due to the fact that they maintain the belief that in order to manufacture a better quality product, a higher cost is required, which definitely results in an increased sale price. In accordance to Anderson and Narus' analysis, the managerial phenomenon that can be drawn is as follows: (1) in a marketing environment where hearsay or 'word-of-mouth' is insignificant, increased costs must be determined by heightened standards of quality. On the other hand, reduced prices within this market do

not have to be determined by a lower standard of quality. (2) If it impacts by diffusing the rate of demand, it may be that increased prices work alongside either higher or lower quality standards.

In terms of products/services and the pricing factor, high quality products/services are commonly associated with high prices. Most organisations seek to acquire high quality products/services but many are not willing to spend large amount of money to finance the purchase. In some extreme cases, organisations are willing to forgo quality at the expense of cheaper products which contribute higher profit margin for the companies. However, in the long run, such a procurement strategy may work against them because cheaper products with lower quality may require additional maintenance costs and result in higher incidents of customer complaints. The interrelation between price and quality are some of the trade-offs that purchasing managers have to decide on during the supplier selection process (Dickson, 1966).

Taking the above discussion into account the following hypotheses are posed to address research question two:

H1a: There is a significant positive relationship amongst high product/service quality and price; the relationship has an influence on supplier selection.

H1b: There is a significant positive relationship between high technology quality and supplier delivery performance; the relationship has an influence on supplier selection.

As mentioned before, the interrelation of the criterion high quality of technology and product/service with the delivery performance of these criteria is what has an influence on the supplier selection. Thus the sub hypothesis (H1b) was developed based upon the further argument that follows.

Generally, the process of selection of the supplier and assessment of it was primarily formulated around the choice of the cheapest supplier, with a disregard towards any other significant elements like those linked to production breaks, delayed delivery times and a poor standard of products (Aretoulis, G. N et. al,. 2010).

The good quality of products and services from the supplier will help to improve the delivery services to the customer. Suppliers who can maintain their product quality are not likely to encounter too many reworks or return products ,thus they will be able to concentrate on the improvement of delivery performance and may also reduce the manufacturing lead-time due to a proper quality management arrangement, resource planning and delivery schedule.

Furthermore, (Kannan and Tan (2002), concluded from their survey that a positive correlation is found between the supplier product quality and delivery performance. Suppliers ability to deliver high quality products on time, signals that the suppliers are capable of meeting the delivery and meet the quality standards as required.

3.4.2 Price and Cost Criteria

As quoted by Lehmann and O'Shaughnessy (1982), businesses are required to consider the cost elements in selecting the supplier, with consideration towards whether or not the suppliers are able to offer a reasonably priced service and whether or not they would be willing to discuss the reduction of the price for both parties involved. In previous practices, cost was the most significant element affecting companies' decision in the supplier selection process. At the same time, most companies would collaborate cooperatively with particular suppliers due to the decreased price for goods or services offered.

Price and cost is crucial to the supplier selection decision because by employing such criteria in supplier selection decision, organisations will be able to effectively manage operational cost such as cost of rework, cost per unit, inventory holding cost as well as maintenance cost. Cost savings can be applied to numerous business activities such as production planning and management of inventory. In most industries, the cost of raw material is the main overhead; in some cases, it can account for up to 70% of company's overall cost (Ghodsypour and O Brien. 1998). This also suggests that firms which select suppliers based on appropriate pricing mechanism to achieve cost efficiency gain in terms of improved cash flow.

However, the problem of choosing the right supplier with the right price so that organisational business profits can be maximised has become increasingly critical to companies' survival due to keen competition in the micro-profit era (Giunipero *et al*., 2006).

Low cost was a definitive attribute within the price composite criterion. The Purchasing managers that display favour ability towards multiple obtaining regard decreased cost to be a more significant element than the buying managers who prefer single sourcing. Purchasing managers have in the past been known to stress upon retrieving the most reduced price possible for any given goods, as traditionally, this is how they have been assessed and rewarded.

Due to the fact that cost has conventionally been a leading element, the selection of suppliers based solely upon price has been a regular way of approaching the decision. A well liked application of the cost approach has been the calculation of the total sum for individual purchases. Based on these calculations, the entire price of working with a given supplier is worked out, and the one that is cheapest is chosen (Ozcan Kilincci and Suzan Aslı Onal 2011).

This analysis therefore includes price factor as an element for supplier selection.

H2: The price and cost management factor is significantly linked to the supplier selection.

The interrelation of the criterion price with the delivery performance of these criteria is what has an influence on the supplier selection. This sub hypothesis was developed based upon the following information.

Timely delivery and cost are two significant elements of success for service providers in the current competitive market. A lot supplier companies are proposing the assurance of time as means to entice potential customers in a market that is punctuality-sensitive.

Cost and performance time have a close relation to one another. Amongst companies are those with customers willing to pay an extra cost for a service delivery that is particularly timed. For example, this could include Federal Express's next day delivery service. From the viewpoint of the company, it may be more expensive to execute such high standard time performance. Due to the fact that delivery time performance is often dependent on the operating efficiency and available capacity of the system, a company may be required to improve the efficiency of its service delivery system or heighten the capacity to be able to meet the time performance desired. Whichever of these approaches may be used, both are likely to increase the cost of operation of the company, which will effectively impact upon the price and potential profitability of the company (So Kut 2000). In the meantime Li and Lee (1994) investigated the competition of price between two service companies; whereby clients ponder upon both their speed of delivery and prices when choosing their services.

The relationship between price/cost factors and delivery are basically related to the scope of supplier production capacity and transportation or issues around logistics. The buying firm will normally consider the supplier capacity during the evaluation and selecting the supplier. Purchasers will look into how the suppliers use their capacity to meet the buying firm demand as well as how the suppliers will attempt to meet the planned and unplanned demand due to some uncertainty in the requirements of the demanding market.

During the selection process, the buyer gets quotes from the suppliers in the form of a price capacity description. The purchaser also takes into consideration the supplier production capacity to minimise the total expected cost of the items. This scenario is important due to the buyer’s need to know how the supplier will use its capacity to meet buying firm demands, which will eventually affect the delivery and price of the item.

If the supplier has limitations in capacity, the buying firm will have to consider procuring additional capacity otherwise it will later create a problem for them meeting their demand. It will impact on the price of the item to be procured and eventually will have an effect on the delivery performance.

The suppliers' delay in delivery time will cause delay in production for the firm. The costs related to delivery time will increase proportionally to the performance of delivery time. Hence proving that through the provision of a guaranteed delivery time, the supplier may see an increased demand for the goods or may have the opportunity to charge a price premium.

The increase of the cost of transportation, particularly its relation to less investment on the infrastructure of transportation, means that most of it enhances the total logistic cost. Therefore, the infrastructure procurement cannot offer a guarantee of the logistic system. The link between raw material suppliers and product consumers, intra or inter companies, is called a supply chain. A supply chain is a process that integrates all of the sub systems. These are production facilities, supplier, customers and distribution services; all of which are related to one another.

It also assumes the suppliers' price growth as well as the service level, as better levels of service would necessitate appointing more skillful and experienced personnel, who would in turn assign a heightened service priority, with commitments to shorter service lead time and the like, all of which would ultimately lead to higher prices (Benjaafar, S., Elahi,E. and Donohue,K.L. 2007).

With this in mind, the following sub-hypothesis is proposed:

H2a: The price and cost factor has a significant positive relationship with supplier delivery performance; this relationship influences supplier selection.

3.4.3 Delivery

Central to most procurement processes is the timely delivery of the products, services or equipment, especially to companies that are concerned about meeting the ready for service date in their operations. Poor delivery performance disrupts the production operations and results in poor sales performance, which subsequently leads to poor customer satisfaction index.

According to Vonderembse and Tracey (1999), punctuality of delivery for a supplier is paramount. If suppliers steadily deliver on time, such delivery capability helps the planning and implementation team to meet the ready for service date as required by their customers.

Shin *et al*., (2000) highlighted the fact that lead time significantly indicates delivery. A reduced delivery time assists to decrease stocks and heighten inventory turnover, these displaying the advantages on delivery that is punctual. Thus, besides low cost, managers should also consider selecting suppliers based on delivery performance and other attributes. As a result, included in supplier selection factors of this study is that of delivery capability. Weber (2001) also found "Service delivered as promised" to be the decision factor with the highest importance for associations meeting buyers and developing loyalty toward suppliers.

Companies who are liable to consistently missioned their guaranteed delivery times are likely to eventually lose any credibility with clients for future investments, and the low delivery standard would defeat the initial purpose of handing out time guarantees in order to entice customers. It is true that a lot of service companies accurately monitor and maintain their delivery performance of achieving the delivery times that were promised (So Kut, 2000).

The selection of a supplier is therefore based upon achievements in areas of supplier product standards, speed of delivery and flexibility strongly impact on the level of market shares, profitability and customer satisfaction (Shin, H., Collier and Wilson, 2000).

Consistent with the above findings, the following hypothesis is articulated:

H3: Supplier delivery performance and responsiveness can have a significant impact on the supplier selection.

3.4.4 Supplier Relationship Management

Supplier relationship management and selection is a critical issue in any supply chain partnership (Guinipero *et al.,* 2006). In this vein, the literature has tended to focus on the general construct of trust and interaction level between buyers and sellers and both parties' commitment to the relationship (Anderson and Narus, 1990, Dwyer *et al.,* 1987, Frazier and Rody 1991).

Supplier relationship management has become more strategic and recognized as a major contributing factor to the competitive advantage of a firm. For example, improved supplier management through careful supplier selection would enhance the firm's strategic position (Narasimhan, 2002). An emphasis on building and developing buyer-seller long term relationships may necessitate an improvement of not just the operations and business process but also develop an effective communications process to be a key element of the supplier selection process (Kannan *et al.,* 2002).

By nature, efforts of selection identify the underlying quality of the company's supplier portfolio in the sense that the company actually decides upon contract parties. This transaction-based, "arms' length" attitude is more likely preferred for multiple sourcing of goods. However, when a company intends to develop a long-term relationship with a supplier, as in single sourcing, relationship oriented factors become more significant than issues such as decreased cost.

However, in the real business world, organisations are employing programs which seek to build supplier relationships in order to accomplish: lower cost of product, reduced cycle time, on time delivery, efficient inventory management, improved product quality, good after sales service and low maintenance cost. In such respect, the management of supplier relationships needs to include much deeper constructs than direct relational or operations-based factors alone.

Over the past decades, concentrated attention has been put on buyer-seller relationships as a crucial factor in the operation of strategies (Cousins and Lawson, 2007, Dwyer *et al.,* 1987). A lot of scholars and research academics have identified the necessary factors that

cause the failure or success within buy-seller relationships, by increasing their attention on them (Anderson and Narus, 1990, Coulter and Coulter, 2002, Kim, Han, and Lee, 2001, Morgan and Hunt, 1995, Pressey and Mathews, 2000).

Effective management of supplier relationship is believed to contribute to improved quality of products/services and greater product technology. High trust and commitment level developed in long-term business partnerships may encourage both buyers and suppliers to collaborate in research and development efforts with the view of enhancing their products or services. Such teamwork promotes better interaction and support among the employees. Transfer of skills and expertise as well as technology sharing which normally occur under these circumstances may eventually benefit both parties.

Another significant contribution of strong buyer-seller relationship is price advantage. Purchasing organisations that have developed comfortable business relationships with their suppliers enjoy certain benefits from them such as more competitive pricing, enhanced delivery performance and better service or maintenance quality.

Previous research has shown that by building long term business relationship, firms are able to reduce costs and become more effective in performing their purchasing, logistics and production functions (Li and Dant, 2001).

The importance supplier relationship management in the supplier selection comes from way "it commits resources while simultaneously impacting such activities as product design collaboration, delivery scheduling, and production planning and product quality", as quoted by Narasimhan (1983). The significance of this reflection further increases when regarded in relevance to recent builds in supply chain management. This is whereby the involvement in the supply chain is likely to be sustained in relevance to a long-term relationship criterion. For example, previously not ensuring properly incorporated current issues like the closeness of the relationship and continuous improvement capabilities that are now considered to be relevant to purchasing decisions.

With regards to the supplier relationship management, it is proposed that:

H4: Supplier relationship management, which includes supplier business background experience with an element of short and long term relationship, has a tremendous correlation with the supplier selection.

In conjunction with the interrelationships among criteria, the sub hypothesis (H4a) was developed to display that supplier relationship management and quality has an influence to supplier selection. This sub hypothesis was developed based upon the following information.

The inter relationship among criteria is then followed by the relationship between supplier relationship management and quality has an influence on the supplier selection. In this point of view, supplier involvement is included as an important element in supply chain capabilities, as investigators have recorded its connection with new product development which is seen to be positive (Clark and Fujimoto, 1991; Helper, 1991). Keeping suppliers involved in the development of goods does not only help to solve lead time and standard issues, but also allows the purchasing company to utilize and gain access to the suppliers capabilities for mutual advantages (Takeishi, 2001). To add to this, the involvement of suppliers in operational and strategic values will enable the partnership an improved understanding that enhances their opportunities for strategic viability (Vonderembse and Tracey, 1999; Tracey and Tan, 2001).

The co-design and inspiration provided by supplier involvement can effectively support businesses with the shortening of the cycle of product development, diversity and innovation in products, so that together they can maintain customer satisfaction at an increased level (Chen, Paulraj A. and Lado A., 2004).

This likely approach is an advantage due to the fact it establishes that eventual outcomes may be above or below predicted standard because of unanticipated or uncontrollable elements. To demonstrate an example, a client's involvement with a supplier could provide better than expected advantages when the participators of its primary supplier involvement program discover an unexpected means of significantly improving

production efficiency via higher standard designs of goods. However, the same relationship may also lead to a lack of benefits in comparison to what was anticipated when the production time required to apply the process improvements are a lot more than expected because of technical issues.

When considering a buyer who faces two suppliers with different possible quality levels, the buyer would like to procure parts from the highest quality supplier, where a quality outcome is determined by a supplier's current quality and any costly investment undertaken as a result of the buyer supplier relationship. When a buyer faces a set of suppliers of an unknown quality and non-verifiable investments, the buying firm must design a sourcing arrangement that allows them to both extract some information about the suppliers and encourage (costly) investments on their part.

Costly investment is put forward by the purchaser promising the supplier who delivers the higher quality level the entirety of the buyer's business. It is acknowledged that a lot of value of a working relationship is evident in the partner's ability to recognise opportunities to increase advantages or reduce costs in time.

Then again, by maintaining a long-term buyer seller relationship, the purchasing company could miss out on opportunities to embrace market price changes. An example of this is that upon the decrease of a price of a market component, the company may not be able to agree a similar price drop with the supplier that would match that of the market price.

Based on this discussion, the following sub hypotheses are submitted for testing:

H4a: Better supplier relationship management will be associated with greater quality and technology of product or services; this relationship influences supplier selection.

And

H4b: There is a significant positive relationship amongst supplier relationship management and price that affects the supplier selection decision

In conjunction with the interrelationship among criteria the sub hypothesis (H4c) was developed where the Supplier relationship management and business ethics which has an influence to supplier selection. This sub hypothesis was developed based upon the following information.

With regards to the buyer seller relationship, the existence of social bond element has become more relevant. It is because a social bond is regarded to be more definitive in the earlier steps of the buyer-seller relationship formulation and less evident within the later stage (Smith, 1998; Wilson1994). Additionally, social links covers "Defining the purpose of the relationship" and "search and selection of an appropriate partner" in the building steps of buyer-seller relationships as quoted by Wilson (1994). With that in mind, social bonds may be applied to the analysis of primary supplier selection and maintenance of relationships with suppliers alike.

A cause for consideration of the interdependence that formulates among buyer and seller relationships naturally leads to a regard to how the advantages came about through the relationship they share. The following article embeds areas of transaction cost and is predominantly interested in the way relationships are governed.

By referring to transaction cost economics it is evident that transactions which take place in a marketing environment where swapping prices and ethical hazards are low does not need governance, or perhaps only at a minute level. Contrasting with this, transactions occurring in the market organisation, where switching prices, dependency moral hazards are all high, need suitable governance mechanism to be applied if transaction prices are to be decreased. Provan (1993), stated that in environments that contain a sole buyer and a lot suppliers, the tendency for supplier opportunism was not positively related to its embedding or its regarded connectedness. Marchington and Vincent (2004), expand on the thinking's of transactions and governance operations to implement a multi-level (organisational, interpersonal and institutional) viewpoint, concentrating on the social scenario of transactions and relating behaviour.

The responsibility of trust in formulating the environment within which cooperation can grow is something that has been subject to discussion by a lot of researchers (e.g. Dyer and Singh, 1998, Jones *et al.*, 1997, Nooteboom, 1996; Ring and Vande Ven, 1994).A few of these have pondered upon the antecedents to trust, proposing that cooperation (Anderson and Narus, 1990) and fear of sanctions in society (Hagen and Choe, 1998) could be at the heart of these so-called trusting behaviours.

Such points are important cooperation or potential societal sanctions could act as inertia generators, inhibiting a particular businesses willingness to change from faulty to suppliers that are intact with which they have no previous experience of transactional history. However it is interesting that Morgan and Hunt (1995) put competitive benefits in cooperation formulated with commitment and trust which will undoubtedly cause decreased transaction prices in a strong dependency relationship environment. (Nooteboom, 1996) and (Morgan and Hunt 1995) proposed elements for sustaining trust and commitment:(1) giving resources and advantages that are better than those of other partners;(2) displaying high standards of values within the corporation that are similar to the company values(3) offering the communication of fundamental information; and(4) the avoidance of taking advantage of partners.

Whilst these methods were proven to apply to developing relationships with other firms, through application to disruptive contexts they may be challenged. For example, failing to abandon disruption damaged but entrusted suppliers could cause a loss in competitive benefits (Greening Phil and Rutherford Christine 2011).

Based on this discussion, the following hypothesis is submitted for testing

H4c: There is a significant positive relationship between supplier relationship management and business ethics; this relationship influences supplier selection.

3.4.5 Decision-Making Tools and Techniques

Decision-making in order to select the right supplier usually requires strategic thinking and is time consuming. Supplier selection is made difficult due to various criteria that must be considered in the process of making decisions. Dickson (1966) identified over twenty suppliers attributes which purchasing managers trade off when selecting suppliers. The real challenge here is whether to "go or no go" when selecting the best available supplier.

This approach often goes beyond price, and consideration is typically given to the whole cost related to item, services, quantity, delivery and maintenance. In this context, it is important to note that purchasing personnel today do much more than "buy things". Their responsibilities now encompass the management of relationships and also facilitating decision-making by bringing together the pertinent internal and external parties to the organization (Ellram, 1993).

Verma and Pullman (1998) have also proposed a supplier selection technique using a method known as Discrete Choice Analysis and Multi Nominal Logic. They have proposed this in order to identify and quantify the relative weight of attributes involved in a supplier selection process focusing on the selection of suppliers which have a number of "trade-off" attributes such as those that might be found in international supplier relationship scenarios, for example cost-quality, performance-reliability, reputation-customer orientation and etc.

Taking all of this in consideration, the use of a result of a singular model as a basis for agreeing a final solution could lead to an imbalance decision with a lack of correct and accurate information, as any given model will have its own limitations. The major decision making personnel are not happy to accept the result of the model without questioning the entire process. Qualities of decision making processes and actual decisions themselves can be better by applying more than one approach, instead just a model. The multiple perspectives decision-making enables knowledge and expertise sharing with the participants, leading to a decision that is not so biased (Sharon M. Ordoobadi and Wang, 2011).

Substantial analysis of supplier selection (Vyas and Woodside, 1984; Verma and Pullman, 1998) has shown that decision makers not only use an assessment model; but they use a variety of decision rules at differing areas in the process of selection. Furthermore, participants in decision making often have varying understandings of the supplier selection scenario, hence are required to learn the rationale and mindset of their colleagues with each aspect of the supplier evaluation problem in mind. This needs to be achieved through sharing of knowledge (Levary, 2007). Sharing knowledge aids the variations between the individual models, providing observations about a decision situation. Such models are formulated on computer-aided technological systems that may be trained. Therefore, decision makers that come to face a similar but different situation can refer to this system.

The problem of supplier selection is not a structured decision making process but one in which decision makers' concerns are unique and vary with regards to what the situation may be. The decision-makers of problems that done have a structure such as supplier selection are always searching for knowledge that can give them more than a range of results on a table.

From the preceding literature review, the researcher proposes that:

H5: The decision making tools and techniques utilized have a positive correlation with supplier selection decision.

In conjunction with the interrelationship among criteria the sub hypothesis (H5a) was developed where the decision making tools/technique and quality has an influence to supplier selection. This sub hypothesis was developed based upon the following information.

In certain circumstances the buyer often does not know the suppliers' qualities, hence searching for information and sourcing gives the buyer a chance to observe and learn more about the suppliers' qualities. If the buyer was able to perfectly assess the suppliers' information and product quality/services and choose the best one, the buyer may be a confident to select the best preferable supplier. In terms of information source on supplier

selection, it is important that the supplier would make all the available information easily accessible to the seller. No doubt that the elements of personal decisions have the influence on their supplier selection, followed by friends in the same industry, recommendations from a senior-level meeting planners (such as a managers), co-workers, past attendees, industry associations' website, search engines, and meeting industry magazines. Thus the information sharing and communication tools have great influence in the decision-making process of supplier selection (Miyoung Kim and Soyoung Boo 2010).

To be able to survive in the current competitive environment and to respond to client requirements, firms do not have any other choice but to offer great quality services and products. The making of high-quality goods in turn needs selection of the best suppliers by these firms. Because of this, most of the companies put a lot of time and effort to assessment and choice of the correct suppliers. Commonly, the decision makers resort to differing selection models or tables to assist them in the process of decision making.

Based on this discussion, the following hypothesis is submitted for testing:

H5a: There is a significant positive relationship between decision making techniques and high product quality which affects the supplier selection decision.

3.4.6 Government Policies

Companies from different national backgrounds have different considerations in selecting suppliers, depending on the country's national agenda, government policies as well as the political, economical, social and cultural context which the companies operate in (Lehmann, 1974).

Pressures exerted by the government relate to the government's role in controlling firms' social conduct through regulations and laws. In this research study, government pressures are defined as pressures by legal authorities of the firm's home country on the supplier regardless of the origin of the supplier (local or international).

Beyond the particular perception of supplier management, a number of researchers off validated proof that the procurement policies of government regulations have a strong impact on organisations involvement in corporate activities. On a general level, Porter (1991), stated that organisational responses to regulations may result in a competitive advantage. Furthermore, prospective tightening of regulations may cause companies to set higher standards up front in order to be prepared for the future and to avoid high readjustment costs (Barnett and King, 2008). In this perspective, Darnall *et al*., (2008) wrote that companies can are able to make regulations that are less relevant to them when they predict costly post adaptations of their processes, by complying with higher social standards. Instead, in some supply chains, government regulations can erode the returns that might be achieved by the possession of a superior position and resources.

In the context of this study, government procurement policies which govern the telecommunications sector in Malaysia have to be taken into account during the supplier selection decision. Being a prominent sector in the country, the telecommunications sector is highly regulated to ensure fair competition and equal opportunity for all players in the industry. The main telecommunications companies also play a role in the vendor development program aspired by the government as part of its national agenda. For example, in accordance with the Malaysian government procurement policy, local companies with Bumiputera status must be given priority in the supplier selection process. Thus, the government procurement policy is a factor that must be considered during the decision making process in supplier selection.

In the supplier selection context, it was suggested that complying with appropriate government procurement policies reduce the risk of incurring high supplier switching costs in case of new regulatory requirements in the future. Therefore, it is hypothesized that companies from different national backgrounds have different considerations when undertaking the supplier selection process and strategies.

Based on this discussion, following hypothesis is put forward for testing

H6: Alignment with government procurement policies has a positive affects to supplier selection.

In conjunction with the interrelationship among criteria the sub hypothesis (H6a) was developed where the government procurement policies and business ethics has an influence to supplier selection. This sub hypothesis was developed based upon the following information.

While looking at the linkages between government policy and business ethics issues, we can look at the scenario in Japanese corporation and organisation business environment. The study shows that the relationships among the policy and ethics were existent. It ranks five factors according to the influence they exert on managers to make ethical/unethical decisions. The five factors are; industry climate, government and company policy, behaviours of superiors, behaviours of colleagues, and personal codes of behaviours. Japanese managers believe that "policy" influences their ethical decisions most, with "one's personal code of behaviour (Chiaki Nakano 1997).

The governing rules and regulations as set out by the government also seek to address the ethical issues that are prevalent in any business environment. Therefore, during the supplier selection process, suppliers with records of unethical business practices will also taken into consideration during the supplier selection decision.

Based on this discussion, the following hypothesis is submitted for testing

H6a: There is a significant relationship between government policies and business ethics which affects supplier selection.

In conjunction with the interrelationship among criteria the sub hypothesis (H6b) was developed where the government procurement policies and decision making tools/techniques has an influence to supplier selection. This sub hypothesis was developed based upon the following information.

The making of decisions is a crucial activity in each realm, being used in our day-to- day lives and in social affairs or national conducts. So when decisions are made by people, they have to be reasonable and correct. Normally, the process of a decision is constituted

by several crucial elements like deciding person, the decision object, method, tool, environment, policy, information and target.

Therefore in order to choose the better supplier it has to be done through certain ways both the subjective and objective circumstances taken into account, and based on information and experiences. Decision-making is an important activity in each thing we do, involving our daily lives and the project of social affairs or national policies (Lin and Wu 2008).

According to Groenewegen and Vergragt (1991), it is indicated that adherence to government policies and regulations often requires supplier organisations to handle complex business processes (e.g., coordination of works, design of employee benefit systems, implementation of safety guidelines) which can only be achieved through effective management systems and strong planning capabilities (Groenewegen and Vergragt, (1991); Hart, (1995); Waddock and Graves, 1997).

From these aspects, government policies play a critical role in the success of a firm's selection process. The supplier selection decision clearly needs to be based on the evaluation of supplier capabilities, market demand and market supply within the context of national rules and regulations as described previously.

In the context of this study, government procurement policies which govern the telecommunications sector in Malaysia have to be taken into account during the decision making process. Being a prominent sector in the country, the telecommunications sector is highly regulated to ensure fair competition and equal opportunity for all players in the industry. The main telecommunications companies also play a role in the supplier development program aspired by the government as part of its national agenda. For example, in accordance with the Malaysian government procurement policy, local companies with Bumiputra status must be given priority in the supplier selection decision. Thus, the government procurement policy and decision making tool/techniques is a factor that must be considered during the decision making process in supplier selection.

Based on this discussion, the following hypothesis is submitted for testing:

H6b: There is a significant relationship between government policies and decision making tools and techniques which affects supplier selection.

3.4.7 Business Ethics

Business ethics and business management are closely related in such a way that both are concerned about making the right business decisions. While management relates to how the company is affected by business decisions, business ethics is more related to personal behaviour whereby it is concerned about how business decisions affect everything else in the company.

Ethical elements impact all sizes of business organisations because, as a matter of fact, they all forms of human activity are impacted upon. An area in which a small amount of studies has been done on organisational misbehaviours and non-compliance has been conducted is purchasing and supply management. This is therefore a surprise, because Badenhorst (1994), states that the purchasing environment in particularly can create an environment of promoting unethical behaviour. This is due to the fact that in the buying process, the buyer and the seller communicate with one another in an attempt to gain the best benefits for their firm. Badenhorst (1994), states these personal benefits to include money in the form of kick-backs, gifts (both material and non-material), and sometimes bribes (Millington *et al.*, 2005). In addition, Badenhorst (1994) also suggests that a purchaser may have an invested interest in a supplier, and the purchaser may place his own interests above those of his employer. In these instances, it shows that the ethical issues in purchasing and supplier relationship management have been investigated, (Badenhorst 1994); Cooper *et al.*, (2000); Landeros and Plank, (1996); Razzaque and Hwee, 2002).

However, in most large organisations, purchasing activities are carried out throughout the organisation, not just in the purchasing unit. This article investigates the phenomenon of ‘‘maverick buying’’: employees, both purchasing and non-purchasing, who buy goods and services outside of established contracts or procedures. Fuelled by a drive to reduce

costs and increase purchasing efficiency in the face of increasing competitive pressures, many organisations are looking for ways to exploit purchasing synergies (Faes *et al.*, 2000; Smart and Dudas, 2007).

The ethics of organisations are operationalised not only as the frequency of unethical behaviour and the scope of ethics programs, but also as the ethical culture and the potential consequences of unethical behaviour. Unethical behaviour in and of organizations is commonly defined as behaviour that violates generally accepted moral norms of behaviour (Jones, (1991); Trevin˜o *et al.*, 2006). Ethical behaviour implies adherence to these moral norms whereas unethical behaviour implies the violation of these moral norms. Corruption, sexual harassment, stealing and fraud are instances of commonly considered types of unethical behaviour (Crane and Matten, 2007).

As Milton Friedman claimed long ago, on this view, ethics is both absent from, and extraneous to, this business cycle (Friedman, 1970). At best, ethics is introduced from the outside, in the form of codes and packages, supporting a triple bottom line or goals of corporate responsibility and citizenship.

However from the other point of view that business ethics is an intrinsically ethical enterprise ethics applies from the inside out, and we need to internally develop, rather than externally.

Although detailed information about the business and procurement ethics is not specifically or clearly stated in the previous study, it was somehow discussed broadly in purchasing and supplier selection. Therefore, this study will include the ethics factor to be measured as a critical factor in the supplier selection decision.

Based on the evidences that link business procurement ethics with supplier selection decision, it is hypothesised that:

H7: The business ethics are intrinsically involved in the supplier selection.

3.4.8 Supplier Selection Impact on buying firm business performance

Past studies and industry practices clearly pointed out that the performance of organizations is affected by the application of specific supply chain strategies. Tan (2002) examined supply chain management and supplier assessment practices which affect performance of a firm.

Other studies have employed various performance measures to evaluate the effectiveness of supply chain management strategies. For instance, Li *et al*., (2005) adopted delivery dependability and time to market to evaluate the predictive validity of their six supply chain management constructs. Several constructs analysed in their studies comprised strategic partnership with suppliers, relationship with customers, sharing of information, quality of information, internal lean practices and postponement. Chen and Paulraj (2004), tried to evaluate the connection between supply management, customer responsiveness, strategic purchasing and buying firm's financial performance by measuring buyer and supplier performance. Vickery, Jayaram, Droge and Calantone (2003), studied the performance implications of a supply chain strategy that are integrated, using customer service and financial achievement as the performance constructs. Narasimhan and Kirn (2002), investigated how SCM relationships affected diversification, integration and company performance by looking at the growth of sales and market share as well as firm profitability. Meanwhile, Tan (2002), measured firm performance by taking into account overall quality of product, level of customer service and competitive position of the company.

An increasing emphasis on verifying long-term relationships, driven by competitive pressures and business complexity, has encouraged a lot companies to become highly selective in their choice of suppliers. Supplier selection criteria assist a company to verify competent suppliers; the assessment process often involves the consideration of several important supplier performance aspects that include price, delivery punctuality and quality (Kannan and Tan, 2002; Kim and Rucker, 2005; Vonderembse and Tracey, 1999). When suppliers are chosen through use of these criteria, supplier performance and the buying organisations operations performance are predicted to improve (Tan, 2002; Vonderembse and Tracey, 1999), thus enhancing the company's ability to obtain advantage on a competitive level.

Suppliers have had important significant roles in company strategies, as suggested in like those by Vonderembse and Tracey (1999) and Hsu *et al*., (2006), who maintain that suppliers have a crucial role in developing a competitive advantage which positively impacts on firm performance. As suppliers become responsible for the areas and subsystems of the final item, they incorporate production costs, technological development and quality performance in them. This is why strategic factors are considered when choosing them. Through us of selection criteria that compatible with the firm's strategy, it is a possibility that the two goals and objectives can be aligned.

Supplier selection as the first link of the supply chain is of great importance to companies because it commits resources while at the same time provides an impact on activities such as production, implementation planning and control, inventory management, cost saving, work efficiency and product quality.

From the above, the following hypothesis is proposed:

H8: Better supplier selection decision process would have a significant link to greater work efficiency and company performance.

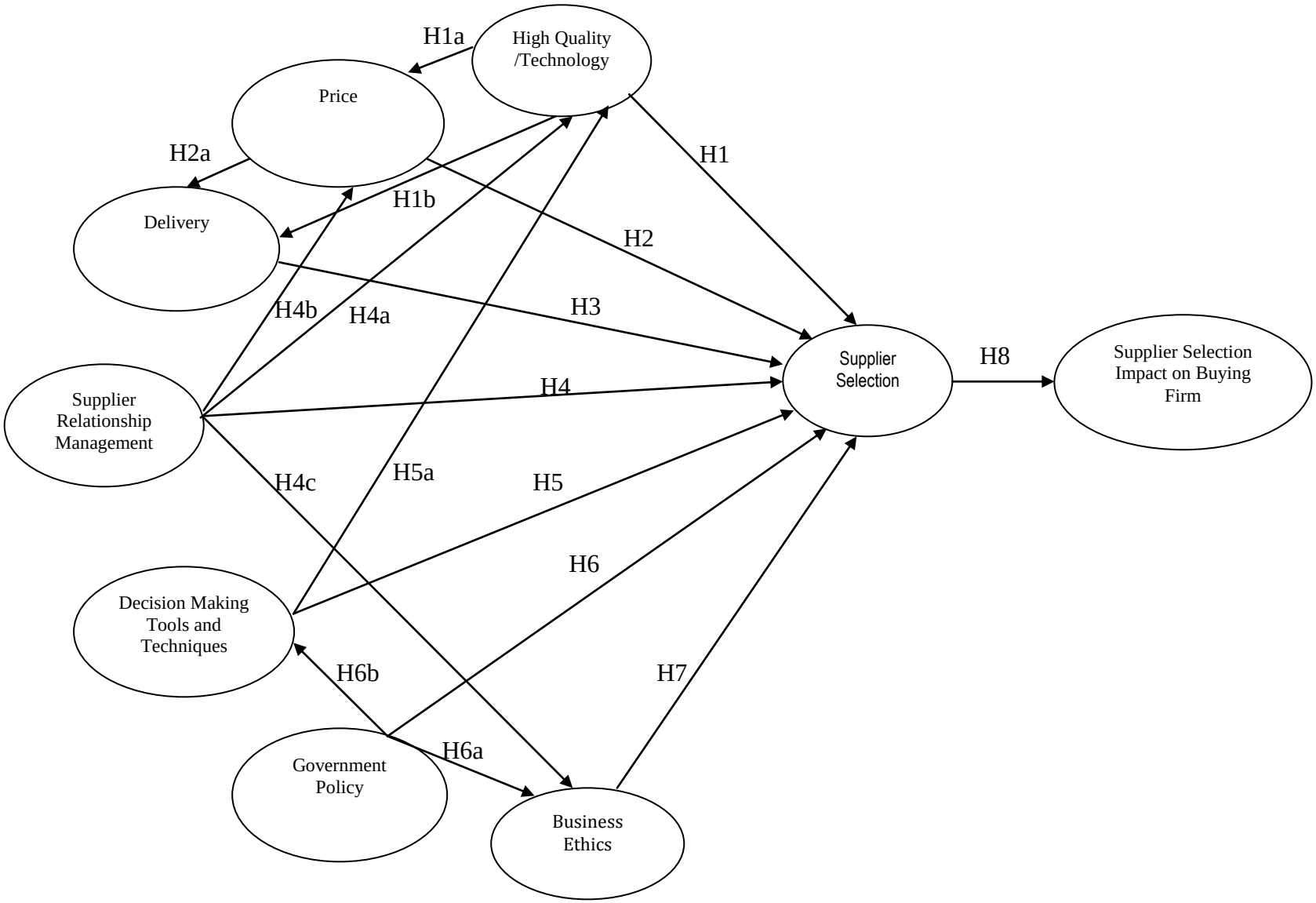
3.5 Research Hypotheses

On the basis of the reviewed literature and from the above hypothesis development discussion and argument, seventeen hypotheses were formed and proposed as shown in the diagram Figure 3.2. This diagram tells us about all of the hypotheses constructed showing how they are linked to each other using the straight line arrow. The independent variable such as quality (H1), price (H2), delivery (H3), supplier relationship management (H4), decision making tools and techniques (H5), government policy (H6) and business ethics (H7) will have a direct relationship with the dependent variable which is the supplier selection. There are also the interrelationships amongst the independent variables which lead to effect the supplier selection such as how quality criteria (H1a) have a relationship with the price which will affect the supplier selection, (H1b), (H2a), (H4a), (H4b), (H4c), (H5a), (H6a) and (H6b). The impact of the supplier selection is also

examined in terms of the relationship it has and the impact it has on the buying firm. This can be seen on the hypothesis under (H8).

Figure 3.2 below shows the research hypothesis diagram:

Figure 3.2: Research Hypotheses



3.6 Conclusion

The criteria's and factors influencing supplier selection are often interrelated and do not always exist in isolation. This study was a first toward exploring the interrelationships among the influencing factors within the context of supplier selection in the in the supply chain management scope.

This chapter provided a detailed investigation of the supplier selection criteria towards development of the hypothesis. The study also highlights the impact of the supplier selection to the buying firm business performance. The hypotheses demonstrated the different relationships between the study constructs in the integrative framework provided.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction

In the previous chapter it was explained how the theoretical framework has been developed or built, and how key research questions were identified along with variables. Seventeen hypotheses have also been formulated. This chapter presents an overview and understanding of the research methodology that is applied in this study. It will discuss the research method, design and process in order to address the research questions stated in the earlier chapter.

4.2 Research Methodology

According to Bryman (1984), the term methodology refers to an epistemology position while methods and techniques refer to the way of gathering and analysing data. Thus, both indicate different levels of analysis. Sounders *et al*., (2007), indicated that the term methodology belongs to a wider construct as it is linked to theories of how research should be conducted including assumptions related to the theoretical and philosophical aspects which studies are based on. To be more precise, research methods explain how research questions will be answered in terms of tools or instruments to be used by a researcher to gather and compile the empirical evidence.

The selection of research methodology and method is known to be a vital step towards the success of a research project. In social research, three major leading epistemologies which have been discussed broadly are positivist, relativist and social constructionist. Positivism refers to the philosophical stance that an object can be observed and is a social reality. It emphasises on a methodology that is highly structured to assist duplication as well as on observation that can be quantified which leads to statistical analysis. The ontological assumption within the positivist paradigm is that reality is objective, external and singular and hence separated from the individual who observes it.

Epistemological debate has been focussed on whether reality exists beyond the human mind and the researcher is independent from the subject being researched, or reality is part of that being researched so that the researcher interacts with the subject being investigated.

Hence, research design should take into account the epistemology whereby the formal research design needs to focus on difference issues. Several other factors affecting research design involve the philosophical position, particularly the ontology and epistemology. Among the main philosophical position are positivism, interpretivism and realism. However, fundamentally different among research philosophies are logical positivism and phenomenological inquiry (Sarantakos, 1998; Patton, 1990; Collis and Hussey, 2003). Some other writers chose the term philosophies and perspectives to explain the difference between these two main traditions of inquiry (Smith, E. *et al.*, 2002; Sounders *et al.*, 2007).

In discussing the differences between these cultures of inquiry, the terms ontology and epistemology are often used to examine how human beings come to know about their world (Burrell and Morgan, 1979; Smith *et al.*, 2002). Ontology is concerned about the nature of existence; hence, it seeks to answer what is the nature of reality (Denzim and Lincoln, 2000) with the assumption that reality is objective, external and singular, and thus is separated from the observer.

Positivist methods usually incorporate the assumption that there are true answers, and the role of the researcher is to start with hypothesis about the nature of the world and then seek the data to either confirm or disconfirm it. The researcher could also pose several hypotheses and seek the data which will allow selection of the correct ones. Positivist methods are more concerned about ensuring that the results grant an accurate reflection of reality. The aim of a positivist research design is to maximise internal validity, and this requires the eradication of plausible alternative explanations for any differences observed between groups. Threats to internal validity are the phenomena of changing trend over time.

By contrast, phenomenological interpretivism views reality as subjective and multiple, as seen and interpreted by human beings through sense-making process while the epistemology is concerned about knowing the relationship between the inquirer and the known (Denzim and Lincoln, 2000). The strongest argument of the interpretivist is the necessity to discover what is referred to as details surrounding a situation in order to understand the reality or reality behind a given situation (Remenyi *et al.,* 1998). This argument is more likely to be associated with the term constructionism. In this perspective, there is no absolute truth and it requires proponents to establish how various claims for truth and reality become constructed in everyday life. It is therefore the role of the interpretivist to try and understand the subjective reality of matters that they are studying with the intention to understand and identify their purpose, intention and behaviour in a meaningful way for these research participants.

4.3 Research Method

The basic tenets of positivism are empiricism and objectivity (Denzim and Lincoln, 2000; Sekaran, 2006). The roots of the logical positivist paradigm lie in natural science. Hence, the positivist upholds the philosophy that reality can be discovered through the experiment reasoning or scientific observation and tested in terms of its caused-effect relationship among identified variables (Creswell, 2003; Collis and Hussey, 2003; Saunders *et al.,* 2007). The application of the positivist paradigm in management and organisational studies is therefore aimed at producing general causal theories in explaining various aspects of organisational behaviours which are validated through scientific methods.

