

Supplier Selection: A case study of Malaysian manufacturing industry.

SUPPLIER SELECTION: A CASE STUDY OF  
MALAYSIAN MANUFACTURING INDUSTRY.

TAI CHEE HONG 1900694

MASTER OF BUSINESS ADMINISTRATION (MBA)

UNIVERSITI TUNKU ABDUL RAHMAN

FACULTY OF ACCOUNTANCY AND  
MANAGEMENT

MAY 2022

Supplier Selection: A case study of Malaysian manufacturing industry.

**SUPPLIER SELECTION: A CASE STUDY OF  
MALAYSIAN MANUFACTURING INDUSTRY.**

**TAI CHEE HONG**

**A RESEARCH PROJECT SUBMITTED IN PARTIAL  
FULFILMENT OF THE REQUIREMENT FOR THE  
DEGREE OF**

**MASTER OF BUSINESS ADMINISTRATION (MBA)**

**UNIVERSITI TUNKU ABDUL RAHMAN**

**FACULTY OF ACCOUNTANCY AND  
MANAGEMENT**

**MAY 2022**

**SUPPLIER SELECTION: A CASE STUDY OF  
MALAYSIAN MANUFACTURING INDUSTRY.**

**BY**

**TAI CHEE HONG**

**THE RESEARCH PROJECT IS SUPERVISED BY:**

**DR FOO MEOW YEE**

**DEPUTY DEAN**

**STUDENT DEVELOPMENT AND INDUSTRIAL  
TRAINING**

**FACULTY OF ACCOUNTANCY AND  
MANAGEMENT**

## Contents

<b>1.0 Introduction</b> .....	1
<b>1.1 Background of the study</b> .....	2
<b>1.2 Overview the Manufacturing PMI Malaysia</b> .....	4
<b>1.3 Problem Statement</b> .....	5
<b>1.4 Research Objective</b> .....	7
<b>1.6 Significance of study</b> .....	8
<b>1.7 Conclusion</b> .....	9
<b>2.0 Literature Review</b> .....	10
<b>2.1 Supply Chain Management (SCM)</b> .....	10
<b>2.2 Supplier Selection Process</b> .....	11
<b>2.3 Dependent Variable: Supplier and Firm Performances</b> .....	13
<b>2.3.1 Establishment of evaluation criteria and indicators for supplier selection</b> .....	13
<b>2.4 Criteria of supplier selection</b> .....	14
<b>2.4.1 Pricing and Costing</b> .....	15
<b>2.4.2 Delivery Performance</b> .....	16
<b>2.4.3 Quality of products and services</b> .....	17
<b>2.4.4 Buyer-sellers' relationship</b> .....	18
<b>2.4.5 Suppliers' Reputation</b> .....	19
<b>Chapter 3 Methodology</b> .....	21
<b>3.0 Introduction</b> .....	21
<b>3.1 Research design</b> .....	21
<b>3.2 Data Collection Method</b> .....	22
<b>3.2.1 Target Population</b> .....	22
<b>3.2.2 Sampling Frame and Sampling Location</b> .....	22
<b>3.2.3 Sampling Techniques</b> .....	22
<b>3.3 Sample Size</b> .....	23
<b>3.4 Data Collection Method</b> .....	23
<b>3.4.1 Primary Data</b> .....	23
<b>3.4.2 Secondary Data</b> .....	23
<b>3.5 Research Instrument</b> .....	24
<b>3.5.1 Objective of Questionnaire</b> .....	24
<b>3.5.2 Questionnaire Design</b> .....	24
<b>3.6 Pre-Test and Pilot test</b> .....	25
<b>3.7 Construct Measurement</b> .....	26

3.7.1 Origin of Construct.....	26
3.8 Data Processing.....	28
3.8.1 Questionnaire Checking.....	28
3.8.2 Prevent missing value.....	28
3.8.3 Data Editing.....	28
3.8.4 Data Coding.....	29
3.8.5 Data Transcribing.....	29
3.8.6 Data Cleaning.....	29
3.9 Data Analysis.....	29
3.9.1 Descriptive Analysis.....	29
3.10 Scale Measurement.....	30
3.10.1 Reliability Test.....	30
3.11 Inference Analysis.....	30
3.11.1 Normality Test.....	30
3.11.2 Multiple Linear Regression.....	30
3.12 Hypothesis developments.....	32
3.13 Conceptual Framework.....	33
3.14 Conclusion.....	34
Chapter 4 Data Analysis.....	35
4.0 Introduction.....	35
4.1 Descriptive Analysis (Personal Information & General Profile of Company).....	35
4.3 Missing Data.....	42
4.4 Outlier.....	42
4.5 Normality, Linearity and Homoscedasticity.....	44
4.5.1 Normality (Kolmogorov-Smirnov).....	44
4.5.2 Linearity (Pearson's Correlations).....	45
4.5.3 Homoscedasticity.....	46
4.5.4 Multicollinearity.....	49
4.6 Factor analysis.....	50
4.6.1 Exploratory Factor Analysis.....	50
4.6.2 Eigenvalues.....	51
4.6.3 Screen Plot.....	53
4.6.4 Kaiser-Meyer-Olkin.....	54
4.6.5 Factor Loading Based on Rotated Component Matrix.....	55
4.7 Reliability Test- Cronbach's Alpha.....	56
4.7.1 Variable: Price and Cost.....	56

4.7.2 Variable: Delivery Performance.....	57
4.7.3 Variable: Quality of products .....	57
4.7.4 Variable: Buyer-Sellers' Relationship.....	58
4.7.5 Variable: Suppliers' Reputation.....	58
4.7.6 Variable: Supplier and Firm Performance.....	59
4.8 Multiple Regression Analysis.....	60
4.9 Analysis Hypothesis.....	63
<b>Chapter 5: Summary, Findings and Recommendation .....</b>	<b>65</b>
5.0 Introduction.....	65
5.1 Contribute to Theoretical Implications.....	65
5.2 Discuss of Major Findings.....	67
5.3 Managerial Implication.....	71
5.4 Limitation of the study.....	72
5.4.1 Time constrains of data collection .....	72
5.4.2 Low respond rate from targeted population.....	73
5.4.3 Questionnaire development.....	73
5.5 Recommendation .....	73
5.5.1 Develop of open-ended question into the questionnaire.....	73
5.5.2 Improve the respondent rate through social media .....	73
5.6 Conclusion.....	74
6.0 Reference.....	75
7.0 Appendix.....	84