In adopting this positivist philosophy approach, the subject has to be pragmatic, objective and tangible, and bound within science and observation. As such, quantitative research method can be adopted. Quantitative research strategy emphasises on the quantification in data collection and analysis. Quantitative research engages with employing a deductive approach to the relationship between theory and research with more concerns and emphasis on testing of the theory. Deductive reasoning, which concerns with testing or confirming hypotheses, is narrower in nature. Meanwhile, inductive reasoning is more exploratory and open-ended in nature, especially at the initial phase.

Deductive research approach is relevant to modify existing theory, develop hypothesis and create research strategy to assess the hypothesis. Testing the hypothesis is important to search, confirm or disconfirm as well as explain relationship between variables. Deductive reasoning approach starts from the general to become more specific, then eventually narrowing down to more particular hypotheses to be tested through data collection and analysis observation. Testing of hypotheses with specific data collected enables the confirmation or disconfirmation of the original theories. Testing the theory will directly or indirectly search to explain causal relationship between variables.

The main characteristic of the deductive approach is that concepts need to be operationalised in a way which enables facts to be measured quantitatively. The ability to measure allows the researcher to find differences in terms of characteristics under review. It will also offer a consistent device for making such distinctions and further findings to obtain more accurate estimates of the extent of relationship between concepts.

In dealing with deductive research approach, matters related to reliability and validity need to be addressed. The threats to reliability are mainly derived from participant error, participant bias, and observer error and bias. On the other hand, the threats to validity come from testing, history, instrumentation, ambiguity about causal direction, mortality, and maturation.

4.3.1 Justification for Adopting the Positivist Philosophy via Deductive Approach

As mentioned in the previous chapter, this research plans to determine the relationship between supplier selection criteria in the telecommunications industry through a number of hypotheses that have been proposed. Thus, by adopting the positivist philosophy via deductive approach as the guiding principle, the researcher focuses on how to prove or disprove the relationship between the variables under study via hypothesis testing using effect statistics. Such quantitative method allows the researcher to measure the relationship's strength and helps describe how the variables relate to the focal constructs.

4.4 Research Strategy

Research strategy is basically the way of conducting the research; it could be a choice of adopting a survey approach, experiment study, carrying out a case study or conducting an action research and to a certain extent, an ethnography research can also be considered. The most widely used methods identified by Chisnall (1997) including the type of research are 1) Exploratory, 2) Descriptive and, 3) Causal.

4.4.1 Exploratory Research

The main emphasis in an exploratory research is on the discovery of insights and ideas (Churchill 2001, p.104). Singleton *et al.,* (1993) stressed that exploratory studies are undertaken when relatively little is known about the subject or the subject is not clearly defined. The aims of exploratory researches are mainly for (Churchill 2001, p. 108):

- formulating a problem for more accurate examination,
- developing hypotheses,
- identifying priorities for additional research,
- collecting data or information about the practical issue,
- increasing the analyst's knowledge with the issue,
- clarification of concepts

In exploratory research, the researcher can clarify the understanding of an issue or problem and assess the occurrence in a new light, especially when the researcher lacks a clear idea about the research area. There are a few different ways that are commonly used to conduct exploratory research such as searching the literature, conducting interviews, and speaking with experts in the subject (Saunders, Lewis and Thornhill, 2007).

There are four different approaches in an exploratory research, which are literature search, experience survey, focus group and the analysis of selected cases.

4.4.2 Literature Search

A literature search refers to a well thought out and organised search of statistics, journals, articles, magazines, newspapers, and books for information/data or insight into the issue at hand (Churchill 2001, p. 109). Another term used to describe this is documentary search (Edwards and Talbot 1996), where information is gathered through documentary sources. This approach alone is not particularly suitable for this present study. However, the researcher adopts this approach to gather data and information where it was helpful and relevant to the topic.

4.4.3 Experience Survey

An experience survey is the attempt to acquire the information or knowledge and experience of those that are familiar with the general subject being examined or investigated (Churchill 2001, p.109). Here, respondents would be selected very carefully, and chosen because of Research Design and Methodology displaying the likelihood that they can contribute to the survey effectively. Random sampling may often be inappropriate in an experience survey, since it will be a waste of time to interview someone who does not have any information or knowledge pertaining to the subject. As such, an experience survey would be unsuitable with this present study, since it involves an in-depth study of supplier selection within private and state owned companies.

4.4.4 Focus Group

Focus groups have become one of the most popular interview techniques. There are personal interviews, simultaneously conducted amongst a small number of individuals, normally between six and twelve (Bernard 2000, p.210), brought together "by a trained moderator to explore attitudes and perceptions, feelings and ideas about a topic" (Descombe 1998, p.115).

4.4.5 Case Analysis

The Analysis of chosen cases is often referred to as the study of insight stimulating examples (Churchill 2001). Concentrated study of chosen cases of each occurrence under investigation would be involved in such a method. This method focuses on people, institutions or practices. A good example of this type of study might be benchmarking. Again, this approach is not appropriate for the present study.

4.5 Descriptive Research

The main importance in descriptive research is "on finding or determining the rate of recurrence with which something occurs or the degree to which two variables co varies" (Churchill 2001, p.103). Singleton *et al.,* (1993) also puts emphasis on the purpose of this sort of research, which is simply to describe a particular phenomenon. It is stated that there are three main objectives of descriptive research:

- To identify the facts which focus on a well-defined entity and measure these dimensions systematically and precisely,
- To estimate opinions or views from people,
- To assess the relationships.

An activity or situation that is designed to evaluate an event and applied to assess a hypothesis is known as descriptive research (Hair *et al.,* 2010). The main goals of descriptive studies are to identify the relations between the different variables, to determine the descriptions of the characteristics in relations to the particular population, to estimate the part of a population that portrays these characteristics as stated by Cooper and Schindler (2003). Descriptive research has been divided into two category (1) longitudinal study and (2) Cross-sectional study.

4.5.1 Longitudinal study

Longitudinal study is a form of developmental research strategy, where data is gathered over an extended period of time (Edwards and Talbot 1996, p.31), or where the same questions are asked at two or more points in time Singleton *et al.,* (1993). There are two

categories of study used in longitudinal study: true panel and omnibus panel. True panel research involves the study of fixed respondents, which are "measured repeatedly over time with respect to the same variables" (Churchill 2001, p.129). With regard to omnibus panel, the research involves the study of fixed respondents, "who are measured repeatedly over the time but this time, on variables which vary from measurement to measurement" (Churchill, 2001, p.129). Such an approach would not be suitable with this study, as the nature of a longitudinal study involves the gathering of data over a very long period of time.

4.5.2 Cross-sectional study

This method is often termed as a sample survey or survey design. A sample survey is defined as a cross sectional study in which the sample is chosen to represent the target population at an essential particular point in time and the importance here is on developing the summary of statistics (Churchill 2001' p.135). Numerous research projects study certain phenomena by taking cross sections at one particular time, and analysing them carefully. Therefore, this method or approach is particularly appropriate for this present study.

4.6 Causal Research

The main emphasis in causal research is on a determination of cause and effect relation (Churchill 2001, p.103) and it involves determining the relationship between two or more variables. Causal research can be applied in the research to identify if one variable will cause another variable to change or occur (Hair *et al.*, 2010). Causal research may be divided into three main areas: thought experiment, true experiment and natural experiment.

4.6.1 Thought Experiment

Thought experiment is simply a thought where researchers "think about research questions as if it were possible to test them in true experiments" (Bernard 2000, p.123). Under this type of experiment study it could be divided into two types: True Experiment (Laboratory Experiment) and True Experiment (Field Experiment**).** However, this approach is not suitable to the present study.

4.6.1.1 True Experiment (Laboratory Experiment)

A research investigation where investigators create a situation with exactly the same conditions, so as to control some variable, and manipulate other variables is known as a laboratory experiment (Churchill 2001). Bernard states that "laboratory experiment can test and clarify theories about how things work in the real world" (Bernard 2000, p.124). Laboratory experiment is of a relatively short duration, located on site, and involves close control of variables and meticulous observation (Descombe, 1998). However in the present study is concerned about obtaining data in a way of natural settings, this type of laboratory experiment is visibly unsuitable.

4.6.1.2 True Experiment (Field Experiment)

A research study that is applied in a realistic situation, in which one or more independent variables are manipulated by the experimenter, within carefully controlled conditions as permitted by the situation is defined as a field experiment (Churchill 2001). (Descombe 1998), defines field experiment as a study where the research appears to be restricted to a specific situation, one in which crucial variables can be manipulated and controlled. This approach is not suitable with the present study due to it is very difficult to get any company willing to be subject to such experiment.

4.6.1.3 Natural Experiment

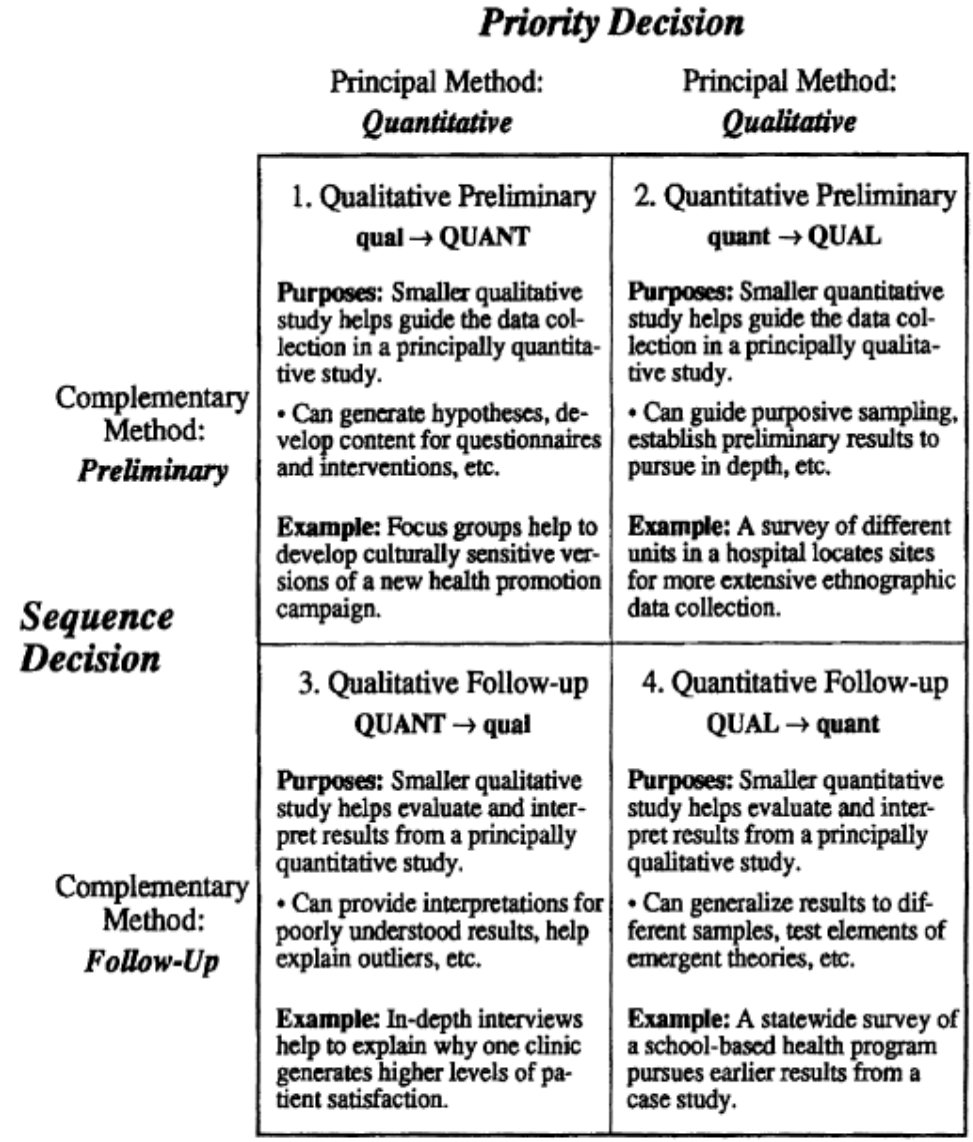
Natural experiment is a research study where the researcher collects experimental data under natural conditions. Bernard describes it as something that is "going on around us all the time" (Bernard 2000, p.127). In this experiment, the researcher make the data happen, out in the natural world (not in a lab) and it is then subsequently evaluated (Bernard 2000). Bernard stresses that many natural experiments evaluate data direct from observation or from archives. However, this approach is not suitable with the present study.

4.7 Research Design

Research design is a general plan of how the researcher intends to answer the research questions that have been set (Saunders *et al.,* 2007). Research design entails defining the nature of the methodology to be implemented, as well as the spatial location, industry and unit of analysis selected. In other words, the research design is a statement written before any data is collected which explains and justifies what data is to be gathered, how and from where it will be collected. At a later stage, it will require the researcher to explain how the data will be analysed and how this will provide answers to the research questions. A research design is a formula or simply the basic directions to carry out the project as stated by (Hair *et al.,* 2010).

Morgan (1998), in his study has indentified the Priority-Sequence model in the mixed method research strategy in combining the qualitative and quantitative methods. The selection of either a quantitative or qualitative approach as the principal method is the priority of the two methods. The preceding step is to determine the sequence whether the complementary method will function as either a follow-up or an initial to the principal method. An easy way in deciding which method should be applied is to develop on the decision in regards to which method will be chosen to be principal. The research designs where a preliminary qualitative study gives complementary aid in developing a larger quantitative study was adopted in this study based on Morgan 1998 sequence. These studies are normally principally quantitative research, but initially they utilize some of the qualitative techniques to develop or better the effectiveness of the quantitative research that follows. These two decisions give away four fundamental research designs: (a) preliminary qualitative methods in a quantitative study, (b) preliminary quantitative methods in a qualitative study, (c) follow-up qualitative methods in a quantitative study, and (d) follow-up quantitative methods in a qualitative study. The Figure 4.1 shows the priority sequence decision adopted from the Morgan study.

Figure 4.1: Priority Sequence Model



Complementary Combinations of Qualitative and Quantitative Research: The Priority-Sequence Model Adopted from David L. Morgan 1998

(Source: Adopted from David. L. Morgan 1998)

Thus this study chooses cell 1 strategy to be adopted in the mixed method research design. In this study the research design involves mixing qualitative and quantitative approaches. The study showed that more weight was given by quantitative phase and the qualitative and quantitative phases were happening sequentially.

As a result, the researcher proposes to conduct qualitative research first in order to gain some insight and investigate the studied occurrence (Zikmund, 2003). This was very helpful in aiding researchers to be familiar with the subjective dimension of the supplier selection criteria.

4.7.1 Qualitative Research

As mentioned in the research design (in section 4.8), the first stage of the empirical study involved the conduct of qualitative research. Patton (2002), defined qualitative enquiry as going into the field or into the real world of organisations, programs, neighbourhoods, street corners and getting close enough to the circumstances and people there to capture what was taking place (Patton, 2002).

Qualitative research has become a conventional and valid type of inquiry in the social sciences. Its value in generating valuable contextualised information is widely recognised (Creswell *et al.,* 2003). As the present study puts considerable emphasis on industrial context (i.e., higher education), qualitative enquiry is considered to be valuable.

In addition, the researcher employed qualitative research to achieve the following objectives:

- Clarification of domain of constructs
- Item generation and scale development
- Addressing the research questions and assessment of proposed relationships

4.7.2 Qualitative Data Collection Methods

Qualitative data collection methods include personal interviews and focus groups. In this study researcher adopt the personal interviews technique with few key informants.

4.7.3 Personal Interview

According to Saunders *et al*., (2003), interviews are most advantageous when the study includes both exploratory and explanatory elements. The researcher favours the interview technique for the first stage of the data collection because of the exploratory nature of the study at this stage. Moreover, the explanatory element of this study makes the use of interviews appropriate given that interviews enable the inference of relationships between variables (Cooper and Schindler, 1998).

In qualitative interviewing, interest is much greater in the respondent's point of view (Bryman and Bell, 2007). Interviews enable the researcher to ask more complex, open-ended and follow-up questions, which is not possible with some other forms of data collection (i.e., questionnaires). Thus, detailed information can be obtained. This is important in gaining rich and further inside information on supplier selection criteria and the relationship to the impact on company overall performance.

In addition, personal interviews take into account the social environment of the setting that is being examined as well as non-verbal communications such as the behaviour and attitude of the interviewee (Collis and Hussey 2003). This makes it possible for the researcher to "get the feel" of the context under study (i.e., higher education). The researcher intends to discover how interviewees respond to supplier selection process and criteria in the organisation through the personal interviews.

4.7.4 Key Informant Semi-structured Interviews

Specifically, key informant semi-structured interviews are appropriate for this study. One aim of semi-structured interviews is to develop an understanding of the respondent's "world" (Easterby-Smith *et al.,* 1991). From this perspective, the researcher started the investigation with a fairly clear focus, so that more specific issues could be addressed

(Bryman and Bell, 2007). In this context, a list of questions on quite specific topics to be covered (i.e., supplier selection criteria and critical factors) was prepared.

With regards to key informant interviews, rather than being selected randomly to sample the range of issues examined, respondents are chosen on the basis of their expert and distinctive knowledge (Jankowicz, 1995). When the study objectives are to define the important characteristics of main concepts by basing the decision upon the personal experience and understanding of the people involved, this method is very practical (Tremblay, 1982). The means in which such a concept of supplier selection criteria are understood and interpreted in practice within particular organisations in the telecommunications industry in Malaysia needs to be investigated from the perspective of key informants (for instance, chief finance and procurement officer, chief technical officer of the company) who are believed to have comprehensive knowledge of the related subject matters.

Therefore, in obtaining additional in-depth information in order to further enrich the main background data survey questionnaires, face-to-face interviews with regards to the related subject matter were conducted with a few key informants from the telecommunications companies. The objective for having the interview was to gain more insight of the related criteria and obtain additional information particularly in terms of the total scenario of the supplier selection process and criteria which will lead to an effect on the overall company performance in telecommunications companies. Information gathered from the interviews will be used to enhance the richness of the item and construct development and determine whether any more factors are related to the research area.

In this study, the researcher engaged in face-to-face interviews with the chief finance officer, chief procurement officer, vice president (technical division), general manager (technical division) and procurement manager of major telecommunications service providers in Malaysia. It was necessary to deliberately handpick the senior officers in the companies on the clear assumption that they were the key informants who might be able to contribute insights and information on the supplier selection criteria and process in their organisation.

For this purpose, the researcher employed the semi-structured interview approach. A sample of the interview questions are shown in Appendix 1. Bernard (2000), argues that semi-structured interviewing works very well in cases where we are dealing with managers and elite members of the community. The main reason why the researcher adopted semi-structured interview for this study was to gain as much new leads and insights into the subject matter as possible. Besides, the semi-structured interviews were carried out in a casual and informal manner, thus allowing respondents to feel relaxed and more willing to contribute their knowledge and insights. The semi structured interview data were analysed manually. The data are classified through deductive content analysis based key words or themes captured and were used to further enrich of the items development process.

Details and information captured during the interviews attached in the Appendix 1.

4.8 Qualitative and Quantitative Approaches

Quantitative studies seek to explain statistical patterns which describe regularities in human lives (Collis and Hussey, 2003). Quantitative methods search for patterns in human lives by separating the social world into experimental components known as variables which can be represented numerically as frequencies or rate, whose relations with each other can be explored by statistical methods, and accessed through systematic measurement and researcher-introduced stimuli as stated by Payne and Payne (2004).

Quantitative studies focus on testing hypotheses and generalising the findings to a broader population (Saunders *et al.,* 2000). On the other hand, qualitative studies give emphasis to the social world and the details of reality which people-as social actors produce. Therefore, qualitative studies aim to understand the meanings that people attribute to different aspects of their lives (Silverman, 1993).

Both perspectives have merits and limitations. While Payne and Payne (2004) criticised qualitative studies for their lack of generalisability, validity and reliability, Schwandt (1997), described the quantitative logic as mechanistic and degrading to the human nature, which contradicted the principles of social sciences.

The quantitative approach is usually employed to address research objectives, such as describing the characteristics of an event or issue as it appears in its environment; examining the relationships which exist between two or more variables; and determining the cause and effect of the relationship between two factors.

This research plans to explain the phenomenon and process of supplier selection in the Malaysian telecommunication industry. The research objectives seek to identify critical criteria's that need to be assessed to reach the conclusion stage of supplier selection in the organisation. To accomplish these goals, the quantitative approach is applied to prove the results with evidence supported by data.

4.8.1 Justification for Adopting the Qualitative and Quantitative Mixed method study Approach

After reviewing the strategies commonly used in previous studies, the researcher concluded that the research strategy that is most appropriate for this study is the survey research techniques with the use of personal interviews, document reviews and survey questionnaires in order to add more dimensions to the items and findings. As discussed earlier, survey research is one of the most well known methods used in data gathering. Due to its easy and convenient handling, it became well liked during World War I and II, and its popularity increased steadily since the 1970s (Neuman, 1995; Hussey and Hussey, 1997). Researchers who utilize survey research methods rely on well structured questionnaires for data gathering.

There are various approaches to the study of supplier selection in different organisations. Tracey and Chong (2001) used the regression techniques to examine supplier selection, customer satisfaction and company performance. Rohit Verma and Madeleine Pullman (1998) had tested hypotheses to explore the nature of certain relationship of variables such as cost, delivery and quality, and determine the relative weights of attributes in the real selection of suppliers. Other researchers like Hokey Min (1994), proposed the multi-attribute utility theory that effectively dealt with both quantitative and qualitative factors in multiple criteria and uncertain decision making environments.

As a means to gather data, the researcher used online web-based questionnaire as the main mechanism for data gathering. The survey questionnaires provided meaningful background information which was representative of the target populations' views and opinions. However, according to Edward and Talbot (1999), although questionnaires are useful and easily administered, feedback that is gathered through such method may not provide enough depth to the issue under study.

Based on previous literature, most researchers used questionnaires as their main instrument in gathering data. Therefore, the method used for this research study is a mixed method with a combination of quantitative or qualitative studies.

4.9 Document Review

The researcher also performed document reviews on how organisations or companies manage and organise their purchasing activities in relation to supplier selection process. A relevant document is part of an important input of how supplier selection has been practiced and implemented in organisations. Secondary analysis is the analysis of data by a researcher who is not involved in the collection of those data (Bryman and Bell, 2007). It was suggested by Marshall and Rossman (1999), that the review of the documents is an unobtrusive technique that is rich in describing the beliefs and values of participants in the setting.

Official documents classified as "Private and Confidential", "Restricted" and "For Internal Use Only" was reviewed for this study, such as the Purchasing Standard Operating Procedures, Procurement Business Process Manual, General Procurement Policy, Red Book Procurement Guidelines, Internal circular, newspaper cutting and related official document. However, only a certain available, non private and confidential documents were attached in the Appendix 5. Those private and confidential documents such as standard operation procedure and internal circular were unable to be produce and revealed.

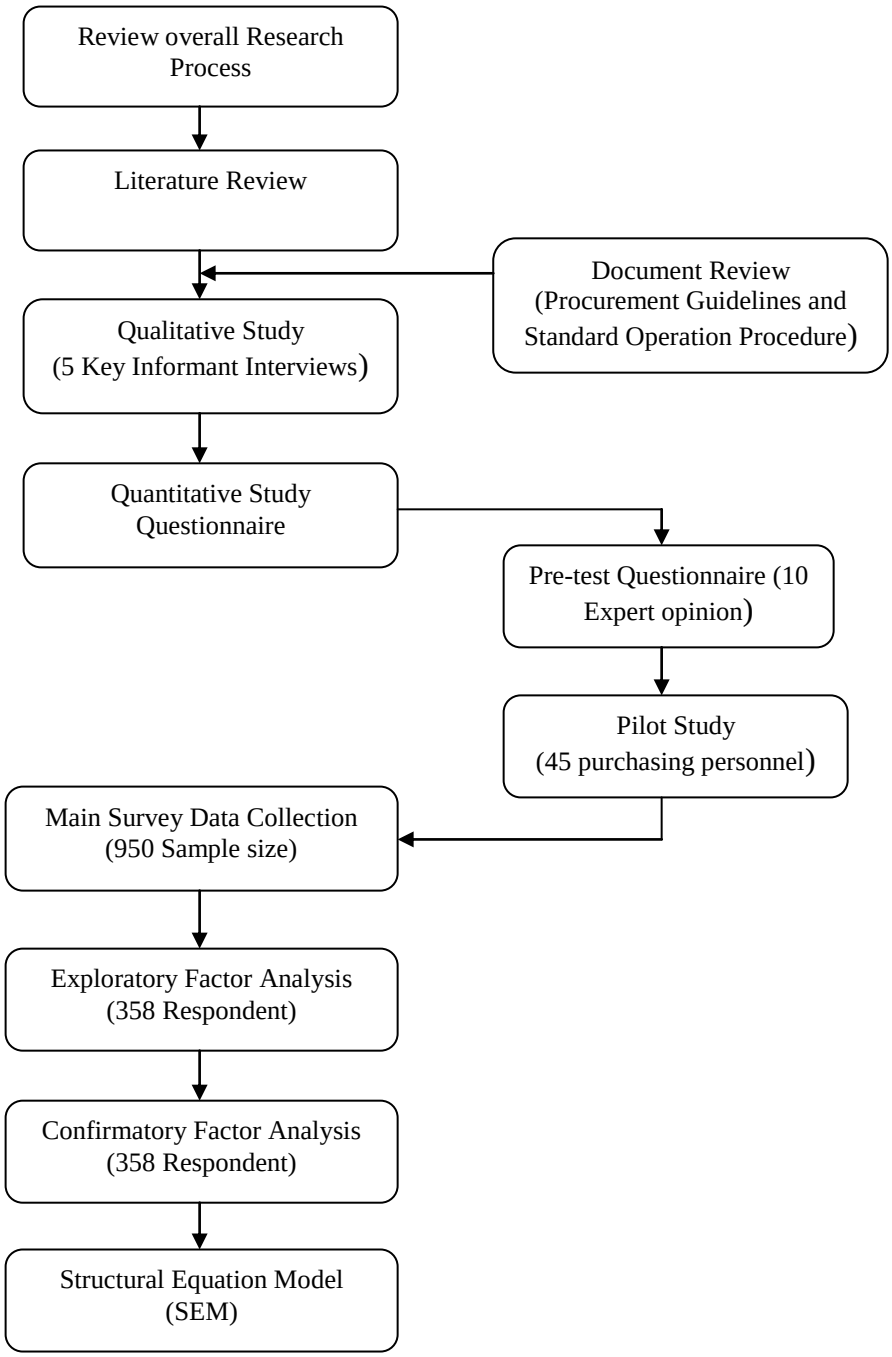
Cohen *et al*., (1972), argued that the reliability and validity of this documentary data are not suitable for the purpose of the research; however, secondary data could provide more meaningful and useful information in this study. All information gathered by this method

was subsequently triangulated with the outcomes from the key informant interviews to add to the richness and diversity of data.

4.10 Research Design Process

Based upon the overall review in the research design, the proposed research design process is shown in flow chart Figure 4.2 below:

Figure 4.2: Research Design Process



The literature review in the supplier selection area has helped the researcher gain broad information on this study. The document reviews have been observed on how organisations or companies manage and organise their purchasing activities in relation to supplier selection. To further enrich and clarify the subject matter as well as to assess the relationships with the product construct, the qualitative study (interview) with a few key informants was conducted. To validate the items and construct of this study, pre-tests and pilot tests were performed. The quantitative studies from the main survey questionnaire were used to assess and determine the tendency towards supplier selection criteria and relationship with the item constructs. The main questionnaire survey data was analysed by going through the Exploratory Factor Analysisand Confirmatory Factor Analysis. The Structural Equation Model (SEM) technique was used to assess the supplier selection model and to test the hypothesis. The above Figure 4.2 therefore illustrates the process employed by the researcher to investigate and answer the research objectives and questions.

4.11 Triangulation

Methodological triangulation, as the term indicates, involves triangulating or employing more than one type of methodology (Bryman, 2006). For the purpose of this study, the researcher makes use of the data triangulation method by combining the quantitative and qualitative techniques of data collection.

The concept of triangulation was introduced in social science by Webb *et al*., (1996) and used by Denzin (1978). Triangulation is generally defined by Denzin (1970) as the mixture of methodologies in studying a specific phenomenon.

Its primary aims are to validate research findings across methods to present a more complete account of social reality. Thorpe and Lowe (1991) and Patton (1990) indentified four basic types of triangulation that contributed to validity enhancement of qualitative data analysis: theoretical triangulation, data triangulation, method triangulation and analyst triangulation.

Therefore, in order to look at something from a number of angles rather than to look at it from only one angle triangulation is utilized by qualitative and quantitative social researchers. According to Neuman (2003), there are four types of triangulation;

Firstly, the triangulation of measures, which shows the use of more than one measure for the same phenomena. Second is the triangulation of observation, where the gathering of data is done by a variety of observers to give away a more complete view of the setting. Thirdly, triangulation of theory, which happens when multiple theoretical perspectives in the planning phase of the research is utilized by the researcher and lastly, triangulation of methods, which means the conducting of qualitative and quantitative styles of research.

Bryman (2006) identified two schemes for justifying the combination of quantitative and qualitative research based on a content analysis of social science articles in which the two methods were combined (See Table 4.1).

Table 4.1: Triangulation Scheme

Triangulation Scheme	
	Scheme One
Triangulation	Convergence, corroboration, correspondence or results from different methods. In coding triangulation, the emphasis was placed on seeking corroboration between quantitative and qualitative data.
Complementarity	Seeks elaboration, enhancement, illustration, clarification of the results from one method with the results from another (Greene et., 1989:259).
Development	Seeks to use the results from method to help develop or inform the other method, were development is broadly construed to include sampling and implementation, as well as measurement decisions (Green *et al*, 1989: 259).
Initiation	Seeks the discovery of paradox and contradiction, new perspective of frameworks, the recasting of questions or results from one method with questions or results from the other method (Green *et al*, 1989:259).
Expansion	Seeks to extend the breadth and range of enquiry by using different methods for different inquiry components (Green *et al*, 1989: 259).

	Scheme Two
Triangulation or greater validity	Refers to the traditional view that quantitative and qualitative research might be combined to triangulate findings in order that they may be mutually corroborated. If the term was used as a synonym for integrating quantitative and qualitative research, it was not coded as triangulation.
Offset	Refers to the suggestion that the research methods associated with both quantitative and qualitative research have their own strength weaknesses so that combining them allows the researcher to offset their weaknesses to draw on the strength of both..
Completeness	Refers to the notion that the researcher can bring together a more comprehensive account of the area of enquiry in which he or she is interested if both quantitative and qualitative are employed.
Process	Quantitative research provides an account of structures in social life but qualitative research provides sense of process.
Different research questions	This the argument that quantitative and qualitative research can be each answer different research questions.
Explanation	One is used to help explain findings generated by the others.
Unexpected results	Refers to the suggestion that quantitative and qualitative research can be fruitfully combined when one generates surprising results that can be understood by employing the other.
Instrument development	Refers to context s in which qualitative research is employed to develop questionnaire and scale items, for example, so that better wording or more comprehensive closed answers can be generated.
Sampling	Refers to situations in which one approach is used to facilitate the sampling of respondents or cases.
Credibility	Refers to suggestions that employing both approaches enhances the integrity of findings.
Context	Refers to cases in which the combination is rationalized in terms of qualitative research providing contextual understanding coupled with either generalisable, externally valid findings or broad relationships among variables uncovered through a survey.
Illustration	Refers to the use of qualitative data to illustrate quantitative findings, often referred to as putting ‘meats on the bones’ of dry quantitative findings.

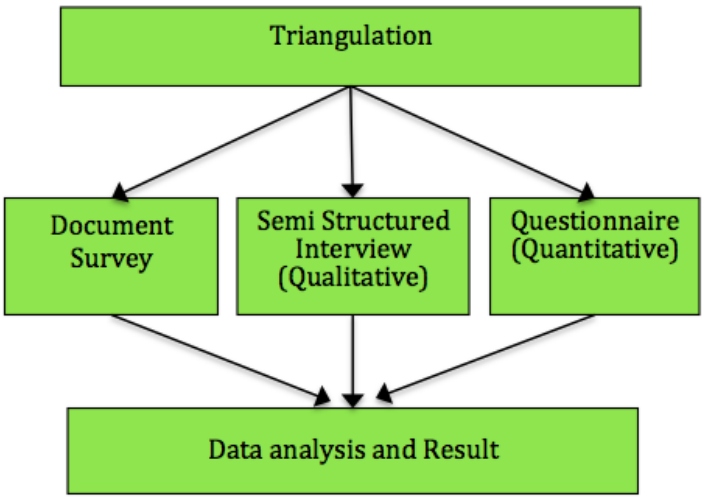
Utility or improving the usefulness of findings	Refers to a suggestion which is more likely to be prominent among articles with an applied focus, that combining the two approaches will be more useful to practitioners and others.
Confirm and discover	This entails using qualitative data generate hypotheses and using quantitative research to test them within a single project.
Diversity of views	This includes two slightly different rationales – namely, combining researchers' and participants' perspective through quantitative and qualitative research respectively, and uncovering relationships between variables through quantitative research while also revealing meanings among research participants through qualitative research.
Enhancement or building upon quantitative/qualitative findings	This entails a reference to making more of or augmenting either quantitative or qualitative findings by gathering data using a qualitative or quantitative research approach.
Other/unclear	
Not stated	

Source: Adapted from (Bryman, 2006)

Combining qualitative and quantitative methods involves the employment of several methods in the study of the same phenomenon. This is termed as "methodological triangulation" (Denzin, 1978). Triangulation can be used when approaching a phenomenon from different perspectives and thereby allows conclusive understanding of the research problem (Jick, 1979; Deshpandé, 1983). Consistently, due to the fact that social phenomena are so complicated, different kinds of methods or techniques are necessary to best understand these complexities (Creswell *et al.,* 2003).

The present study adopts the triangulation of method technique which is better known as the 'mixed method' approach (Tashakkori and Teddlie, 1998, 2003). It is an approach in social sciences which employs collecting data by both forms of research styles; i.e. qualitative and quantitative concurrently or sequentially (Cresswell, 2003). It indicates that data will be integrated, related, or mixed at some stage of the research. The reasons for combining the two methods are considerably various and different from researcher to another.Therefore this study adopts the research design triangulation approach as below.

Figure 4.3: Triangulation approach



Triangulation means studying the same research problem from varied perspectives in terms of data sources, methods, investigators or theories (Denzin, 1978), so that the convergence of results can be obtained to increase their credibility. Through the triangulation approach of this study, it is also important to use other sources such as document review and personal interview to gather required information.

4.11.1 Argument for Methodological Triangulation

Given the aforementioned limitations of each approach, combining both qualitative and quantitative approaches can strengthen a study (Greene and Caracelli, 1997) as it neutralises a number of the disadvantages of certain techniques or methods, for example the details of qualitative data can complement quantitative results (Jick, 1979; Lyon *et al.*, 2000; Baker, 2001; Tashakkori and Teddlie, 2003). Combining qualitative and quantitative methods involve the employment of several methods in the study of the same phenomenon. This is termed "methodological triangulation" (Denzin, 1978; Olsen, 2004). Triangulation can be used when approaching a phenomenon from different perspectives and thereby allowing conclusive understanding of the research problem (Jick, 1979; Deshpandé, 1983; Baker, 1994; Lyon *et al.*, 2000). Time and again, because of the complexity of social phenomena, differing methods are required to gain a clear understanding of these complexities (Creswell *et al.*, 2003). Webb *et al.*, (1996) further supported that researchers should employ more than one instrument to measure variables.

This study adopted a triangulation approach in which semi-structured interviews, document review and survey questionnaires were employed. The study mainly employed the quantitative method, in particular a self-administered survey questionnaire, to look into the consequences and past history of supplier selection decision in telecommunications companies. The questionnaire will be employed to determine the tendency towards supplier selection criteria in telecommunications industry in the Malaysia context. A qualitative method (i.e., semi-structured interviews) was initially used to give validation of the measurement scales before the main survey was conducted. In other words, the research adopted a qualitative data collection and analysis approach at the beginning, subsequently followed by quantitative data collection and analysis (Creswell *et al.,* 2003). Qualitative results then formed the scales framework for the explanatory stage of the study with the target to assess the relationships. At the same time, the interviews could probably help the researcher in explaining and supporting the quantitative results. Therefore this study adopts the triangulation approach by the combination and conduction of qualitative and quantitative styles of research.

4.12 Item Development and Creation

The objective of this first step was to create a pool of items by identifying items from existing literature review and interviews. Firstly, all the items that were identified were then categorised in accordance to the varying supplier selection criteria and factors that they were initially planned to concentrate on. This developed an initial item pool for each of the supplier selection criteria. Then, only items that were considered to be applicable and focused in particular situations or industries were picked. Once this was done, the question items were created for the purpose of developing the survey questionnaire.

At the beginning, the researcher analysed items from past literature and fine-tuned them alongside the qualitative study. Items that were relevant to each construct were identified. In order to avoid a questionnaire that was too long and achieve parsimony, the items were kept to a minimum (Devillis, 2003). Initially, seventy three (73) question items were generated. In the following Table 4.2, the dimensions/constructs together with their measurements based on literature and qualitative study are presented.

Table 4.2: Measurement items for the constructs of the study

Construct	Items	Sources
Quality & Technology	1.Supplier fulfils the *technical specifications* and requirements of my organisation 2.Supplier offers the *latest technological* products 3.Supplier offers an acceptable product or equipment or *technical support* 4.Supplier offers product /equipment *warranty* 5.Supplier offers reasonable *life span* of the product 6.Supplier offers *training and support* to use the product 7.Supplier offers *reliable* product/ equipment 8.Our organisation is involved in *product development* with our suppliers 9.Supplier should be *certified and is compliant* with relevant quality standards 10.Supplier offers products of *high quality standards*	Alex Sharland, Reham A. Eltantawy & Larry C. Guinipero, (2003). Mark A. Vonderembse & Michael Tracey, (1999). (Dickson, 1966; Waber *et al*. 1991). Item 1,2 and 3 has been extracted and supported from the interview-qualitative study
Price	1.Must comply with the *price schedule* and payment terms 2.Supplier charges for *repairs*/tendered project works and *engineering services* are reasonable 3.Supplier offers *competitive prices* 4.*Spare part price*/cost should be considered during the supplier selection process 5.Supplier clearly states the *maintenance cost price* for the warranty and post warranty 6.Should offer clear *total cost* of ownership 7.Possible future *price escalation* within the contract period should be agreed upon 8.Future *switching or hidden costs* are considered and discussed	Zeger Degraeve, Eva Labro& Filip Lammings (1993). Roodhooft, (1998). (Dickson, 1966; Lehmann and O'Shaughnessy, 1982). (Giunipero *et al*, 2006). Item 1,2 and 7 has been extracted and supported from the interview-qualitative study
Delivery	1.Be able to *deliver* the products/equipments/services *in a timely manner* 2.Should comply with a *fast response* time in dealing with customer request 3.Compliance with *late delivery* penalty charges imposed due to late delivery 4.Is compliant with the *quantity requirement* 5.Is compliant with the *completion and ready for service/commission date* 6.Offers short or reasonable product *delivery lead time* 7.Appropriate *production planning capability* in order to accommodate demand 8.Clear hierarchical structure for *escalating issues process* 9. *Supplier located* close to our organisation.	Michael Tracey & Chong Leng Tan, 2001. (Ellram, 1990). Kannan and Keah (2002). Item 5 and 8 has been extracted and supported from the interview-qualitative study
Supplier Relationship Management	1. Has *experience* supplying to the *telecommunication industry*. 2.Has *experience working* with us and supplying to our *organisation* 3.Supplier *background, brand, reputation* and performance to be considered 4.Has *track record and expertise* in the telecommunications industry 5.Willingness to *establish a partnership* business relationship 6.Able to articulate their *short term or long term business relationship* 7.Able to provide an indication of their *inventory control management* 8.Supplier *financial stability* and *business practices* 9. Offers high *commitment* from higher level management team.	Dickson, 1966; Lehmann and O'Shaughnessy, 1982). (Guinipero *et al.*, 2006) (Narasimhan, 2002). (Kannan 2002). (Ellram, 1990). Item 1,2,4 and 9 has been extracted and supported from the interview-qualitative study

Decision Making Tools and Technique	1.Has a relevant and up to date *information systems* 2.A clear *authorisation limit* or level of authority within the supplier organisation 3.Supplier should be evaluated based *appropriate decision making tools and techniques*	Elram (1998), Saaty 1980 (Ho key min, 1994).
Government Policy	1.Follows Malaysian *government rules and regulations* 2.Meets *Local Authority rules* and requirements 3.Complies with all *national and international rules* and regulations 4.Supplier adheres to the *procurement policy* of my organisation 5.Supplier supports the *national strategic Bumiputra agenda* 6.comply with *national environmental guidelines* 7.in alignment with *government procurement policies* and guidelines 8.comply with recognised occupational *safety and health* procedures 9.should bring for *benefits to the country* 10.comply with all *contract terms and conditions*	(Lehmann, 1974). Darnall *et al*. (2008). (Barnett and King's 2008).(Procurement Red Book Guidelines 2006) Item 4,5 and 9 has been extracted and supported from the interview-qualitative study
Ethics	1.Should be involved in any *lobbying* activities 2.Should be involved in any *canvassing* activities 3.Should be practicing offer of *gifts* 4.Should be involved in *bribery or corruption* activities 5.Should be involved in any *inducement and rewards* activities 6.Is *transparent* in supplier business practice 7.Is *fair, equitable and honest* in supplier business practice 8.Shows high *integrity* in business practice	(Go¨ran Svensson and GregWood 2008). (Cooper 2000). (Handfield and Baumer 2006). (Landeros and Plank 1996). (Munro 1992). (Muel Kaptein 2010). Item 2 and 4 has been extracted and supported from the interview-qualitative study
Supplier Selection	1.Have clear *understanding of supplier selection* 2.It is important to have a *process for selecting suppliers* in my organisation 3.The process of *selecting suppliers* in my organisation is *not complicated* 4.Organisation has *clear guidelines* for the selection of suppliers 5.It is necessary to have *knowledg*e about how the supplier evaluation and selection process work in the organisation 6.Needs further *training in supplier selection* and procurement	(Dickson, 1966; Waber *et al*. 1991). (Ellram, 1990). Item 3 and 5 has been extracted and supported from the interview-qualitative study
Supplier Selection impact	1.Improved supplier selection process will improve *work efficiency* 2.Improved supplier selection process will *improve productivity* 3.Improved supplier selection process will promote high standard of *working culture* 4.Improved supplier selection process will develop *better planning and work coordination* 5.Improved supplier selection process will create *healthy market competitiveness* 6.Improved supplier selection process will improve *customer satisfaction* 7.Improved supplier selection process will *achieve cost savings* 8.Improved supplier selection process will improve quality and *services to the customer* 9.Improved supplier selection process will meet *internal and external needs and requirements* 10.Improved supplier selection process will further enhance *workers skills and knowledge*	Vijjay R Kannan & Keah Choon Tan, 2002 Narasimhan and Kirn (2002) Item 3,8 and 9 has been extracted and supported from the interview-qualitative study

4.13 Questionnaire Development Process

Development of the survey instrument was carried out in stages. The first stage was item creation, which is creating a pool of items by identifying issues from existing literature reviews and responses from semi structured interviews of key informants. The second stage involved document review such as company procurement standard operation procedure within the telecommunications companies to ensure that the items gathered from literature were in line with the context under study. The third stage was face and content validity involving expert opinions and comments from colleagues, academicians and practitioners. At this stage, the survey questionnaires were distributed to colleagues in Brunel University, supply chain management practitioners, consultants, academicians and professionals for further refinement.

The following section describes each of the steps in detail.

4.13.1 Questionnaire Design

For the objective of this analysis, the main data collection method was conducted via survey questionnaires. The questionnaire was developed through analysing various elements believed to be important in the supplier selection criteria, as had been identified previously during the literature review and some insight knowledge from interviews and document reviews. The researcher has also purposely selected the major Telecommunications service provider companies in Malaysia as the main subject. Based on the information, an outline questionnaire was drafted.

Step 1: Specify Research Goals and Information Needed

Specifying one's research goals is absolutely fundamental before design in any questionnaire. It determines "what information will be sought and from whom" (Churchill 2001, p. 315) the information will be gathered. The preliminary stage is the most critical part, as the researcher must "determine how best to accomplish them within the available time and resources" (Czaja and Blair 1996, p. 11).

Step 2: Determine Type of Questionnaire and Method of Administration

After specifying the basic information needed for the research, the researcher needed to decide how the information will be gathered. The type of questionnaire depends on whether a survey is to be administrated by online web-base survey, post mail, by personal, or by personal interviews.

Churchill suggests a researcher must "use the type of data to be collected as a basis for deciding on the type of questionnaire" and "use the degree of structure and disguise as well as cost factors to determine the method of administration" (Churchill 2001, p. 341). For this study, the researcher conducted a survey distributed by online web base survey and personally by hand.

Step 3: Determine Content of Individual Question

Determining the content of individual questions is very important to ensure good responses. Churchill argues that the content of individual questions is highly important, and points out it is largely controlled by "the researcher's previous decisions regarding information needed, the structure and disguise to be imposed on its collection, and the method for administering the questionnaire"(Churchill 2001, p. 319). To ensure thoroughness, Churchill further suggests the researcher needs to ask some additional questions, such as (Churchill 2001, p. 319):

- Is the question necessary?
- Are several questions needed instead of one?
- Do respondents have the necessary information?
- Will respondents give the information?

The questionnaire was divided into three parts, thereby ensuring that each question was “specific and addressed only one important issue” (Churchill 2001, p.341). The first part of the questionnaire asks for general information about the respondent. This data provides some basic information on the respondent's such as gender, age, position and experience and etc. The second part of the questionnaire focuses on all the variables involved in the

hypothesis testing. The third part asks each person's basic understanding of supplier selection and the impact of supplier selection.

Step 4: Determine Form of Response to Each Question

The next step in designing a questionnaire is to decide what type of response to each and every question might fit the needs of the survey. Questions can be asked as closed-ended, open-ended, multiple choices, two choices, or to represent a scale (Churchill 2001, p. 324, Czaja and Blair 1996, p. 18). However, most questions may be classified as either closed or open-ended (Pallant 2001, p. 7). Most researchers argue that a questionnaire should be kept short, in order to get good responses. Although most researchers claim that a lengthy questionnaire might increase the non-response rate, Dillman (1978, p. 54) and Champion and Sear (1969, p. 339) found out that there is no relationship between longer questionnaires and lower response rates. Champion and Sear (1969, p. 339), conclude that longer questionnaires tended to be returned more frequently than shorter ones. They have found that the nine-page questionnaire was returned significantly more often than the shorter three pages questionnaire (Champion and Sear 1969, p. 339). In another study, However, Dillman (1978, p. 55) and Frazer and Lawley (2000, p. 38), suggested the optimal or ideal length for questionnaires was about 12 pages or 125 items.

A five-point Likert scale ranging from ‘strongly disagree’ to ‘strongly agree’ picked as the format of respond. Thus the respondents were asked to mark the question on a five-item likert scale except for the section personal background where the respondents were required to tick in the appropriate box. The scales given were 'strongly disagree', ' disagree ', 'neutral', ‘agree’ and 'strongly agree'. One of the advantages of using Likert scale is that respondents are able to rate their agreements to specific attributes in a flexible manner.From the previous study in this area (Rohit Verma and Madeleine E. Pullman, Kannan and Tan (2002), in order to explore the regarded importance of varying supplier attributes, a likert-type scale was utilized.

Since the aim of this research is to get an in-depth view of supplier selection in Telecommunication service provider companies in Malaysian, the research questionnaire is quite lengthy. However in order to prevent respondents getting bored, all questions in the main questionnaire were a closed-ended question. These enable respondents to fill the questionnaire much more easily.

Step 5: Determine Wording of Each Question

The choice of words and phrases employed in a questionnaire is extremely crucial in a mail survey. Descombe (1998, p. 98) stresses the wording of the questions is in fact the most difficult part in questionnaire design, but it is certainly one of the most critical to get right. Churchill argues that choosing a right phrase in every question is very vital, as "poor phrasing of a question can cause respondents to refuse to answer it even though they agreed to cooperate in the study" (Churchill 2001, p. 330). Although there are no "clear cut rules that can guide this process" (Pallant 2001, p. 10), the researcher should use simple words and phrases, which can easily be understood by respondents. Hence, all words used must be suitable, clear, precise and comprehensive (Janes 1999, p. 322). Balnaves and Caputi (2001), asserted that a researcher need to understand that in developing a questionnaire, wording is not only an issue of generating good questions in relation to the research question of hypothesis and of interest but generating good questions that can be understood" (Balnaves and Caputi 2001, p. 82).

In this study since all the potential respondents are from the entry level executives, middle management level and senior higher level management, it is assumed that they posses sufficient understanding of the English language, the questionnaire was subsequently written in English.

Step 6: Determine Question Sequence

The determination of question sequence is also highly important. Churchill (2001, pp 335-337) underlined five guidelines in organising the questions:

- Use easy, straightforward and interesting opening questions. The first question is very crucial. If the respondent cannot understand the question, it might affect the remainder of the question.
- Use funnel approach: start it with broad questions and gradually narrow it down to the scope.
- Design branching questions carefully.
- Ask for classification information last.
- Place hard or sensitive questions later in the questionnaire.

Thus the questionnaire was design to follow such guidelines. As discussed in Step 3, the questionnaire was divided into three parts: the general information, questions for hypothesis testing and understanding on supplier selection continued with the impact of the supplier selection.

Step 7: Determine Questionnaire Layout

The physical appearance or layout of a questionnaire must not be disregarded when seeking a clear response. A researcher must design a questionnaire that "looks professional and relatively easy to answer" (Churchill 2001, p. 342).Sloppy and unattractive questionnaires will produce a poor response, as respondents may feel "the study is unimportant, and hence refuse to cooperate, despite researchers' assurance that it is important" (Churchill 2001, p. 337). On the other hand, "well formatted questions assist response rate and accuracy of answers" (Balnaves and Caputi 2001, p. 84).

To ensure clear response, Sproull (1991) suggests that the questionnaire should be professionally typed and printed so that its appearance gives the impression of credibility and professionalism. Another important aspect in the design of a questionnaire must be to provide a clear introduction and direction (Sproull 1991). Any covering letter that is sent

with a mail questionnaire is essential in introducing the study to the potential respondents (Czaja and Blair 1996).

Choosing answer formats must also be looked at when designing questionnaires. Balnaves and Caputi (2001, p. 84), suggest that, whatever format a researcher chooses, it must be (a) consistent in the use of the format, and (b) consistent in the type of response required for that format. Moreover, item responses should also be well structured in order to facilitate quick and easy responses (Sproull 1991).

For this study, the researcher provided a clear introduction and directive on what respondents should follow when completing the questionnaire. With regard to layout, the researcher made a conscious effort to make sure the appearance of the questionnaire looked professional. Every question was numbered, and given a section on each topic staring from section A to section J. Size and type of font, and size of answer boxes, were standardised, so as to make the questionnaire look attractive and user-friendly. A covering letter was also attached to each questionnaire, which explained the aim of the research, introduced the researcher, stressed the confidentiality of the response, and asked the respondent to help by returning the questionnaire promptly.

Step 8: Pre-test Questionnaire

Questionnaire pre-test is very vital, before the real survey is conducted. According to Czaja and Blair (1996, p. 105) the reason that a pre-test is a necessary preliminary to pilot study is to detect potential flaws. To ensure comprehensiveness in the questionnaire, a pre-test was done, using Business School postgraduate students in Brunel University. Upon receipt of their comments, a questionnaire was revised and further refine. The revised version was then submitted for an expert opinion feedback.

At this stage of development, the survey questionnaires were distributed to supply chain management practitioners, consultants, academicians and professionals for feedback. The questionnaires were assessed by experts including supply chain management consultants and lecturers to measure internal consistency of the survey questions. Twelve experienced and knowledgeable personnel on the subject matter formed the panel of experts. The

basic procedure was to have a panel of experts to confirm the validity of items, based on item representativeness and clarity. The questionnaire was reviewed by both the potential respondents and by an expert.

Feedback and suggestions from participants were gathered to further improve the contents of the questionnaire. The objective was to make the questions more clearly understood by all respondents and provide meaningful data for the study. Basically, the questions must be in logical order, easy to understand, simple to answer in order to gain full cooperation from respondents. Appropriate wordings were used to enhance clarity and questions deemed irrelevant were taken out.

A few comments were raised from the expert opinion, such as to remove the sensitive question related to income due to the fact that respondents felt uncomfortable answering such a personal matter. In the question related to job division, respondents suggested to add another option ("all of the above units") which would allow respondents to choose the best option for the entire range of divisions rather than answer each single option. In the supplier selection section, participants from the expert opinion suggested that this section to be separated into two: supplier selection and supplier selection impact. In order to address this comment, a new additional section was created and added onto the questionnaire. The new section was created as section J. Thus the questions from 1-6, related to supplier selection, were grouped into section I and questions from 7-16 which were related to supplier selection impact, were arranged and group into section J. Based on their feedback, the items were further refined and the revised version of the questionnaire was developed with a total of eighty one (81) questions (including personal background). However, participants agreed on the simple language and format of the questionnaire. The edited and revised version questionnaires were then used in the pilot test.

The final questionnaire contained of twelve pages, separated into nine sections with total of 81 questions (Including personal background questions). In the section A consist of questions on Personal Background (Questions 1 to 9), Section B consist of questions on items related to Technologies and Quality (Questions 1 to 10), section C consist of questions on items related to Price (Questions 1 to 8), section D consist of questions on

items related to Delivery (Questions 1 to 9), section E consist of questions on items related to Supplier Relationship Management (Questions 1 to 8), section F consist of questions on items related to Decision making tools and techniques (Questions 1 to 3), Section G consist of questions on items related to Government Policy (Questions 1 to 10), Section H consist of questions on items related to Business Ethics (Questions 1 to 8), Section I consist of questions on items related to Supplier Selection (Questions 1 to 6) and Section J consist of questions on items related to Supplier Selection Impact (Questions 1 to 10).

4.13.2 Coding of Data

Coding of the data involves reviewing the questionnaires thoroughly and assigning labels to key themes or meanings emerging from the data that seem to have potential to reveal answers to the research question. Coding is undertaken to look systematically for indicators of different perceptions and preferences as well as understanding behavioural actions or events from the data collected or people interviewed (Bryman and Bell, 2007; Miles and Huberman, 1994).

The coding process needs to be done for each section or subtitle. The codes will be grouped into a comparative table which enables the researcher to carry out the analysis in line with the research questions. Coding for this study is established as Appendix 3.

4.14 Population and Sampling

According to Gilbert (2001), a study population is a set of the entire elements eligible for the study. In an effort to gather data that can represent the whole target population, samples are chosen from the total population. It was revealed by Sekaran (2006) that sampling offers in depth information that deals with a small number of units.

In this analysis, the total population is defined as all full time employees of four major telecommunications service providers in Malaysia totalling approximately 45,000, comprising 28,000 employees from Telekom Malaysia Berhad, 8,500 from Celcom Axiata, 4,500 from Maxis Communications and 4,000 from DiGi Telecommunications. The total population ranges from non-executives to senior management staff of the

companies mentioned above. However, in order to get meaningful data which is directly related to the subject under study, the target population only comprises executives and management staff from concerned departments/divisions/units namely procurement, purchasing, finance and technical engineering department.

4.15 Targeted Samples

According to Bryman and Bell (2007), the segment of a population that is selected for investigation is defined as the sample. A study sample is selected to represent the population as a whole, due to the diversity of society. It is normally selected as a proportion of the full population. In order to generate useful statistics, it is generally accepted that any study sample should contain more than 20 individuals.

There are two main sampling techniques, probability and non-probability sampling (Bryman and Bell, 2007). A sample that is randomly selected out of a population is called the probability sample. In this type of sampling method, each unit in the population has a known probability of being chosen for the analysis. When this method is employed, it is generally believed that the sample is more representative of the whole population. Probability sampling aims to minimise sampling error (Bryman and Bell 2007). Conversely, a non-probability sample is a study sample whereby units in the population are not selected at random; meaning not all units in the total population has an equal opportunity of being chosen for the study. In other words, some units of the population has more chances of being selected compared to others (Bryman and Bell, 2007).

In this research, the sampling method chosen was the probability sampling method. The selection of respondents was conducted based on stratified random sampling where the researcher had a clear idea what sample unit was needed. This involved dividing the population into homogeneous subgroups and then selecting a simple random sample in each subgroup. The researcher had chosen certain homogenous groups with weights assigned to each division. Only employees of selected department or division such as purchasing, procurement, finance and engineering division became the target sampling population.

The selection of related departments in this study was on the basis of job function and reference towards previous literature. Strauss (1962) identified departments that are normally involved in the purchasing process and selection of the supplier were production, purchasing, engineering, and scheduling departments while Duncan (1965) stated that engineering, production, and purchasing as functional departments holding major influence in the purchasing process. Buckner's (1967) research showed that purchasing, operations management, and management level were most frequently involved in supplier selection and purchase decisions.

In selecting study sample from the telecommunications companies, the sample frame was gathered from the companies' online websites, company database and direct contact with officers from the selected companies via email or telephone. The samples were then selected based on the employees' job functions which were related to supplier selection activities within the organisations.

Determining the sample size depends on a number of factors including homogeneity of the sampling unit, confidence, precision, statistical power, analytical procedure, cost, time and personnel (Davis 2000). However, there are various suggestions for sample size determination. Following the rules of thumb by Roscoe (1975), a sample size that is more than 30 and below 500 is deemed appropriate for most researches. However, in multivariate analysis, the sample size should be a few times (10 times or more preferably) as many as the amount of variables in the research project.

Therefore, the target sample population for this study was identified as personnel who were involved in supplier evaluation and selection was made within the scope of purchasing telecommunications infrastructure and technical product/works/services for major telecommunications companies in Malaysia. The main sampling units targeted were executives and management staff in the technical, procurement and finance divisions. The total estimated sample was 950 respondents throughout the whole of Malaysia.

Based on the calculation of sample size in the table below, the population size of (N) within the range of 40000 to 50000 would require the sample size of (S) 380 to 381.This is demonstrated in the Table 4.3 given below:

Table 4.3 : Sample Size Guidelines

Sample size for a given population size					
N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	175	2000	322
55	48	320	181	2200	327
60	52	340	191	2400	331
65	56	360	196	2600	335
70	59	380	205	2800	338
75	63	400	210	3000	341
80	66	420	217	3500	346
85	70	440	226	4000	351
90	73	460	242	4500	354
95	76	480	248	5000	337
100	80	500	260	6000	361
110	86	550	265	7000	364
120	92	600	274	8000	367
130	97	650	278	9000	368
140	103	700	169	10000	373
150	108	750	186	15000	375
160	113	800	201	20000	377
170	118	850	214	30000	379
180	123	900	234	40000	380
190	127	950	254	50000	381
200	132	10000	269	75000	283
210	136	1100	285	100000	384

(Source: Adopted from Krejcie and Morgan 1970)

Therefore the sample size of 950 respondents for the total population of approximately 45000 is sufficient to accommodate with the sample size requirement.

A detailed description of the sample profile is presented in table 4.4 below.

Table 4.4: Main study Sample Profile

Category	**Department**	**Percentage of Sample Size**	**Number of Sample**
Commercial/ Non-Technical	Purchasing/Procurement	40%	380
	Finance	10%	95
Technical	Engineering/Technical Strategy	50%	475
Total		**100%**	**950**

A targeted thirty percent response rate from the total sample size of 950 personnel would probably help to meet the requirements for the chosen techniques of data analysis such as the Structural Equation Model (SEM) and the Confirmatory Factor Analysis.

For the purpose of the qualitative study the key informant interview sample size profile was calculated based on Table 4.3 below. Since there are four major telecommunications companies used in this study and 3 key personnel were targeted from each company, from these 3 key personnel, 2 are from the commercial division and 1 of them from the technical division. Details of the calculations are shown in the table below:

Table 4.5: Interview Sample Profile

Company	**Division**	**Number of Sample**	**Percent (%)**
Company A (Telekom Malaysia)	Commercial	2	60
	Technical	1	40
Company B (Celcom Axiata)	Commercial	2	60
	Technical	1	40
Company C (Maxis Communications)	Commercial	2	60
	Technical	1	40
Company D (Digi Telecommunications)	Commercial	2	60
	Technical	1	40
Total		**12**	**100**

4.16 Respondents and Unit of Analysis

The final sample of respondents in this study was 950 personnel in four related departments namely procurement, purchasing, finance and engineering of four major telecommunications service providers in Malaysia. Most of the respondents played a role in the supplier selection process within their organizations. In this study, the unit of analysis coincided with the unit of data collection, comprising personnel who were actively involved in the supplier selection process and supply chain management in their respective organisations. Since these personnel represented the purchasing organizations, the outcomes of this survey were based on the buyers' perspectives on the subject under study.

The overall research process was conducted under the premises of the Supply Chain Management theory. Overall, this research should provide the understanding of the supplier selection criteria, supplier selection process and its impact on company performance.

4.17 Cross Sectional Study

A cross-sectional approach was used to test the research hypotheses which had been constructed beforehand. This technique is often termed as a sample survey design. A sample survey is a cross sectional study in which the sample is selected as being a representative of the target population at essentially one particular point in time (Singleton *et al.*, 1993), and the emphasis here is on the generation of summary statistics (Churchill, 2001). Many research projects study certain phenomena by taking cross sections of samples at one particular time, and analysing the samples carefully.In this instance, a sample population from the telecommunications sector in Malaysia was studied whereby data collected from this sample was tabulated and analysed. Sought

4.18 Summary of Research Approach

Table 4.5 displays the summary of the research approach for this study.

Table 4.6: Summary of Research Approach

Focus	Selected Approach
Philosophies	Positivist/Objectivist
Choices	Deductive
Strategies	Survey
Approaches	Triangulations Methods
Time Horizon	Cross-Sectional Study
Techniques and Procedures	
Unit of analysis	Purchasers/buyers in the Companies/Organizations
Population	Major Telecommunication Service Providers companies in Malaysia
Sampling frame and target	Telecommunication Service Providers listed in: 1. The Official Business Directory of Telecommunication Service Providers in Malaysia 2. Telecommunications in Malaysia Info Directory 3. Direct Contact to company personnel 4. Procurement, Purchasing, Finance and Engineering departments/divisions in telecommunications companies
Sampling method	Stratified Random Sampling
Data collection method	Semistructured interviews, document survey and online/web-based questionnaires

4.19 Pilot Study Test

Following from the pre test questionnaire, a pilot study was conducted to purify the items. The pilot study was carried out among the small group of procurement, finance, purchasing and technical personnel in major telecommunications companies in Malaysia namely Telekom Malaysia, Celcom Axiata, Maxis Communications and Digi Telecommunications. The study was undertaken between the months of October and December 2010. The objective of the pilot study was to improve the structure of the questionnaire by eliminating possible flaws and weaknesses in the questionnaire. The test was also conducted to give a preliminary assessment and refinement of the items to facilitate the creation of a final questionnaire for the survey (Zikmund, 1997). A small sample of forty five (45) respondents participated in the pilot study. However out of the total sample of forty five respondents only thirty nine (39) responded to the pilot survey. Prior to sending the questionnaire to be tested, the researcher communicated with the participants regarding the pilot study. Subsequently, the questionnaires were personally handed to them during personal visit. Data gathered from the pilot study was then analysed using the SPSS software (version 15.0 for Windows). The questionnaire items were already coded in the SPSS programme beforehand. The coded data is shown in Appendix 3.

Data analysis of the feedback gathered was carried out to obtain an initial indication of the items' reliability. At this point, the items' reliability is evaluated. It is necessary to establish item reliability as a condition for validity in order to ensure that the measures are error-free and thus able to provide consistent results (Peter, 1979). The proportion of variance which is attributable to the latent variables' true score is called scale reliability (Peter, 1979; DeVellis, 2003). Three kinds of scale reliability available are internal consistency reliability, test-retest reliability and alternative-form reliability. The first type, internal consistency reliability, refers to the uniformity of items that exist within the scale (Churchill, 1979). Secondly, the test-retest reliability represents the stability of responses to items measured over time (Nunnally, 1967). The third type, alternative-form reliability refers to the degree to which two statements that differ can be utilised to rate the same construct at two separate times (Netemeyer *et al*, 2003; Peter, 1979).

Reliability of the items produced was evaluated by means of a questionnaire which contains the items taken from the qualitative study and literature. The scale was then further reduced by the researcher by examining the coefficient of the inter item correlation by evaluating the result of the "corrected item to total correlation" for every single item from each construct. Since the Cronbach's alpha is widely used by most researchers, the internal consistency reliability was evaluated using the coefficient alpha method. The Cronbach's alpha shows how different characteristics of a construct are purportedly measured by the different items (Carmines and Zeller, 1979; Churchill, 1979; Hair *et al*, 2006; Tabachnick and Fidell, 2001).

To evaluate the reliability of a multi-item measurement scale, the most regularly used and widely accepted method is coefficient alpha (Hair *et al.*, 1995). In evaluating a multi-item scale, the first step is to undertake the internal consistency reliability evaluation in order to avoid confusion in factor analysis (Churchill, 1979). For each scale items that have high correlations, the coefficient alpha will show a high reading (Hair *et al.*, 1995). If the coefficient alpha reading is low, there is possibility that the measurement scale utilised did not measure the construct adequately (Churchill, 1979). According to Nunnally and Bernstein (1994), as a standard measure of reliability, 0.7 should be used as a cut-off point for reliability (item to total coefficient > 0.5). However, in the initial stages of research, Nunnally (1978) suggests that a coefficient of 0.50 or 0.60 is good enough. For most research purposes, a coefficient alpha value greater than 0.70 is highly satisfactory (Hair *et al.*, 1995).

Several researchers suggested various threshold levels for Cronbach's α coefficient. Alpha values closer to 1 indicates higher consistency of data reliability. Cronbach's alpha value of 0.60 is generally taken as the minimun threshold value of data reliability (Nunnally and Bernstein, 1994; Nunnally, 1978). Sekaran (2003) belived that Cronbach's alpha value less than 0.60 is considered poor, in the range of .70 to be acceptable, and more than 0.80 to be good (Sekaran, 2003). Hair *et al*., (2006) concurred that the minimum level for Cronbach's α coefficient is 0.70, In exploratory research, the value may decline to 0.60. The rule of thumb on the coefficient value as suggested by Hair, Babin, Money and Samouel (2003) is shown in Table 4.6.

Table 4.7: Rule of Thumb (Cronbach's α Coefficient Size)

α Coefficient Range	Strength of Association
< .6	Poor
.6 to < .7	Moderate
.7 to < .8	Good
.8 to < .9	Very Good
.9	Excellent

(Source: Adopted from Hair et al., 2003)

Based on the result of this pilot study, the Cronbach's alpha for all the constructs was above the minimum threshold of 0.60. The result recorded that the lowest Cronbach's alpha was 0.634 and the highest was 0.966. The following are the detailed Cronbach's alpha for each independent construct: Quality (QLTY) = 0.954, Price (PC) = 0.966, Delivery (DEL) = 0.947, Supplier Relation Management (SRM) = 0.930, Decision Making tools and techniques (DM) = 0.847, Government Policy (POL) = 0.925 and Business Ethics (ETC) = 0.755. Meanwhile, the coefficient alpha values for the dependent variables: Supplier Selection (SS) = 0.634 and Supplier Selection Impact (SSIM) = 0.908.

The total number of items in the pilot test study questionnaire is 81 including the personal background question. For the purpose of testing the reliability of the hypothesis construct all eight (8) questions from the personal background were also excluded. For this pilot test study, only seventy three (73) items were tested.

Based on the result of the pilot study, 7 more items would need to be purged out due to low item correlations (individual score less than 0.40) which did not meet the reliability criteria. Leech and Barret (Pg 49-50) indicated that items with moderately high to high correlation value (i.e., 0.4 and above) will become good components of a summated rating scale. On the contrary, items with score of lower than 0.4 should be deleted. The dropped items were SRM2, ETC6, ETC7, ETC8, SS3, SS4 and SS6 (the codes of the items can be referred to on Appendix 3). Details of the pilot study results are shown in Table 4.7. The following table shows the pilot test result of items in each scale:

Table 4.8: Pilot Test Result

Scale Name (Section)	Code	Items	Cronbach's Alpha	Corrected Item Total Correlation	Item Code Dropped	Number of Items Dropped	New Number of Items for Main Survey
High Quality/ Technology	QLTY	10	0.954	<0.40		0	10
Price & Cost Management	PC	8	0.966	<0.40		0	8
Delivery & Responsiveness	DEL	9	0.947	<0.40		0	9
Supplier Relationship Management	SRM	9	0.930	0.047	SRM2	1	8
Decision Making	DM	3	0.847	<0.40		0	3
Government Policy	POL	10	0.925	<0.40		0	10
Business Ethics	ETC	8	0.755	0.280 0.082 0.002	ETC6 ETC7 ETC8	3	5
Supplier Selection	SS	6	0.634	0.042 0.246 0.363	SS3 SS4 SS6	3	3
Supplier Selection Impact	SSIM	10	0.908	<0.40		0	10

Further exploratory factor analysis could not be conducted due to the limited number of respondents; of which there were only thirty nine. This pilot study disclosed higher internal consistency for all scales. Nevertheless, there is a need to further confirm these findings using the final main survey questionnaire in the full scale research. The final main survey questionnaire is shown in Appendix 4.

4.20 Data Collection

The final questionnaires were sent out to every respondent, together with a personalised official covering letter as shown in Appendix 4. To make sure that a full coverage of the respondents was achieved, a guide was utilized when the distribution of questionnaires was conducted listing all the current record of employees' names and emails that was obtained from the companies Human Resources Division.

Some of the respondents in the headquarters were personally given a questionnaire by hand. Regional and state office respondents were contacted by telephone and questionnaires were sent afterwards via email. This effort was make sure that all respondents understood the significant of the survey.

A total of 950 questionnaires were distributed to all personnel from purchasing and procurement, finance and engineering department in four major telecommunication service providers companies in Malaysia. These included officers in the headquarters in Kuala Lumpur, and officers in both regional and state offices.

Two weeks after the questionnaires were distributed, the researcher made a follow up by contacting all the respondents by telephone and e-mail on various occasions. The reason for doing this is to enhance the response rate. From a total of 950 questionnaires distributed a sum of 376 responses was obtained, giving a response rate of 39.5%. The data analysis will be further discussed on next chapter (Chapter 5).

4.21 Conclusion

This study adopts the positivist philosophy and deductive approach. Thus it employed the mixed method of research design which combined the qualitative and quantitative methods. Therefore this study is principally a quantitative research, but initially some qualitative input from the interview was used at the beginning in order to improve the effectiveness of the quantitative research. The item and variable development were mainly based on the existing literature and the main data were collected from the survey

questionnaires. The survey was conducted in four major telecommunication service provider companies in Malaysia. Three hundred seventy six out of 950 respondents involved in the survey have returned the questionnaire. In this study, the researcher makes use of the data triangulation method by combining the quantitative and qualitative techniques of data collection.

CHAPTER 5: MAIN DATA ANALYSIS (SURVEY QUESTIONNAIRE)

5.1 Introduction

This section looks into the quantitative analysis of research questionnaire survey data via various statistical methods to determine the internal consistencies of the construct in the research model. The Statistical Package for Social Sciences (SPSS) version 15.0 and Structural Equation Modelling (SEM) based on AMOS (version 18.0) were used to analyse the data. The test procedures and results were discussed based on the test findings.

5.2 Data Management

This study was conducted starting from October 2010 through April 2011. The online survey website questionnaires use the Survey Monkey application software to distribute the main survey questionnaire to the respondents. Forty questionnaires were personally handed to the participants in the headquarters offices near Kuala Lumpur and the remaining questionnaires were distributed via email. An email was sent to the respondents with the link to the online survey website. A total of 950 respondents were selected through stratified random sampling from four major telecommunications companies in Malaysia. The participants were selected randomly from a population comprising employees starting from the executive level and above in the procurement, purchasing, finance and engineering department or division in the organisation. Whilst data gathering, due process was followed by sending at least three email reminders to those that did not respond on a fortnightly basis. From a total of 950 questionnaires distributed, a sum of 376 responses was obtained, giving a response rate of 39.5%. However, (18) eighteen questionnaires could not be used due to incomplete data. None of the participants were forced to fill the questionnaires; in fact, all survey participants voluntarily responded.

This raw research questionnaire survey data is primarily processed using the Statistical Package for Social Sciences (SPSS) software version 15.0 to provide elaborately descriptive statistical data analysis.

5.3 Data Screening and Multivariate Assumption Statistics Test

When analysing responses from participants, accuracy of questionnaire survey data is essential. A lot of issues are concerned with accuracy of the questionnaire survey data that are entered into the data file. Missing data, outliers, linearity, normality and homoscedasticity are among the issues that have an effect on the relationships or outcome of the variables. The aim of questionnaire survey data screening is to uncover what is not apparent, as it is to reveal the actual data, for the "hidden" effects are easily overlooked (Hair *et al.*, 2006). Hence, for a straight forward analysis of main data, these issues are paramount considerations that must be resolved (Tabachnick and Fidell, 2007).

A few data screening tests and assumptions of multivariate regressions have to be met first in order to ensure the suitability of the data and interpretation of the results would not be distorted or biased.

- The missing data: these have to be identified so that the incomplete or missing data can be cleared.
- The outliers test: data needs to be identified and those potential outliers will be dropped from further analysis.
- Normality test: The data needs to follow a normal distribution in order for most analyses to work properly. The skewness and Kolmogorov and Shapiro test were used to assess the normality of data.
- Linearity test: the determination of the interdependency of the study variables and show of the correlation among independent variables and dependent variables. The Pearson correlation test was used to test and examine the relationship.
- Homoscedasticity test: to calculate an estimate of the variance of independent variables with dependent variables. The Levene's test is used to measure the homogeneity of variance.
- Multicollinearity test: to test the correlation between two or more predictors in the model. High level of multicollinearity poses a threat to the model.

After all the above tests have been completed and analysed, the data will be used for further analysis in Exploratory Factor analysis. The reason for doing the exploratory factor analysis is to understand the factor loading and structure of a set of variables as well as to simplify complex sets of data. The Confirmatory Factor Analysis will then take part after the Exploratory Factor Analysis, in order to measure whether the structure of the underlying constructs exist. Finally, the Structural Equation Model (SEM) technique was used to assess and test the hypotheses.

5.3.1 Missing Data

Missing questionnaire survey data is amongst the most common and persistent problems in data analysis. It is quite a frequent occurrence in certain areas of research which can affect the outcomes of research objectives. Missing data occurs for a range of different reasons, long questionnaires and/or participants who accidently miss out answering certain questions are the most common ones according to social science. How much is missing, pattern of the missing questionnaire survey data and reason for missing are among the key elements that show the seriousness of missing data according to Tabachnick and Fidell (2007). Despite this, the pattern is more definitive than the amount missing. There are various suggestions like using the mean of the scores on the variance (Stevens, 1992) or removing sample(s) who do not respond to a question (Norusis, 1995) in social science research. According to Tabachnick and Fidell (2007), if only a small number of data points of 5% or less are missing from a large set of data in a random pattern, the problem is less serious and any procedure to manage the values that are missing provides similar outcomes.

In order to locate the missing data, this study applied the SPSS package of missing value and established that from the total data the amount of missing data was less than 5%. Consequently the elimination of all missing data (18 samples out of 376 was 4.7%) did not cause problems with the result of the analysis. After removing and cleaning the missing questionnaire survey data, a total of 358 respondents were used to proceed with the analysis. Table 5.1 shows the summary of missing data that was used for further analysis.

Table 5.1: Missing Data

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
QUALITY	358	100.0%	0	.0%	358	100.0%
PRICE	358	100.0%	0	.0%	358	100.0%
DELIVERY	358	100.0%	0	.0%	358	100.0%
SUPRELATION	358	100.0%	0	.0%	358	100.0%
DECISION	358	100.0%	0	.0%	358	100.0%
POLICY	358	100.0%	0	.0%	358	100.0%
ETHICS	358	100.0%	0	.0%	358	100.0%
SUPSEL	358	100.0%	0	.0%	358	100.0%
SUPSELIMP	358	100.0%	0	.0%	358	100.0%

The above table shows all of the missing data that has been removed and the total number of 358 valid respondents' data that will be used for further analysis**.**

5.3.2 Outliers

A score with a characteristic that is distinct from the rest of the data is what we call an outlier. This occurs with a great value on one variable or a combination of scores on two or more variables to deviate the statistics (Tabachnick and Fidell, 2007). As stated by Hair *et al*., (2006), the outlier is judged to be an unusually high or low value on a variable, or a distinctive combination of values across a number of variables that make the observation stand out from the rest. Hair *et al*., (2006) have categorised outliers into one of four classes based on the source of their distinctiveness:

a) It can be caused by a procedural error, for instance an error in data entry or mistake in coding.

b) It is an observation that takes place as the outcome of an unusual event which accommodates for the distinctiveness of the initial observation.

c) It consists of unusual observations for which the researcher has no accountability.

d) It consists of observations that come under the ordinary range of values on each of the variables.

The three ways to detect outliers are (Tabachnick and Fidell, 2007; Hair *et al.*, 2006; Field, 2006):

a) Univariate detection

b) Bivariate detection

c) Multivariate detection

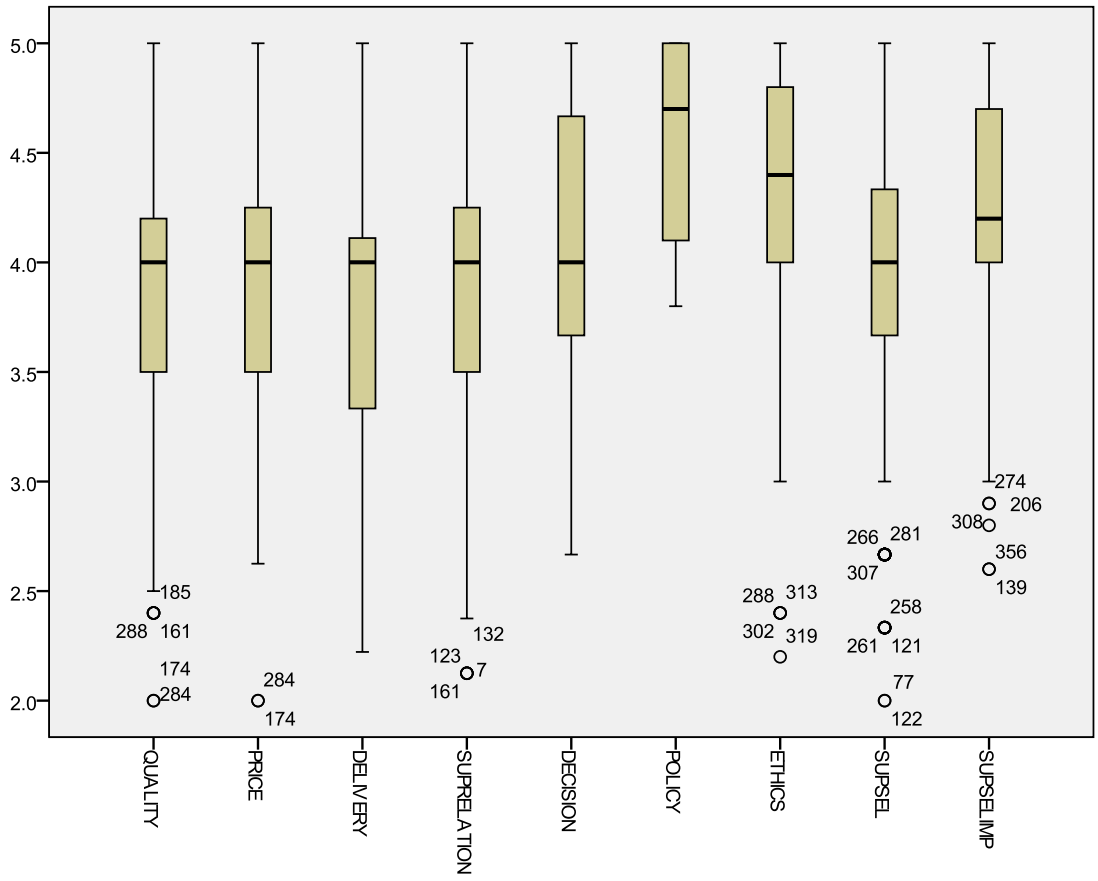
Cases with a great value on one variable which can be distinguished by assessing the distribution of observations for each variable are known as univariate outliers (Hair *et al.*, 2006). Outliers can be detected with those cases falling at the outer ranges of the distribution by applying a distribution test or cases with standardized scores in excess of 3.29 which could be potential outliers ($p<.001$, two tailed test) by applying z scores test (Tabachnick and Fidell, 2007). As stated by Tabachnick and Fidell, (2007) the greatness of a standardized score is determined by the size of the sample; with a very large N, a few standardized scores over 3.29 are to be expected.

Bivariate outliers can be distinguished by the application of a pair of variables together in a scatter plot in which if cases fall outside the range of the other, observations will be visually perceived as isolated points (Hair *et al.*, 2006).

Multivariate outliers are an amalgamation of scores on two or more variables. Due to a large number of graphs and limited number of variable observations, multivariate is a better solution than bivariate. Hence for multidimensional position of variables, the multivariate detection technique of handling outliers is more utilizable. Multivariate outliers can be distinguished by Mahalanobis (D^2) measure where assessment of each observation can be made across a set of variables as stated by Hair *et al.*,(2006) and Field (2009). With regards to this test, if df (degree of freedom) value is greater than 2.5 in small samples and 3 or 4 in large samples, it can be designated as a potential outlier (Hair *et al.*, 2006).