## **1.0 Introduction**

Supply Chain Management (SCM) plays a crucial part in each of the companies nowadays. Some researcher mentions that adopt an effective Supply Chain Management (SCM) able to support their different manufacturing goals like adaptability, cost, quality and delivery (Wacker, 1996). The literature review shows purchasing function have advanced into the essential jobs and business partnership for firm sustainability (Antony Paulraja, 2006). One of the most well-known topics of SCM study is supplier selection. This study is to investigate what are the criteria for the supplier selection have a vital relationship impact the supplier and firm performance among the manufacturing industries in Malaysia. Also, we will determine that what are the procurement department priority to concern to select their suppliers to improve their firm and suppliers' performance through conduct a survey with some questionnaires before award the order to their vendors especially during Covid-19 pandemic currently due to there are many unexpected government policies will introduce to the citizen that will affect the whole operation of the market. Based on the study from Chowdhury, (2021) and Ivanov, (2021) mention that the COVID-19 pandemic has impacted huge number of individuals around the world and brought about uncommon supply chain disturbances, for example, weaknesses in lead times and request amounts, structural interruptions and extreme interest vacillations.

Besides that, there are many of the organizations agreed that suppliers are the parties who play an important role that will affects the core competencies and revenue of the company, hence the companies' management have significantly relied on suppliers to maintain the sustainability growth of the companies. Furthermore, supplier selection is also important that the buying organization must incorporate into their strategic process. Moreover, there have many past researchers have done the research regarding the supplier selection, however there is no standard or criteria that the buying firm should follow to assess and choosing their vendors. Therefore, understanding and justifying the critical factors of supplier selection impact the supplier and firm performance for a buying firm among the manufacturing industry in Malaysia is getting more important nowadays especially during the pandemic of Covid-19 and the researcher may carry out this study to examine what are the factors of supplier selection have a significant

relationship to impact the supplier and firm performance among the manufacturing industry in Malaysia.

Therefore, we will be censoring and overview the purchasing strategic from the purchase firm among the manufacturing industry in Malaysia are implementing especially after the total lockdown period due to increasing cases of Covid-19 since 1<sup>st</sup> of June 2021 through conduct a brief description on the background of study for this research.

### **1.1 Background of the study**

Choice of the suitable supplier is more indispensable than the accomplishment of the entire manufacturing networks (Tan V. R., 2010). As we know that, the roles of the procurement department in each of the companies are involving in the sourcing and supporting their production line through arrangement of logistic on the raw materials, equipment, machinery and other items to ensure that the working progress are always meet the schedule requirement and also able to achieve the standard of quality of output from their clients and the shareholder in the company. Besides that, the procurement department need to always ensure that the quality of the material is always fulfil the requirement from their production department, so that their output products can achieve the satisfaction from their customers and maintain the loyalty of their existing clients especially in the manufacturing industry.

According to the study from Van Weele (2015), they had constructed a purchasing model follow by few of the steps: identify the needs, picking the vendors, reaching a fair price, indicating agreements (contract), issuing the purchase order (PO), and make sure delivery as per requested. Those process is involved supplier selection as one of the most important steps in the procurement process.



Supplier Selection: A case study of Malaysian manufacturing industry.

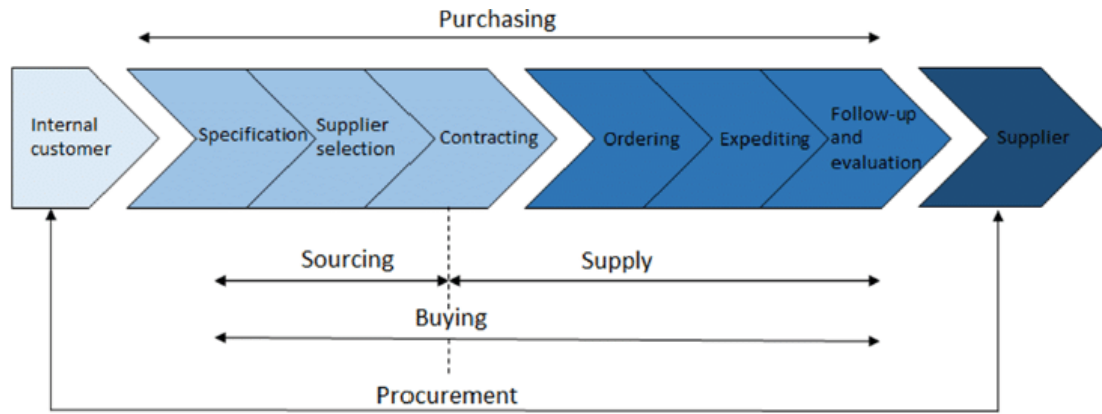


Figure 1: Process model of purchasing and relationship with each other (Van Weele, 2015)