Typically, outliers cannot be characterised as either problematic or beneficial (Hair *et al.*, 2006) however they can bias the mean and increase the standard deviations (Field and Hole, 2003). Therefore, the researcher should maintain awareness of such values because outliers alter the model research fit to the data (Field, 2006). In order to detect univariate outliers this research study applied a graphical and data statistical method. Cook's distance case was used to find multivariate outliers and substantiate their impact on the objectives of the study.

Figure 5.1: Outliers Box Plot Graph



As shown in the above Figure 5.1, twelve potential outliers marked with small circles were found and compared with the multivariate outlier data in the residuals statistics by Cook's distance test which confirmed the samples (See Table 5.3).

Table 5.2: Residual Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.0268	2.8720	2.3966	.16500	358
Residual	-1.68900	.97323	.00000	.68998	358
Std.Predicted Value	-2.242	2.881	.000	1.000	358
Std. Residual	-2.417	1.393	.000	.987	358

[a] *Dependent Variable: NUMEMPL*

Table 5.3: Residual Statistics Cook's Distance

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.4543	3.3457	2.3966	.36457	358
Std. Predicted Value	-2.585	2.603	.000	1.000	358
Standard Error of Predicted Value	.099	.445	.286	.056	358
Adjusted Predicted Value	1.2457	3.6017	2.4011	.39531	358
Residual	-1.64633	1.21099	.00000	.60859	358
Std. Residual	-2.442	1.797	.000	.903	358
Stud. Residual	-2.785	1.951	-.003	1.003	358
Deleted Residual	-2.14105	1.46651	-.00445	.75479	358
Stud. Deleted Residual	-2.818	1.961	-.004	1.006	358
Mahal. Distance	6.735	154.907	65.816	24.480	358
Cook's Distance	.000	.037	.004	.005	358
Centered Leverage Value	.019	.434	.184	.069	358

[a] *Dependent Variable: NUMEMPL*

According to Field (2009), any case with a standard residual value of more than 3 could be an outlier. In addition, any Cook's distance value above 1 indicated in the data editors might influence the research model. However, in this study, all the outliers fell within the acceptable range based on the standard residual between -2.442 and 1.797. Also, the Cook's distance values were all less than 1. Therefore, none of the outliers was deleted.

5.3.3 Normality, Linearity and Homoscedasticity

It needs to be ensured that the data is normally distributed before the result from the data is inferred. The relationship between variables must also be confirmed. Variation is shown when the fundamental assumption shapes it in a multivariate analysis. Variables associated to one another have to be normally distributed as stated by Tabachnick and Fidell (2007). The data is verified in the research by screening the linearity, normality and homoscedasticity.

5.3.4 Normality

Data distribution that shapes the fundamental assumption in measuring the variation of variables is referred to as normality in statistics. It is conventionally better if the variables are normally distributed even though it is not always necessary for data analysis (Tabachnick and Fidell, 2007). If the variation from the data normal distribution is definitively large, all resulting statistical tests are invalid due to normality being necessary in order to utilize the F test and t statistics, as stated by Hair *et al*., (2006).

Through statistical methods, normality of data can be assessed (Tabachnick and Fidell, 2007 and Hair *et al.*, 2006). In statistics, by using the Kurtosis and Skewness test and the Kolmogorov and Shapiro method, normality of data distribution can be measured (Field, 2006; Tabachnick and Fidell, 2007; Hair *et al.*,2006).

In this study, descriptive statistics were initially applied in SPSS 15.0 for Windows to examine the Skewness and Kurtosis of the research data (See Table 5.4).

Table 5.4: Skewness and Kurtosis

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Stats.	Stats.	Stats.	Stats.	Stats.	Stats.	Std. Error	Stats.	Std. Error
QUALITY	358	2.00	5.00	3.9075	.64831	-.175	.129	-.247	.257
PRICE	358	2.00	5.00	3.9406	.63845	-.079	.129	-.285	.257
DELIVERY	358	2.22	5.00	3.9299	.62847	.158	.129	-.636	.257
SUPRELATION	358	2.13	5.00	3.9218	.65825	-.086	.129	-.385	.257
DECISION	358	2.67	5.00	4.0959	.58866	-.066	.129	-.747	.257
POLICY	358	3.80	5.00	4.5830	.41087	-.399	.129	-1.506	.257
ETHICS	358	2.20	5.00	4.3665	.56370	-.872	.129	.721	.257
SUPSEL	358	2.00	5.00	3.9721	.73112	-.253	.129	-.391	.257
SUPSELIMP	358	2.60	5.00	4.2299	.54477	-.550	.129	-.086	.257
Valid N (listwise)	358								

All variables were found to be normally distributed. On the other hand, values for skewness and kurtosis were found to be mixed (both positive and negative). In addition, the Kolmogorov and Shapiro tests (Field, 2006) were used to determine the data normality. The outcomes of this test (See Table 5.5) were found to be significant for all variables, possibly attributed to the large sample size (e.g. n=358 in this study). Minor deviation from normality showed the results of this test as significant; therefore, significant K-S test did not expose a departure from normality of data (Field, 2006).

Table 5.5 : Kolmogorov and Shapiro

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
QUALITY	.146	358	.000	.956	358	.000
PRICE	.167	358	.000	.943	358	.000
DELIVERY	.155	358	.000	.934	358	.000
SUPRELATION	.140	358	.000	.954	358	.000
DECISION	.171	358	.000	.932	358	.000
POLICY	.193	358	.000	.819	358	.000
ETHICS	.134	358	.000	.906	358	.000
SUPSEL	.225	358	.000	.890	358	.000
SUPSELIMP	.135	358	.000	.943	358	.000

[a] Lilliefors Significance Correction

5.3.5 Linearity

The correlation between variables that is represented by a straight line is referred to as linearity. It is imperative to be familiar with the intensity of relationship of variables in data analysis. Linearity is an implicit presumption of all multivariate methods predicated on co-relational measures of association, including factor analysis, multiple regression, structural equation modelling, and logistic regression (Hair *et al.*, 2006). Therefore, it is of importance to identify any departures that may have an effect on the correlation in examining the relationships of variables (Field, 2006; Tabachnick and Fidell, 2007; Hair *et al.*, 2006). By applying Pearson's correlations in this study, it was found that all independent variables significantly and positively correlated to the dependent variables (See Table 5.6). The outcome of this test concluded that all variables were linear with one another.

Table 5.6: Pearson's Correlations

		QUALITY	PRICE	DELIVERY	SUPRELATION	DECISION	POLICY	ETHICS	SUPSEL	SUPSELIMP
QUALITY	Pearson Correlation	1	.733**	.551**	.223**	.268**	.012	.002	.253**	-.030
	Significance (2-tailed)		.000	.000	.000	.000	.820	.969	.000	.576
PRICE	Pearson Correlation	.733**	1	.547**	.382**	.183**	.025	-.024	.218**	.011
	Significance (2-tailed)	.000		.000	.000	.000	.638	.645	.000	.839
DELIVERY	Pearson Correlation	.551**	.547**	1	.116*	.080	.026	-.026	.528**	-.003
	Significance (2-tailed)	.000	.000		.029	.130	.623	.622	.000	.953
SUPRELATION	Pearson Correlation	.223**	.382**	.116*	1	.177**	-.009	.029	.197**	.026
	Significance (2-tailed)	.000	.000	.029		.001	.866	.590	.000	.618
DECISION	Pearson Correlation	.268**	.183**	.080	.177**	1	.270**	-.013	.089	.100
	Significance (2-tailed)	.000	.000	.130	.001		.000	.801	.094	.059
POLICY	Pearson Correlation	.012	.025	.026	-.009	.270**	1	.011	-.021	.137**
	Significance (2-tailed)	.820	.638	.623	.866	.000		.835	.690	.009
ETHICS	Pearson Correlation	.002	-.024	-.026	.029	-.013	.011	1	.001	.110*
	Significance (2-tailed)	.969	.645	.622	.590	.801	.835		.980	.038
SUPSEL	Pearson Correlation	.253**	.218**	.528**	.197**	.089	-.021	.001	1	.040
	Significance (2-tailed)	.000	.000	.000	.000	.094	.690	.980		.452
SUPSELIMP	Pearson Correlation	-.030	.011	-.003	.026	.100	.137**	.110*	.040	1
	Significance (2-tailed)	.576	.839	.953	.618	.059	.009	.038	.452	

**Significant correlation at level 0.01 (2-tailed).

* Significant correlation at level 0.05 (2-tailed).

5.3.6 Homoscedasticity

Homoscedasticity calculates an estimate of the variance of independent variables with dependent variables. The presumption of variation of variables should be constant in multiple regression analysis (Field, 2006). Homoscedasticity is the presumption that dependent variables display equivalent intensities of variance across the range of predictor variables as stated by Hair *et al*., (2006). Therefore, this corresponds to the theory of normality due to the fact that when the theory of multivariate is achieved, the correlations between variables are homoscedasticity (Field, 2006; Tabachnick and Fidell, 2007). By using graphical and statistical methods, Homoscedasticity can be measured (Hair *et al.,* 2006; Field, 2006). Homoscedasticity is identified as homogeneity which can be measured by Levene's test of homogeneity of variances when data are grouped (Tabachnick and Fidell, 2007). Therefore, in confirming the outcomes of variability of independent variables with dependent variables this study used Levene's test of homogeneity of variance (See Table 5.7). It can be concluded that in the Levene's test of homogeneity if the p value is not more than 0.05, the null hypothesis is inaccurate. However in large sample the Levene's test can be significant even the group variance are not very different. Therefore it should be interpreted in conjunction with the variance ratio. For this study the sample size is 358 which are considered large, where the significant p value still can be accepted.

Table 5.7: Homoscedasticity (Levene's Test)

Test of Homogeneity of Variances				
	Levene Statistic	df1	df2	Sig.
QLTY1	2.374	2	355	.095
QLTY2	.108	2	355	.898
QLTY3	.210	2	355	.811
QLTY4	.479	2	355	.620
QLTY5	.199	2	355	.820
QLTY6	.072	2	355	.931
QLTY7	.074	2	355	.929
QLTY8	.051	2	355	.951
QLTY9	.433	2	355	.649
QLTY10	2.426	2	355	.090
PC1	1.043	2	355	.353
PC2	.513	2	355	.599

PC3	.026	2	355	.974
PC4	4.632	2	355	.010
PC5	.170	2	355	.844
PC6	3.297	2	355	.038
PC7	.277	2	355	.758
PC8	.290	2	355	.748
DEL1	3.127	2	355	.045
DEL2	1.419	2	355	.243
DEL3	1.749	2	355	.175
DEL4	.051	2	355	.951
DEL5	.044	2	355	.957
DEL6	.347	2	355	.707
DEL7	1.388	2	355	.251
DEL8	3.795	2	355	.023
DEL9	1.270	2	355	.282
SRM1	.287	2	355	.751
SRM3	.233	2	355	.792
SRM4	.163	2	355	.850
SRM5	.092	2	355	.912
SRM6	1.035	2	355	.356
SRM7	1.086	2	355	.339
SRM8	.691	2	355	.502
SRM9	2.480	2	355	.085
DM1	2.905	2	355	.056
DM2	.574	2	355	.564
DM3	3.331	2	355	.037
POL1	6.351	2	355	.002
POL2	5.038	2	355	.007
POL3	3.432	2	355	.033
POL4	.449	2	355	.638
POL5	2.596	2	355	.076
POL6	1.715	2	355	.182
POL7	.517	2	355	.597
POL8	3.619	2	355	.028
POL9	4.431	2	355	.013
POL10	2.822	2	355	.061
ETC1	2.324	2	355	.099
ETC2	.636	2	355	.530
ETC3	2.308	2	355	.101
ETC4	3.188	2	355	.042
ETC5	1.905	2	355	.150
SS1	2.252	2	355	.107
SS2	1.769	2	355	.172
SS5	2.891	2	355	.057

SSIM1	4.684	2	355	.010
SSIM2	.047	2	355	.954
SSIM3	.082	2	355	.921
SSIM4	.195	2	355	.823
SSIM5	1.062	2	355	.347
SSIM6	.050	2	355	.951
SSIM7	.487	2	355	.615
SSIM8	2.077	2	355	.127
SSIM9	1.442	2	355	.238
SSIM10	2.141	2	355	.119

5.3.7 Multicollinearity

Multicollinearity exists when there is a strong correlation between two or more predictors in the model. High level of multicollinearity poses a threat to the model due to the reason that the standard errors of the *b*-coefficients will increase, which in turn affects whether these coefficients are found to be statistically significant. Also, multicollinearity will limit the size of *R* and make it difficult to assess the individual importance of a predictor (Field, 2005). One way to identify the multicollinearity is to check the variance influence factor (VIF) in the coefficient table.

SPSS provides collinearity diagnostics of which VIF and tolerance statistics. According to Myers (1990), if the largest VIF is greater than 10 then it indicates a serious problem. It also indicates whether a predictor has a strong linear relationship with other predictors. From the test results on the research data, the researcher found that the VIF value of five items, which are highlighted in red, have score value above 10; indicating a cause for concern. This means it is better to drop it out of future analysis. The largest value of VIF is 12.668 and the tolerance is .079, which is below 0.1 (Menard, 1995). The five items were QLTY6 with VIF value 11.068, PC1 with VIF value 10.900, PC7 with VIF value 12.668, SSIM9 with VIF value 10.054, SSIM10 with VIF value 10.421. Hence, these items were deleted and would not be used in the next step of analysis. The result of multicollinearity depicted as per Table 5.8 below.

Table 5.8: Multicollinearity

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.032	.765		2.657	.008		
	QLTY1	.091	.097	.097	.929	.354	.232	4.307
	QLTY2	-.023	.103	-.026	-.227	.821	.197	5.076
	QLTY3	-.060	.115	-.069	-.525	.600	.147	6.792
	QLTY4	-.002	.100	-.002	-.015	.988	.210	4.756
	QLTY5	-.236	.125	-.257	-1.890	.060	.137	7.307
	QLTY6	.136	.161	.141	.845	.399	.090	**11.068**
	QLTY7	-.038	.156	-.039	-.246	.806	.100	9.964
	QLTY8	-.069	.106	-.069	-.649	.517	.222	4.499
	QLTY9	-.067	.116	-.067	-.580	.562	.190	5.260
	QLTY10	.256	.102	.282	2.512	.013	.201	4.976
	PC1	-.176	.154	-.190	-1.143	.254	.092	**10.900**
	PC2	.287	.135	.318	2.127	.034	.113	8.837
	PC3	.324	.124	.325	2.622	.009	.165	6.057
	PC4	-.239	.117	-.265	-2.043	.042	.150	6.672
	PC5	-.031	.087	-.033	-.358	.720	.302	3.306
	PC6	.160	.094	.149	1.711	.088	.334	2.992
	PC7	-.066	.172	-.068	-.382	.703	.079	**12.668**
	PC8	-.144	.154	-.145	-.935	.350	.105	9.557
	DEL1	-.137	.119	-.152	-1.152	.250	.144	6.928
	DEL2	.220	.114	.236	1.921	.056	.168	5.951
	DEL3	.110	.118	.119	.935	.351	.157	6.367
	DEL4	-.247	.111	-.284	-2.233	.026	.156	6.419
	DEL5	.038	.135	.041	.280	.779	.117	8.520
	DEL6	-.008	.126	-.008	-.060	.952	.153	6.532
	DEL7	-.033	.119	-.034	-.275	.783	.165	6.067
	DEL8	.162	.087	.173	1.866	.063	.294	3.401
	DEL9	-.217	.077	-.199	-2.834	.005	.516	1.940
	SRM1	.080	.127	.083	.627	.531	.144	6.948
	SRM3	-.063	.121	-.066	-.519	.604	.158	6.312
	SRM4	.097	.106	.099	.919	.359	.220	4.548
	SRM5	.026	.102	.027	.257	.797	.224	4.466
	SRM6	-.028	.119	-.030	-.233	.816	.158	6.345
	SRM7	-.243	.129	-.270	-1.884	.061	.123	8.133
	SRM8	-.010	.139	-.011	-.074	.941	.122	8.167

SRM9	.130	.094	.141	1.390	.166	.247	4.043
DM1	-.041	.090	-.040	-.462	.645	.332	3.014
DM2	-.001	.092	-.001	-.012	.990	.321	3.112
DM3	-.011	.096	-.010	-.111	.911	.331	3.017
POL1	.101	.134	.069	.750	.454	.302	3.313
POL2	.100	.166	.069	.607	.545	.197	5.087
POL3	-.163	.154	-.114	-1.064	.288	.219	4.572
POL4	.243	.107	.211	2.278	.023	.294	3.399
POL5	.048	.143	.034	.337	.737	.244	4.095
POL6	.209	.143	.159	1.460	.145	.214	4.682
POL7	.010	.094	.008	.110	.912	.437	2.289
POL8	-.242	.161	-.165	-1.507	.133	.210	4.755
POL9	-.044	.141	-.029	-.312	.755	.292	3.424
POL10	-.045	.108	-.035	-.414	.679	.352	2.841
ETC1	-.133	.076	-.140	-1.761	.079	.400	2.500
ETC2	.003	.078	.002	.033	.973	.564	1.772
ETC3	-.022	.090	-.022	-.243	.808	.296	3.377
ETC4	.033	.088	.031	.377	.706	.367	2.727
ETC5	.012	.083	.013	.143	.886	.317	3.152
SS1	-.144	.128	-.153	-1.119	.264	.136	7.347
SS2	-.020	.121	-.022	-.165	.869	.147	6.810
SS5	.283	.096	.321	2.935	.004	.212	4.718
SSIM1	.087	.098	.080	.895	.372	.313	3.200
SSIM2	-.148	.085	-.150	-1.746	.082	.342	2.927
SSIM3	.018	.117	.019	.153	.878	.163	6.133
SSIM4	-.014	.108	-.013	-.126	.900	.242	4.124
SSIM5	-.003	.106	-.002	-.025	.980	.268	3.727
SSIM6	.061	.116	.054	.526	.599	.237	4.222
SSIM7	-.105	.106	-.095	-.991	.323	.275	3.631
SSIM8	.158	.092	.128	1.717	.087	.455	2.196
SSIM9	-.071	.160	-.071	-.446	.656	.099	**10.054**
SSIM10	-.056	.157	-.058	-.357	.722	.096	**10.421**

In summary, results of these preliminary analyses indicated that actions need to be taken to clean the data. The researcher therefore acted upon this in order to ensure no violation of the assumptions and to avoid distortion and biasness of the data analysis which could lead to misinterpretation of the results. Problems which arose were already rectified and data were corrected accordingly. Even though there are still some minor issues on outliers and data distribution, the researcher decided to proceed with further data analysis based on the justification that the numbers of respondent are quite large (n=358). The next step is to examine the factor structures of the constructs and the reliability estimates.

5.3.8 Factor Loading and Data Analysis

Groups or clusters of variables were identified by applying the factor analysis techniques for data reduction. The factor which generates group variables indicates the correlation of the variables towards the factor. Field (2006) defines three major uses of factor analysis:

1. To understand the structure of a set of variables
2. To construct a questionnaire to assess any underlying variables
3. To reduce a data set to a more manageable size whilst retaining as much of the original data as possible.

Underlying dimensions at which variables are clustered collectively in a significant way are included in a factor analysis. This is obtained through identifying variables that correlate strongly with a group of another variable, but do not show a correlation with variables outside that group (Field, 2006). As a matter of fact, factor analysis provides the tools for analysing the configuration of the interrelationships (correlations) between a large number of variables by defining sets of variables that are highly interrelated, identified as factors (Hair *et al.*,2006). Different techniques are used to the point that Exploratory or Confirmatory Factor Analysis can be applied to attain this objective. Both are applied for data reduction or to configure groups of variables. The Exploratory Factor analysis method is applied by taking data as provided, whereas Confirmatory Factor Analysis methods include clustering variables together on a factor or the precise number of factors for testing hypotheses (Hair *et al.*, 2006).

This study initially utilized the Exploratory Factor Analysis method to capture data in a group for a factor and afterwards using Confirmatory Factor Analysis methods to verify the group of measurement variables associated to a factor for the hypotheses testing. The presence of clusters of great correspondence coefficients between subset of variables displays that those variables might be measuring aspects of the equal underlying dimension (Field, 2006). SPSS version 15.0 for Windows was used for exploratory factor analysis.

Since the objective of data analysis is to test the goodness of data, factor analysis was used to simplify complex sets of quantitative data by analysing the correlations between variables to reveal the smallest number of factors which can explain the correlations. The purpose of factor analysis is to make sure that the concepts are correctly measured for this research. The simplified factors will then be used for further analysis. Smaller set of factors will reduce the load of the independent variables. One concept is assessing the raw data for its suitability for factor analysis. The basic criterion is to evaluate based on the sample size. For this study, the sample size of 950 is considered adequate for factor analysis (Hair et al., 2006).

5.3.9 Exploratory Factor Analysis

There are many procedures that are available for rotation and factor extraction in SPSS. The most well-known among these procedures is the principal component extraction technique and a default in SPSS programmes which extracts the maximum variance from the data set along with each component (Tabachnick and Fidell, 2007). Linear combination of observed variables that divide subjects by maximising the variance of their component score is known as the principal component extraction (Tabachnick and Fidell, 2007). Quite a few ways are available to assess the adequacy of extraction and the number of factors but the most regular are Scree plots and Eigenvalues. It is of the most importance to compute the variability in scores (the variance) for any given measures (or variables) before going on to extract factors (Field, 2006).

The reason of this study is to perform this analysis and further examine and understand the factor loading of the items variables. By analysing and assessing the factor loading it helps to simplify the factors which can then be used as a basis for further analysis.

5.3.10 Eigenvalues

Eigenvalues are related with a variance that shows the substantive significance of the factor in a principal component extraction technique. As part of a preliminary run with principal component extraction, a quick approximation of the number of factors is acquired from the size of the eigenvalues reported (Tabachnick and Fidell, 2007).

In addition to component analysis variance of each variable contributing 1, a component with an eigenvalues below 1 is not significant (Tabachnick and Fidell, 2007; Field, 2006; Hair *et al.*, 2006). Hence, only the factors having eigenvalues greater than 1 are important; all factors with latent roots smaller than 1 are considered not important and are ignored (Hair *et al.*,2006). Based on the data of this study, nine factors were found having eigenvalues larger than 1 (See Table 5.9). The initial factor recorded a high value, followed successively by factors with smaller eigenvalues. The number of factors to be retained for further analysis was determined based on Kaiser's Criterion or the eigenvalue rule of 1.0, which means that only factors with eigenvalues of 1.0 or more were taken for further analysis.

Table 5.9: Eigenvalues

Total Variance Explained

Extraction Method: Principal Component Analysis

Component		Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
		Total	% of Variance	Cumm %	Total	% of Variance	Cumm. %	Total	% of Variance	Cumm. %
Dimension	**1**	**16.064**	**24.339**	**24.339**	16.064	24.339	24.339	9.055	13.719	13.719
	2	**7.575**	**11.477**	**35.816**	7.575	11.477	35.816	6.791	10.290	24.009
	3	**6.056**	**9.175**	**44.991**	6.056	9.175	44.991	6.626	10.039	34.048
	4	**5.609**	**8.498**	**53.489**	5.609	8.498	53.489	6.535	9.902	43.950
	5	**3.999**	**6.059**	**59.548**	3.999	6.059	59.548	6.386	9.676	53.626
	6	**3.187**	**4.829**	**64.377**	3.187	4.829	64.377	4.291	6.501	60.127
	7	**2.248**	**3.406**	**67.783**	2.248	3.406	67.783	3.238	4.906	65.033
	8	**1.634**	**2.476**	**70.258**	1.634	2.476	70.258	2.417	3.662	68.695
	9	**1.382**	**2.093**	**72.352**	1.382	2.093	72.352	2.413	3.657	72.352
	10	.973	1.474	73.826						
	11	.896	1.357	75.183						
	12	.871	1.320	76.503						
	13	.865	1.311	77.814						
	14	.786	1.190	79.004						
	15	.751	1.137	80.141						
	16	.715	1.084	81.225						
	17	.694	1.052	82.277						
	18	.636	.964	83.241						
	19	.617	.936	84.176						
	20	.534	.810	84.986						
	21	.494	.748	85.734						
	22	.485	.735	86.470						
	23	.462	.700	87.170						
	24	.420	.637	87.806						

25	.411	.623	88.429						
26	.391	.592	89.021						
27	.379	.574	89.594						
28	.369	.559	90.154						
29	.358	.543	90.697						
30	.333	.504	91.201						
31	.324	.491	91.692						
32	.310	.470	92.162						
33	.293	.443	92.606						
34	.286	.434	93.040						
35	.279	.423	93.462						
36	.266	.403	93.866						
37	.255	.386	94.252						
38	.242	.366	94.618						
39	.227	.344	94.962						
40	.220	.334	95.296						
41	.211	.320	95.615						
42	.208	.315	95.930						
43	.196	.297	96.227						
44	.191	.290	96.517						
45	.179	.271	96.788						
46	.175	.266	97.054						
47	.170	.258	97.311						
48	.159	.240	97.552						
49	.151	.229	97.781						
50	.136	.206	97.987						
51	.130	.197	98.183						
52	.123	.186	98.369						
53	.119	.180	98.549						
54	.115	.175	98.724						
55	.101	.153	98.877						
56	.098	.148	99.025						
57	.090	.137	99.161						
58	.082	.124	99.286						
59	.080	.121	99.407						
60	.073	.111	99.518						
61	.065	.099	99.616						
62	.064	.097	99.713						
63	.055	.084	99.797						
64	.048	.073	99.870						
65	.046	.070	99.939						
66	.040	.061	100.000						

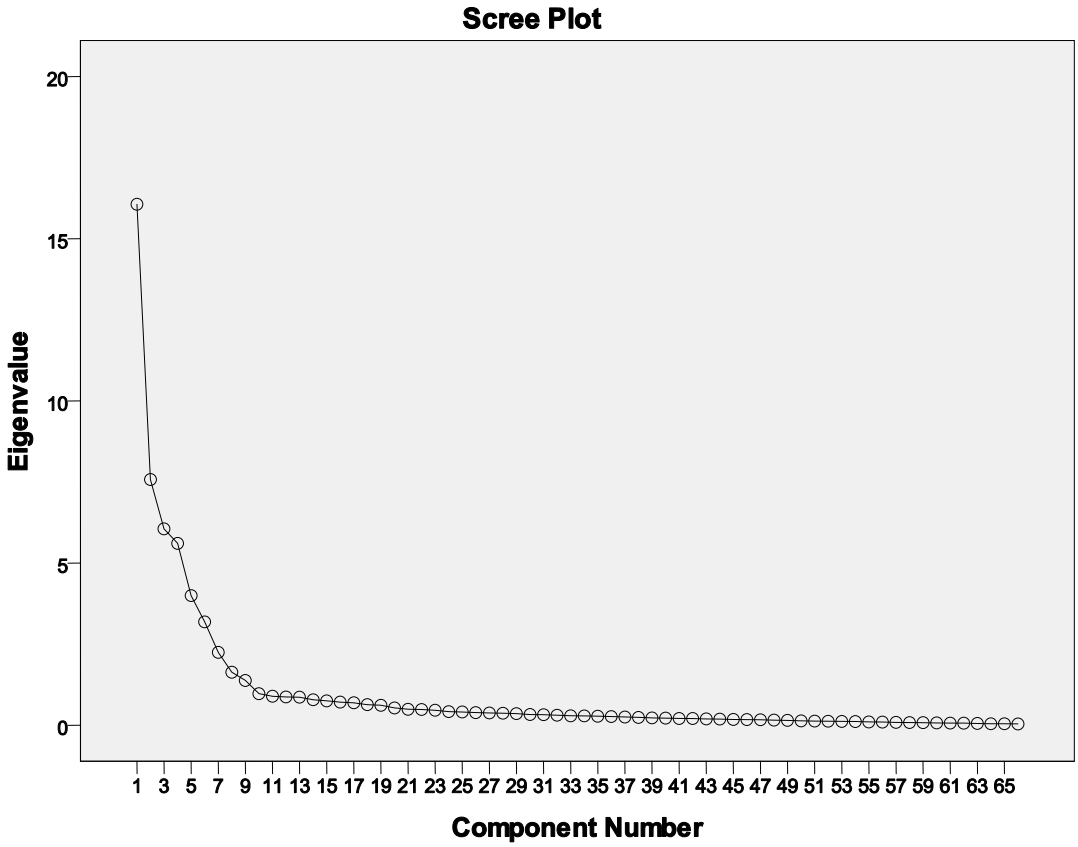
Principal Component Analysis displayed the existence of nine components with eigenvalues greater than 1.0 explaining 24.34%, 11.48%, 9.18%, 8.50%, 6.06%, 4.83%, 3.41%, 2.48% and 2.09% of the variance correspondingly (See Table 5.9). A clear cut-off of these components was exposed by the scree plot.

5.3.11 Scree Plot

A scree plot is usually used to substantiate the maximum number of factors once the extraction factors by eigenvalues are identified. Plotting a scree graph can help in making a decision to extract factors with high eigenvalues. The scree test can be derived by plotting the latent roots against the number of factors in their order of extraction, and to assess the cut-off point, the shape of the resulting curve is used (Hair *et al.*, 2006). Generally the scree plot negatively decreases whereby the eigenvalue is highest for the initial factor and decrementing for the next few factors before reaching diminutively minuscule values for the last several factors (Tabachnick and Fidell, 2007).

As a result of applying a scree plot test on data to verify the extracted factors through eigenvalues, the same number of factors (nine factors) was established, (See Figure 5.2).

Figure 5.2: Scree Plot



After the extraction of the factors, it is essential to recognise to what degree variables load onto these factors. In improving the interpretability and solution's scientific utility, rotation is of importance. It is usually applied to maximise high correlations among variables and factors and minimise low ones. Differing methods can be utilized to build factors from variables but the rotation method is very useful (Field, 2006). Orthogonal and oblique are the two types of rotation techniques (Field, 2006; Tabachnick and Fidell, 2007; Hair *et al.,* 2006). When variables are independent orthogonal rotation technique is effective, meaning when variables are non-correlational, the factor is rotated. In contrast, for co-relational variables, oblique rotation is effective. Orthogonal solutions offer simplicity of describing, interpreting, and reporting results, however they do strain reality unless the researcher is assured that the underlying process is near enough independent while oblique is the other way around (Tabachnick and Fidell, 2007).

Although, different techniques of extraction give about the same results with a good quality data set, different techniques of rotation too have a tendency to give similar results but only if the pattern of correlations in the data is quite clear (Tabachnick and Fidell, 2007). Varimax orthogonal methods which are usually applied in rotation and used for maximising variance were applied in this study. The objective of Varimax rotation is to maximise the factor loading variance by incrementing high loadings and reducing low ones for every factor as stated by Tabachnick and Fidell (2007).

5.3.12 Kaiser-Mayer-Olkin

The Kaiser-Meyer-Olkin (KMO) sampling adequacy measure was calculated to determine data appropriateness and sufficient inter-correlation for factor analysis. The primary stage in factor analysis is the establishment of whether or not the set of items is suitable. Kaiser Meyer Olkin (KMO) is a statistical means that is commonly used to measure the adequacy and suitability of sampled items. The value it holds has the range 0 to 1, 0.70 being a result generally perceived as relatively high, and 0.5 or lower being deemed significantly unsatisfactory. A value over 0.9 is considered to be outstanding.

In relation to this, also taken into account is whether the sample of items is large enough to sufficiently ensure reliability and solidity in factor analysis. Within this field of research the general 'rule of thumb' is to sample at least 300 items in order to provide results that are reliable. For this study, the chosen sample of 950 is more than accommodating to ensure this.

Following Blaikie (2003), KMO should be at least 0.60 and Bartlett's test of sphericity was utilized to test for the overall significant correlation among all items ($p < .05$). The Kaiser-Meyer-Olkin value was 0.894, greater than the suggested value of 0.6 and the Bartlett Test of Sphericity reached a statistical importance, hence backing up the forcibility of correlation matrix. The KMO Table 5.10 below displays the confirmed result.

Table 5.10 : Kaiser-Meyer-Olkin and Bartlett's Test

KMO's Measure of Sampling Adequacy		**0.894**
Bartlett's Test of Sphericity	Approx. Chi-Square	23740.644
	Df	2145
	Sig.	0.000

5.3.13 Factor Loading Based on Rotated Component Matrix

A Varimax Rotation was done to assist the interpretation of these nine components. The presence of a simple structure displaying a number of strong loading, with all variables loading on components was demonstrated by the rotated solution. The factors based on the rotated component matrix were confirmed (See Table 5.11). The following Table 5.11 reveals the rotated component matrix of the scale.

Table 5.11: Rotated Component Matrix

	Component								
	1	2	3	4	5	6	7	8	9
QLTY1	.815								
QLTY2	.734								
QLTY3	.809								
QLTY4	.816								
QLTY5	.812								
QLTY7	.819								
QLTY8	.812								
QLTY9	.839								
QLTY10	.827								
PC2	.491						.623		
PC3	.529						.662		
PC4	.447						.643		
PC5							.666		
PC6							.608		
PC8	**.575**						**.603**		
DEL1		.852							
DEL2	.405	.760							
DEL3		.809							
DEL4		.868							
DEL5		.868							

DEL6		.811							
DEL7		.821							
DEL8		.742							
DEL9									
SRM1			.875						
SRM3			.872						
SRM4			.879						
SRM5			.873						
SRM6			.892						
SRM7			.868						
SRM8			.882						
SRM9			.805						
DM1									.820
DM2									.821
DM3									.814
POL1				.709					
POL2				.793					
POL3				.844					
POL4				.765					
POL5				.820					
POL6				.819					
POL7				.704					
POL8				.861					
POL9				.770					
POL10				.768					
ETC1						.814			
ETC2						.623			
ETC3						.850			
ETC4						.820			
ETC5						.848			
SS1								.879	
SS2								.867	
SS5		.433						.780	
SSIM1					.811				
SSIM2					.770				
SSIM3					.872				
SSIM4					.842				
SSIM5					.818				
SSIM6					.857				
SSIM7					.838				
SSIM8					.649				

From the rotated component matrix result, the factor loadings and cross loadings were examined through the principle component analysis with Varimax rotation to extract the smallest number of factors that best represent the underlying relationship among

variables. Items to factors were categorised by a two stage rule. During the first stage, to ensure that a specific item represented the construct which forms the basis of each factor; a weight of 0.50 was used as the minimum cut-off. The cut-off of 0.50 is based on the guideline for identifying factor loading as recommended by Hair *et al*., (2006). For the second stage, to avoid the problem of cross loading, every item needs to clearly represent only one factor. Only items that meet this criterion were subjected to further analysis. From the result, even though there was a cross loading issue among the items, it was found that item PC8 (0.603-0.575) with a score of 0.028 did not meet the criteria score of minimum 0.10 and was deleted. Item DEL9 was also deleted because it did not meet the weight loading score criteria of the minimum 0.50.

5.3.14 Factor Loading with Cronbach's Alpha

After developing internal consistency of the factors, Cronbach's alpha measure was used to assess each loaded factor. The most relevant dimensions of the elements were specified following the clusters of the items of each construct. Details of the items factor loading scores with the Alpha Cronbach's reliability for each construct were captured as per Table 5.12 below.

Table 5.12: Factor loading and Cronbach's Alpha

CODE	BRIEF DESCRIPTIONS	Factor Loading	Cronbach's Alpha
	QUALITY/TECHNOLOGIES (QLTY)		
QLTY1	Supplier fulfils the technical specifications and requirements of my organisation	0.815	0.953
QLTY2	Supplier offers the latest technological products	0.734	
QLTY3	Supplier offers an acceptable product/equipment technical support	0.809	
QLTY4	Supplier offers product /equipment warranty	0.816	
QLTY5	Supplier offers reasonable life span of the product	0.812	
QLTY7	Supplier offers a reliable product/ equipment	0.819	
QLTY8	Our organisation is involved in product development with our suppliers	0.812	
QLTY9	Supplier should be certified and is compliant with relevant quality standards	0.839	
QLTY10	Supplier offers high quality standard of products	0.827	

	PRICE (PC)		
PC2	Supplier charges for repairs/tendered projects works and engineering services are reasonable	0.623	0.927
PC3	Supplier offers competitive price	0.662	
PC4	Spare part price/cost should be considered during the supplier selection process	0.643	
PC5	Supplier clearly states the maintenance cost price for the warranty and post warranty	0.666	
PC6	Should offer clear total cost of ownership	0.608	
PC8	Future switching or hidden costs are considered and discussed	0.603	
	DELIVERY (DEL)		
DEL1	Supplier be able to deliver the products/equipments/services in a timely manner	0.852	0.945
DEL2	Should comply with a fast response time in dealing with customer request	0.76	
DEL3	Compliance with late delivery penalty charges imposed due to late delivery	0.809	
DEL4	Compliance with the quantity requirement	0.868	
DEL5	Compliance with the completion and ready for service/commission date	0.868	
DEL6	Supplier offers short or reasonable product delivery lead times	0.811	
DEL7	Supplier uses appropriate production planning capability in order to accommodate demand	0.821	
DEL8	Clear hierarchical structure for process of escalating issues	0.742	
DEL9	Supplier located close to our organisation.		
	SUPPLIER RELATIONSHIP MANAGEMENT (SRM)		
SRM1	Supplier has experience supplying to the telecommunication industry	0.875	0.958
SRM3	Supplier background, brand, reputation and performance to be considered	0.872	
SRM4	Supplier has track record and expertise in the telecommunications industry	0.879	
SRM5	Supplier willingness to establish a business partnership	0.873	
SRM6	Supplier able to articulate their short term or long term business relationship	0.892	
SRM7	Supplier able to provide an indication of their inventory control management	0.868	
SRM8	Supplier financial stability and business practices	0.882	
SRM9	Supplier offers high commitment from their higher level management team.	0.805	
	DECISION MAKING (DM)		
DM1	Supplier have a relevant and up to date information systems	0.82	0.846
DM2	Clear authorisation limit or level of authority within the supplier organisation	0.821	

DM3	Appropriate decision making tools and techniques such as total cost of ownership, average hierarchy process	0.814	
	POLICY (POL)		
POL1	Supplier follows Malaysian government rules and regulations	0.709	0.931
POL2	Supplier meets Local Authority rules and requirements	0.793	
POL3	Supplier complies with all national and international legal and regulations	0.844	
POL4	Supplier adheres to the procurement policy of my organisation	0.765	
POL5	Supplier supports the national strategic Bumiputra agenda	0.82	
POL6	Supplier must comply with national environmental guidelines	0.819	
POL7	Supplier is in alignment with government procurement policies and guidelines	0.704	
POL8	Supplier must comply with recognised occupational safety and health procedures	0.861	
POL9	Supplier should bring benefits to the country	0.77	
POL10	Supplier must comply with all contract terms and conditions	0.768	
	ETHICS (ETC)		
ETC1	Supplier should be involved in any lobbying activities	0.814	0.857
ETC2	Supplier should be involved in any canvassing activities	0.623	
ETC3	Supplier should be practicing offer of Gifts	0.85	
ETC4	Supplier should be involved in bribery or corruption activities	0.82	
ETC5	Supplier should be involved in any Inducement and rewards activities	0.848	
	SUPPLIER SELECTION (SS)		
SS1	I have clear understanding of supplier selection	0.879	0.936
SS2	It is important to have a process for selecting suppliers in my organisation	0.867	
SS5	It is necessary to have knowledge about how the supplier evaluation and selection process work in the organisation	0.78	
	SUPPLIER SELECTION IMPACT(SSIM)		
SSIM1	Improved supplier selection process will improve work efficiency	0.811	0.926
SSIM2	Improved supplier selection process will improve productivity	0.77	
SSIM3	Improved supplier selection process will promote high standard of working culture	0.872	
SSIM4	Improved supplier selection process will develop better planning and work coordination	0.842	
SSIM5	Improved supplier selection process will create healthy market competitiveness	0.818	

SSIM6	Improved supplier selection process will improve customer satisfaction	0.857	
SSIM7	Improved supplier selection process will achieve cost savings	0.838	
SSIM8	Improved supplier selection process will improve quality and services to the customer	0.649	

5.3.15 Communalities

The total variance that is shared by an original variable with other variables that is included in the analysis is known as communality as stated by Hair *et al*., (2007). A communality value of 1 represents a variable that has no specific variance (or random variance) while a communality value of 0 represents a variable that shares nothing with other variables (Field, 2006).

Models containing multiple constructs are required to have communalities of less than 0.5 which can be determined from factor loading. For larger sample size (the sample size for this study is 950), communalities of less than 0.7 are necessary (Hair *et al.,* 2007). In this research variables with a communality value greater than 0.5 was applied (refer to Table 5.13). It is shown in the results that all variables retained in the factor loading have communality values greater than 0.5. The result also showed that 3 items with scores of less than 0.5 would not be considered for the next stage of analysis (CFA). The items were DEL9 (0.314), ETC2 (0.431) and SSIM8 (0.466). Results also confirmed the high variation ranging from 0.531 to 0.905 which indicated high level of variance between the variables.

Table 5.13: Communalities

Code	Initial	Extraction	Code	Initial	Extraction
QLTY1	1	0.726	DM1	1	0.767
QLTY2	1	0.636	DM2	1	0.76
QLTY3	1	0.745	DM3	1	0.73
QLTY4	1	0.732	POL1	1	0.611
QLTY5	1	0.769	POL2	1	0.693
QLTY7	1	0.786	POL3	1	0.741
QLTY8	1	0.734	POL4	1	0.598
QLTY9	1	0.765	POL5	1	0.699
QLTY10	1	0.766	POL6	1	0.725
PC2	1	0.823	POL7	1	0.531
PC3	1	0.821	POL8	1	0.75
PC4	1	0.739	POL9	1	0.633
PC5	1	0.668	POL10	1	0.625
PC6	1	0.627	ETC1	1	0.674
PC8	1	0.776	**ETC2**	**1**	**0.431**
DEL1	1	0.828	ETC3	1	0.73
DEL2	1	0.774	ETC4	1	0.709
DEL3	1	0.808	ETC5	1	0.723
DEL4	1	0.806	SS1	1	0.905
DEL5	1	0.828	SS2	1	0.907
DEL6	1	0.775	SS5	1	0.833
DEL7	1	0.759	SSIM1	1	0.681
DEL8	1	0.658	SSIM2	1	0.607
DEL9	**1**	**0.314**	SSIM3	1	0.766
SRM1	1	0.778	SSIM4	1	0.745
SRM3	1	0.79	SSIM5	1	0.697
SRM4	1	0.781	SSIM6	1	0.762
SRM5	1	0.791	SSIM7	1	0.725
SRM6	1	0.824	**SSIM8**	**1**	**0.466**
SRM7	1	0.784			
SRM8	1	0.806			
SRM9	1	0.688			

The total variance that is shared by an original variable with other variables that is included in the analysis is known as communality as stated by Hair *et al.*, (2007). A communality value of 1 represents a variable that has no specific variance (or random

variance) while a communality value of 0 represents a variable that shares nothing with other variables (Field, 2006).

5.3.16 Summary

Table 5.14: A summary of main data item purification process

Construct	Items dropped	Reasons for dropping the items
QUALITY/TECHNOLOGIES (QLTY)	QLTY6	Score of variance influence factor (VIF) in the multicollinearity result more than 10
PRICE (PC)	PC1	Score of variance influence factor (VIF) in the multicollinearity result more than 10
	PC7	Score of variance influence factor (VIF) in the multicollinearity result more than 10
	PC8	Highly cross-loaded on other factors
DELIVERY (DEL)	DEL9	Factor loading score less than 0.50. and low communalities <0.5
ETHICS (ETC)	ETC2	Low communalities <0.5
SUPPLIER SELECTION IMPACT(SSIM)	SSIM8	Low communalities <0.5
	SSIM9	Score of variance influence factor (VIF) in the multicollinearity result more than 10
	SSIM10	Score of variance influence factor (VIF) in the multicollinearity result more than 10

In summary, results showed that the internal consistencies of the constructs of this study were relatively high since the Cronbach alpha was above 0.7 for all the constructs (Hair *et al.,* 1995). Additionally, items assigned to each dimension consistently exhibited high loadings on their constructs (See Table 5.13). Factor loadings of all the items were fairly high indicating reasonably high correlation between the hypothesized factors and their individual items.

Based on all of the above results including the factor analysis rotated component matrix and communalities, nine items were dropped (See Table 5.14) and the remaining items which met the criteria of data screening process would be further evaluated using Confirmatory Factor Analysis (CFA), Structural Equation Model (SEM) analysis and hypothesis testing via AMOS 18. The Confirmatory Factor Analysis was applied to measure the convergent and construct validity of scales at the next stage.

5.4 STRUCTURAL EQUATION MODELLING (SEM) DATA ANALYSIS

5.4.1 Introduction

As discussed in previous section, Structural Equation Modelling (SEM) is a method used to assess the hypothesised relations between variables by estimating a series of separate, yet interdependent and multiple regressions at the same time. The measurement model and structural model is tested by the application of SEM. For this research, after the preliminary data analysis was completed, where data were screened and purified, the cleaned data were then assembled into AMOS. Data analysis commenced after verifying that all statistical assumptions were reasonably met.

5.4.2 Structural Equation Model

Used for the assessment and analysis of multivariate data, Structural Equation modelling (SEM) is a method that has for a long time been deemed appropriate for theory testing in particular, within the social science studies and business fields (Bagozzi, 1980). This status has been gained through the way in which the structural equation models are able to demonstrate the incorporation of several independent and dependent variables whilst also displaying hypothetical latent constructs that may be a representation of observed variables. This is as appose to ordinary regular regression models which cannot display as much information in results, making Structural Equation Model (SEM) the preferred tool. They also allow means to trial the chosen set of relationships between observed and hidden variables, as well as enabling the testing of theories and models even when actual experiments may not be feasible. Due to these factors that work in their favour, structural equation models are universally recognised in studies within all social and behavioural sciences (MacCallum and Austin, 2000).

There are seven independent variables (high technology and quality, price, delivery, supplier relationship management, decision making tools and techniques, government policy and business ethics) and two dependent variables (supplier selection and supplier selection impact) in this study. AMOS 18 system application is utilized to construct the relations amongst independent variable and dependent variable.

In this study, Structural Equation Model (SEM) is the analysis technique used. The overall model fit is estimated using maximum likelihood estimation (MLE) in the measurement model. This estimation technique will be used in the analysis that follows.

To summarise the above, SEM is used to examine complex relationships between the verified variables and those that are hypothetical. These complex relationships are tested by SEM to also include relationships between two or above hidden/unobserved variables.

5.4.3 Confirmatory Factor Analysis (CFA)

Confirmatory Factor Analysis was used to simplify complex sets of quantitative data by means of analysing the correlations between variables to reveal the smallest number of factors which can clarify the correlations. The objective of Confirmatory factor Analysis is to ensure that the concepts are accurately measured for this research. The simplified factors will then be utilized for further analysis. Smaller set of factors will reduce the load of the independent variables. One of the concepts is assessing the raw data for its suitability for factor analysis. The basic criterion is to evaluate based on the sample size. For this study, the sample size of 950 is considered adequate for factor analysis (Hair *et al.,* 2006).

Within this study, the researcher proposed to evaluate the general hypotheses of relationships between critical factors or criteria and supplier selection decision, and the effect of supplier selection on overall company operation. To provide further validation, the research constructs were examined by conducting a measurement model assessment called Confirmatory Factor Analysis (CFA). The Confirmatory Factor Analysis is a technique utilized to measure whether the theoretically imposed structure of the underlying constructs exist in the observed data (Anderson and Gerbing, 1992). It allows for testing whether the indicators of the specific construct converge or share the high proportion of variance in common, i.e. convergent validity through the computation of the factor loadings. One of the important consideration in the case of high convergent validity is the size of the factor loading (Hair *et al.,* 2006), variance extracted and composite reliability for each construct (Baggozi *et al.,* 1991; Gerbing and Anderson, 1988; Fornell and Larcker, 1981).

The relationships between the constructs were also examined (the structural model). According to Kahn (2006), Confirmatory Factor Analysis (CFA) is an excellent method for testing hypothesis concerning a theory. Stevens (2002) posits that CFA is used when there is a strong empirical base to test fixed factors a priori and when specific variables are fixed to load on specific factors. Based on the relations established in this research, the model of this study was built integrated with previously verified measurement scales. Thus, from the survey data analysis for the supplier selection criteria, using the CFA to test all criteria presented in the previous chapter with the existing literature was most appropriate.

A two-step approach in structural equation modelling that allows assessment of the importance of all pattern coefficients and gives a particularly constructive framework for formal comparisons of the substantive model of interest with the next probable theoretical alternatives, was suggested by Anderson and Gerbing (1988). Initially the validity of the construct was assessed by Confirmatory Factor Analysis in implementing the measurement model assessment method (Hair *et al.,* 2006). Using this method, the relations amongst the constructs were examined by structural equation modelling. Firstly the measurement model was confirmed then the structural model was built. The evaluation of the discriminant and convergent validity is made possible by the measurement model. The structural model will provide an evaluation of nomological validity if the measurement gives an acceptable fit to the data (Anderson and Gerbing, 1988).

Confirmatory Factor Analysis was also used to test discriminant validity of the constructs, i.e. the degree to which a construct is truly different from other constructs. Using CFA is also necessary to ensure that constructs have nomological validity. In CFA, the overall fit of the model is utilized as the required and adequate condition to inspect the nomological validity (Steenkamp and Van Trijp, 1991).

For further theory testing and development, the validity of a construct is an important condition (Carmines and Zeller, 1979; Steenkamp and Trijp, 1991). Therefore, to make certain that the theoretical denotation of a construct is empirically captured by its indicators, confirmatory factor analysis is utilized as a stricter evaluation of construct

validity (Bagozzi *et al.,* 1991; Steenkamp and Trijp, 1991). The researcher assessed how well all the apparent variables of the same construct were related to one another by implementing this approach (Fornell and Larcker, 1981; Bagozzi *et al.,* 1991; Anderson and Gerbing, 1988, Hair *et al.,* 2006). In addition, the overall validity of the model such as nomological validity is confirmed with measurement model assessment by confirmatory factor analysis. Subsequently, quality of fit indices of measurement models are used (Steenkamp and Trijp, 1991; Lages, 2000).

The maximum likelihood (ML) estimation technique was implemented in assessing the measurement model by confirmatory factor approach (Hair *et al.,* 2006; Tabachnick and Fidell, 2007). This method is appropriate when the sample size does not meet the criterion of having at least five observations for each and every variable (Bentler and Chou, 1987; Anderson and Gerbing, 1988; Hair *et al.,* 2006). To be able to resolve the likely problem of an unreliable Chi-square static and standard errors due to MLE application the model fit indicators were used in model validation (Bentler and Chou, 1987).

The psychometric properties of the measurement and structural models were examined using the maximum likelihood estimation (MLE) method by CFA because it is the most widely employed technique in most SEM programs; more efficient and unbiased when the assumption of multivariate normality is achieved (Hair *et al.,* 2006). MLE is applicable as it has proven to be quite robust to violations of the normality assumption (Hair *et al.,* 2006). Olsson *et al*., (2004; 2000) also found that it produces reliable results under any circumstances compared to other techniques. From the overall fit, the most common index is the chi-square statistic (Hair *et al.,* 2006; Hoyle, 1995). Then again the confirmatory factor analysis is highly sensitive to sample size in the chi-square test.

Other fit indices like the comparative fit index (CFI), goodness of fit index (GFI), root mean square error of approximation (RMSEA), adjusted goodness of fit index (AGFI) and standardized root means square residual (SRMR) were also used to check the validity of the measurement model to overcome the problem of chi-square sensitivity to the large sample size and standard error due to the MLE application (Bentler and Chou, 1987).

The current study used the covariance matrix as input in conducting SEM analysis. All analyses were performed on covariance matrices and this choice was primarily based on interpretive and statistical issues as recommended by Hair *et al.,* (2006). (1) Interpretation - correlation matrix holds no advantage over covariance matrix in terms of standardized results because it is simple to produce these results by requesting a completely standardized solution. (2) Statistical impact - the use of correlations can lead to errors in standard error computations.

5.4.4 The Measurement Model

In the first CFA run for the measurement model, a total of fifty seven items was tested from the entire model. The resulting fit indices of model for normated Chi-square (2.67), root mean square error of approximation (RMSEA = 0.068), and goodness of fit measure (GFI = 0.723) indicated a poor model fit. Further, incremental fit indices such that normated fit index (NFI = 0.802), normated comparative fit index (CFI = 0.865) and adjusted goodness of fit index (AGFI = 0.696) also displayed a poor model fit (Hair *et al.*, 2006).

An investigation of the modification indices suggested that allowing the number of item errors to co-vary would improve model fit. To further improve the model, the researcher decided to simplify and re-specify the model by reducing the number of items relatively based on the factor loading scores and modification indices. Items with low factor loadings would probably be eliminated. Meanwhile for the modification indices, items were selected from the descending order score value of indices. Items having high value of modification indices and correlated within the same construct would be deducted.

Thus, the researcher posited that the error terms for the pair item within the same construct would be dependent and presumably correlate. The next step was to look at the residual score in the standardised residual table. With regards to this matter, those items having scores of more than 0.04 would be considered for item deletion. This improved model fit in each of the indices suggested a good fit to data; however, it did not meet the criteria for a well fitting model.

An important criterion at this stage was that the critical hypotheses of the original models would not be affected. The final models did not change significantly from the initial models given that most of the re-specification carried out on the initials models referred to the estimation of the correlation amongst some measurement errors in the observed variables of measurement model.

From the fifty seven items initially included in the measurement model for the total of nine constructs, twenty four items were eliminated from the initial model. Therefore, the final confirmatory factor analysis in the measurement model consisted of seven exogenous constructs and two endogenous constructs with a total of thirty three items. The final confirmatory factor analysis (CFA) measurement model is shown as per Figure 5.3 and Figure 5.4.

Figure 5.3: Confirmatory factor analysis Model

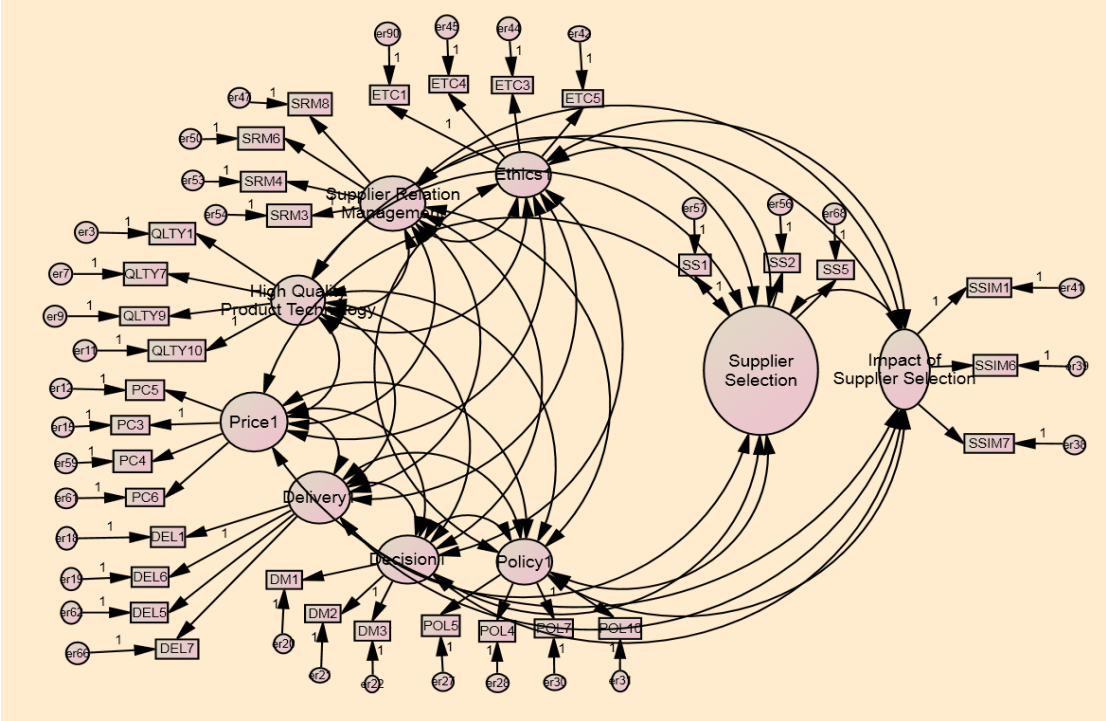
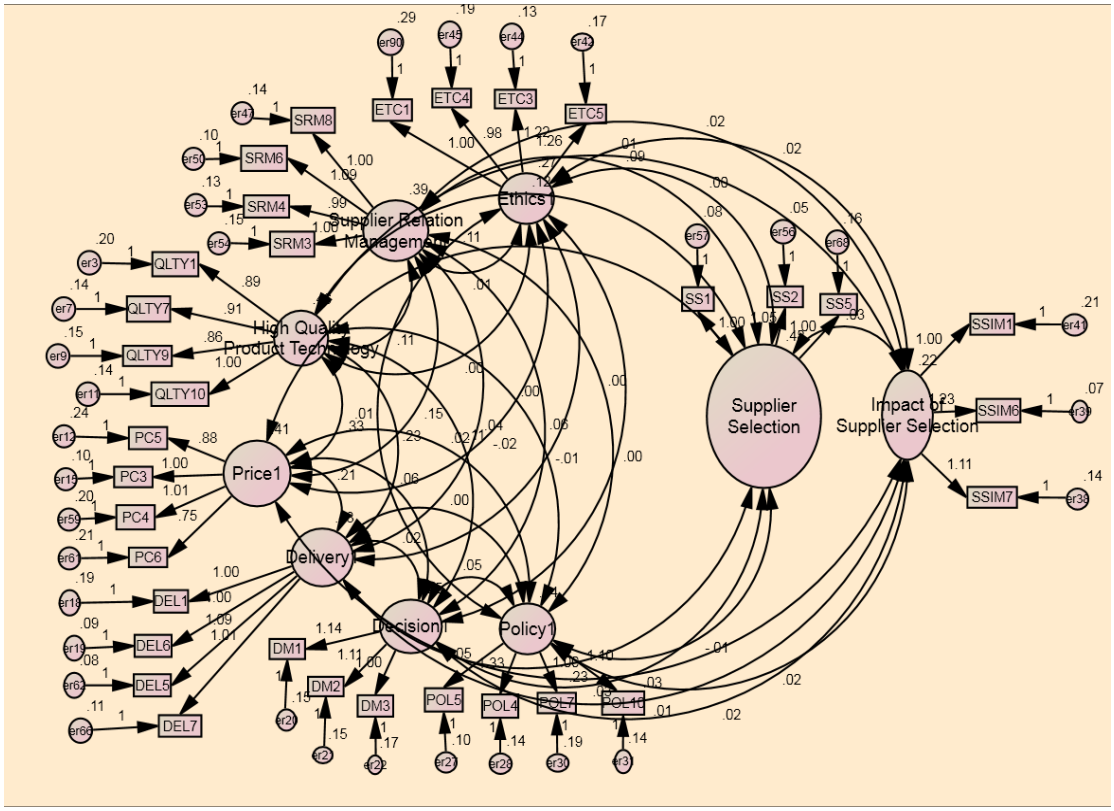


Figure 5.4: Measurement Model



The indicators' factor loadings for each construct were sufficiently high and statistically significant to show that the indicators and their underlying constructs fitted the model. Based on the result, the standardised factor loadings were fairly high ranging from 0.647 to 0.913. According to Hair (2010), individual standardised factor loadings (regression weights) ought to be 0.5 at the least and preferably 0.7.

Table 5.15 presents the measurement model results of standardised regression weight while Table 5.16 shows additional results that includes the standard factor loadings, standard errors, construct reliabilities (*t*-value) and the significant p value indicators. Therefore, the measurement model could be judged as providing an acceptable fit.

Table 5.15: Standardized Regression Weight

			Estimate
QLTY10	<---	High Quality Product Technology	.875
QLTY9	<---	High Quality Product Technology	.832
QLTY7	<---	High Quality Product Technology	.857
QLTY1	<---	High Quality Product Technology	.803
PC3	<---	Price1	.899
PC5	<---	Price1	.752
DEL6	<---	Delivery1	.913
DEL1	<---	Delivery1	.832
POL5	<---	Policy1	.773
ETC4	<---	Ethics1	.757
ETC3	<---	Ethics1	.865
ETC5	<---	Ethics1	.846
SS1	<---	Supplier Selection	.924
SS2	<---	Supplier Selection	.953
SS5	<---	Supplier Selection	.865
DEL5	<---	Delivery1	.928
DEL7	<---	Delivery1	.897
SRM8	<---	Supplier Relation Management	.857
SRM6	<---	Supplier Relation Management	.909
SRM4	<---	Supplier Relation Management	.864
SRM3	<---	Supplier Relation Management	.850
SSIM7	<---	Impact of Supplier Selection	.815
POL4	<---	Policy1	.801
SSIM1	<---	Impact of Supplier Selection	.717
SSIM6	<---	Impact of Supplier Selection	.913
PC6	<---	Price1	.723
PC4	<---	Price1	.818
DM3	<---	Decision1	.774
POL7	<---	Policy1	.647

			Estimate
DM1	<---	Decision1	.823
DM2	<---	Decision1	.816
POL10	<---	Policy1	.733
ETC1	<---	Ethics1	.692

Table 5.16: Regression Weight

			Estimate	S.E.	Critical Ratio (t-value)	P	Label
QLTY10	<---	High Quality Product Technology	1.000				
QLTY9	<---	High Quality Product Technology	.862	.042	20.339	***	par_1
QLTY7	<---	High Quality Product Technology	.905	.043	21.260	***	par_2
QLTY1	<---	High Quality Product Technology	.894	.047	18.937	***	par_3
PC3	<---	Price1	1.000				
PC5	<---	Price1	.882	.051	17.360	***	par_4
DEL6	<---	Delivery1	1.000				
DEL1	<---	Delivery1	.999	.045	22.346	***	par_5
POL5	<---	Policy1	1.052	.094	11.164	***	par_6
ETC4	<---	Ethics1	.981	.075	13.115	***	par_7
ETC3	<---	Ethics1	1.215	.088	13.869	***	par_8
ETC5	<---	Ethics1	1.257	.091	13.764	***	par_9
SS1	<---	Supplier Selection	1.000				
SS2	<---	Supplier Selection	1.054	.033	32.270	***	par_10
SS5	<---	Supplier Selection	.998	.040	25.230	***	par_11
DEL5	<---	Delivery1	1.086	.037	29.352	***	par_12

			Estimate	S.E.	Critical Ratio (t-value)	P	Label
DEL7	<---	Delivery1	1.010	.037	27.185	***	par_13
SRM8	<---	Supplier Relation Management	1.003	.049	20.396	***	par_14
SRM6	<---	Supplier Relation Management	1.095	.048	22.813	***	par_15
SRM4	<---	Supplier Relation Management	.989	.047	20.850	***	par_16
SRM3	<---	Supplier Relation Management	1.000				
SSIM7	<---	Impact of Supplier Selection	1.114	.078	14.322	***	par_17
POL4	<---	Policy1	1.329	.116	11.509	***	par_18
SSIM1	<---	Impact of Supplier Selection	1.000				
SSIM6	<---	Impact of Supplier Selection	1.230	.086	14.301	***	par_19
PC6	<---	Price1	.746	.046	16.180	***	par_20
PC4	<---	Price1	1.007	.051	19.815	***	par_21
DM3	<---	Decision1	1.000				
POL7	<---	Policy1	1.000				
DM1	<---	Decision1	1.135	.078	14.641	***	par_22
DM2	<---	Decision1	1.111	.076	14.540	***	par_23
POL10	<---	Policy1	1.102	.097	11.336	***	par_24
ETC1	<---	Ethics1	1.000				

5.4.5 Assessing the Unidimensionality

The constructs in the proposed model were each assessed for unidimensionality. The existence of one latent trait underlying the data is known as Unidimensionality (Hattie, 1985). In CFA, the model's overall fit is utilised as the required and adequate condition to assess whether a set of measurement items is unidimensional (Kumar and Dillon, 1987; Steenkamp and Van Trijp, 1991).

Unidimensionality is evident with each item loading onto the underlying construct; all of the items are put under a confirmatory factor analysis (CFA). An inspection of factor loadings showed that all items had significant factor loadings with *t*-values exceeding 1.96. All the constructs had high alpha coefficients greater than 0.7. Some further items had square multiple correlations of less than 0.5 which meant the construct explained less than half the variance in the item.

5.4.6 Assessing the Convergent Validity

In assessing the convergent validity of each measurement model, the *t*-value implemented displayed critical ratio in the measurement model (See Table 5.17) (Bagozzi *et al.*, 1991; Chau, 1997). All the *t*-values of the items were considerably larger than the critical value of 1.96 at the 0.99 confidence level and all indicators displayed higher individual squared multiple correlations (Reliabilities) more than 0.50.

In this study, the convergent validity was examined based on the factor loadings of each and every unidimensional construct. Convergent validity was achieved because the factor loadings of the measurement items were significant and substantial, i.e.>0.5 (Hair *et al.*, 2006), as well as the model receiving a satisfactory level of fit. Also, the convergent validity of the measures was assessed by measuring the composite reliabilities of each of the constructs.

Table 5.17: Convergent Validity

	QLTY	PC	DEL	SRM	DM	ETC	POL	SS	SSIM	Item Reliabilities	Sum Item Reliabilities
QLTY1	0.803									0.64	
QLTY7	0.857									0.73	
QLTY9	0.832									0.69	
QLTY10	0.875									0.77	2.84
PC3		0.899								0.81	
PC4		0.818								0.67	
PC5		0.752								0.57	
PC6		0.723								0.52	2.57
DEL1			0.832							0.69	
DEL5			0.928							0.86	
DEL6			0.913							0.83	
DEL7			0.897							0.80	3.19
SRM3				0.850						0.72	
SRM4				0.864						0.75	
SRM6				0.909						0.83	
SRM8				0.857						0.73	3.03
DM1					0.823					0.68	
DM2					0.816					0.67	
DM3					0.774					0.60	1.94
ETC1						0.692				0.48	
ETC3						0.865				0.75	
ETC4						0.757				0.57	
ETC5						0.846				0.72	2.52
POL4							0.801			0.64	
POL5							0.773			0.60	
POL7							0.647			0.42	
POL10							0.733			0.54	2.20
SS1								0.924		0.85	
SS2								0.953		0.91	
SS5								0.865		0.75	2.51
SSIM1									0.717	0.51	
SSIM6									0.913	0.83	
SSIM7									0.815	0.66	2.01
Average Variance Extracted (AVE)	**0.71**	**0.64**	**0.80**	**0.76**	**0.65**	**0.63**	**0.55**	**0.84**	**0.67**		
Construct Reliability	**0.91**	**0.88**	**0.94**	**0.89**	**0.85**	**0.87**	**0.83**	**0.94**	**0.86**		
SQRT (AVE)	**0.84**	**0.80**	**0.89**	**0.87**	**0.80**	**0.79**	**0.74**	**0.91**	**0.82**		

The average variance of latent variables explained by each measured variable indicates the Average variance extracted value. Higher reliability and higher convergent validity of the latent variable gives higher AVE value. Bagozzi and Yi (1988) recommended that AVE should be higher than 0.5. From Table 5.18, it can established that all the AVE value of each variable have a value greater than 0.5. For all underlying variables, the results displayed that the value of the average variance extracted (AVE) is more than 0.5 which indicates the high levels of construct reliability (See Table 5.18). Since all t-values were significant (p = .05) and the average variances extracted were larger than 0.50, therefore, each of the latent variables has a definite level of reliability and convergent validity was established.

5.4.7 Assessing the Discriminant Validity

Construct validity examines the degree of measurement items to reflect the latent construct which they are designed to measure. Discriminant validity is one part of assessing construct validity in confirmatory factor analysis. It is the degree to which a construct is truly different from other constructs (Hair *et al.,* 2006). By using average variance extracted, discriminant validity can be measured (Fornell and Larcker, 1981; Hair *et al.,* 2006). To satisfy the requirements for discriminant validity, the average variance extracted should be greater than the squared correlation (Fornell and Larcker, 1981), thus the result display in Table 5.18 showed the discriminant validity is established.

Table 5.18: Discriminant Validity

	QLTY	PC	DEL	SRM	DM	ETC	POL	SS	SSIM
QLTY	**0.84**								
PC	0.329	**0.80**							
DEL	0.229	0.215	**0.89**						
SRM	0.105	0.152	0.041	**0.87**					
DM	0.107	0.059	0.021	0.060	**0.80**				
ETC	0.003	-0.019	-0.014	0.007	-0.003	**0.79**			
POL	0.001	0.017	0.003	0.003	0.048	0.005	**0.74**		
SS	0.118	0.108	0.228	-0.001	0.034	-0.010	-0.005	**0.91**	
SSIM	0.008	0.026	0.007	0.022	0.019	0.021	0.022	0.029	**0.82**

To summarise, Table 5.18 display the overall outcomes of construct validity using nomological, convergent and discriminant validity assessment of the measurement model gave statistically and theoretically valid constructs. Based on the construct validity results, assessment shows statistically and theoretically valid constructs for the measurement model. Hence the underlying latent variables for the structural equation model testing stage were robustly established for further analysis and model testing.

5.4.8 Assessment of Model Fit

As mentioned earlier, a two-step method was adopted to progress with the study. A structural equation modelling method was utilized that indicated relations amongst dependent and independent variables following the measurement model estimation. Structural equation modelling gives an estimation method that is most suitable and efficient as stated by Hair *et al*., (2006). A sequence of independent multiple regression equations can be simultaneously estimated by it.

The overall fit of the measurement model confirmed consistency of the theoretical model and the estimated model which was based on the observed values (Diamantopoulos and Siguaw, 2000; Hair *et al.,* 2006). Although many techniques are on hand to assess the overall model fit, none of the methods alone can give an absolute guarantee of model fit. Kline (1998) suggested at least four tests including chi-square, GFI, AGFI, NFI, RFI, IFI, TLI and CFI. However, most well known fit indices are chi-square, Goodness of Fit Index (GFI), Root Mean Square Error Approximation (RMSEA) and Adjusted Goodness of Fit Index (AGFI). No constraints were forced to any parameter relating to manifest and latent variables during this analysis.

Absolute and incremental fit indices were established and found that the model was a sufficient representation of the dependent and independent proposed constructs. In implementing the root mean square error approximation (RMSEA) to find model fit, the result was 0.041, that was under the cut-off value of 0.05 (Hair *et al.*,2006; Garver and Mentzer, 1999).

The NFI, RFI, IFI, TLI and CFI measures were also utilized to measure the model goodness of fit. The readings for these indices were NFI=.913, RFI=.900, IFI=.965, TLI=.959 and CFI=.965 correspondingly, which were greater than 0.90 criterion value (Diamantopoulos and Siguaw, 2000; Doll *et al.*, 1994; Hair *et al.*, 2006; Mueller, 1996). The GFI and AGFI were GFI=0.892 and AGFI=0.868 respectively, indicating some dissimilarity in regards to the suggested threshold value of 0.90 (Hair *et al.*, 2006). However, Doll *et al*., (1994) and Durande-Moreau and Usunier (1999) recommended that a criterion of 0.80 is considered acceptable or adequate. The model fit was considered acceptable because the values for GFI and AGFI were within the acceptable range from 0.80 to 0.90.

Thus, the absolute fit measures indicated that for the sample data collected, the structural equation model denoted a satisfactory fit. In addition, the chi square (x^2) value at 1.611 showed a reasonable fit. This therefore shows that the proposed model maintained a good fit from the observed data.

In order to assess whether the model was valid, the overall fit of the model to the observed data was examined. Table 5.19 displays the results for the goodness of fit indices.

Table 5.19: Goodness of fit index (Measurement Model)

Note for Model (Default Model)

Number of distinct sample moments: 594
Number of distinct parameters to be estimated: 135
Degrees of Freedom: 459
Chi-square = 739.446
Probability level = .000
CMIN/DF (x^2) =1.611

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.913	.900	.965	.959	.965

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Model	RMR	GFI	AGFI	PGFI
Default model	.019	.892	.868	.730
Saturated model	.000	1.000		
Independence model	.139	.303	.260	.285

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	102	739.446	459	.000	1.611
Saturated model	561	.000	0		
Independence model	33	8493.489	528	.000	16.086

Table 5.20 : RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.041	.036	.047	.996
Independence model	.206	.202	.209	.000

Based on the above criteria, the model satisfied these requirements and showed a satisfactory fit with the RMSEA value of 0.41. Table 5.20 shows the results of the Root Mean Square Error Approximation confirmatory factor analysis test for this study.

After the measurement model was confirmed, the structural model later was examined. Figure 5.5 and 5.6 present the model and structural path analysis for each relationship.

Figure 5.5: Structured Model

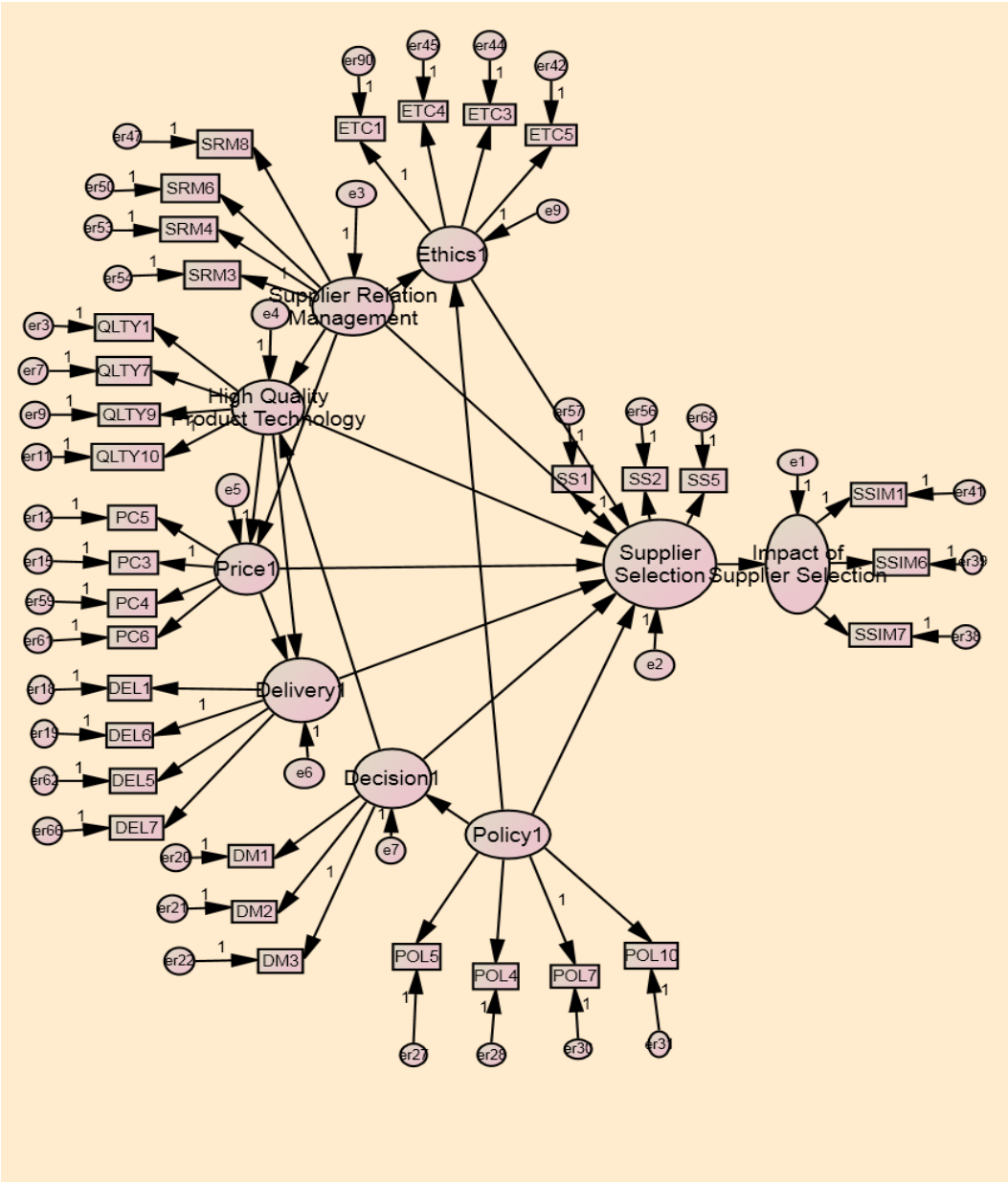
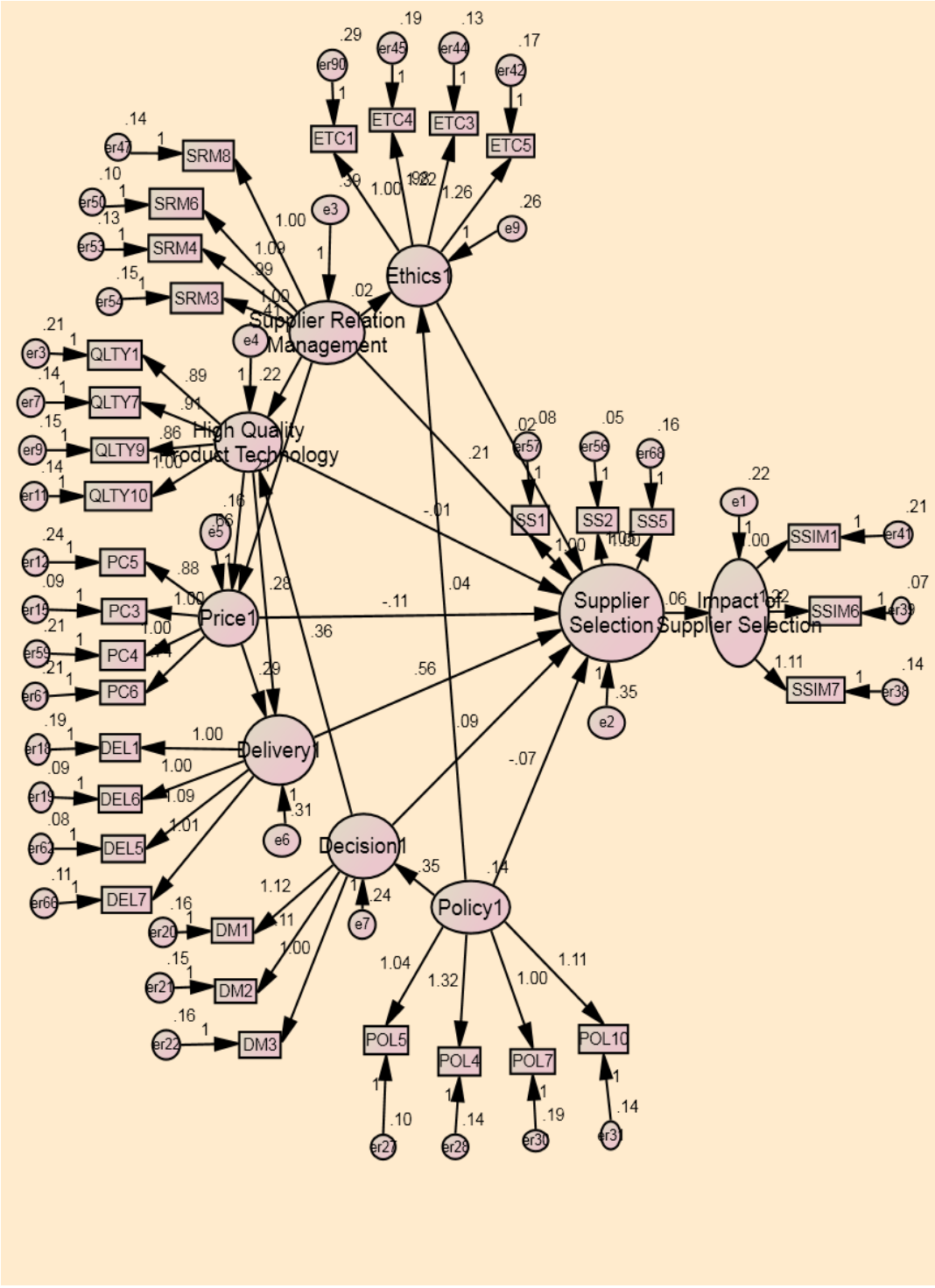


Figure 5.6: Structured Model Path Analysis



The whole fit indices for the structural model indicated a chi-square of 739.446 with 459 degrees of freedom ($p<0.00010$). The chi-square test becomes increasingly sensitive as the number of indicators increase (Hair *et al.*, 2010). Hair *et al.*, (2010) further asserts

that large sample size of more than 200 also has a propensity to produce significant (x^2) =1.611 statistics although the data set may be fitting to the hypothesised model. In these cases, the Tucker Lewis index (TLI) = 0.959 and normated fit index (NFI) = 0.909 provided seemingly unbiased estimations of incremental of fit to the proposed structural model. Goodness of fit index (GFI) of 0.887 and adjusted goodness of fit index (AGFI) of 0.868 also showed a good model fit (Doll *et al.,* 1994; Garver and Mentzer, 1999; Hair *et al.,* 2006). Moreover, the comparative fit index (CFI) of 0.963 was comfortably above the standard threshold of 0.9 for model fit. For the Relative Non Centrality Index (RNI), King *et al*., (2000) stated that the convention has decided that values of such indices exceeding 0.90 reflect reasonable model fit, while more recent thinking (Hu and Bentler, 1998) has dictated that values above 0.95 are more preferable.

Additionally, RMSEA is regarded to be one of the most informative criteria in structural equation modelling as it considers the potential error of approximation in the population (Byrne, 1989). Values of less than 0.05 suggest a good fit, values ranging from 0.08 to 0.10 indicate medium fit and values greater than 0.10 indicate a poor fit (Diamantopolous and Siguaw, 2000; Hair *et al.,* 2006). Moreover, a model with a GFI less than 0.8 should be rejected (Tanaka and Huba, 1985). From this structural model result, the root mean square error of approximation fit indices (RMSEA) of 0.042 showed a perfect model fit (Fornell and Larcker, 1981; Mueller, 1996; Bagozzi *et al.,* 1991; Hair *et al.,* 2010; Doll *et al.,* 1994; Garver and Mentzer, 1999). Browne and Cudeck (1993) also suggested that RMSEA of less than 0.05 is indicative of a "close fit," and that values up to 0.08 represent reasonable errors of approximation.