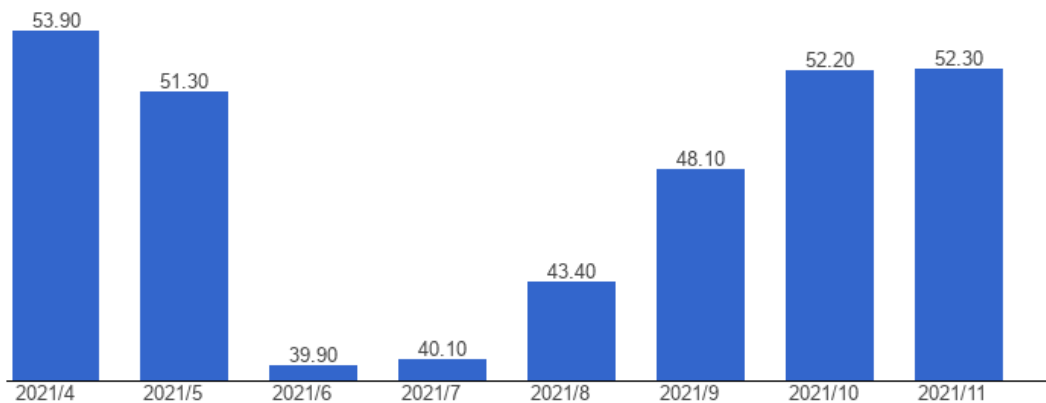
There are many of researchers have done their research regarding on the influence of Covid-19 pandemic on supply chain (Belhadi, 2021); (Choi T. Y., 2020); (Chowdhury, 2017); (Goodarzian, 2021); (Karmaker, 2021); (Kumar, 2021); (Majumdar, 2020); (Nagurney, 2021). We will investigate factors of the supplier selection that will impact the supplier and firm performance among the Malaysian manufacturing industries by carry on a survey questionnaire for the data collection. A series of recent studies has indicated that there are many of the companies are focus on supplier selection process in purchasing activity since they are reliable on their suppliers to supply goods and provide delivery services which were previously provided in-house in order to specialize and concentrate on their competencies (Tookey, 2011). In sprit of the volume of exploration, especially in the space of supplier selection, little endeavour has been had to distinguish the effect of the vendor selection determination and evaluation on the purchasing organization’s business performance. According to the study from (Mark A. Vonderembse, 1999) concluded that purchasing manager with the aim of deciding the degree which manufacturing companies utilized different vendor selection and supplier contribution strategies, and how to influence manufacturing performance. While there was broad utilization of the supplier selection criteria introduced, the equivalent was not valid for vendor selection. The target of this study is to look at the criterial of vendor choice effect the supplier and firm performance among the manufacturing business in Malaysia and justifying what are the critical factors that have significant relationship impact the supplier and firm performance among the manufacturing industry in Malaysia especially during the pandemic of Covid-19 that affected the operation and the profit of the company. In addition, we will discuss that the PMI (Purchasing Managers’ Index) between the month of April 2021 to November

2021 to support the motive that we decided to choose this topic as our research at the moment.

## **1.2 Overview the Manufacturing PMI Malaysia**

The purpose of the Manufacturing Purchasing Manager Index (PMI) Malaysia is to measure the performance of the manufacturing sector and it had collected the feedback from the survey among 450 manufacturing companies. Based on the result which construct from Markit Economic sources from The Global Economy.com. The Manufacturing PMI Malaysia combine from five independent indexes with the following weight:

1. New Order (30%)
2. Output (25%)
3. Employment (20%)
4. Suppliers' Delivery Times (15%)
5. Stock of Item Purchased (10%)



*Figure 2: Chart of PMI from 04/2021-11/2021.*

*(Sources from: [https://www.theglobaleconomy.com/Malaysia/pmi\\_manufacturing](https://www.theglobaleconomy.com/Malaysia/pmi_manufacturing))*

According to the chart above, we can see that the current rate of the Manufacturing PMI fall on 39.9 which is the lowest point since April 2021 due to the reason of the increasing case of Covid-19 and the announcement from the Malaysian government regarding the Standard Operating Procedure (SOP) depends on each stage of the National Recovery Plan. Through the percentage from the five individual indexes, we can know that the output and new orders moderated the most since the pandemic of Covid-19 emerged in April 2021.

Another statement from the source of online article on The Edge Markets (2021) point out that HIS Market chief business economist Chris Williamson agrees that the statement regarding Malaysia's manufacturers reported an updated downturn in June due to increase cases of Covid-19 and each of the Standard Operation Standard (SOP) reintroduced by government Malaysia during the National Recovery Plan Malaysia are tend to deaden the demand, hinder production and disrupted supply chain.

Consequently, based on the chart result from the Manufacturing PMI Malaysia, it can be indicated that the index is influenced and dropped compare to the previous quarter index due to the increases cases of Covid-19 and the announcement of Standard Operation Process (SOP) from the government Malaysia along the National Recovery Plan. Hence, the performance of the manufacturing industries has much affected during the pandemic moment currently. Thus, each of the industries need to well control their operating cost to minimize the loss and procurement department is also play a vital role to control the costing among the other department in the company through widely choosing their suppliers as business partner who always supply their goods and services to meet the requirement from the production line shortly. Besides that, we will investigate and conduct a survey to determine what factors that will impact the decision making in supplier selection.

### **1.3 Problem Statement**

In the procurement literature, one such essential and well-researched area is supplier selection. The variety of these criteria demonstrates how different variables have been chosen by purchasing managers depending on the purchasing situation and what are the indicators as measurement that the buying organization to evaluate their supplier and firm performance. It is important to understand what are the criteria that the buying organization from the manufacturing industry in Malaysia assess and choosing their suppliers to maintain the substantiality and performance of the company especially during the pandemic of Covid-19. Besides that, there are some of the past researchers were conducting critical criteria of supplier selection that will impact the supplier and firm performance among the manufacturing industry. Hence, we have chosen five of the supplier selection criteria (Pricing and costing; Delivery Performance; Quality of products and services; Buyer-sellers' relationship and Supplier's Reputation) as our independent variables and we need to find out each of the constrain and limitation that can be carry out in this study.

### Supplier Selection: A case study of Malaysian manufacturing industry.

Firstly, price and costing is one of the criteria that we are concern in this study. This is because these criteria consider as one of common factor which there have many past researchers have discuss on their supplier selection study and had find out some of the limitation and challenges that had encounter in their study. Based on the study conducted by Nydick & Hill (1992) highlighted those businesses must take into account a variety of aspects, not only pricing and product quality when evaluating potential suppliers. Hence, this can mention that the price and costing is not the most important criteria of supplier selection and the buyer need to consider other such as delivery performance, quality of the products and services. Secondly, delivery performance is also one of the criteria that we need to investigate whether there has any relationship to impact the supplier and firm performance among the manufacturing industry in Malaysia. According from the study from Rohit Verma (1998) conclude that the sample of purchasing manager in their study allot more weight to cost and delivery performance attributes than quality of the products and services during the supplier selection process. Another author suggests that purchasing manager should concentrate on the brunch of supplier selection factors that assesses vendors across various aspect such as cost and pricing, delivery performance and quality of products and this can lead to enhance the firm and supplier performance and also their supplier have a clear direction that what are the criteria that their customers priority concern for before award the purchase order (Chan K. Hahn, 1990). Hence, it cannot be denied that quality of the products and services is also one of the common factors that many past researchers are carried out on their study and we need to find out that quality of product and services have positive relationship to impact the supplier and firm performance among the manufacturing industry in Malaysia. Lastly, those three criteria are important to study whether have significant relationship to influence the supplier and firm performance among the manufacturing industry in Malaysia.