Table 5.21 : Model Fit Summary (Structured Model)

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	83	776.647	478	.000	1.625
Saturated model	561	.000	0		
Independence model	33	8493.489	528	.000	16.086

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.024	.887	.868	.756
Saturated model	.000	1.000		
Independence model	.139	.303	.260	.285

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.909	.899	.963	.959	.963
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.905	.823	.871
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.042	.036	.047	.995
Independence model	.206	.202	.209	.000

From the above summary (See Table 5.21), it can be deduced that this model showed an overall fit. The goodness of fit indices indicated that the structured model was valid. The AGFI of 0.868 and parsimonious value PNFI of 0.823 were above the threshold of the critical value 0.80.

5.4.9 Assessment of Supplier Selection Criteria Effects

Based on the standardized total effect scores result as shown in Table 5.22, the results display the ranking of importance in supplier selection criteria is (1) Delivery performance score .524, (2) Supplier Relation Management score .234, (3) High Quality and Technology score .180, (4) Decision Making Tools and Techniques score .109, (5) Price score .052, (6) Business Ethics score .012 and (7) Government Policy score .011. The three most important influencing criteria are delivery, followed by supplier relation management and then quality. While the last there less important criteria are the price followed by ethics and government policy.

Table 5.22: Standardized Total Effects

	Policy	Supplier Relation Management	Decision	High Quality Product Technology	Price	Ethics	Delivery	Supplier Selection	Impact Supplier Selection
Supplier Selection	**.011**	**.234**	**.109**	**.180**	**.052**	**.012**	**.524**	**.000**	**.088**

5.5 Hypotheses Testing

Based upon the structural model, the research hypotheses were tested using standardised estimates and *t*-value (critical ratio). For data analysis, the researcher employed AMOS 18.0 software to examine the hypotheses.Using path estimates and *t*-values (critical ratio), seventeen hypotheses were examined in this study. Nine of the *t*-values were greater than 1.96 critical values at the 0.01 significant levels. The remaining eight hypotheses were insignificant. The detailed result of the hypothesis testing is shown on Table 5.23.

Table 5.23: Regression Weight Hypothesis Testing Result

Dependent Variable		Independent Variable	Path Estimate	Critical Ratio (t value)	P Value
Supplier Selection	<-	High Quality Product Technology	-0.01	-0.105	0.917
Price	<-	High Quality Product Technology	0.662	14.254	***
Delivery	<-	High Quality Product Technology	0.282	3.445	***
Supplier Selection	<-	Price	-0.107	-1.044	0.296
Delivery	<-	Price	0.294	3.356	***
Supplier Selection	<-	Delivery	0.559	8.579	***
Supplier Selection	<-	Supplier Relationship Management	0.208	3.41	***
High Quality Product Technology	<-	Supplier Relationship Management	0.219	3.618	***
Price	<-	Supplier Relationship Management	0.208	4.73	***
Ethics	<-	Supplier Relationship Management	0.016	0.335	0.738
Supplier Selection	<-	Decision	0.085	1.064	0.287
High Quality Product Technology	<-	Decision	0.357	4.429	***
Supplier Selection	<-	Policy	-0.073	-0.72	0.471
Ethics	<-	Policy	0.038	0.447	0.655
Decision	<-	Policy	0.347	3.931	***
Supplier Selection	<-	Ethics	0.017	0.249	0.803
Impact of Supplier Selection	<-	Supplier Selection	0.06	1.524	0.127

This table shows the detailed result of the hypothesis testing regression weight scores and the significant value of each hypothesis. Further details of the analysis of hypothesis testing will be discussed in chapter 6.

5.6 Conclusion

This chapter includes details of the data management and analysis of the main survey study. SPSS and AMOS application software were used to examine the data that came from the main questionnaire survey. The Structural equation modelling (SEM) method was used for the analysis of multivariate data and for testing the model fit. Based upon the confirmatory factor analysis (CFA) the measurement and structured model were tested and displayed a fit that was deemed satisfactory. For the purpose of hypothesis testing, the model was further examined and tested via path analysis.

CHAPTER 6: RESULT AND DISCUSSION

6.1 Introduction

A comprehensive discussion of the research findings predicated on the statistical results of the hypothesis testing is presented in this chapter. Seventeen hypotheses which posit relationships between critical criteria and supplier selection in the telecommunications industry with the effect of supplier selection on company performance have been tested to confirm their validity. The relationships and interrelationships amongst independent and dependent variables have been thoroughly examined and statistically tested, and their results are explained in detail.

6.2 Demographics Characteristics

The successful completion of the main study within six months shows that the respondents are interested in the subject being studied. As mentioned in the chapter prior to this, research data for the main study were gathered from Malaysia. From the 950 questionnaires given out among employees in four departments (procurement, purchasing, finance and engineering) from four major telecommunications companies in all six regions (northern, southern, eastern, central, Sabah and Sarawak) throughout Malaysia, 376 were returned with feedback, recording a response rate of 39.5%. This encouraging response rate might be due to the accessibility of the questionnaire via the internet (i.e. web-based). 15% of the questionnaires were handed personally by the respondents. All the questionnaires were successfully collected after sending at least three reminders as part of the follow-up procedure after two weeks of initial questionnaire distribution. Data were coded and cleaned before inferring research findings based on descriptive statistics. After removing and cleaning the missing data, a total of 358 respondents were used to proceed with the analysis.

The demographics of survey respondents such as gender, ethnicity, age, job position, division, years of service, number of direct reports and division involved in the supplier selection process were asked in the questionnaire. Based on the feedback, 66.5% (n=238) of the survey participants were male and 33.5% (n=120) were female. A majority (76.8%,

n=275) of them were Malay, 10.3% (37) were Chinese, 10.9% (39) were Indian and 2% (n=7) were others. Respondents between the ages of 36 and 40 years formed the largest group (29.6%, n=106) while only 6.4% (n=23) of respondents were less than 25 years old. Most of the respondents (34.9%, n=125) had remained in their present job for 11 to 20 years and32.7% (n=117) were working with their present employer for 5 to 10 years. 64.2% (n=230) comprised non technical officers while technical officers were 35.8% (n=128). Respondents from the new entry management level were approximately 53.4% (n=191), 43.6% (n=156) were from the middle level of management and only 3.1% (n=11) were from the senior and higher level of management. From the total respondents, 13.1% (n=47) worked in companies with less than 1,000 employees, 34.1% (n=122) in companies with between 1,000 to 5,000 employees and 52.8% (n=189) in companies with more than 5,000 workers.

A majority of the respondents, 52.8% (n=189) were from government linked companies or state owned companies. Approximately 47.2% (n=169) were from privately owned companies. Approximately 91.1% (n=326) agreed that the users, procurement, finance, technical and senior management teams or divisions were involved in supplier selection while 8.9% (n=32) responded that the procurement and finance were the only divisions involved in supplier selection in their organisations. Table 5.9 below shows the demographics data.

Table 6.1: Demographics Characteristics

		Number (N)	Percentage (%)
GENDER			
	Male	238	66.5
	Female	120	33.5
ETHNICITY			
	Malay	275	76.8
	Chinese	37	10.3
	Indian	39	10.9
	Other	7	2
AGE			
	Less than 25 years	23	6.4
	26 – 30 years	31	8.7
	31 – 35 years	46	12.8
	36 – 40 years	106	29.6
	41 – 45 years	99	27.7
	45 years and above	53	14.8
POSITION			
	Executive(e.g. Assistant Manager, New Executive)	191	53.4
	Management (e.g. Manager, Assistant General Manager)	156	43.6
	Senior Management (e.g. General Manager, Vice President and above)	11	3.1
DIVISION			
	Technical/Engineering (e.g. Network Development, Operation & Maintenance, Transmission)	128	35.8
	Non Technical/Non Engineering (e.g. Procurement, Business development, Finance)	230	64.2
YEAR OF SERVICE			
	Less than 5 years	51	14.2
	5 to 10 years	117	32.7
	11 to 20 years	125	34.9
	20 years and above	65	18.2
NUMBER OF EMPLOYEES			
	Less than 1000	47	13.1
	1000 to 5000	122	34.1
	More than 5000	189	52.8
DIVISION INVOLVE			
	Procurement/Purchasing and Finance	32	8.9
	All of the division (Procurement, Finance ,Engineering/Technical, Senior management Team and User)	326	91.1

6.3 Research Findings

Hypotheses were built on the basis of relationships amongst dependent and independent variables within this study. The general findings in this study indicated that high quality and technology, price, decision making tools and techniques, government procurement policy and business ethics elements were not considered to be predictive factors to supplier selection. Meanwhile, direct relationships between delivery performance, supplier relationship management and supplier selection decision were established. The relationship among the independent variables were also analysed and the results were mixed; some hypotheses were supported while some rejected. An evaluation of the research hypotheses and explanation of the outcomes will later be discussed in this chapter. The summary of the research findings of each hypothesis is displayed in Table 6.2 below.

Table 6.2: Hypotheses Summary

Hypothesis	Path Estimate	Critical Ratio (t value)	Remarks
H1: High product quality and technology are positively related to the supplier selection decision.	-0.01	-0.105	Rejected
H1a: There is a significant positive relationship amongst high product/service quality and price; the relationship has an influence on supplier selection.	0.662	14.254	Accepted
H1b: There is a significant positive relationship between high products quality and supplier delivery performance; the relationship has an influence on supplier selection.	0.282	3.445	Accepted
H2: The price and cost management factor is significantly linked to the supplier selection decision.	-0.107	-1.044	Rejected
H2a: The price and cost factor has a significant positive relationship with supplier delivery performance; this relationship influences supplier selection.	0.294	3.356	Accepted
H3: Supplier delivery performance and responsiveness can have a significant impact on the supplier selection decision.	0.559	8.579	Accepted
H4: Supplier relationship management, which includes supplier business background experience with an element of short and long term relationship, has a tremendous correlation with the supplier selection decision.	0.208	3.41	Accepted
H4a: Better supplier relationship management will be associated with greater quality and technology of product or services; this relationship influences supplier selection.	0.219	3.618	Accepted
H4b:.There is a significant positive relationship amongst supplier relationship management and price that affects the supplier selection decision.	0.208	4.73	Accepted
H4c: There is a significant positive relationship between supplier relationship management and business ethics; this relationship influences supplier selection.	0.016	0.335	Rejected

H5: The decision making tools and techniques utilized have a positive correlation with supplier selection decision.	0.085	1.064	Rejected
H5a: There is a significant positive relationship between decision making techniques and high product quality which affects the supplier selection decision.	0.357	4.429	Accepted
H6: Alignment with government procurement policies has a positive affects to supplier selection.	-0.073	-0.72	Rejected
H6a: There is a significant relationship between government policies and ethics which affects supplier selection	0.038	0.447	Rejected
H6b: There is a significant relationship between government policies and decision making tools and techniques which affects supplier selection.	0.347	3.931	Accepted
H7: The business ethics are intrinsically involved in the supplier selection.	0.017	0.249	Rejected
H8: Better supplier selection decision would have a significant link to greater work efficiency and company performance.	0.06	1.524	Rejected

In the above table, two independent variables were found to be significant while the remaining five independent variables were not. The two significant independent variables were supplier relationship management and delivery performance. Price, decision making tools and techniques, quality, government policy and business ethics were found to be insignificant.

Therefore, in conclusion, results of the hypotheses testing revealed that delivery performance and supplier relationship management were significant factors to the supplier selection. Other factors such as price, decision making tools and techniques, high quality product and technology, government policy and business ethics turned out to be insignificant to the process of selecting suppliers. In addition, the supplier selection decision was also found to be insignificant to the buying firm business performance.

Taking into account the study of indirect effects of criteria when selecting the supplier; with regards to the interrelationships between the independent variables tested; eight of the hypotheses were discovered to be substantial whilst two hypotheses remain insignificant. The analyses of hypothesis testing results will be discussed in more depth in the next section.

6.4 Analysis of Hypotheses

6.4.1 High Product Quality and Technology

Hypothesis H1: High product quality and technology are positively related to the supplier selection – Rejected.

Hypothesis H1 posits that high product/service quality and technology have a significant and positive impact on supplier selection. It is widely perceived that product quality and technology are important attributes which will positively influence supplier selection decision. However, with a path estimates value of -0.01 and *t*-value of -0.105, the statistical result indicated that these factors are negatively related in the context of the telecommunications industry in Malaysia. The negative relationship signifies that the higher the product quality and technology, the lower the chances of the supplier being selected by the organization. Thus, this hypothesis is not supported by the result.

Although there have been many discussions and debates in previous literature that the level of product/service quality and technology plays a significant role in the selection of suppliers, the research outcome in the context of this study somewhat differs. Some of the arguments and justifications which support this notion maintain that product/service quality has always been a basic criteria or default factor which is clearly specified in the supplier selection guidelines for any purchasing organisation. Therefore, whenever suppliers offer products or services which exceed the quality requirements of the buyers, chances are that the suppliers will not be selected because most organizations only demand for the right level of product/service quality. Most importantly, the level of product/service quality must match the requirements and meet the needs of their customers. Purchasing organizations generally will not procure products/services which exceed their customer requirements because level of quality is normally associated with price. For higher quality products which exceed normal requirements, customers have to end up paying more for them. To illustrate the point, to address a consumer market which demands like Proton cars (Malaysian national cars), the purchasing company will try to seek suppliers that can supply cars which match the technical specifications and quality of a Proton at the right price. In this case, only suppliers that can offer cars which match the technical specifications and quality of a Proton are qualified for further evaluation.

Suppliers who offer a Porsche to a market which only has requirements for a Proton will definitely not be selected.

When suppliers offer products/services that are too high in quality, to a certain extent it adds pressure to the purchasing organization in terms of higher pricing, high maintenance needs as well as high level of expertise to manage and maintain the products. Inadvertently, the purchasing and maintenance costs will increase because the buying company needs to engage experts from the suppliers to handle and maintain the products or equipment. In some cases, customized tools are required to operate and maintain high quality products and equipment, resulting in additional costs to the purchasing company.

This outcome is similar and somehow consistent with some of the previous research where their findings show that flexibility was the important variable overall, followed by the other factors such as delivery performance and cost (Van der Rhee *et al.*, 2009).

Due to the high volatile business environment in the telecommunication industry, as customers require more sophisticated choices such as faster innovation and better service delivery demands, uncertainty will arise. For example, high uncertainty might discourage a supplier from making specialised asset investments. Williamson (1985) stated that uncertainty will cause to a boost in the complexity of contracts, adding to the monitoring of associated investments and the cost of exchange.

This above point of view is in line with an opinion raised in an interview with the technical division personnel of a telecommunications company regarding the degree of product quality to be procured. While the quality of product/services is a basic procurement criterion, the level of quality required must match the technical specifications of the consumers and should not exceed or fall below the expected requirements. Among the reasons cited was that the rate of competition in the telecommunications sector is considerably high, and technology-related products change at a rapid pace and require the telecommunications service providers to be aware of changes in the product/service technology offered to consumers. Due to the volatility in technology, telecommunications service providers in Malaysia will be burdened with high overhead cost if they were to invest in expensive products, tools or equipment

because such investments will go to waste once new products, tools or equipment are needed to improve or upgrade the telecommunications services. In short, if high product quality is a big priority to telecommunications companies, high investment in fast-changing technological products will result in huge operating costs.

In addition, ‘‘product quality” was not considered by the experts as a very essential and significant assessment criteria, this criteria still interacted the least amount with other criteria. Evaluation criterion of ‘‘product price”, ‘‘product quality”, ‘‘service”, ‘‘technology ability”, ‘‘delivery performance”, ‘‘lead-time”, ‘‘reaction to demand change in time”, ‘‘production capability” and ‘‘financial situation” can be indirectly influenced by focusing on the evaluation criterion of ‘‘stable delivery of goods”. Evaluation criterion of ‘‘stable delivery of goods “can be indirectly influenced by focusing on the evaluation criterion of ‘‘reaction to demand change in time” (Chang.B.,Wei.C.C., and Wu.C.H., 2011).

Suppliers that meet the availability criteria are then analysed with regards to their capabilities and technical competence. It was found that with a small number of exceptions, it was enough in itself, despite the view that the main criterion in purchasing innovative components is the technological competence of the supplier (Hoetker, 2005).

It was suggested that multinational companies (MNCs) do not always go with the most competent supplier, and that there is always what is named a technical acceptance level that operates as a technological threshold in regards to this analysis. After that, Companies that were not only available but that also met the technical requirements of the MNC on another set of criteria were analysed, which played a decisive role in the end (Ruokonen, 2008).

Hypothesis H1a: There is a significant positive relationship amongst high product/service quality and price; the relationship has an influence on supplier selection – Accepted.

Result of the statistical hypothesis test supported the above hypothesis which postulates that there is a positive and significant relationship between high products/services quality and price. With a path estimate value of 0.662 and *t*-value of 14.254, the study revealed that buying firms have to pay more for higher quality products/services. In other words, as the quality of the products/services increases, the price of the products/services will also rise in tandem.

This positive correlation between quality and price of products/services can be attributed to the higher cost of acquiring higher quality products due to increased investment in product innovation as well as research and development initiatives. Therefore, suppliers have to recover the cost of such investments from the buying firms in exchange for the better quality products/services offered. Likewise, buying firms that place high importance on the level of quality will have to incur additional costs in order to acquire high quality products or services.

This situation is also applicable in cases when the demand for certain products/equipment is inelastic. It can also happen in markets where only limited suppliers are able to provide the products/services that is much required by customers.

The product/service quality and price factors also have an impact on the selection of suppliers. Suppliers who charge high prices for their products/services due to the quality level may have less chances of being selected, unless the buying company considers product/service quality as its most important selection criteria.

Hypothesis H1b: There is a significant positive relationship between high quality products/services and supplier delivery performance; the relationship has an influence on supplier selection – Accepted.

Based on the statistical result, high quality products/services are positively correlated with supplier delivery performance. A path estimates value of 0.282 and a *t*-value of 3.445 indicated that whenever the value of product/services quality goes up by 1, the value of supplier delivery performance will also increase by 0.282. Therefore, this hypothesis is significant and supported.

The positive relationship between high quality product/services and supplier delivery performance is justified because companies which procure good quality products may encounter fewer problems associated with faulty, damaged or defective items. Therefore, companies can avoid the hassle of having to deal with product repairs, returns or reworks which may affect turnaround time and result in backlog on orders from customers.

In addition, companies which have preference for quality products or services usually have good relationships with their suppliers. Since both sides do not have to deal with a lot of quality issues, superior supplier delivery performance can be achieved. As a result, the products and services provided will be able to satisfy customers of the buying companies. Excellent supplier delivery performance also encourages greater working relationship and enhances buyer confidence in the suppliers. Therefore, suppliers providing products and services of high quality are generally linked to great delivery performance. Consequently, these suppliers will have higher chances of being selected by buying organizations.

6.4.2 Price and Cost Management

Hypothesis H2: The price and cost management factor is significantly linked to the supplier selection – Rejected.

Hypothesis H2 proposes that price is significantly linked to the supplier selection decision. However, the statistical outcome derived from the path analysis structured model recorded a path estimate value of -0.107 with a *t*-value of -1.044. Hence, the relationship is not significant and the hypothesis is not supported.

Based on previous studies, the pricing factor plays a prominent role in the selection of suppliers. Then again, focusing primarily on price is argued to be inappropriate as it is "perhaps one of the most defined characteristics of primitive purchasing" (Lammings, 1993). According to Lammings, while the price factor is important and that price is not irrelevant in supplier selection decisions, the relative emphasis among the traditional factors has changed over time and other factors may also become more significant now.

Choi and Hartley 1996, in his study found that among the least important selection items is price, regardless of the position in the supply chain, high importance is not placed on low price. Certainly, among the least important criteria rated by respondents consistently was low price, despite the position of a company in the supply chain. Buyers from all tier levels are de-emphasising the importance and significance of preliminary price, which entails; this is in accordance with Choi and Hartley 1996 result findings.

In the context of this study, the price factor is not significant in selecting suppliers. However while considering the cost factor to the buying firm the study indicated a negative relationship to the price factor, whereby the higher the price, the less opportunity for the supplier to be selected. Rationally, there is indeed truth along this view because purchasers will naturally opt for suppliers who can provide products or services at lower prices. Companies which are able to offer products or services at a cheaper price compared to other competitors in the market probably have higher chances of being considered as suppliers. The most important advantage of selecting suppliers who offer low prices is that the savings in operation or production costs can be passed on the end consumers. Otherwise, purchasing organizations that procure products or services at high

prices are sometimes compelled to pass on the high cost of production to their consumers, thus resulting in high prices for its products and services in the market.

Generally in the context of this research, the price factor has less influence on supplier selection decisions made by major telecommunications service providers in Malaysia. Selection of suppliers based on the price factor will trigger unhealthy price competition where suppliers will try to win procurement contracts by undercutting one another, some at the expense of their product or service quality. It is undeniable that if the price factor becomes the determining criterion for selection of suppliers, it may lead to the undermining of product or service quality. To elaborate, suppliers may try to reduce their operating or production costs in order to offer the lowest and most attractive prices in the market by compromising on the quality of raw materials and production supplies. Thus, as a result, the purchasing organizations will be supplied with cheap products of inferior quality and standards. Consequently, the consumers will be at the losing end because they will be provided with substandard products or services.

However, it cannot be denied that while the price factor may not be the main criterion, it indeed plays a part in the selection of suppliers. The significance of the price factor, nevertheless, depends largely on the purchasing organisations' procurement objectives in the short or long term. A study by Thompson *et al.*, (1998) supported the view that the price factor had lost it great importance in the supplier selection process.

It was observed in Ho *et al.*, (2010), study that cost or price in not usually the most widely adopted criterion. Instead, the most well-known criterion utilized for evaluating the performance of suppliers is quality, followed by delivery, price or cost, and so on. Therefore proving that traditional single criterion method derived from the lowest cost is not supportive and adequately robust in contemporary supply management. Due to the fact that customer-oriented criteria (quality, delivery, flexibility, and so on) were not considered, the traditional cost-based approach cannot ensure that the selected supplier is global optimal.

One of the reasons cited for the declining emphasis placed on the price factor when selecting suppliers is the changing business environment. Strong competition among telecommunications companies in Malaysia in meeting consumer needs in terms of provision of the correct goods and services within the desired time frame, in the correct location, at the ideal price has shifted their focus on other elements as well. As a result, to achieve other business objectives such as product/service excellence and delivery performance, purchasing divisions of telecommunications companies in Malaysia not only look at prices as the most important criterion when selecting suppliers, but also consider other critical contributing factors as well.

Hypothesis H2a: The price and cost factor has a significant positive relationship with supplier delivery performance; this relationship influences supplier selection – Accepted.

With a path estimate value of 0.294, *t*-value of 3.356 and p value less than 0.01 indicating significance, it was confirmed that the price and cost management of products and services has a significant positive relationship with supplier delivery performance. Hence, this hypothesis is supported.

Basically, when suppliers charge high prices on certain products or services, they have indirectly factored in additional transportation cost into the prices of products or services supplied. By doing so, suppliers will be able to accommodate buyer's request for fast delivery because additional transportation costs incurred for unscheduled delivery are already added into the overall price of products or services to be delivered. It is stated in accordance with Hsieh.C.C *et al.,* (2011) observation that vendors' expenses will increase along with the service level, due to the fact that higher service levels require hiring more skillful and knowledgeable personnel, assigning higher service priority, committing to shorter service lead time, and so on, all of which will cause an increase in cost.

Likewise, if the buyer requires the supplier to make delivery of products or services on short notice, the supplier will fulfill the request but will demand that the buyer pay extra for urgent delivery service. Such incidents normally happen when there are unexpected changes to product demand or when emergency purchase is required by the buying firm.

Suppliers will usually try to cater to urgent or unscheduled delivery but at higher transportation fees.

On the other hand, in the event that the prices of products and services offered to buyers are low, chances are that the delivery process can be somewhat rigid with average delivery performance to be expected because suppliers do not want to incur high transportation cost. Late delivery of products and services may cause buying firm to be burdened with customer complaints and dissatisfactions. In worst cases, the buying firm may have to bear operations losses because of poor delivery performance which fails to meet customer requirements and expectations.

6.4.3 Delivery Performance and Responsiveness

Hypothesis H3: Supplier delivery performance and responsiveness can have a significant impact on the supplier selection – Accepted.

Based on the test results, supplier delivery performance and responsiveness are significant factors in the selection of suppliers. With a *t*-value of 8.579 and p value less than 0.01, the test confirmed that supplier delivery performance and responsiveness are positively correlated to supplier selection; thus, the above hypothesis is supported. The correlation values indicated that when the value of delivery performance increases by 1, the value of supplier selection will go up by 0.559.

In line with the business nature of the service industry, timely delivery of products and services is a strategic objective of telecommunications companies. Therefore, supplier delivery performance and responsiveness is vital to the success of the business. By emphasizing on the importance of supplier delivery performance and responsiveness in the selection of suppliers, telecommunication service providers will have more confidence in their ability to provide on time delivery of products and services to their end customers. As such, implications and problems related to delay in product and service delivery can be minimized.

If supplier delivery capability is not given priority during the selection process, poor delivery performance of suppliers may affect the whole network of supply chain and jeopardize operations or cause service disruptions. Delay in product or service delivery may also result in rescheduling of work (e.g. ready for service and equipment roll out) and in some extreme cases, changes to initial project plan have to be made.

For the end customers, poor delivery performance contributes to low customer satisfaction and may even encourage customers to switch to other competitors. Such inefficiencies in the supply chain network can trigger business losses to organisations if the issues are not properly addressed.

Immediate response from suppliers is also required in emergency situations whenever there are service disruptions, technical problems or damage to products or equipment. Similarly, scheduled maintenance and repair of telecommunications infrastructure equipment by suppliers must be carried out on time without any delay. Hence, supplier responsiveness is another crucial element to be given priority by telecommunications service providers in order to ensure smoothness in their business operations and efficient product/service delivery to end customers.

Therefore, supplier delivery performance and responsiveness are important factors which have direct implications on business operations and customer expectations. The research findings also confirmed the hypothesis that the delivery service factor is positively correlated to supplier selection and must be taken into consideration by telecommunications companies during the selection decision. In order to minimise disruption, consistent supplier performance in the areas of delivery is required. It is a condition that is necessary in order to ensure uninterrupted conduct in the purchasers operations within business. This finding is in accordance with earlier research. The study established that companies which operate in growth markets attached greater significance and importance to delivery reliability, support of service, less cost influenced and cheaper in price (Bill Donaldson 1994). The most crucial criteria across all levels, even after 28 years since Dickson's study of supplier selection is meeting delivery deadlines, this is in accordance with Choi and Hartley 1996 result findings.

6.4.4 Supplier Relationship Management

Hypothesis H4: Supplier relationship management, which includes supplier business background experience with an element of short and long term relationship, has a tremendous correlation with the supplier selection decision – Accepted.

The importance of supplier relationship management has been acknowledged by previous scholars in existing literature. Narasimhan (2002) mentioned that improved supplier relationship management would enhance a firm's strategic position. Kannan *et al*., (2002) also remarked that building long term buyer-seller relationships may improve business operations as well as develop effective communication.

The research result indicated that there is a positive relationship between supplier relationship management and supplier selection process. With a path estimates value of 0.0208, *t*-value of 3.41 and $p<0.01$, this hypothesis is confirmed and supported.

Supplier relationship management is critical in determining the direction and objective of a business collaboration. In order to maximise the potential benefits of a successful business partnership, telecommunications companies have to form mutually beneficial relationships with their key suppliers. Effective supplier relationship management helps streamline processes, promotes trust and information sharing as well as increases two-way communication between buying organisations and suppliers. It is contributes to improved quality and greater technology of products and services. High level of trust and commitment established in long-term business partnerships may encourage both buyers and suppliers to collaborate in research and development efforts with the view of enhancing their products and services. Consequently, strategic partnerships with key suppliers help enhance product innovativeness, reduce cost of operations, ensure timeliness of delivery and improve competitiveness.

The benefits and advantages associated with effective and efficient supplier relationship management encouraged buying firms to seriously explore supplier relationship development. Supplier relationship management programmes and solutions have been

initiated by most organisations to improve alliance with their supply base. Therefore, supplier relationship management is a key aspect in strategic business planning and a critical factor in influencing the supplier selection decision.

Another discovery in relation to the factors on preliminary supplier-selection is the maintenance of relationships with suppliers that meet buyer's requirements, where more attention should be paid to factors, especially "Position in the industry (credit rating) of supplier" as the most crucial deciding elements in meeting buyer-supplier relationships. This contrasts with decision factors affecting preliminary supplier selection. These findings are also fitting to previous studies related to buyer-seller relationships (Dwyer *et al.,* 1987; Lyons and Mehta, 1997; Morgan and Hunt, 1995).

This outcome is also in accordance with an earlier research study discovery, stating that selecting suppliers based upon the potential for long-term close relationships was rated as very important by companies' at all three tier levels. The character of the relation was thought to be a crucial consideration when auto assemblers make their direct supplier selection. These findings empirically support this argument. It is not of any surprise that direct suppliers will feel pressure from their customers (the auto assemblers) when they are looking to join forces with them and therefore creating stress relationships upon selection of their own suppliers. Then again, the finding that states that indirect suppliers also heavily weigh the potential for a long-term relationship upon the selection of suppliers is contrary to commonly held beliefs.

Hypothesis H4a: Better supplier relationship management will be associated with greater quality and technology of product or services; this relationship influences supplier selection – Accepted.

One of the strategic objectives of supplier relationship management is to streamline the processes between an organization and its key suppliers. Good supplier relationship management practices enable effective communication between the two parties; hence, increasing efficiency in terms of procuring products and services, inventory management and material processing.

In the context of this study, it is postulated that better supplier relationship management will result in the supply of greater quality and technology products and services to telecommunications companies. The statistical findings indicated a positive relationship with a path estimates value of 0.219 and *t*-value (critical ratio) of 3.618. The result confirmed that this relationship is significant; thus, the hypothesis is supported.

Proponents of supplier relationship management will concur that most successful companies develop strong business relationships with their key suppliers. Companies that have formed strong working relationships with their suppliers are able to roll out new products and services to market at a faster rate, providing them a competitive advantage. Guinipero *et al*., (2006), noted that in any supply chain partnership, supplier relationship management is essential. Good supplier relationship management fosters trust and commitment over time as well as opens up two-way communication which benefits both parties. Major telecommunications companies in Malaysia adopt this positive approach by building strategic partnerships with their key suppliers. These organisations recognize the significant contributions of their suppliers to the overall growth of their business; hence, efforts are consistently made to nurture the mutually beneficial relationship.

Various initiatives such as vendor development programs and incentive schemes are drawn up to form strong working relations, which later translate into better product and service offerings for the customers. Some examples of common joint initiatives which have taken place between buyers and suppliers in the telecommunications industry are product development programs, joint ventures on project basis, product innovation and training. Forward planning for future procurement needs in view of business growth is also a critical initiative which can be successfully implemented with the help of effective and efficient supplier relationship management.

In return, suppliers who are encouraged by the support and trust bestowed upon them will strive hard to provide the best possible products and services to the telecommunications companies. They make every effort to increase their commitment towards the business in order to minimize procurement and delivery issues. For example, there are times when telecommunications companies depend on the suppliers' skills and expertise in handling sophisticated product or equipment. In such situations, problems may surface due to poor

handling or miscommunication. However, with good buyer-seller relationship, problems which arise can be amicably solved and challenges can be tackled more effectively to ensure smooth business operations and profitability for both parties. Telecommunications companies also benefit from the transfer of skills and technology from their suppliers.

Good supplier relationship management practices help to ensure that such programs can be successfully implemented and consistently improved from time to time. This is why a cooperative long-term relationship is just as important and significant to the auto assemblers as it is to the indirect and direct suppliers (Choi and Hartley 1996). It may be that they are also discovering that long term supplier relationships can boost the level of quality, reduce costs and improve delivery performance.

To sum up, even though supplier relationship is a subjective element which may not be purely quantified, good supplier relationship management by telecommunications companies can lead to a win-win situation for both parties. Such relationship contributes to improved supplier performance and leads to better quality and technology of products or services supplied.

Hypothesis H4b: There is a significant positive relationship amongst supplier relationship management and price that affects the supplier selection decision – Accepted.

Forming close relationships with key suppliers can consistently create additional value such as lower production costs, improvement in supplier performance, new product innovation, better product quality and enhanced competitiveness. Nevertheless, supplier relationships must be effectively and efficiently managed in order to reap their full benefits. More and more organisations are moving towards adopting a more aggressive approach in strategic supplier relationship management in order to attain exceptional business performance. With a path estimate value of 0.208 and *t*-value of 4.73, the research result indicated that the above hypothesis is supported.

The hypothesis testing confirmed that there is a significant positive relationship between supplier relationship management and price that influences the process of selecting suppliers. The price factor associated with supplier relationship management mostly dwells around the needs of both parties to make extensive investments in their efforts to foster stronger business relations.

In their effort to manage supplier relationships more strategically, telecommunications companies make substantial investments in developing supplier relationship management programs and solutions as well as introducing various incentives to encourage long term business partnerships with key suppliers. Similarly, suppliers also come up with various initiatives to foster closer relations with the Telco's in order to attain successful, long term business partnership which provides them with continued business opportunities. Sometimes suppliers have to make financial sacrifices for marketing of products, proof of concept and new product trial so as to gain trust, confidence and appreciation from buying companies. Joint efforts in product innovation, new product research, tools and techniques development require commitment to the business partnerships from both parties.

Substantial resource investment is essential in a modern supplier relationship. Therefore, managing the relationship for longer terms becomes more vital (Dwywr *et al.*, 1987; Simpson and Mayo, 1997). Buyers' motivation to explore new options or alternatives can be reduced by relearning business procedures, developing new personal relationships or just by the fact that it will be costly for a large transaction of specific assets investments (Burnham *et al.*, 2003).

To recover the investment made towards promoting an effective business relationship with the buying firms, suppliers will take into account the investment cost within the prices of products and services to be offered. Consequently, buying firms will look at the price factor during the selection decision and devise ways to obtain some return on the investments made in fostering close relationship with suppliers.

Hypothesis H4c: There is a significant positive relationship between supplier relationship management and business ethics; this relationship influences supplier selection – Rejected.

The statistical results of the study revealed that there is no significant relationship between supplier relationship management and business ethics in the supplier selection decision. This confirmation was made after the test results noted that the path estimate value is 0.016 and the t-value is 0.335. Thus, this hypothesis is not supported.

This hypothesis is not supported because good supplier relationship management does not guarantee that unethical behaviour will not be practiced. In fact, unethical business practices often happen when buyers and suppliers have close working relationship because either side will want to take advantage of the other. A supplier who has a good relationship with personnel from a buying firm will try to lobby or canvass directly in order to attain a business contract or tender from the company. According to Badenhorst (1994), the purchasing environment is conducive in promoting unethical behaviour. Ethical issues related to supplier relationship management and purchasing have long been a subject of investigation in past studies (Badenhorst, (1994); Cooper *et al.,* (2000); Landeros and Plank, (1996); Razzaque and Hwee, 2002). This is also in line with Cambra and Polo-Redondo (2011) study stated that due to the fact that inter firm relationships evolve, the content, orientation and influence of elements like trust and communication might alter.

Close business relationship formed over longer terms may provide a platform for buyer and sellers to deviate from acceptable moral norms (Jones, 1991). For instance, some suppliers openly offer to personnel in buying organisations in order to influence the business decisions without feeling guilty of unethical conduct. In reciprocation, the buyer accepts the rewards, gifts or bribes without feeling any remorse. In the context of the Malaysian business environment, such occurrence is quite common. Sometimes, buyers and suppliers collaborate so that both parties benefit from the influenced business decisions.

Due to such inconsistencies, some suppliers are selected without going through the proper evaluation and selection process. Some are chosen even when they do not fulfil the selection criteria. As a result of unethical practices, the company ends up having incompetent suppliers who are not capable of providing products or services that meet required standards and suppliers who do not live up to the expected supplier performance in their supply base.

Therefore, in summation, strong relationship with suppliers does not necessarily warrant that unethical conduct will not be practiced. Instead, telecommunications companies have to ensure that suppliers are effectively and efficiently managed so that they will have second thoughts about behaving unethically. They must also take remedial steps to increase transparency in the supplier selection process.

6.4.5 Decision Making Tools and Techniques

Hypothesis H5: The decision making tools and techniques utilized have a positive correlation with supplier selection decision – Rejected.

The H5 hypothesis proposes that there is a positive relationship between decision making tools and techniques utilized with supplier selection decision. The hypothesis testing recorded a path estimate value of 0.085 with a *t*-value of 1.064.Although the result of the statistical analysis showed there is a positive correlation between the two factors, the relationship is not significant; therefore, the hypothesis is not accepted.

The outcome of this analysis is further supported by several existing literature which question the effectiveness of the tools and techniques of decision making such as the Discrete Choice Analysis and Multi Nominal Logic proposed by Verma and Pullman (1998) in the process of evaluating and selecting suppliers. Undoubtedly, organisations use various approaches and techniques in coming up with supplier selection decisions. Most of the decisions are derived after taking into account a variety of criteria which are applicable to the organizations based on their procurement objectives and strategic business planning. In the process of selecting suppliers, purchasing managers have to consider supplier attributes which match their strategic objectives in the best possible

way. While it is accepted that certain tradeoffs have to be made in order to achieve the best possible solution in procurement, purchasing managers have to ensure that a win-win situation is accomplished whenever a selection decision is made.

The test results indicated that decision making tools and techniques does not have a significant impact on the selection of suppliers. It is argued that the decision making tools and techniques only consider the quantifiable attributes which are then fed into the information systems whereas the intangible elements which cannot be measured such as the political influence, cultural environment and business ethics are not taken into account. Moreover, the tools and techniques will not take into account the intangible attributes such as collaboration between buyers and suppliers, business partnerships, bilateral trade between governments of different countries which promote win-win situations for all parties.

Realistically, it is difficult to find a specialist in purchasing or procurement who is also an outstanding decision maker for supplier selection, and vice versa. In a lot of cases knowledgeable workers that are involved in the supplier selection decision-making process can be classified into two groups: final decision makers and specialist in purchasing. The CEO or a top-level manager who possesses the most excellent judgment in making decision is known as a final decision maker. Even though the final decision maker may not be familiar with details of the quality of each supplier, he or she must understand the vital perspectives of the organisation. The aim of the final decision makers participating in conducting supplier selection is to meet the organisation's strategy. On the contrary, an expert will understand and be able to identify each and every supplier's characteristics and performance in his or her area. It is essential that he or she is capable of interpreting the selection criteria but is not directly responsible for decision making. The teamwork of these two groups of people will make decisions that are relevant and appropriate to the organisation.

A study regarding the application of decision making technique like the total cost of ownership among Dutch firms discovered that a lot of purchasing managers have insufficient experience when it comes to the application of TCO and value analyses (Wouters *et al.,* 2005). This is may be due to the fact that a number of managers fail to

identify purchasing function as a strategic resource (Ellram and Siferd, 1998). It has previously stated by researcher's that "no one (TCO) model fits all purchase situations" (Ellram and Siferd, 1998, p. 67). In some relational settings TCO can be ineffective and it depends on the complexity of the cost drivers involved and the type of relationship.

The absence of certainty is a factor that often influences decision making within supplier selection, due to the continuous and rapid changes in dynamics making it difficult to quantify differing variables. This makes the whole process lack structure and thus does not enable a sense of consistency in how the supplier selection decision is made (Cook 1992). Usually, decision making models provide methods that both compensate for desired results and methods that do not. Research actually suggests that the concept of 'optimality;' although classic and omnipresent, is not always the most relevant or appropriate model within the supplier selection process (Cook 1992).

Therefore, supplier selection is something that largely includes varying groups of criteria, making decisions as teams, differing decision models and inevitably, areas of uncertainty. There are a whole array of factors and variables that influence how a firm may conduct the supplier selection process.

Due to the existence of uncertainty, many internal and external factors, both tangible and intangible, which have to be taken into consideration in the decision making process, such tools and techniques become less effective and cannot be looked upon as a critical factor in the supplier selection criteria.

In the case of the telecommunications industry in Malaysia, in addition to common supplier attributes, there are also intangible elements that are subjective and cannot be quantified but have to be taken into consideration when making supplier selection decisions such as political influence, cultural environment, etc. Besides being in a highly regulated industry, the telecommunications companies are clearly guided by government rules and regulations which affect their procurement decision making system to a certain degree. Hence, in such circumstances, structured decision making tools and techniques may not be applicable.

Therefore, in the context of this study, the decision making tools and techniques do not have much bearing on the supplier selection decision of telecommunications service providers in Malaysia.

Hypothesis H5a: There is a significant positive relationship between decision making techniques and high product quality which affects the supplier selection decision – Accepted.