Next is the buyer-seller relationship and suppliers' reputation are added as the criteria of supplier selection in this study. Although those two criteria not common as the above factors (pricing, delivery performance and quality) but there are also some of the prior authors had suggest that buyer-seller relationship and suppliers' reputation can consider as factors in supplier selection. According from the study from Bernhard Lienland (2003) pointed out that suppliers' reputation is an undervalue factor in supplier selection and suggest to increase focus on reputation in the future survey and vendor selection approaches. Thus, we need to determine that suppliers' reputation have a

positive or negative relationship to impact the firm and supplier performance among the manufacturing industry in Malaysia. For the buyer-sellers' relationship there are some past researcher such as Vijay R.Kanan (2006) have recognized that there have little evidences exists regarding how buyer-seller relationship as the criteria of supplier selection and how buyer-sellers' relationship affect more extensive measure of the buying firm's performance. Hence, we have chosen buyer-seller relationship as one of our independent variables in this study to investigsate whether buyer-seller relationship have a positive or negative significant relationship to impact the firm and supplier performance among the producing business in Malaysia.

In this study, we will only focus on five supplier selection criteria (cost and pricing; quality; delivery performance; buyer-sellers' relationship and suppliers' reputation) as the independent variables and determine whether those supplier selection criteria have a significant relationship between impact of the firm and suppliers' performance among the manufacturing industry in Malaysia.

#### **1.4 Research Objective**

The purpose of this study is to investigate and determine factors which have a significant relationship that impact the firm and suppliers' performance among the manufacturing industry in Malaysia during the pandemic of Covid-19 currently. Therefore, the objective of this study area carrying on:

1. Identifying and investigate the significant criteria that affects the firm and suppliers' performance by carry out a broad literature review which lay out the breach in the writing.
2. To construct model to investigate the relationship between those factors that lead to supplier selection impact the supplier and firm performance among the manufacturing industry in Malaysia.
3. Utilize every accumulated datum and examination that has been recovered from fundamental survey to explore the effect of supplier selection.
4. To construct and investigate the model of supplier selection criteria in the manufacturing industries in Malaysia by taking a look at the questionnaire survey data collecting.

## **1.5 Research Question**

There are some of the authors such as (Dickson G. , 1966); (Ellram, 1991); (Tracey, 2001) had investigated the link between supplier evaluation and contribution to corporate efficiency and overall performance. Having suitable vendor determination measures will prompt the choice of the right vendors, which will influence on the organization's performance and core competence.

Providing the significant of supplier determination, the accompanying inquiries have been perceived as waiting be tended to. The following research issues will be addressed in this project.

1. Do pricing and costing have significant relationship to impact the supplier and firm performance?
2. Do delivery performance have significant relationship to impact the supplier and firm performance?
3. Do quality of products and services have significant relationship to impact the supplier and firm performance?
4. Do buyer-sellers' relationship have significant relationship to impact the supplier and firm performance?
5. Do suppliers' reputation influence have significant relationship to impact the supplier and firm performances?

To overcome the research question as shown on above, a coupled of theories are created. The details of the hypothesis are carrying out further in Chapter Two. The outcomes of testing hypothesis, and the analysis of the key facts, enable possible replies to encompass the substance of the questions above.

## **1.6 Significance of study**

In progressively serious and globalized world business sectors especially during the pandemic moment of Covid-19, most of the organization are cutting down their operating and administrative costing to sustains their business and survive in the market. Supplier selection is one of a significant purchasing process in many companies especially in manufacturing industry company. Since there are many buying firms are looking for lower price, high quality of products, punctual delivery and good after sales services, hence those criterial plays an important role that the buying organization will evaluate and assess before award the order to that particular vendor. Therefore, a

productive supplier selection process should be set up and of fundamental significance for successful supply chain management. The significant of this study is to analysis what are the factors that manufacturing buying companies in Malaysia are priority concern during the supplier selection process to select the appropriate vendors who always able to support their production line. Besides that, we also need to determine that what are those indicators that the manufacturing industries of buying firm are looking for to measure their firm and supplier performance.

We need to develop five of the supplier selection criteria as independent variable through literature review those past researchers' studies and we need to construct those indicators from the independent variables accordingly as the measurement of the dependent variable in this study. Hence, primary data is important information that we need to get through the result of the questionnaire which distribute to participants, so that we are able to analysis the result from the respondent and can achieve the purpose that why we choose this topic as our research studies.

## **1.7 Conclusion**

In this chapter we will talk about the history and purpose of research on important factors for choosing suppliers impact the supplier and firm performance among the manufacturing industry in Malaysia. Those factors of supplier selection that we will carry out as our independent variables are pricing and costing, delivery performance, quality of products and services, buyer-sellers' relationship and suppliers' reputation and justify there have positive or negative relationship impact the supplier and firm performance among the manufacturing industry in Malaysia.

## **2.0 Literature Review**

### **2.1 Supply Chain Management (SCM)**

Supply Chain Management (SCM) can be defined as a systematic which can show as the flow of material supplier through the manufacturers or services providers and then the end user. It is a coordinated approach that starts with arranging and involves control of material, logistic, services and information (Fantazy, 2010). Previous research showed Supply Chain Management (SCM) is significant due to deep influence suppliers have on cost incurred by buyers within the supply chain and the quality of these firms' end products (Chen J.-l. Z., 2013) Besides that, studies from Jones,C. (1989) are well documented, it is also well acknowledged that Supply Chain Management(SCM) act for a networking of company interacting to hand over products or services to the end user, joining flow from raw material supply to finished product. Nevertheless, a number of authors have recognized Supply Chain Management (SCM) had overcome this new management philosophy through filled with buzzword such as: coordinated buying procedure, incorporated planned operations, supplier joining, purchaser vendor cooperation, supply base administration, key vendor unions, store network synchronization supply chain management (Tan K. H., 1998a); (New S. , 1997); (La Londe, 1994). However, there have no clear description on supply chain management or its activities in the literature (New, 1997). According from the study of Lisa M. Ellram (1991) mentions that the limitation that can be found on her research is want to carry out the goal of supply chain management that connect the entire channel, from supplier to end-user. However, the notion of supply chain management are challenging to understand of its enormous scope and scope of application. The most difficult aspect of study has been conceiving the supply chain management idea.