The positive relationship between decision making tools/techniques and high product quality and technology which affects supplier selection is supported by the statistical result which recorded a path estimate value of 0.357, *t*-value of 4.429 and p value less than 0.01. The result indicated that when the value of decision making tools and techniques increases by 1, high product quality and technologywill rise by 0.357. Hence, the hypothesis is significant and is supported by the research findings.

Effective decision making tools and techniques employed help to facilitate the supplier selection decision of telecommunications companies. Decision making tools and techniques which are able to analyse and evaluate suppliers based on a set of selection criteria will make it easier for telecommunications companies to make informed decisions when choosing suppliers who provide high quality products and services.

Employing the right method such as the Total Cost of Ownership approach, combined with the application of a well-designed and complete supplier database system with up-to-date information helps buyers to identify and select suppliers who meet the selection requirements and offer quality products and services as well.

6.4.6 Government Policies

Hypothesis H6: Alignment with government procurement policies has a positive affects to supplier selection – Rejected.

In any country, government rules and regulations play a prominent role in providing guidelines for business entities to conduct their corporate activities. Therefore, when it comes to procurement, complying with laws and regulatory requirements set by the government minimizes the risk of companies having to incur high costs of switching suppliers should the government impose penalty on the companies due to non-compliance issues.

However, result of the hypothesis testing revealed that there is a negative relationship between government procurement policies and supplier selection criteria in the context of this study. The recorded path estimates value is -0.073 with a *t*-value of -0.471. Hence, the relationship is not significant and the hypothesis is not supported.

The research findings indicated that government procurement policies do not have a high impact on the supplier selection decision of telecommunications service providers in Malaysia. This may be attributable to the fact that the telecommunications companies have already taken into account the government procurement policies when drafting their own companies' procurement guidelines in order to avoid complications when dealing with suppliers, especially international suppliers. In line with Barnett and King's (2008) view that some companies set higher standards up front and comply early to government rules and regulations so as to avoid high readjustment cost and costly post adaptations of processes (Darnall *et al.,* 2008).

Another view asserts that while government policies are important in shaping the telecommunications companies' procurement guidelines for selection of suppliers, lack of enforcement will result in ineffectiveness of the policies at the implementation stage. The negative correlation indicated by the study results shows that whenever the government policies are given more emphasis, the suppliers have to meet more stringent policies in order to be chosen as suppliers by the telecommunications companies.

But as mentioned earlier, the role of government policies is not highly critical in the supplier selection criteria of the telecommunications companies in Malaysia unless the enforcement and implementation of such policies are given due emphasis. For example, if the government policies stipulate that businesses in Malaysia are not allowed to procure products or services from suppliers in countries which are sanctioned by the government, the telecommunications service providers have to comply with the directive even though the suppliers in those countries are known to have superior quality products or services which meet the needs and requirements of certain projects. However, if there is no strict enforcement of the stipulated guidelines in cases on non-compliance to government rules and regulations, the policies will not be considered as a critical factor in the supplier selection criteria. Government policies and guidelines that are loosely stated, conflicting, contain grey areas or numerous loopholes that can be easily manipulated will also result in difficulties at the implementation and enforcement stage.

In conclusion, government procurement policies are not critical to the selection of suppliers for telecommunications companies in Malaysia because basically the companies have already incorporated the minimum requirement set by the government in their company's procurement guidelines. Moreover, weaknesses in the enforcement of government procurement rules and regulations in the country may contribute to the insignificance of the factors in the supplier selection of telecommunications companies in Malaysia.

Hypothesis H6a: There is a significant relationship between government policies and ethics which affects supplier selection – Rejected.

From the statistical result, a path estimates value of 0.038 and *t*-value of 0.447 revealed a positive correlation between the two variables. However, a p value of 0.655 indicated that the relationship is not significant; thus confirming that the above hypothesis is not supported.

In this regard, government procurement policies which are strictly enforced will contribute to improvements in the ethical aspects of the supplier selection criteria. Stricter enforcement will drive both buyers and suppliers to comply with ethical guidelines in

order to avoid harsh penalties imposed by the authorities due to non-compliance issues. Clear governance of the selection procedures will result in a more transparent process which is free from unethical practices. Consequently, effective implementation of government procurement policies helps fight unethical business practices such as bribery, lobbying and canvassing activities.

Nevertheless, this postulation is not supported by the research findings, indicating that government policies and business procurement ethics do not play a significant role in the supplier selection criteria of telecommunications companies in Malaysia. While stricter enforcement of government guidelines compel telecommunications companies to conduct supplier selection in a more orderly manner, the ethics of parties involved in the selection process cannot be easily predicted. Even Badenhorst (1994) pointed out that the purchasing environment promotes unethical behaviour where buyers and sellers will use all means to gain an advantage including grafts, rewards and kick-backs.

Ethics is a subjective matter which can never be quantified. Depending on a person's behaviour, unethical practices can also be influenced by organisational norms and business culture. Therefore, strict enforcement of government policies may not necessarily eliminate unethical practices in the process of supplier selection of telecommunication companies.

Hypothesis H6b: There is a significant relationship between government policies and decision making tools and techniques which affects supplier selection – Accepted.

The research findings confirmed that there is a significant and positive relationship between government policies and decision making tools and techniques which influence the supplier selection of telecommunications companies in Malaysia. It can be argued that whenever the government has established guidelines pertaining to the code of conduct and procurement policies, the buyers and suppliers must ensure that business transactions are conducted based on the stipulated guidelines. All decisions made must be in line with the information derived from the company's information database and comply with the government policies.

With the establishment of clear government guidelines and policies, particularly with regards to procurement from international suppliers, an effective decision making tools and techniques must be employed to facilitate those involved in the supplier selection to make informed decisions in order to avoid any oversights or problems associated with the non-compliance with government policies. For instance, buyers must be aware of restrictions imposed when dealing with international suppliers, countries that are sanctioned by the Malaysian government, taxation issues and etch.

6.4.7 Business Ethics

Hypothesis H7: The business ethics are intrinsically involved in the supplier selection – Rejected.

The statistical analysis result recorded a p-value of 0.803, indicating that business ethics is not a significant factor in the supplier selection criteria of telecommunications companies in Malaysia; thus, the above hypothesis is not supported. However, with a path estimate value of 0.017 and a *t*-value of 0.249, there is a positive correlation between business procurement ethics and the supplier selection criteria.

Basically, all organisations have clear ethical guidelines for all employees under their purview. The behaviour of employees is governed by business ethics while they are performing job-related activities or when making business decisions on behalf of their companies. By holding on to their company's code of ethics, employees ensure that their behaviour conform to generally accepted moral norms when dealing with others in a corporate setting.

Hence, personnel on both sides (buyer and seller) are expected to adhere to their companies' code of conduct while dealing with one another's so as to avoid unethical behaviour which will tarnish the images of their corporations. The rejection of the above hypothesis may be due to the fact that purchasing managers in the telecommunications industry in Malaysia adhere to a set of business procurement ethics which clearly spell out that suppliers who are unethical and corrupt in their business dealings must not be selected at all costs.

As concluded by Munro, “codes are almost useless to individual employees who are faced with particular dilemmas” (1992, p. 105). Dilemmas that cannot be managed in advance by the use of rules or guidelines cause the emergence of ethical decisions. Therefore, the dynamic relationship amongst rules or guidelines and their application that becomes the focal point of inquiry is known as ruling. An analytical space where ethics as practice becomes visible can be opened by looking at the relation and translation amongst the use of rules and rules themselves (Dean, 1994). Then again, this does not indicate that ethical rules and codes become outdated. Ethical codes become instruments that are applied in their everyday management of their own and others ‘affairs by skillful and knowledgeable members.

In supply chain management, ideally both buyer and seller are expected to display good code of ethics when making business decisions. However, according to Badenhorst (1994), the purchasing environment is conducive in promoting unethical behaviour, especially when the buyer or seller attempts to gain advantage for their company, or when either party has a vested interest in the business dealing. There are situations in which both parties collaborate and become involved in unethical behaviour such as corruption and kickbacks, particularly when they put their personal interests above that of their companies. Those who are caught practicing unethical behaviour in business normally face severe penalties.

However, it is not generally known to what extent employees strive to exercise good business ethics in their daily transactions. For example, although both buyers and sellers are not allowed to engage in unethical behaviour during their business dealings such as canvassing, lobbying, corruption and kickbacks, such elements are not explicitly shown or easily detected in most business dealings. Since it involves the personal behaviour of individuals, business ethics cannot be easily measured or quantified. As a result, in the context of this study, business procurement ethics cannot be considered as one of the critical factors in the supplier selection of telecommunications companies in Malaysia.

It also is in accordance with Donaldson (2003), argument ‘one problem preventing us from taking ethics more seriously is a form of scientific point of view where we regard ethics as worse than ‘‘soft’’ because it lacks a theoretical foundation’ (Donaldson 2003, p. 363).

From the statistical result it was found that the business ethics would not be so much the critical criteria during the supplier selection. This argument could be valid as the ethics issue would not be very much important to the working or middle level management as they are not the decision maker. From the statistic data the new entry management and middle management is the majority of the respondent which gave about 96% of the total respondent, while only 3% of it came from higher or top level management. It relates back to the interview with a few key informants (the top or higher level management) where from their point of view the business ethics issue is important in supplier selection. In this case it can be seen that the decision maker position or level which is at the higher level management perceive the business ethics issue as important. The issues of lobbying, bribery, corruptions potentially occurs or appears to be related to the decision maker level as they are the key central point to make a decision to select the supplier.

6.4.8 Supplier Selection Impact

Hypothesis H8: Better supplier selection decision would have a significant link to greater work efficiency and company performance – Rejected.

The result of the hypothesis testing showed that there is a positive relationship between the supplier selection decision process and company performance. This positive correlation is signified by the path estimate value of 0.06 and *t*-value of 1.524. However, since the *t*-value recorded does not pass the critical point of 1.96, the relationship is considered not significant; thus, this hypothesis is not supported.

Even though past related studies indicated that supplier selection affects the performance of purchasing organisations, in the context of this study, the statistical outcome revealed otherwise. Supplier selection does not have a significant impact on the work efficiency and company performance in telecommunications companies in Malaysia.

Even though supplier selection is an important process in supply chain management, it alone cannot determine the success of the company. There are myriads of factors which can influence organisational work efficiency and performance. To ensure success in business, an organisation effectively charts its future course via strategic business

planning. Strategic planning is effectively used to plot the long term direction of the organisation. It basically establishes the organisation's current position, determines the direction it wants to go and devises plans on how it will get there. Organisations have to align all their plans and strategies in order to accomplish their corporate goals and objectives. Such effort involves alignment of business processes in all aspects of the organisation. The right strategy with the most effective and efficient business planning will guide the organisation in the right direction over time.

In relation to this study, based on the positive relationship established by the statistical analysis, it cannot be denied that supplier selection does contribute to the work efficiency and company performance of telecommunications companies in Malaysia. However, this factor alone is not significant enough because there are other internal and external factors which have greater impact on organisational performance such as product and marketing strategies, corporate culture and business process flow, to name a few. Good supplier selection undeniably helps increase business efficiency but to gain added advantage, the telecommunications companies need to establish good working relationships with their suppliers. The capability to effectively cooperate and manage suppliers is becoming increasingly important in order to create sustainable competitive advantage in the challenging business environment today. The telecommunications companies must be able to support and execute initiatives offered by suppliers so that projects can be successfully implemented. Otherwise, without mutual support, the supplier selection decision process will be regarded as just another business transaction which will pass when the contract terms with the suppliers expire. The company will not be able to reap the benefits of good supplier selection process if no effort is made to enhance the positive collaboration that can lead to better company performance.

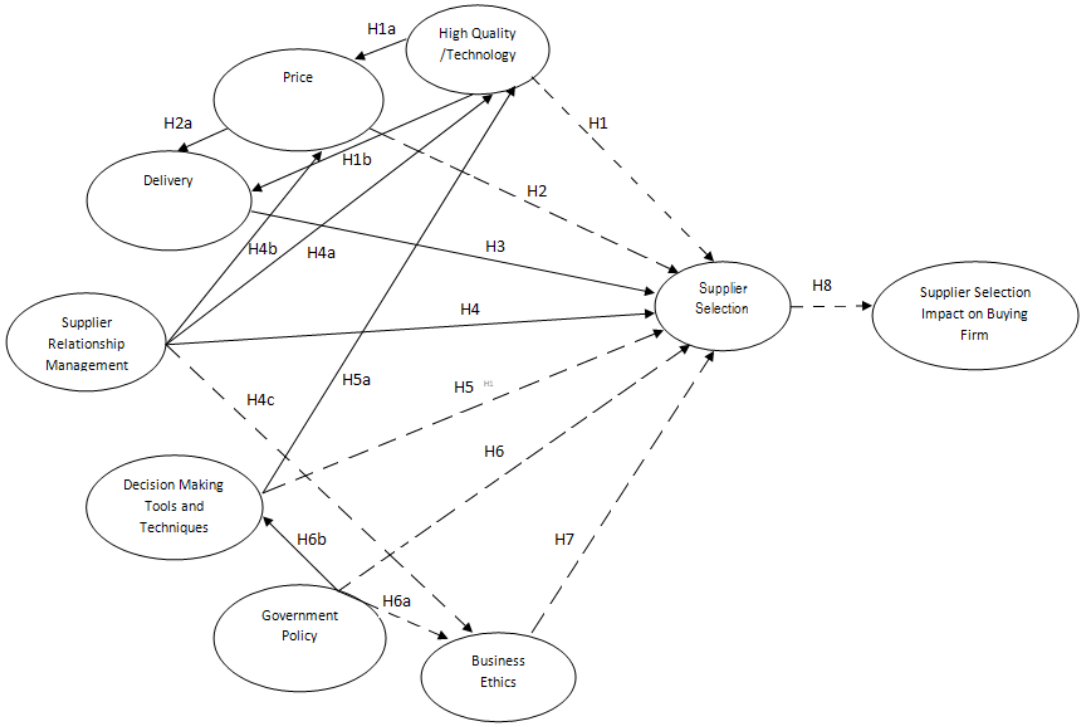
Therefore, in support of the hypothesis test result, better supplier selection process alone is not a significant contributor to the work efficiency and company performance of telecommunications companies in Malaysia if the companies do not strategically plan to achieve their business goals and objectives.

6.5 Updated Model and Hypotheses Relationships

Figure 6.1 below displays the final validated structural model of supplier selection criteria and hypotheses testing results for this study. Through the use of path estimates and *t*-values (critical ratio), seventeen hypotheses were examined in this study. Nine of the *t*-values (critical ratio values) were greater than 1.96, and the path estimates values were at the 0.01 level as indicated by the direct solid line. The hypotheses that were accepted as having a significant direct relationship to supplier selection criteria are: Delivery (H3) and supplier relationship management (H4). The other factors such as Quality (H1), Price (H2), Decision making tools and techniques (H5), Government Policy (H6) and Business Ethics (H7) were insignificant and rejected. Seven of the supplier selection criteria sub hypotheses (H1a), (H1b), (H2a), (H4a), (H4b), (H5a) and (H6b), which interrelated amongst each other, were found to be significant and accepted to have an indirect relationship with supplier selection. However two of the sub hypotheses (H4c) and (H6a) were insignificant and not supported. For the relationship of supplier selection decision and impact of the supplier selection on the buying firm (H8), it is found that the Supplier Selection has an insignificant relation to the impact of supplier selection. Tenuous

The result of the path structural model suggests the model is acceptable with the success of results fitting, indicating that this model is a good fit. The value of Chi- Square x^2 is 1.625; indicating the given data is well described by some hypothesised functions. The result of a few goodness of fit indices such as Normated Fit Index (NFI) = 0.909, Tucker Lewis Index (TLI) = 0.959, Comparative Fit Index (CFI) =0.963 and Root Mean Square Error Approximation (RMSEA) =0.042, indicates this model is valid. It also demonstrates a fall within the threshold for indicating a good model fit (Hair 2010).

Figure 6.1: Validated Model and Hypotheses



Notes: Solid lines indicate significant relationships, and dotted line indicates insignificant relationships.

Chi-Square	DF	Chi-Square (x2)	GFI	AGFI	NFI	TLI	CFI	RMSEA
776.64	478	1.625	0.887	0.868	0.909	0.959	0.963	0.042

6.4 Conclusion

Out of seventeen hypotheses which had been tested, the statistical results indicated that only nine hypotheses were supported. The remaining eight were found to be insignificant and therefore not supported. Factors such as delivery performance, supplier relationship management has a direct effect to supplier selection as well as interrelationships which exist among independent variables such as price, government policies, product/service quality, delivery performance and supplier relationship management have been identified as significant criteria which has an indirect effect in the supplier selection process in the telecommunications industry in Malaysia. Meanwhile, the study also revealed that the supplier selection process does not have a significant impact on buying firm work efficiency and overall company performance.

In reality, purchasing managers have to trade off various supplier attributes during the selection process. Buying firms have to decide on the combination of factors which should be given priority in order to achieve strategic procurement objectives. Since supplier selection is contextual, the selection criteria depend very much on the situation and the organisation. Factors that are critical for one company may not be so important for another company even though they both come from the same industry.

The next chapter will present the contribution of this study as well as its implications, research limitations and suggestions for future research.

CHAPTER 7: CONCLUSION

7.1 Overview

Within this research, the interrelating factors between criteria or influential elements of supplier selection have been studied, along with the examination of the impact that supplier selection has upon the overall company business performance of the buying firm, particularly focusing on telecommunications service providers companies in Malaysia. A quantitative approach was predominantly taken in order to collect data; with the use of structured survey questionnaires that were distributed, so feedback from a sample of the target audience could be retrieved. A qualitative approach was also employed through the key informant interviews that were conducted in order to gain an insight on the supplier selection criteria and process within organisations with a little more insider detail. For the purpose of obtaining additional supporting evidence of supplier selection government policy criteria, (i.e. Malaysian government procurement books and guidelines and companies' purchasing standard operation procedures), a document review was also performed. Both the qualitative and quantitative research methods enable the compiling of responses that can assist in verifying the critical criteria and influencing elements in supplier selection along with the overall impact on company or business performance.

The information gathered for this research was drawn from the sample of employees used who all work in major telecommunications companies in Malaysia and represent the target population. Four different well-established telecommunications companies in Malaysia were used for the sample which consisted of 950 employees within the finance, purchasing, procurement and engineering technical departments. For this research, the structural equation modelling with AMOS software version 18 was used to explore the relationships within multiple research constructs. Extra detail and insight was displayed by this model, not only into the critical criteria and influencing elements of supplier selection, but also showing direct and indirect relationships between some of these factors and how the company performance is affect by the supplier selection.

The key arguments of the thesis are drawn together in this chapter as well as the presentation of significant conclusions that have been reached. The next section elaborates upon research contributions in few aspects, as well as presenting the limitations in research and accommodating future possible research avenues. Lastly, the chapter is finalised and ended with a summary write up of the conclusion.

7.2 Contribution to Theories/Theoretical Implications

This study is structured in novelty by the building of a comprehensive theoretical framework that studies the significant elements influencing the supplier selection for telecommunications companies in Malaysia. In prior studies such as Ellram1990, Tam and Tummala 2001, Kannan and Tan 2002, it appears that research has not been conducted in with focus on business ethics and government policies when looking at supplier selection criteria, but rather on supply chain management in the more commonly recognised areas that are deemed influencing factors. Therefore, it can be claimed that this is the first study which empirically tested and examined this theoretical framework. Several theoretical contributions emerged from this research as well.

As far as the researcher is aware, this research study is the first work that looks at the combination of the important elements of government policies and business ethics together with other influencing factors in the supplier selection criteria.

Based upon the previous literature of supplier selection by from scholars in the research history of this field, critical factors highlighted by Dickson (1966) comprised of price, capacity, delivery, performance history, quality, communication system, supplier relationship management, service standard, financial and management capability, geographical location and various others that added up to 23 in total. On the other hand, Ellram (1990) suggested that the important elements of price and cost, delivery performance standards and quality have always been recognised as playing a significant role in the deciding factors of supplier selection. Despite this, a comprehensive reflection that is able to take into account the formulation of supplier selection criteria and influencing elements through the ideations of government policies and business ethics has not yet been tested. Technically, by combining all the criteria it also offers about proof in

relation to the construct validity and reliability of previous and current scales dimensions via confirmatory factor analysis (CFA), which has been employed by those measurement models.

Primarily, although previous studies on supplier selection have been conducted, they have only ever specifically focused upon influencing elements that are widely known such as price, delivery, quality; decision making tools techniques and supplier relationship. The elements such as government policies and business procurement ethics have been disregarded during these studies. To reflect this, in the present study, an integrated model was developed that combined all factors related with supplier selection including government policies and business ethics as new additional dimensions to be examined.

Secondly, as well as business ethics and government policies, the impact of the supplier selection on the overall company performance was also integrated into this model. Hence, the present study contributes to the theory of supplier selection by providing a comprehensive and validated framework which explains the relationships between the elements of supplier selection in telecommunication companies in Malaysia, its background, and previous impacts supplier selection has had on buying firm business efficiency and performance.

Thirdly, the study contributed new knowledge on supplier selection because it was conducted in the telecommunications industry in the Malaysian business environment. Previous studies on supplier selection mostly covered other major industries such as manufacturing, airlines, automotive, textile and food industries.

As a final point, a key combination of elements associates to the fact that this study provides first hand proof and research results from a fairly new business background (Malaysia), considering that the majority of the previous studies took place in Europe, China, USA and the UK. This is the first supplier selection study reported in the telecommunications industry focusing on major service providers in Malaysia, making it significant in enabling an examination of a wider range of discoveries retrieved from research conducted in an Asian context.

7.3 Methodological Approaches

In terms of the methodology of the approach, the contribution of this study stems from the use of structural equation model using AMOS software system. AMOS system application is a tool for analysis that has not been previously utilised in the study of supplier selection. In fact, only a few supplier selection studies adopted the SPSS data analysis technique but none of the previous studies used structural equation modelling techniques with AMOS software application in their data analysis. AMOS has the advantage of being able to formulate very complex models with a combination of all constructs and variables. Furthermore, AMOS can handle the entire measurement model comprehensively, which is not the case with other methods of analysis such as SPSS or regression model analysis. Thus, in the present research, a considerable methodological approach contribution has been made by using structural equation model techniques and AMOS application system tool to deal with a medium respondent size of between 200 and 500.

In addition to this, the current study employed the triangulation method (mixed data sources) which combines the qualitative and quantitative techniques of data collection. Semi-structured key informant interviews enabled the exploration of the concept of supplier selection in the telecommunication industry, which had not been previously examined, and to refine the research framework. This was later followed by a quantitative phase, with the survey results analysed via structural equation modelling using AMOS analysis software. This particular combination had not been previously adopted in this area of research. With this in mind, such an attempt has set a new benchmark for future researchers in this field.

The present study also provides reliable and valid measurement scales for all constructs which can be used for future research. Also, the results of the hypothesis testing revealed that all the factors have either a direct or indirect influence on different areas of supplier selection in the telecommunications industry. Therefore, this study contributes predictive factors which influence supplier selection as well as the desired outcomes from implementing these in a particular context, namely supplier selection in the telecommunications industry. In conclusion, the use of AMOS has brought about significant contributions in terms of measurement models and structural levels.

7.4 Implications of the Study

The investigation of critical factors which influence supplier selection for telecommunications companies is an important endeavor. However, the research findings of this study have quite a few practical implications. Some important implications for managers and academicians are as follows:

Firstly, this study pointed out the importance of supplier selection criteria and influencing factors in the telecommunication industry. The results show that supplier delivery performance and supplier relationship management were found to be the most significant influencing factors in the supplier selection criteria. The findings also indicated a positive influence on dependent variables in the context of telecommunications companies in Malaysia. The price factors were found to be less important due to this factor possibly leading to unhealthy competition in the market in terms of price wars among the suppliers in order to win the business. Therefore, telecommunications service providers in Malaysia are more likely to focus on the above mentioned dimensions in their supplier selection criteria. In addition to this, telecommunications companies should also consider the interrelationships that exist among independent variables such as price, product quality and technology, decision making tools and techniques, government policies and business ethics; as most of these factors also play important roles in the supplier selection criteria. Results showed that these variables were significantly interrelated to one another in the criteria of selecting suppliers.

Secondly, this study showed that a government policy is not a significant or critical criterion in the supplier selection. The reason for this may be due to the government policy that is designed in favour of state owned companies or government link companies, while the others include all the private owned companies that are given more flexibility in adopting and implementing the policy. At the same time the policy that is in favour of Bumiputra or local suppliers would not be supported due to the main suppliers or the major part-takers in the telecommunication business being from the international market. The company may have given some priority to support local based suppliers but due to the nature of product technology complexities, expertise from the foreign suppliers is required to deal with product installation, maintenance or the repair of equipment. Therefore, the managers or the policy makers have to realign the government policy to be

more flexible and balanced with the national agenda and technological factors. This would help the companies within the country to be more competitive and to be able to compete globally.

Thirdly, the research findings suggested that managers in purchasing firms are responsible in ensuring that the criteria and process of selecting a supplier is aligned with the procurement policies and guidelines set by the government and the company. However, as the business environment gets more complex and dynamic, certain criteria such as supporting Bumiputra/local suppliers and national agenda guidelines require some realignment in order to match and balance the company and government requirements. It is important to note that companies have to adhere to certain policies and guidelines but only as long as the minimum requirements are met, they are considered compliant. The issue, for the most part, might not be due to lack of policies but due to weak implementation and enforcement of the related policies from the government officials. Governments in destination countries have to build up their institutional ability for enforcing the laws pertaining to protect or support local and Bumiputra companies and other government policies and guidelines. Therefore this study discovered that some companies have developed their own business strategic plans and policies in order to cope with future business requirements that are in accordance with government policies and guidelines.

The comprehensive model of supplier selection identified in this study suggests that companies have to ensure that all their employees who are involved in supplier selection activities must adhere to the business code of conduct in order to promote transparency and avoid integrity issues, especially those related to unethical business practices. In other words, it is in the strategic interest of all parties involved with Supplier selection to diminish incidences of ethical malfeasance. Undoubtedly a huge majority of buying firms and suppliers behave ethically; as it is in their best interests to do so.

In the Telecommunications industry in Malaysia, the researcher have identified that business ethics and government policy have little effect since government policy are more guidelines and ethics are influenced by local strategies such as supporting local Bumiputra companies and political interference.

However, there cannot and should not be any margin for error or mistake since these problems involve dealing with human subjects. The nature of supplier selection activities involves a number of structural and behavioural features of supplier selection and it revealed how these may give an increase to ethical concerns. Utilising moral behavior and strategic theories, this study recommended that clients and sponsors (buyers and sellers) have both unique and collective responsibilities in making sure that the moral and ethical problems related with supplier selection are dealt with.

Purchasing personnel who are involved in the supplier selection decisions must align themselves with the code of conduct and business ethics policies and clearly manage and uphold the concept of trust, honesty, transparency and integrity in the criteria of supplier selection. Parties or personnel involved in selecting suppliers for their companies must ensure that they avoid any unethical behaviour when dealing with suppliers. If elements of misconduct or unethical practices such as lobbying, canvassing, and offerings of bribes, gifts or rewards by suppliers are detected, then they must take necessary action.

Finally, in an ideal world, effective supplier selection should lead to improved work efficiency and overall company business performance. This can be realised by focusing on the training and skills development programs conducted and technology transfer by the suppliers. Selection of the right supplier could also bring benefits to the company in terms of price avoidance and cost saving. However, from the results of this study, effective supplier selection has insignificant impacts upon the buying firm's efficiency and business performance.

This could be due to how the buying firm actually plan, organise and align all their plans and strategic business planning in order to achieve their corporate goals and objectives. Such effort involves internal alignment of business processes in the organisation. The right strategy with the most effective and efficient business planning will guide the organisation in the right direction rather than relying on the good supplier.

Buying firm could also need to ensure that top management supports the whole supplier selection strategy and activities. This is a critical issue which needs to be addressed, because by having a clear direction and continues support from the top level management

to the supplier selection strategy would probably help to improve the company performance. By having a proper directives from top management, will certainly enable purchasing officers and top management share the same directions, use and apply the right supplier selection strategy for the benefit of the performance in the organisation and it clients. Without strong and continues support from the top level management, this will create a disruption on the effective supplier selection which expected to lead into improve company performance.

Research findings suggest that telecommunications companies should place greater emphasis on supplier relationship management and supplier delivery performance when selecting suppliers because these two factors critically influence the business operations of companies in the telecommunication industry.

In overall the objective of this research study has been achieved by investigating and analysing the supplier selection criteria in telecommunication service provider companies in Malaysia. The summary of the research objectives and achievements are shown in Table 7.1 below.

Table 7.1: Research Objectives Achievement

Descriptions	Tasks	Achievement	Evidence
To identify and examine the critical criteria and factors that influence supplier selection.	By conducting an extensive literature review	Yes	Chapter 2
To analyse interrelationships which exist among critical criteria and their relative importance to the supplier selection?	By conducting a thorough literature review as well as input from few interview of key informant.	Yes	Chapter 2 , 3 and Appendix 2
To develop a model to explain the criteria that lead to supplier selection.	By conducting an extensive literature review and analyse the gathered data.	Yes	Chapter 3,5 and 6
To analysis to investigate the impact of supplier selection on firm performance.	By gathering and examining the data from the interviews and main questionnaire.	Yes	Chapter 5 and 6
To examine and test the model of supplier selection criteria in a major telecommunications service provider companies in Malaysia.	By analysing the questionnaire survey data collection using a Structural Equation Model (SEM) technique.	Yes	Chapter 5

7.5 Areas for Future Research

The main focus of this research is the critical influencing factors of supplier selection in telecommunications companies in Malaysia. The study looked at important factors in the supplier selection criteria and the impact of supplier selection on work efficiency and company performance.

This study was conducted in a single setting. The research findings are limited to the context of the telecommunications industry in Malaysia and may not be applicable to other industries and countries. Taking this into account, a suggestion for future research would be to replicate this study in other business settings and other countries in order to provide wider generalisation of the research results.

It is also recommended that in future research on supplier selection, consideration should be given to include intangible elements such as political, culture and social factors. The research might generate new insight if it were to be implemented in different political and culture environment, and incorporating new variables related to the macro environment such as political interference and cultural factors of supplier selection in the telecommunications industry. Therefore, the researcher suggests that future research in supplier selection be geared towards the development and implementation of a conceptual framework which takes into consideration the political interference, environment and culture factors that can be included in the supplier selection criteria in the telecommunications industry.

Possible criticism of this study concerns the reliance on cross sectional data involving existing companies and business environment. As such, this study considers only the current market players and current business environment as well as data that were collected within a specific time frame. A more accurate approach to cope with the dynamic business environment would be to adopt the longitudinal research design and approach. Future research using longitudinal research design and approach would allow inclusion of changes in demand of the industry and business market environment which would be able to provide further insight in validating and examining the findings.

For future research, this study also suggests using in-depth interviews and focus group interviews in order to gain more qualitative insight alongside the with survey questionnaires. With these combinations of comprehensive qualitative insight and further additional input from quantitative survey data, it may help to understand more about individuals' and groups perspective towards the ethics element which may influence the supplier selection decision.

Another interesting area of investigation in the future research is to undertake a comparative study in different countries as well as different cultures such as China, India, Turkey, Saudi Arabia, Bahrain and other countries in the world in order to ascertain whether different cultures and governments haves differing requirements.

7.6 Concluding Remarks

Supplier selection is an integral part of the supply chain network, and choosing the right suppliers to work with will have an impact on the companies' business operations and performance. For their own benefits, buying firms/companies must be very discriminatory and precise when determining the critical factors in their supplier selection process.

The present study revealed a variety of potential relationships between supplier selection criteria/influencing factors and company performance in the telecommunications companies in Malaysia. While factors such as supplier relationship management and supplier delivery performance emerged as the two most critical factors in the supplier selection criteria of telecommunications companies in Malaysia, other tangible and intangible factors should also be given due consideration when making selection decisions, depending on the business context and organisational requirements. The inter relationship among the criteria of supplier selection should be given strong consideration while selecting the supplier. This is due to the multiple supplier selection criteria being interrelated to each other which could affect the supplier selection decision.

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APPENDIX 1: Interview Questions and Transcripts

1. Could you please describe your views on supplier selection process in your organisation?

2. What do you think are the criteria or the critical factor of the supplier selection in your organisation?

3. Could you briefly explain how the process of selecting suppliers takes place? Who are the parties involved in the selection process?

4. In the context of your organisation, how do you describe the influential factors such as government policy (for example government tax, supporting national agenda) and business ethics such as bribery, how lobbying affects the selection of suppliers?

5. Based upon your experience and knowledge, to what extent does the supplier selection give impact to your company's operational performance?

6. Perhaps you can share with me your experience in dealing with the supplier selection process that leads to improvement in your overall company performance? How does this occur?

TRANSCRIPTS:Interview With Key Informants

This section presents an analysis of personal interviews, which were conducted between October and November 2010. The qualitative study was conducted through semi-structured key informant interviews in order to validate a studies conceptual framework and revise the measurement scales to fit the context of the present research. In addition, the aim of the qualitative study is to collect more in-depth information to enhance the understanding of supplier selection activity and its impact on the performance of Malaysian telecommunication service providers.

The researcher managed to interview five key personnel in the telecommunications industry in Malaysia, namely the Chief Financial Officer, Chief Procurement Officer, Vice President (Technical), General Manager (Technical) and Procurement Manager of major telecommunications companies. Five interviews were conducted out of twelve key personnel from the four major telecommunication service provider companies, making it an approximate 41.6 percent response rate.

A number of critical issues were discussed, especially issues that were related to the companies' supplier selection criteria and process. The interview question is shown in the Appendix 2.

Interview with the Chief Financial Officer of Company A

In response to the question about his views on his organisation's supplier selection criteria and process, the Chief Financial Officer (CFO) pointed out that it is important for all the organisations to adhere to procurement guidelines as stipulated by the management. For instance, all government-linked companies (GLCs) are required to abide by the procurement Red Book issued by Khazanah Nasional Berhad. According to him, in order to acquire products/equipment or services, his organisation has to go through the normal procurement process. Procurement via open or closed tenders has to follow procedures set by the tender board committee. All relevant parties which are

involved in the procurement process will play their roles accordingly, making sure that each procedure is closely observed.

The CFO also stressed that strategic procurement is crucial in meeting the organization's strategic objectives; hence, being a part of the procurement process, supplier selection plays a prominent role in ensuring an effective and efficient procurement function for the organisation. Effective procurement may lead to lower cost structure, better inventory control and improved product and services quality. These attributes can pave the way for the organization to be more competitive in the market by being able to provide quality products or services to consumers at the best possible prices. Therefore, the procurement plan must be aligned with the organisation's strategic business plans and objectives. In answering the question, the CFO summarized that the objective of the supplier selection process should be to select the best possible supplier which would be able to meet and support the organisation's business goals.

When asked about the critical factors in the supplier selection decision of his organisation, the CFO outlined several criteria such as price, quality and technology of product or services, supplier and delivery performance among the most important factors which need to be scrutinized and emphasized. He pointed out that many of these factors are interrelated; as a result, these interrelations influence the supplier selection criteria as well. He commented as follows:

"I believe price normally plays an important role with the weight ranging in the region between 30% and 50%. Higher weightage is also given to quality technical product because I think we simply want to purchase items that are able to provide the best technical value and services. In this, both price and high quality products or services are relatively importance."

The interview revealed that for Company A, product/service technology and quality are given topmost priority in the criteria of selecting suppliers, as well as awarding business to suppliers for a particular project. High product/service quality also contributes to operational cost savings in terms of lower product maintenance costs. Such savings can

be passed on to end consumers in the form of competitive pricing for our telecommunications products or services.

During the supplier evaluation and selection process, the supplier selection decision-making team must ensure that the selected suppliers meet certain technical requirements and are able to deliver the products or equipment on time. Product/service quality and delivery performance of suppliers are considered critical supplier selection factors for Company A. The interrelationship between these two factors is significant and may influence supplier selection because high quality products/services and superior delivery performance will help increase the customer satisfaction index. On the other hand, low quality products/services or late product/service delivery will lead to customer complaints and dissatisfactions. Increased or continued customer complaints and grievances will eventually result in declining business. Consequently, if the issues are not properly addressed, the company business performance can be severely affected. Therefore, to nip such problems in the bud, careful procedures in the selection of supplier which meet specific stringent requirements are observed. In addition to the above issues, the company's strategic procurement plan, the product life cycle and maintenance cost will also need to be taken into account when making supplier selection decisions. The CFO explained that he believed there are also other factors involved in the supplier selection process; however, the overall decision making depends on the company situation, requirement, guidelines and policy.

When asked whether factors such as government procurement policies and business procurement ethics affected Company A's selection of suppliers, the CFO concurred that both factors played important roles in the process. He mentioned that Company A's code of business ethics in dealing with vendors or supplier are already in place, referring to the existing code of conduct related to ethical issues such as lobbying, receiving and offering gift, canvassing, bribery and others. In quoting the CFO:

"I think ethics is a global issue. Everybody is supposed to be above the board, in whatever service or business people are doing, the ethics factor must be given topmost priority".

The CFO also pointed out that all organisations, especially government-linked companies, must ensure that they adhere to the government procurement policies in all business transactions regardless of whether they are transacted locally or internationally. In his capacity as the CFO of Company A, he had instructed all relevant divisions, departments and lines of business, especially the procurement division, to monitor and implement the required actions toward meeting the requirements of the policies and guidelines as stipulated in the Procurement Red Book. While most organisations will have their own ways of handling the procurement process, basically all telecommunications service providers in Malaysia comply with government procurement policies and guidelines.

In relation to the impact of supplier selection on company's business performance, the CFO's comments were as follows:

"At the end of the day, after we have finally selected or awarded contracts to suppliers, they should be able to provide what was expected of them in order for us to service our end customers with whatever products or services that we have bought."

"If our operation does not function properly because we purchase a lower quality or faulty product, our business is affected because customers will be unhappy. Of course our business will be affected, especially in a very competitive market such as telecommunications."

Another significant factor believed to benefit the organization is by building good relationship with suppliers. The CFO agreed that better supplier relationship management can also lead to the acquisition of products with enhanced quality and competitive pricing. Such interrelation of factors was explained by the CFO:

"Supplier relations must be effectively managed in order to create a win-win situation for both parties. Suppliers must be regarded as our business partners; therefore, we also depend on their support and commitment to ensure that our business can progress smoothly. Besides better communication, good supplier relations also results in high commitment and involvement from the suppliers which will enable us to come up with

better quality products for our customers, who will then benefit from our value-for-money products and services. Some of our suppliers are also involved in our business procurement planning to ensure business continuity and consistency. This creates a sustainable competitive advantage for our organization."

The CFO believed that a well-structured and stringent process of supplier evaluation and selection, coupled with up-to-date information pertaining to the pool of reputable suppliers, will help improve the procurement process by allowing organisations to make informed and correct decisions in purchasing the right product with the right quality, right price and from the right suppliers. Such move will contribute to improved end-to-end service, which will consequently reduce customer complaints and avoid unnecessary costs. Eventually, increasing operational efficiency will lead to improved business performance of the organisation.

Interview with Chief Procurement Officer of Company A

With regards to the supplier selection criteria and process, the Chief Procurement Officer (CPO) commented that selection of suppliers depends on the type procurement method employed such as request by quotation, direct purchase, tender (open and closed tender), etc. The method used is determined by purchase value of items to be procured and item specifications.

The supplier selection procedures will strictly follow the procurement manual and guidelines developed by the company. Basically, before a supplier is selected or any purchase is made, requirement for the purchase must first be justified by the requesting party. The purchasing process will only start after the request approval is given. The selection of supplier for any purchase has to go through certain processes such as appointment of the purchasing committee (including the commercial and technical committee), level of authority, management approval and tender board approval.

As for the critical factors in the selection of suppliers in Company A, the CPO pointed out that price, delivery performance, product technical specification and quality, compliance to the terms and condition of the tender and contract, supplier capabilities as

well as supplier performance and track record, strength and weaknesses must be considered. Most of these factors are related to one another and the relationships among the factors can influence the selection decision in many ways. He commented that:

"*Under no circumstances do we buy things just because they are cheap. Most importantly, they must meet the technical requirements. Items that do not meet the critical requirements are not even considered even though they are the cheapest available in the market. However, I believe that most of these factors such as price, delivery performance, product quality, technical specification, supplier capability, supplier performance, and supplier relations are linked to one another; in other words, they are all interrelated. One factor can contribute to the effectiveness of other factors in the supplier selection and performance."*

In dealing with ethical issues, he remarked that:

"Well, we have terms and conditions in the tender which spell out the do's and don'ts with regards to the tender. That means the suppliers must not indulge in canvassing, giving bribes and things like that. They are also not supposed to put undue pressure and influence on our people. They are not supposed to do anything unethical and against the law. You know we have the right to suspend or disqualify them from the tender if they were proven to be involved in any unethical activity or breach the Corruption Act".

Furthermore, the CPO stressed that:

"We also have a clause in the tender terms and conditions whereby we can also disqualify parties which in our view are colluding, meaning the same party or related parties putting multiple bids. We will not allow them to participate in the tender under three or four different names if we have reasons to believe that they are colluding. We may disqualify or even cancel the tender."