#### **2.1.1 Supply Chain Management (SCM) in Manufacturing Industry**

There are some of authors had applied Supply Chain Management (SCM) to support in the manufacturing and construction industries. Previous study had shown that SCM can provide a sustainable competitive advantage by empowering the manufacturer to their clients by upgrading products offering and services while mitigate costing at the same time (Davis, 1993). Besides that, SCM is a concept that start and thrive in manufacturing industry. Prior research showed the first implementation of SCM can be found in the Just-In-Time (JIT) delivery system as one of a part in Toyota Production



System (Shingo, 1998). The purpose of this system is to control the logistic process in the Toyota motor factory to ensure the right items, accurate quantity, maintain the level of stocks and successfully manage supplier's cooperation with the production line. Besides that, supply chain management also can carry out the quality control through the literature review shows that working closely together with vendors as a business partner in long-term relationship of loyalty and trust may enhance the quality of products and mitigate costing of output (Deming, 1982). Some authors have also suggested that supply chain management as the chain interacting each part of the manufacturing and supply process from raw material through final product, broad in scope few organizational limit. According this wide definition, supply chain management include the entire value chain and located inventories and supply management from taking out of raw material to its usage. (Scott, 1991); (New S. P., 1995).

## **2.2 Supplier Selection Process**

Supplier selection can define as boundless circumstances and elements used to assess the capacities of providers and choosing the circumstances for long term competitive advantages for the buying firm (Thomas Y. Choi, 1996); (Vonderemse, 1999). In addition, supplier selection also can define as involving the capabilities if vendors act as key resources in the improvement of the ability and performance of a purchaser (Ying Liao, 2010). Supplier determinations connect with ecological purchasing management have turned into the vital component and principal driver for organization sustainability (Gurel, Acar, Onden, & Gumus, 2015) Based on the study from (Li C. C., 1997) supplier selection is multi-attribute decision making process in which purchasing manager declare their choice between different suppliers or vendor attributes, which are subsequently applied to rank and pick suppliers. Besides that, the literature review shows that an effective selecting and assessment vendors and dealing with their contribution in the supply chain are through to be potentiality that cause manufacturer to achieve the four dimension of customer satisfaction: competitive pricing, product quality, product variety and delivery services. (Morgan.J, 1996); (Quinn, 1997); (Narasimhan, 1998); (Mihaly, 1999); (Poirier, 1999)

According to the study from Cooper and Eillram (1993) mentions that the procurement department not only focus on purchase things but they become relationship administrator; expediting decision making by carry out related parties internal and

external to the company. On the other hands, there are some of the past researches such as (Bregman, 1995); (Mason, 1996); (Krause D. , 1997); (Roos, 1998); (Degraeve, 1999) agree that those buying organization have liability of selecting suppliers within the framework of achieving system-wide goals rather than mitigating cost while another set of researchers are in charge of forming and maintaining long-term strategic alliances with the vendors. Based on the result from the (Monge, 2003) prove that it is possible to clear that supplier selection process is the most important aspect affecting supplier management. However, the researcher also notes that inadequate or non-existent documentation and recording of materials, standards, supplier quality programmes, and raw material alternatives is a major issue that occurs during the supplier selection process.

Over time, an extensive literature has developed the supplier selection process through collecting feedback from 170 unit of purchasing manager who having the membership from the National Association of Purchasing Managers and able identified that there are relative relevance of quality, pricing, delivery performance, and other supplier qualities has been assessed by the writes (Dickson 1966); (Cardozo, 1971); (Chapman S. N., 1993); (Chapman S. N., 1990); (Dempsey, 1978); (Hakansson, 1975); (Monczka, 1981); (Wagner, 1989). Moreover, some study determine that quality was the most important factor based on the review from 74 articles which discussing supplier selection criteria, following by shipping quality and price (Weber, 1991).

A recent study conducts by Verma Rohit (1998) list out that in the term of supplier selection literature, there is a wealth of information available in conceptual framework and decision support method of purchase. However, there have no article cited in the study of Rohit regarding how the purchasing manager accurate choosing their vendors due to previous empirical studies have relied on managers' assessment of the perceived important of various suppliers. Furthermore, the researcher also agree that an actual supplier selection is assessing the qualities of suppliers based on their traits and picking one or more providers who adequately suit the firm's expectations. Last but not least, some authors such as (Zsidisin, 2001), (Chen I. P., 2004) have also suggested that individual purchasing is urged to settle on savvier choice and determination prior to proposing to do any buy.

### **2.3 Dependent Variable: Supplier and Firm Performances**

We have implementing some of the indicators to measure dependent variable (Supplier and firm performance) among the independent variables (Price and cost, delivery performance, quality of products, buyer-sellers' relationship and suppliers' reputation.) There are various aspects for estimating the firm performance, environmental, organizational, financial, economic, marketing and competitive. Based on study from Subrata (2013) agreed that although previous studies on environmental performance have discovered significant relationship between ecologically sustainable policy and environmental performance, however the researcher claims that include the environmental dimension of company performance would be redundant. On the other hands, some of the researchers such as Rao (2002) and Halt (2005) remaining the two dimensions of organization performance in their studies are economic performance which cover organisation, financial, economic and marketing performance measures and the second dimension is competitiveness which cover the operational and competitive dimension of firm performance. Also, there have some of the authors such as (Tan K. C., 2002) have claimed that overall quality of products, the degree of customer service, and the company's competitive position were all factors in determining the company performance.

#### **2.3.1 Establishment of evaluation criteria and indicators for supplier selection**

According to the study from Chen (2009) had develop enterprise strategic analysis, which is the main success criteria that influence firm performance through implement this enterprise strategic analysis as supplier selection indicators and those indicators can classifying into various factor to establish an assessment framework for supplier selection. Moreover, this author suggested that the criteria selection can classify into two key factors which are "competition factor" and "organization factor". The criteria that can include on "competition factor" are quality, cost, delivery date and services. For criteria which can include as "organization factor" are technical and production capability, relationship combination and organization management.

Those are the indicators that we are going to carry out measurement for each of the independent variables accordingly in this study.

<b>Independent Variable</b>	<b>Dependent Variable Indicator -Supplier and Firm Performance</b>
Price and Cost	Increase the Gross Profit Margin of the company by reducing the cost of goods sold
	A company able to offer competitive pricing among their rivals
Delivery performance	Vendors able to achieve On-time delivery to support their customers' company operation
	Supplier provide the shortest lead time to support their customers' production line
Quality of products	Reduce defect rate of the faulty or damaged goods and material that fail to meet the requirement from the buying firm
Buyer-sellers' relationship	The supplier provides professional customer services with assists their customer to overcome the problem
Suppliers' Reputation	Strong collaboration to build reputation and image for the company

*Table 1: Indicator of the measurement on dependent variable*

## **2.4 Criteria of supplier selection**

Previous studies have shown there have more than 60 evaluation criteria, which have been used selectively across different research based on case-specific needs (Weber et al., 1991; Ho, 2010). Lin and Purchase (2006) reported that there is a lot of prescriptive research on how buyers should choose their suppliers, and there is a lot of agreement on a number of aspects that influence individual choices, such as costing, perceived quality, delivery performance, and other more industry-specific criteria. On the other hands, recently studies had categories 11 main criteria for vendor selection, close by their definition, there are: quality, cost, delivery, flexibility, and relationship (Hsiu Mei Wang Chen, 2016). One of the enormous strides in the vendors choice interaction is the plan of standards. Many methodologies have tended to the significance of determination measures in supplier selection (Min, 1994); (Barbarosoglu, 1997); (Krause D. a., 1997); (Ghodsypour, 1998); (Motwani, 1999); (Masella, 2000); (De Boer, 2001); (Humphreys P. S., 2001); (Liu, 2005). Besides that, most of the authors endeavoured to recognize and decide the relative significance of criteria for supplier selection in different enterprises. The choice measures utilized for supplier selection and the weightings appointed to then can be unique due to a number of factors; the demographic characteristics of the purchasing managers, the size of the buyers' company, the preferred sourcing strategy and the type of products or services purchased.

On the other hands, some of the researchers had concentrated the need for integrating environmental criteria into the vendor selection process as increasingly more end user become mindful and worried about the natural issue (Humphreys P. S., 2003). Also, previous research suggests new standards on supplier selection cycle, for example, exchange relationship, foreign exchange rate, traffics, customs obligations, geographic area, exchange limitation, quality administration, and ecological elements have been remembered for the selection criteria due to further development in procurement processes (Pani, 2014).

#### **2.4.1 Pricing and Costing**

The price factors consist of unit price, pricing term, exchange rates, taxes and discount. While the cost can be defined as the financial valuation of effort, material, assets, time and utilities consumed, chances caused, and opportunity denied in progress and delivery of a goods or service (S. Jharkharia, 2007). The price and costing of purchase is in practice plays a vital role for the buying firm. This is due to the reason that picking an appropriate vendor can bring down price tag in a huge level as well as upgrading the organization's idea of competitiveness. Consequently, there are numbers of the authors concluded that supplier selection is the most important activity embraced by the procurement department (Ghodsypour & O'Brien 2001). Based on the study from Kolter and Keller (2006) highlighted that numerous respondents in their study had expressed that to choose a vendor, cost keeps on being a significant rule they use. In addition, a recent study by Michael & Chong (2001) pointed out that high levels of customer satisfaction such as competitive pricing, product quality, product variety and shipping services and the organization performance result from picking and evaluating vendors according on their ability to supply high-quality materials and structural components, as well as prompt delivery and quality of product. Other than that, those researchers also agree that supplier participation in market growth and ongoing quality enhancement has an even bigger impact on company success. However, it discovered there are no proof that picking suppliers based on unit pricing may improves customer happiness or organizational performance in this research. Also, there have another researcher suggested that those conventional approaches to supplier evaluation have been to pick vendors just based on costing for long times. However, as businesses have determined that centering exclusively on price as a factor for supplier selection is

inefficient, they have shifted to a more complete multi-criteria approach (Om Pal, 2013). Moreover, the past researchers provide strong evidence for the usefulness of due to fierce competition in the micro-profit age, the difficulty of selecting the appropriate supplier at the cheapest offer to maximum organization business profits has become increasingly crucial to firms' survival (Handfield, 2006) and also another researcher concluded that pricing is only ranked 6<sup>th</sup> among 24 units criteria from their empirical result analysis and it can explain that the market has become more competitive, and costing is no longer the most important criterion for supplier selection according on the result of the studies from Ehsan Eshtehardian (2012). Last but not least, recently studies from Gao (2020) and Khan (2018) suggested that the material pricing is a critical tool by organizations in their battle to improve competitive advantages over their competitors and normally determined by total cost involved in manufacturing a specific item.

#### **2.4.2 Delivery Performance**

Delivery can be defined as the ability of the supplier to meet determined delivery arrangement which incorporate lead-time, on-time performance, fill rate, returns management, area, transportation, and incoterms (W Thanaraksakul, 2009). A large number of existing studies in the broader literature have examined those criteria such as quality, delivery performance and warranties are important aspects to consider before choosing a supplier compare to other factors such as “pricing and costing”, “production capability”, “technical capability”, “management capability”, “vendor reputation”, “financial position”, “employees' relationship”, “post sales services” and numerous more relationship-specific characteristic (Busch, 1962 & Dickson, 1966). Overall the study from Mark A. Vonderembse (1999) highlighted that procurement department manager should concentrate on a series of supplier selection criteria that assesses vendors on a variety of factors, including product quality, product performance, and delivery performance. As Vonderembse & Tracey (1999) remind us on-time delivery is critical for a supplier and satisfy their clients' deadlines for being ready for action and also highlight purchasing managers should also take into account delivery performance and other factors while choosing vendors.

Based on the study from (Shin, 2000) highlighted that lead time altogether shows delivery and the author is agreed that a diminished delivery duration helps to diminish

inventories and uplift stock turnover, these showing the benefits on delivery that is dependable. So that, authors suggest that other than minimal expense, managers ought to likewise consider choosing vendors dependent on delivery execution and different properties. As has been previously reported in the literature, there are many firms investigate and improve their delivery performance of achieving the delivery period as requested from their customers. Organizations which obligated to reliably missioned their dependable delivery period are probably going to ultimately miss whichever validity with customers as to future ventures, and the low shipping standard shall nullify an underlying point of giving out time ensures to captivate clients (Kut, 2000). In addition, Choi (1996) agreed that the consistency factor concerning fulfilling delivery time constraints actually appeared to be the main model on all stages, as well as the capacity to comply with the details.