In addition to the ethical factor, government policies also play a significant role in selecting suppliers. The following quotes reflect this idea:

"Well, there is also weightage on the compliance of government procurement policies. For example, we try to give preferential treatment to local suppliers, but of course that is subject to the suppliers fulfilling the technical requirements as specified by us. Meeting the technical requirements will be an added advantage to qualified local suppliers; and in certain cases, those requirements become a critical factor."

When discussing matters related to the impact of supplier selection on the company operational and overall business performance, the CPO agreed that supplier selection is important and will have a direct or indirect impact on the company. This was explained by the CPO as follows:

"I believe that supplier selection is also very important because supplier is part of our 'eco system'. If we engage the wrong supplier, and if our suppliers are weak and not performing, that will have a direct impact on our capability to service our customers. What we expect from our supplier is that they are supposed to deliver the quality products that meet our requirements, as what is agreed in the contract. They are supposed to deliver the products on time and without fail. So by choosing the right suppliers to work with, we can reduce the risk of non-performing suppliers."

On the question about the impact of late product/service delivery by suppliers, the CPO stressed that:

"Yes, if we are late in provisioning our network because the suppliers don't deliver, there will certainly be an impact on our business. We try to reduce faults, improve quality and enhance customer experience. For instance, our installers or TM agents are our front liners. Their product/service delivery performance has an impact on our company image."

The CPO finally commented about the importance of supplier selection to the company's overall business performance:

"The performance of our suppliers certainly will affect our business performance. If we select the wrong suppliers, we are going to pay the price for it. But if we choose the good ones, it will definitely benefit us."

Interview with the Vice President (Technical) of Company A

The Vice President (VP) agreed that proper selection of suppliers plays a big role in ensuring that the organization is able to deliver quality products and services to the end consumers as expected. Choosing the correct suppliers with winning attributes contributes to the good image of the company because some suppliers, for instance telecommunications installing agents, interact directly with the company's end consumers.

Being the VP of the Technical Division, he also reiterated the view of his general manager that compliance to the technical specifications as required will be the main criteria in the supplier selection decision. Only then, other factors such as pricing will be used to determine the final decision. For example, from a list of 10 suppliers who vie for a contract, only 3 suppliers are able to match the technical requirements of the products or services. Out of the 3 suppliers who are shortlisted, the supplier which is able to offer the most competitive price will be selected. In short, the most ideal suppliers to be selected by the company will be suppliers who are able to fulfill the technical requirements of the products or services to be acquired as specified by the technical team and at the same time offer the most reasonable or cheapest price among other contenders.

He commented that:

"Supplier that can offer the cheapest price but do not meet the minimum technical requirements based on the compliance list will be ineligible for further evaluation. Meeting the technical specifications is a prerequisite for being selected as our suppliers. Once they meet the requirements as determined in the compliance list, they will then be evaluated based on other selection criteria. Most of the time, pricing is the next criteria we look at. If a supplier meets the technical specifications and at the same time offers the

cheapest price, chances are that the supplier will be selected by the company. That is the most ideal situation."

Sharing his views on the critical factors of supplier selection in his organization, the VP noted that apart from technical specifications and pricing, product technology, product quality and company policy are also important criteria which influence the selection decision. He remarked that:

"All these factors are actually interrelated as selection criteria. For instance, products that meet our technical specifications are usually high quality products. Our technical requirements are rather stringent and we comply with international standards."

On government policy as one of the selection criteria, the VP explained:

"Another crucial factor in the supplier selection criteria is our company policy. Being a government-linked company (GLC), we have to abide by procurement policies as stipulated by the government. Hence, all the government policies are reflected in our company procurement guidelines. To illustrate an example, suppliers who are not registered with the MOF (Ministry of Finance) will not be considered for any contract. Suppliers with Bumiputera status will be given priority in the selection process. This is not an isolated case. In other countries too, the same is practiced to protect their national agenda. "

About business ethics as an influencing factor in selecting suppliers, the VP believed that it is quite difficult for suppliers to get involved in unethical practice such as lobbying, canvassing or bribery just so that they can be selected as suppliers for his company because the recommendation for appointment of suppliers has to go through many layers of management for approval before the final decision is made. Technically, suppliers that do not meet the requirements as specified are weeded out at the initial stage. The VP had this to say:

"In our organization, based on my experience and observation, it is actually very difficult for suppliers to lobby for contracts. Our system is very rigid. If the suppliers are not qualified, or if they do not meet the requirements that we have set out, there is no way they can get the business. I cannot see how they can lobby for business. There is just no room for that at the company level."

However, such unethical practices may happen at the implementation stage involving middle to lower management staff. He explained:

"During implementation of contracts, the suppliers normally interact with the lower level employees. So there may be cases where the company employees take advantage of the suppliers, and vice versa. For example, employees who are in charge of job allocation will ask for gifts or get the contractors to entertain them at fancy restaurants. Some even collaborate with the suppliers, getting them to claim extra for jobs not fully completed as required. The costs savings by the supplier is then shared between them. I admit that such unethical practices, although they may not be rampant, do exist. But these things are not easy to monitor. Even if we know it happens, action cannot be taken against them because we have no hard evidence."

The VP proposed one solution to minimize unethical practices in the business environment relating to procurement:

"Good supplier relationship management may be able to suppress unethical practices. For instance, if we have good relationship with our suppliers, they will think twice about offering bribes. But first we must show that we have high work ethics. Our suppliers may feel embarrassed to involve us in unethical behavior if we adhere strictly to our code of conduct."

In his opinion, he believed that organizations should develop long term business relationship with suppliers in order to achieve stability and continuity in business. Such partnership can actually benefit both parties - the purchasing organization will be able to get better commitment from the supplier while the supplier can benefit from continued business from the organization. He commented:

"I would like to propose to the management to revise our contract terms to 5 years. With longer contract periods, there will be better commitment from both parties. Besides, in five years, both parties can invest in research and development so that the products or services can be further improved as technology changes. Having long term partnerships can also help small suppliers to establish their businesses. Since our organization is big, we should help nurture the businesses of our suppliers, especially Bumiputra companies. In that way, we can have a win-win situation for all."

The VP also touched on the impact of supplier selection on company performance.

"Of course if we select the right suppliers, it will be reflected in the company performance. For instance, if we appoint reliable contractors to install our services, and if the customers are satisfied with their work, the business of our company will definitely grow. In addition, there are also good suppliers who are willing to transfer their skills and expertise to our internal employees. By having employees who are equipped with related skills and knowledge, we will be able to handle our customers better and not rely 100% on our suppliers."

Interview with General Manager (Technical) of Company B

The General Manager (GM) in charge of the technical department believed that the supplier selection process starts from the request of product/service technical specification until the purchase is made from a specific supplier. Since it is crucial for the technical team to come up with the technical specifications required, supplier involvement will initially begin at that point.

In the GM's opinion, the selection criterion which is given the highest priority and weightage in the supplier selection process is meeting the minimum technical requirements. In other words, the product/service technical specification is the most important factor in the supplier selection criteria. All the technical specifications must be

aligned with the company's business requirements and meet expected customer needs. He commented as follow:

"We do not demand for products or services which are over specs or under specs. Of utmost important, the products must be able to meet customer expectations. Therefore the technical requirements must match the requirements of the end users. For example, if our market demands for a Proton, and we know that a Proton will best suit the requirements of our market, we will draw up technical specifications to purchase a Proton. We will not purposely prepare technical specifications of a Ferrari if we just want to acquire a Proton, and vice versa. We understand that if we acquire a Ferrari, we may end up paying unnecessarily high for a product which does not suit our Proton market. If we purchase a product with lower specifications compared to a Proton, we may end up with a low quality product which will cause problems to the company later in the form of customer complaints and excessive maintenance costs."

When asked about the critical factors of supplier selection, the GM remarked that technical specifications, product quality and price are the three most important factors in selecting suppliers.

"All three factors contribute to the company's bottom line. First will be the product technical specifications, then the product quality and followed later by the product price. In certain cases, other selection criteria which are interrelated with the three factors and will contribute to the success of the business are also taken into account such as delivery performance and supplier relations."

Touching on government policies and business ethics as supplier selection criteria, the GM mentioned that:

"I cannot deny the fact that sometimes there are vendors who lobby and canvass, especially if they want to obtain insider information about our product technical specifications and requirements. In worst cases, the suppliers approach us in order to know whether their technical proposals are acceptable and will pass the technical evaluation criteria during the request for quotation or tender process."

Even though there are unethical elements in dealing with suppliers, he believed that the company employees will be able to manage the suppliers and adhere to the code of conduct as stipulated in the company policy and procurement guidelines. He noted that good business ethics will lead to better supplier relationship management. He commented as follow:

"Oh yes, that is why we always keep an eye on our staff to ensure that the relationship built with supplier is well managed and abide by the company code of conduct. We have to be very careful in building and maintaining our relationship with suppliers. We must know the limits of the relationship. If we practiced good business ethics, our suppliers will respect us and the relationship between us will be better and well-managed. "

Keeping abreast with government policies and procedures is also crucial to the organization. From the technical point of view, the company will always comply with the government policies. He remarked that:

"For me, it is very clear; we have to comply with government policies. As part of the technical team, we must always ensure that the product or equipment technical specifications will follow the acceptable and approved standards, and abide by government policies such as being environmental friendly, usage of non-hazardous material, and others."

When enquired about supporting national agenda, he commented that:

"I'm not sure about that. You may need to check with the commercial or procurement team."

While discussing about the impact of supplier selection on company efficiency and overall performance, he agreed that supplier selection will contribute towards the company performance. He answered as follow:

"It is actually quite simple. If we buy the right item or product from the right source and right supplier, in return we will get what we want. It really depends on how you utilize your relationship with the supplier. As I mentioned just now about the billing system, we will also benefit by adopting paperless billing where company can save on printing costs. In terms of product or equipment, a good supplier will eventually transfer their skills, knowledge and technology to us. Such knowledge and skill transfer will allow our company to operate the business more efficiently and become more competitive in the market as well."

Interview with Procurement Manager of Company C

Referring to the supplier selection process in his organization, the Procurement Manager emphasized that the process involves internal purchase requirement and request, sourcing for supplier, request for quotation, supplier evaluation and finally approval from higher level authority. The process of selecting the supplier will very much depend on the product or service requirement and the expected purchase amount or budget.

While commenting on the criteria and factors for supplier selection in Company B, the manager believed that delivery performance and inventory management are the two most important factors. Therefore, supplier delivery and capability such as supplier product lead time, supplier on time delivery performance, stock inventory management, supplier financial strength and background, supplier experience and track record are given topmost considerations. However, the significance of these factors in the supplier selection criteria is also influenced by other selection criteria such as price and product quality. In fact, the interrelations which exist among the critical factors contribute to the supplier selection decisions. In Company C, although the price factor is important in the selection decision, supplier delivery will be given more weight compared to the price of the products/services to be purchased. He stressed the following:

"First of all is supplier delivery performance because most of the time, we require short delivery lead time and item must be delivered on time. Based on past experiences, we had to entertain many ad hoc purchase requirements. So whenever we want to select

suppliers, we emphasize on their delivery performance and services first. Price of course is also part of the criteria, but it is secondary compared to delivery performance."

From the interview, it was discovered that the organization had developed a supplier database and inventory management system to facilitate the procurement process. The system allows the relevant procurement employees to access supplier information, supplier products/services and delivery capability. The system also enables the company to manage its stock or inventory items more efficiently. In supplier selection, physical location of the suppliers to the company's headquarters is also considered.

When enquired about the impact of government policies on the selection of supplier for the organization, the manager stated that at the time the company's procurement policies were developed, the government rules and regulations were already taken into account. Hence, by abiding to the company's procurement policies, the company is indirectly complying with the basic government procurement policies.

Regarding the ethical factor, his response was as follows:

"Sometimes you have suppliers approaching you with all kinds of gifts, rewards or lobbying to get contracts from the company. Lobbying is normal in the business environment but gifts or bribes are unacceptable. We cannot stop the suppliers from lobbying for the company business but we would not accept any kind of bribery or monetary rewards which are considered unethical from suppliers."

Pertaining to the impact of supplier selection on the company operational performance, the manager commented that:

"Part of our strategic objective is to build long term business relationship with suppliers by establishing long term contracts with them; therefore, the suppliers are willing to provide extra service such as training and sharing technical expertise with us."

APPENDIX 3: Questionnaire Coding and Labeling

CODES	BRIEF DESCRIPTIONS	SECTIONS
GENDER	Gender	A
ETHNICITY	Ethnicity	A
AGE	Age	A
POSITION	Current Position	A
DIVISION	Division/Unit	A
YEARSVC	Number of years in the Company	A
INCOME	Monthly Income	A
NUMEMPL	Number of employees in the organisation	A
DIVINV	Division do you think should be involved	A
QLTY1	Supplier fulfils the technical specifications and requirements of my organisation	B
QLTY2	Supplier offers the latest technological products	B
QLTY3	Supplier offers an acceptable product/equipment technical support	B
QLTY4	Supplier offers product /equipment warranty.	B
QLTY5	Supplier offer reasonable life span of the product	B
QLTY6	Supplier offers training and support to use the product	B
QLTY7	Supplier offers a reliable product/ equipment	B
QLTY8	Our organisation is involve in product development with our suppliers	B
QLTY9	Supplier should be certified and is compliant with relevant quality standards	B
QLTY10	Supplier offers high quality standard of products	B
PC1	Supplier must comply with the price schedule and payment terms	C
PC2	Supplier charges for repairs/tendered projects works and engineering services are reasonable	C
PC3	Supplier offers a competitive price	C
PC4	Spare Part price/cost should be considered during the supplier selection process	C
PC5	Supplier clearly states the maintenance cost price for the warranty and post warranty	C
PC6	Supplier should offer clear total cost of ownership	C
PC7	Possible future price escalation within the contract period should be agreed upon	C
PC8	Future switching or hidden costs are considered and discussed	C
DEL1	Supplier be able to deliver the products/equipments/services in a timely manner	D
DEL2	Supplier should comply with a fast response time in dealing with customer request	D
DEL3	Compliance with late delivery penalty charges imposed due to late delivery	D
DEL4	Compliance with the quantity requirement	D
DEL5	Compliance with the completion and ready for service/commission date	D
DEL6	Supplier offer short or reasonable product delivery lead times	D
DEL7	Supplier uses appropriate production planning capability in order to accommodate the demand of our organisation.	D
DEL8	Clear hierarchical structure for escalating issues process	D
DEL9	Supplier located close by to our organisation.	D
SRM1	Supplier has experience supplying to the telecommunication industry.	E
SRM2	Supplier experience of working with us supplying to our organisation	E
SRM3	Supplier background, brand, reputation and performance to be considered	E
SRM4	Supplier has track record and expertise in the telecoms industry	E
SRM5	Supplier willingness for establishing a partnership business relationship	E
SRM6	Supplier able to articulate their short term or long term business relationship	E
SRM7	Supplier able to provide an indication of their inventory control management	E
SRM8	Supplier financial stability and business practices	E
SRM9	Supplier Offer a high commitment from their higher level management team.	E
DM1	Supplier have a relevant and up to date information systems	F
DM2	Clear authorisation limit or level of authority within the supplier organisation	F
DM3	Appropriate decision making tools and techniques	F
POL1	Supplier follows Malaysian government rules and regulations	G
POL2	Supplier meets Local Authority rules and requirements	G
POL3	Supplier complies with all national and international legal and regulations	G
POL4	Supplier adheres with the procurement policy of my organisation	G
POL5	Supplier supports the national strategic Bumiputra agenda	G

POL6	Supplier must comply with national environmental guidelines	G
POL7	Supplier is in alignment with government procurement policies and guidelines	G
POL8	Supplier must comply with recognised occupational safety and health procedures	G
POL9	Supplier should bring for benefits to the country	G
POL10	Supplier must comply with all contract terms and conditions	G
ETC1	Supplier should be involved in any lobbying activities	H
ETC2	Supplier should be involved in any canvassing activities	H
ETC3	Supplier should be practicing offering Gifts	H
ETC4	Supplier should be involved in bribery or corruption activities	H
ETC5	Supplier should be involved in any Inducement and rewards activities	H
ETC6	Transparency in supplier business practice	H
ETC7	Supplier is fairly, equitably and honestly in supplier business practice	H
ETC8	Supplier shows high integrity in business practice	H
SS1	Clear understanding of Supplier Selection	I
SS2	It is important to have a process for selecting suppliers in my organisation	I
SS3	The process of selecting suppliers in my organisation is not complicated	I
SS4	I has a clear guidelines for the selection of suppliers	I
SS5	It is necessary to have knowledge about how the supplier evaluation and selection process work in the organisation	I
SS6	Need further training in supplier selection and procurement	I
SSIM1	Improved supplier selection process will improve work efficiency	J
SSIM2	Improved supplier selection process will improve productivity	J
SSIM3	Improved supplier selection process will promote high standard of working culture and work ethic	J
SSIM4	Improved supplier selection process will develop better planning and work coordination	J
SSIM5	Improved supplier selection process will create healthy market competitiveness	J
SSIM6	Improved supplier selection process will improve customer satisfaction	J
SSIM7	Improved supplier selection process will achieve cost savings	J
SSIM8	Improved supplier selection process will improve quality and services to the customer	J
SSIM9	Improved supplier selection process will meet internal and external	J
SSIM10	Improved supplier selection process will further enhance workers skills and knowledge	J

APPENDIX 4: Questionnaire

Brunel UNIVERSITY WEST LONDON

QUESTIONNAIRE ON SUPPLIER SELECTION IN TELECOMMUNICATIONS INDUSTRY IN MALAYSIA

Suzari Abdul Rahim
PhD Researcher
Room 355, Michael Sterling Building,
Brunel Business School, Brunel University,
UB8 3PH, Uxbridge, United Kingdom
Telephone: (44)-07504409569 Email:Suzari.AbdulRahim@brunel.ac.uk

Dear Team/respondents,

I am writing this letter to seek your help with my PhD research which I am currently pursuing at Brunel University in the UK. I will be very grateful if you could please complete this questionnaire on supplier selection process.

By completing this questionnaire, you agreeing to the use of this data as part of my doctoral studies on Supplier Selection and procurement process and as such by completing this questionnaire you are giving your consent to this study.

I am aware that your time is extremely valuable. I can only assure you that the result of this study will be useful for the telecommunication service provider organisation in Malaysia. This survey is anonymous; hence this survey does not require your name or address.

Staff who involve in evaluating and selecting suppliers for the company or for organisation should participate to complete this for the survey.

Please complete the questionnaire in full to the best of your knowledge. If you have any questions please contact me at my email address. Thank you once again for your help.

Sincerely,
Suzari Abdul Rahim

SECTION A: PERSONAL BACKGROUND

Instruction: Please tick (√) as appropriate

1. Gender
   - a) ☐ Male
   - b) ☐ Female

2. Ethnicity
   - a) ☐ Bumiputera
   - b) ☐ Chinese
   - c) ☐ Indian (*India*)
   - d) ☐ Other(Please specify_____)

3. Age
   - a) ☐ Less than 25 years
   - b) ☐ 26 – 30 years
   - c) ☐ 31 – 35 years
   - d) ☐ 36– 40 years
   - e) ☐ 41 – 45 years
   - f) ☐ 45 years and above

4. Current Position
   - a) ☐ Executive(e.g. Assistant Manager, New Executive)
   - b) ☐ Management (e.g. Manager, Assistant General Manager)
   - c) ☐ Senior Management (e.g. General Manager, Vice President and above)

5. Division/Unit
   - a) ☐ Technical/Engineering (e.g. Network development, operation maintenance*)*
   - b) ☐ Non Technical/Non Engineering(e.g. procurement, finance, business development)

6. Number of years in the Company
   - a) ☐ Less than 5 years
   - b) ☐ 5 - 10 years
   - c) ☐ 11 - 20 years

d) ☐ 20 and above

7. Number of employees in the organisation

a) ☐ *Less than 1000*
b) ☐ 1000 to 5000
c) ☐ More than 5000

8. Which of the following division do you think should be involved in the supplier selection process in your organisation?

a) ☐ User
b) ☐ Technical/Engineering
c) ☐ Procurement
d) ☐ Finance
e) ☐ Senior management
f) ☐ All of the above mentioned unit/division
g) ☐ It's every one's job
h) ☐ No one's job
i) ☐ Don't Know/Not applicable

SECTION B: TECHNOLOGIES AND QUALITY

To what extent do the following criteria/factors influence the supplier selection in relation to technology and quality of products/equipments/services in your organisation?

Instruction: **Please circle as appropriate about supplier selection criteria.**

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

1.	The product/equipment/service offered by the supplier fulfils the technical specifications and requirements of my organisation.	1 2 3 4 5
2.	The supplier offers the latest technological products.	1 2 3 4 5
3.	The supplier offers an acceptable products/equipments technical support.	1 2 3 4 5
4.	The supplier offers products /equipments warranty.	1 2 3 4 5
5.	The supplier offer reasonable life span of the product /equipment.	1 2 3 4 5
6.	The supplier offers training and support to use the products/equipments/services.	1 2 3 4 5
7.	The supplier offers a reliable products/ equipments/services.	1 2 3 4 5
8.	Our organisation is involved in product development with our suppliers.	1 2 3 4 5
9.	Each supplier should be certified and is compliant with relevant quality standards (E.g. BSI Kitemark, ISO).	1 2 3 4 5
10.	The supplier offers high quality standard of products/equipments/services.	1 2 3 4 5

SECTION C: PRICE AND COST

To what extent do you think the following criteria/factors influence the supplier selection in relation to price and cost of products/equipments/services in your organisation?

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

1.	The supplier must comply with the price schedule and payment terms as part of the agreed contract.	1 2 3 4 5
2.	The supplier charges for repairs/tendered projects works and engineering services are reasonable.	1 2 3 4 5
3.	The supplier offers a competitive products/equipments/services price.	1 2 3 4 5
4.	The spare part price/cost should be considered during the supplier selection process.	1 2 3 4 5
5.	The supplier clearly states the maintenance cost price for the warranty and post warranty period.	1 2 3 4 5
6.	The supplier should offer clear total cost of ownership.	1 2 3 4 5
7.	Any possible future price escalation within the contract period should be agreed before supplier is selected.	1 2 3 4 5
8.	Any future switching or hidden costs are considered and discussed during supplier selection process.	1 2 3 4 5

SECTION D: DELIVERY AND RESPONSIVENESS

To what extent do you think the following criteria/factors influence the supplier selection in relation to delivery and responsiveness of products/equipments/services in your organisation?

Instruction: **Please circle as appropriate about supplier selection criteria**.

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

1.	The supplier must be able to deliver the products/equipments/services in a timely manner.	1	2	3	4	5
2.	The supplier should comply with a fast response time in dealing with customer request (e.g. within 24 to 48 hours)**.**	1	2	3	4	5
3.	There is compliance with late delivery penalty charges imposed due to late delivery.	1	2	3	4	5
4.	There is compliance with the quantity requirement.	1	2	3	4	5
5.	There is compliance with the completion and ready for service/commission date.	1	2	3	4	5
6.	The supplier should offer short or reasonable product delivery lead times.	1	2	3	4	5
7.	The supplier uses appropriate production planning capability in order to accommodate the demand of our organisation.	1	2	3	4	5
8.	There is a clear hierarchical structure for escalating issues process.	1	2	3	4	5
9.	It is beneficial to have the supplier located close by to our organisation.	1	2	3	4	5

SECTION E: SUPPLIER RELATIONSHIP MANAGEMENT

To what extent do you think the following criteria/factors influence the supplier selection inrelation to managing supplier relationship of products/equipments/services in your organisation?

Instruction: **Please circle as appropriate about supplier selection criteria**.

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

1.	The supplier has experience supplying to the telecommunication industry.	1	2	3	4	5
2.	The supplier background, brand, reputation and performance to be considered before and as part of the supplier selection evaluation process.	1	2	3	4	5
3.	The supplier has track record and expertise in the telecoms industry.	1	2	3	4	5
4.	The supplier has willingness for establishing a partnership business relationship with our organisation.	1	2	3	4	5
5.	The supplier should be able to articulate their short term or long term business relationship with our company.	1	2	3	4	5
6.	The supplier should be able to provide an indication of their inventory control management procedures.	1	2	3	4	5
7.	As part of the Supplier Selection Process there should be a calculation on their financial stability and business practices.	1	2	3	4	5
8.	The supplier shows and offers a high commitment from their higher level management team.	1	2	3	4	5

SECTION F: DECISION MAKING TOOLS AND TECHNIQUES

To what extent do you think the following criteria/factors influence the supplier selection in relation to decision making tools and techniques of products/equipments/services in your organisation?

Instruction: **Please circle as appropriate about supplier selection criteria.**

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

1.	The supplier should have a relevant and up to date information system.	1 2 3 4 5
2.	There is a clear authorisation limit or level of authority within the supplier organisation.	1 2 3 4 5
3.	The Supplier should be evaluated based on appropriate decision making tools and techniques such as total cost of ownership, average hierarchy process etch.	1 2 3 4 5

SECTION G: GOVERNMENT POLICY

To what extent do you think the following criteria/factors influence the supplier selection in relation to company and government policy in your organisation?

Instruction: **Please circle as appropriate about supplier selection criteria**.

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

1.	The supplier follows Malaysian government rules and regulations.(e.g. Any purchases of product from Israel country is restricted).	1 2 3 4 5
2.	The supplier meets Local Authority rules and requirements (e.g. registered with PKK.CIDB).	1 2 3 4 5
3.	The supplier complies with all national and international legal and regulations**.**	1 2 3 4 5
4.	The supplier adheres with the procurement policy of my organisation.	1 2 3 4 5
5.	The supplier supports the national strategic Bumiputra agenda.	1 2 3 4 5
6.	The supplier must comply with national environmental guidelines (e.g. recycling, waste management).	1 2 3 4 5
7.	The supplier is in alignment with government procurement policies and guidelines (e.g. tax, trade, national agenda).	1 2 3 4 5
8.	The supplier must comply with recognised occupational safety and health procedures (e.g. NIOSH,IOSH).	1 2 3 4 5
9.	The supplier should bring for benefits to the country (e.g. financially, works skills. technology).	1 2 3 4 5
10.	The supplier must comply with all contract terms and conditions specified by our organisation.	1 2 3 4 5

SECTION H: BUSINESS ETHICS

What extent do you think the following criteria/factors influence the supplier selection in relation to business ethics in your organisation?

Instruction: **Please circle as appropriate about supplier selection criteria.**

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

1.	The supplier should be involved in any lobbying activities (e.g. tender project lobbying).	1	2	3	4	5
2.	The supplier should be involved in any canvassing activities (e.g. approach certain people to release some price information).	1	2	3	4	5
3.	The supplier should be practicing offering Gifts (e.g. supplier offer valuable gift in order to win the project).	1	2	3	4	5
4.	The supplier should be involved in bribery or corruption activities (e.g. offer "under table" money to win the tender/project).	1	2	3	4	5
5.	The supplier should be involved in any Inducement and rewards activities (e.g. supplier offer rewards with some percentage of money from total contract value in return to the awarded project).	1	2	3	4	5

SECTION I: SUPPLIER SELECTION

To what extent do you think the supplier selection is important to your company?

Instruction: Please circle as appropriate about supplier selection.

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

1.	I have clear understanding of what Supplier Selection is.	1 2 3 4 5
2.	It is important to have a process for selecting suppliers in my organisation.	1 2 3 4 5
3.	It is necessary to have knowledge about how the supplier evaluation and selection process work in the organisation.	1 2 3 4 5

SECTION J: SUPPLIER SELECTIONIMPACT

To what extent do you think the supplier selection may affect your company operational performance?

Instruction: Please circle as appropriate about supplier selection criteria.

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

1.	An improved supplier selection process will improve work efficiency.	1	2	3	4	5
2.	An improved supplier selection process will improve productivity.	1	2	3	4	5
3.	An improved supplier selection process will promote high standard of working culture and work ethic.	1	2	3	4	5
4.	An improved supplier selection process will develop better planning and work coordination.	1	2	3	4	5
5.	An improved supplier selection process will create healthy market competitiveness.	1	2	3	4	5
6.	An improved supplier selection process will improve customer satisfaction.	1	2	3	4	5
7.	An improved supplier selection process will achieve cost savings.	1	2	3	4	5
8.	An improved supplier selection process will improve quality and services to the customer.	1	2	3	4	5
9.	An improved supplier selection process will meet internal and external customer needs and requirements.	1	2	3	4	5
10.	An improved supplier selection process will further enhance workers skills and knowledge.	1	2	3	4	5

Other comments:

_____
_____
_____
_____
_____
_____
_____

APPENDIX 5: Procurement Red Book (Government of Malaysia Procurement Guidelines)

IMPROVING GLC PROCUREMENT IS IMPORTANT (II)
Current GLC Procurement Practices Lag Best Practice

Key issues identified(1)	Examples
RESTRICTIVE GOVERNMENT GUIDELINES	• Treasury Circular Letters (TCLs) prohibit use of electronic purchase methods • For certain products, GLCs are only allowed to use a prescribed set of suppliers
PAYING ABOVE MARKET PRICES	• Lack of market intelligence on suppliers and products • Use of 'lowest cost technically acceptable' approach and not total cost of ownership (TCO)
LONG CYCLE TIMES	• High percentage of purchases through typically time consuming open tenders • Slow adoption of e-procurement technologies
EXISTENCE OF COLLUSION AND CORRUPTION	• Frequent tender information leaks often results in intense and (at times) unethical lobbying by suppliers • Specification management process "hijacked" to pre-select a specific supplier
WEAK PROCUREMENT ORGANISATION	• Organised as an administrative function rather than one of strategic relevance • Usually under resourced with gaps in commercial and analytical capabilities
POOR SUPPLIER MANAGEMENT	• Supplier performance not tracked and managed • Vendor programmes not structured to develop competitive Bumiputera vendors

(1) Issues list not exhaustive
Source: GLC and supplier interviews

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GLCs HAVE REALISED SIGNIFICANT BENEFITS FROM IMPROVED PROCUREMENT

Selected Examples

Category Of Procurement Improvement	Company	Initiatives	Benefits
1 Realise cost savings	TM	• Aggregated demand • Intensified supplier competition	RM130Mn or 20% in savings
2 Reduce procurement cycle time	TM	• Introduced differentiated purchase methods • Conducted non-core processes in parallel	25% reduction in cycle time
3 Enhance supplier management	PETRONAS	• Implemented structured process to register, track and graduate vendors	20 vendors graduated, several are now regionally competitive

RED BOOK GUIDED BY THREE PRINCIPLES

1. The Red Book is the primary procurement guideline for GLCs
2. Adoption of the Red Book guidelines (including any variation in, or non-compliance of the guidelines) should be in accordance with best practice corporate governance, i.e., any Red Book guideline adopted must first be ratified by GLC Boards
3. To ensure Red Book guidelines are adhered to by GLCs, clear GLC CEO targets should be set, tracked and reported to GLC Board on a quarterly basis

RED BOOK APPROACH IN SUPPORT FOR LOCAL AND BUMIPUTERA CONTENT

Red Book guidelines

Set optimal spend targets and communicate to PCG via GLICs
- % spend for local content
- % spend for Bumiputera content (including vendor development programmes)

GLC targets should take into consideration (list not exhaustive)
- GLC type and size of purchases
- Availability and cost of local products and Bumiputera suppliers
- Current and potential spend levels

The GLC Board may from time to time, set increases in target spend for respective GLCs

Key implications

Critical for GLCs to understand for the products that they buy, what can be sourced
- Locally (with local content)
- From genuine Bumiputera vendors
- From foreign vendors

To meet national development objective of increasing local content and genuine Bumiputera content, GLCs could manage the spend levels across various categories as a portfolio

Required implementation steps

Clear definitions on
- Local content
- Genuine Bumiputera vendor

A proven approach to ascertain local products and genuine Bumiputera vendors

Tools to help determine the optimal spend levels for a GLC

BEST PRACTICES COVERED BY RED BOOK ARE COMPREHENSIVE

KEY OBJECTIVES OF RED BOOK GUIDELINES	DESCRIPTION
MINIMISE TCO	• Reduce total cost of products procured, resulting in initial and on-going cost savings • Hence, the cheapest bid may not necessarily be the most cost effective over the life of the product
ENSURE EFFICIENT PROCUREMENT CYCLE TIMES	• Enhance procurement unit effectiveness by consistently delivering products requisitioned in a timely and efficient manner, resulting in, for example, reduced downtime, additional revenues and enhanced competitive responsiveness
ENHANCE TRANSPARENCY AND ERADICATE CORRUPTION	• Minimise "black boxes" in the procurement process by adopting a clear disclosure policy and leveraging e-procurement where possible • Cultivate an ethical working environment that will reduce graft, enable products to be purchased at competitive market prices, and ultimately improve profitability
ENHANCE ORGANISATION CAPABILITIES AND GOVERNANCE	• Develop a strong in-house procurement unit to support the company's long term profitability objectives • In addition, establish robust mechanisms to ensure agreed practices and processes are adhered to
DEVELOP A STABLE AND COMPETITIVE SUPPLIER BASE	• Build strong, long-term relationships with strategic suppliers and help develop local vendors • Use continuous evaluation and feedback to drive down costs and improve quality and service • Support government policy by helping to develop capable Bumiputera vendors

Source: Red Book team

RED BOOK PROPOSES CLEAR IMPLEMENTATION ACTIVITIES TO INITIATE CHANGE IN GLC PROCUREMENT

	Implementation guide/activities
BOARD	• Revise procurement policy to - set high level target spend for local products - set high level target spend for Bumiputera vendors - determine need to establish a Bumiputera Vendor Development Programme Set CEO targets on adherence to the Red Book • Elevate Head of Procurement to a reporting line no more than 2 levels below the CEO and ensure that incumbent has the requisite skill set and capabilities
CEO	• Determine priority of procurement initiative and implications for organisation • Appoint an internal project champion • Validate initial procurement assessment and determine procurement priorities • Approve high level timelines, targets and reporting frequency • Communicate initiative to the organisation • Secure Board approval
CPO AND PROCURE-MENT UNIT	• Conduct self assessment(s) to determine level of procurement maturity and gaps to best practices • Design a procurement program based on the self assessment and program may either be a comprehensive transformation or a set of focused initiatives

Source: Red Book

EXAMPLE: POTENTIAL QUICK-WIN POLICY ENABLERS TO ENHANCE TRANSPARENCY

Module 5

EXAMPLE OF POTENTIAL INITIATIVES	DESCRIPTION
CODES OF CONDUCT	**Establish standards of behaviour for all participants in the supply chain, inline with overall company policies on business ethics** **Where possible, institutionalise the codes of conduct into supplier contracts and employment terms**
INCREASE PROCESS TRANSPARENCY	**Establish policy on required level of documentation for key decisions and policy on disclosure of information**
ESTABLISH SECURE COMMUNICATION CHANNELS	**Establish a secure communication channel or a whistle-blower policy, to encourage self-policing**

TEN STEP CHECKLIST TO SUPPORT NATIONAL DEVELOPMENT OBJECTIVES

1 SET DEFINITIONS	2 DETERMINE NET PROCUREMENT SPEND	3 DETERMINE SUPPLIER CONCENTRATION	4 DETERMINE KEY PRODUCT CATEGORIES WITHIN 80% OF NET PROCUREMENT SPEND	5 FOR EACH KEY PRODUCT CATEGORY, DETERMINE BUMIPUTERA VS. NON-BUMIPUTERA SPLIT
Use Red Book as a guide to set acceptable definition for genuine Bumiputera vendors and local content Determine approach to determine genuine Bumiputera vendors	Extract procurement spend data from existing company database Adjust total procurement spend to exclude, for example • Internal transfer pricing transactions • Regulated costs	Identify supplier concentration for Net Procurement Spend, for example • Include only top 80% of spend by top suppliers for further analysis	Identify top product categories for 80% of Net Procurement Spend	Segment 80% of Net Procurement Spend by product category and supplier type

6 SELECT VENDORS FOR INTERVIEWS	7 CONDUCT SITE VISITS AND INTERVIEWS	8 ANALYSE INTERVIEW RESULTS	9 COMPUTE SPEND TARGETS	10 DEVELOP CATEGORY PURCHASING STRATEGIES TO MEET SPEND TARGETS
Select top 80% vendors based on supplier concentration analysis These selected vendors should ideally cover the key product categories	Visit the vendors' premises to collate data, assess vendors' capacities and capabilities, and interview their management teams	Based on interview results, determine • Local and Bumiputera content • Price premium • Non-genuine Bumiputera vendors Compare findings with results from desktop analysis (step 5)	Understand the cost of supporting local and Bumiputera content to the GLC Identify optimal spend targets for the GLC • Local spend target • Bumiputera spend target	Prioritise purchasing categories for implementation For prioritised categories, develop purchasing strategies to increase local /Bumiputera content or reduce price premiums

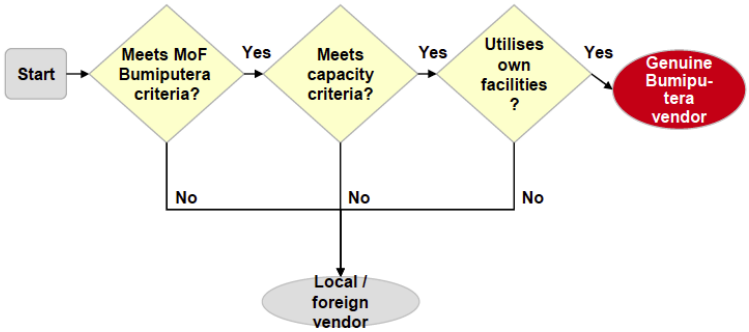
PROPOSED DEFINITION FOR GENUINE BUMIPUTERA VENDORS AND LOCAL CONTENT FROM GENUINE BUMIPUTERA VENDORS

Criteria for a "genuine" Bumiputera vendor

Test ownership
- ≥51% of equity, Board members and employees are Bumiputeras
- Key posts and finances controlled by Bumiputeras
- Other MoF criteria

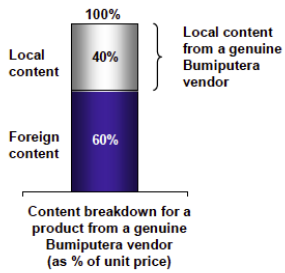
Capacity test to ensure that suppliers have required premises, equipment and employees to perform key functions

Test to ensure suppliers utilise their own capacities and capabilities to add value to the product



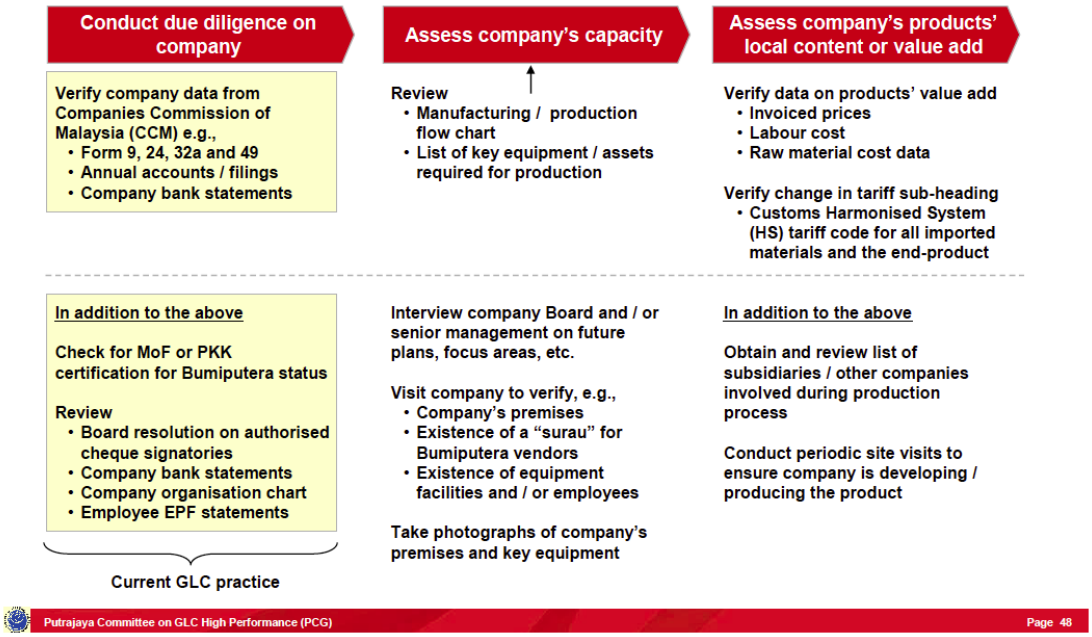
Determining local content from a genuine Bumiputera vendor

Value of local content includes cost of local materials, labour costs, overheads (including depreciation) and profits (similar to definition used by MITI to determine product origin)



Content breakdown for a product from a genuine Bumiputera vendor (as % of unit price)

OVERVIEW OF VERIFICATION PROCEDURES THAT SHOULD BE CONDUCTED DURING VENDOR INTERVIEWS



PUTRAJAYA COMMITTEE ★ GLC HIGH PERFORMANCE ★

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