#### **2.4.3 Quality of products and services**

Quality of products and services can be defined as the ability of the vendor to fulfil quality determinations reliably which incorporate quality highlights (material, aspects, design, durability), assortment, production quality (production lines, manufacturing strategies machinery), quality framework, and continuous improvement (A. Sarkar, 2006). In addition, recently authors have point out that the quality of product as fulfilment required standards, details and prerequisites for actualising supply chain sustainability (Orji, 2015; Rashidi, 2020; Stevic et al, 2020). Some authors have driven the further development of the standard for quality has always been an important consideration in the procurement department (Dickson, 1966; Waber et al., 1991). Also, the researcher clearly indicated the important of Three (3) factors that plays a significant role on vendor selection are: the quality of that particular products been fulfilled the requirement, the capability of delivering the goods on time and the history of performance (Dickson, 1966). Overall of the study from Schonberger and Gilbert (1983) provide strong evidence for the efficacy the need for high quality of the product or services as a factor of supplier selection. This is due to the reason that the authors had proof that as many firms have concluded that the poor quality of the production materials supplied would be to blame for more than half of the difficulties with product quality. Based on the study from Emre Alptekin (2009) agreed that since the costing of the raw material may alter its quality, this demonstrates that vendor picking decisions should take degree of quality of the raw material into consideration in addition price.

Over time, an extensive literature has developed on selection criteria are steady with their apparent significance according to buyers and the author can find out that quality was shown the most crucial selection factors while price and delivery performance were more commonly used to make vendor selection decision (Verma, 1998). There are some of the authors had concluded that quality plays an important role during selection process through conduct the questionnaire to their respondents. As example, based on the result of survey conducted from Sharland (2003) conclude that quality alongside abilities is the most critical factor in the underlying. Besides that, the result of the survey from Miyoung Kim (2010) conclude that the main element is vendor capacity to satisfy quality specification and to guarantee the supplier can meet explicit delivery times, and it is important to maintain the relationship between buying firm and supplier during the primary supplier selection stage.

#### **2.4.4 Buyer-sellers' relationship**

Buyer-seller relationship reflect acknowledgement by the purchaser and provider that for specific purchases, collaboration instead of rivalry might be valuable together. While the subject of connections has gotten a lot of consideration inside the literature and its' clear that buyer-sellers' relationship is certainly not a unidimensional develop. There are number of the past researchers have discussed about what the term buyer-seller relationship suggest. The literature review show that buyer-seller relationship can define into Four (4) types of relationship, there are: politic confine (both parties' dependence and high levels of integration), individual retaining (both parties' obligation and responsibility), mutual investment (long-haul commitment for strategic advantages) and self-centered (describe by an emphasis on company necessities).

On another hand, Toole (2000) has explained buyer-sellers' relationship as bilateral (characterized by shared participation), repetitive (close yet missing the closeness of a bilateral relationship), discrete (insignificant collaboration), or hierarchical (one partner is prevailing). Prior research suggests that strategic supplier alliance, a specific indication of long-haul, cooperative relationship, propose that buying firm will generally favor nearer connections when they wish to control the dependability of supply or impact supplier quality and delivery performance (Ellram, 1995).

Based on the study from Frankwick (2008) mentions that purchasers and vendors with thoughts regarding the cycles that ought to be available in a relationship to establish the



framework for effective relationship-explicit speculations and diminished purchaser vulnerability. However, a research gap that can be found on their study is every respondent portrayed their relationship with one key supplier it is hard to get a feeling of whether or not the connections purchasers depicted are common of the multitude of long-haul connections their organizations have with their dealers. Chan (2003) mentions that contingent upon the diverse buyer-seller joining techniques, distinctive determination rules are utilized and various constructions of models pecking orders are implicit request to choose the most ideal supplier. Another group of researchers such as Yuanzhu Zhan (2021) found out that a drawn-out buyer-seller relationship, managers will more often than not assess a supplier all the more decidedly assuming that supplier shares the aggregate perspectives and techniques of the supervisors for a specific supportability aspect. In addition, some authors have driven the further development of linkage between performance and relationship. These have shown gains to those purchaser from successful connection in terms of financial (Amelia S. Carr, 1999); (Martin, 2003); (Johnston, 2004) and the lead time performance (Kulchitsky, 2000). Besides that, this relationship may bring out in enhance responsiveness and customer loyalty (Martin and Grbac, 2003), innovation (Corsten, 2004); (Johnston et al., 2004) and quality (Johnston et al., 2004).

#### **2.4.5 Suppliers' Reputation**

Supplier Reputation define as the degree to which firm and individual in the business accept a supplier tells the truth and concerned about their customers (D.J. Watt, 2010). A favourable reputation is efficiently adaptable across firm and improve the credibility of the provider (Ganesan, 1994). Also, the study from Doney (1997) and Ganesan (1994) carried out that supplier reputation has be portrayed as the convictions that individuals and firms inside an industry hold about the supplier's qualities and capacities as a trading partner. Previous study shows that the impact of reputation in buying choice by adding various signs of corporate standing, defined as "perceptual representation of firm's overall appeal to all of its key stakeholders when compared with other leading rivals." (Fombrun, 1996) There has been numerous studies such as Gabriel (2001) over and over use reputation as a proxy for trust or consider the trust construct as an unmistakable reasonable stream inside the investigation of reputation (Riel, 2004). Different articles such as Verma (1998) and Kannan (2002) had related with the previous class recognize quality, pricing and delivery as the most significant supplier

selection factors which essentially all prescriptive methodologies thusly consolidate. However, (Cheraghi, 2011) highlighted suppliers' corporate reputation, get minimal consideration by the overview and are frequently dismissed by determination models. According of the study from Calabrese (2019) had report that how they adding fresh empirical data to carry out investigating the impact of the companies' reputational aspects on the most important supplier selection criteria, however the limitation that can be found on their study is the researcher point out that there are some significant features can't be considered such as relationship capabilities, investment and trust. Moreover, the researcher had also suggested that both vendors and buyers may desire to collaboration to improve their company's reputation in order to improve its overall desirability. In addition, the key impact for buyers is that luxury brand companies may request financial incentives such as cost reductions as a result of being a more appealing customer than standard brand companies. As P.Cannon (1997) remind us to build and sustain consumer confidence, suppliers must make big efforts since when a high level of buyers trust results in better purchasing outcomes for the provider. In addition, the researchers suggest that though the process of gaining client trust is costly, time-consuming, and difficult, the benefits in terms of stronger buyer-seller ties and increased loyalty might be vital to a supplier's success.

## **Chapter 3 Methodology**

### **3.0 Introduction**

Based on the study from Bryman (1984) explained term of a viewpoint on epistemology is referred to as methodology while strategies and procedures allude to the approach to get-together and breaking down information. Also, another researcher Souder (2007) highlight that the term of methodology has place with a more extensive develop as it's connected to theories of how exploration ought to be directed including suspicions connected with the philosophical and theoretical viewpoints which studies depend on. In chapter 3 we will discuss the methodology for the research to collect and analyse the data. Research design, sampling procedure, and population will be discussed and further explain in this chapter. Moreover, this chapter also describe the method of data collection, measurements, variables and the technique that apply in this study to examine the collected data to test the hypothesis in Chapter 2.

### **3.1 Research design**

According the study from Hassan (2014) mentions that research design assists us with summing up every one of the techniques and strategy that we used to conduct an examination which including when and under what conditions that the data will be get. The purpose of the research design use to define factors that will impact supplier and firm performance among the manufacturing industry in Malaysia during supplier selection. This research focus on quantitative research. By carrying out quantitative exploration, this study will actually want to measure and calculate the statistical result from the data collected (Apuke, 2017).

In the research, explanatory and descriptive analysis are carrying out to analyse the collected data. Descriptive data include gathering data, coordinate, organize data in a table structure, portray and depicts the data collection (Glass, 1996). Also, descriptive analysis also used to explain the attributes of the phenomena (Vos, 2002). For explanatory analysis use to identify the relationship between the independent variable (pricing and costing; delivery performance; quality of the products and services; buyer-sellers' relationship; suppliers' reputation) and dependent variables (supplier and firm performance). Researchers can overview representative sample to investigate the

Supplier Selection: A case study of Malaysian manufacturing industry.

supplier selection criteria impact the supplier and firm performance. Questionnaire will be distributed to participants and collected data will be analysed after this. The primary target of disseminate questionnaire isn't just to gather data yet in addition to distinguish the presence by develop hypothesis.

### **3.2 Data Collection Method**

Data collection is the cycle of gathering data from all resources. Questionnaire generally use for data collection because quantitative research focuses on data that can be estimate (Goertzen, 2017). Questionnaire create by Google Form and distributed via Whatsapp and email.

#### **3.2.1 Target Population**

The target of the research is to determine the relationship between pricing and costing; delivery performance; quality of product and service; buyer-sellers' relationship and suppliers' reputation impact the supplier and firm performance among the manufacturing industry in Malaysia. Hence, the target respondents of this research are the buyers or respondents which come from the procurement department from manufacturing industry in Malaysia.

#### **3.2.2 Sampling Frame and Sampling Location**

A sampling frame is a complete list of everything that include in the population. Based on the study from Turner (2003) highlighted that sampling frame refers to pick a specific group of members in the target population in study. Research questionnaire are distributed to the target respondents, who are the buyers or participants who come from procurement department among the manufacturing industry in Malaysia.

#### **3.2.3 Sampling Techniques**

Based on the study from Taherdoost (2018) suggest that students can apply convenience sampling due to is the most fit sampling method use in academic purpose and also it is more budgeted compare to other method. In this study, data is obtained by non-probability sampling. Convenience sampling is viewed as one of the non-probability-sampling technique because of the respondents are chosen as advantageous to be access by the explores as well as their willingness to answer the questionnaires (Sedgwick, 2013).

### **3.3 Sample Size**

Based on the study from Jon Zamboni (2018) defines the sample size is include of individual samples in any statistical analysis. We able to comprehend groups of subjects chosen from the general population and also considered representative for the particular study of the original population through sample size.

### **3.4 Data Collection Method**

Primary and secondary data collection method will be carrying out in this study. Those data collected from participant will be used to conduct statistical analysis. Besides that, those collected data are used to investigate the relationship the criteria of the supplier selection (pricing and costing, delivery performance, quality of products and services, buyer-sellers' relationship and suppliers' reputation) impact the supplier and firm performance.

#### **3.4.1 Primary Data**

Based on the study from Ajayi (2017) define the primary data as the data collected for the first time for research purpose. Primary data can collect by the researcher from survey, questionnaire, personal interviews, observation and more. Questionnaire which consists several questions that those respondents need to answer accordingly will be used to collect data from the respondents in this study. In this case, the questionnaire will be distributed through Whatsapp or email to our respondents. The qualification for the respondents should be at least have a working experience in procurement department or within the manufacturing industry in Malaysia.

#### **3.4.2 Secondary Data**

Based on the study from Ajayi (2017) define that secondary data as the data that already collected and analysed by others researcher. The secondary data is easier to be collect compare to primary data. Hence the researcher will gather the most recent and most important data to the research tittle in order to formulate the hypothesis as well as support the researchers' writing. Therefore, the researcher will collect the questionnaire from respondents and examines the formulated hypothesis.

### **3.5 Research Instrument**

#### **3.5.1 Objective of Questionnaire**

Questionnaire is very useful in collect the relevant data. Besides that, questionnaire also consider one of tools to assist researcher in data collection in a standardized manner. Hence, questionnaires are successful system for effective information collection and data investigation.

#### **3.5.2 Questionnaire Design**

Self-administered questionnaire utilized in this study. Some past researcher defined the self-administered questionnaires as the respondents need to take full liabilities to read and answer the questionnaire carefully (Zikmund, 2010).

Questionnaire	Number of Items
Section A: Personal Information	4
Section B: General profile of company	6
Section C: Assessment of Supplier Selection Criteria	
1. Pricing and Costing	6
2. Delivery Performance	5
3. Quality of products and services	5
4. Buyer-sellers' Relationship	6
5. Suppliers' Reputation	6
Section D: Assessment of Supplier and Firm Performance	7

*Table 2: Questionnaire Structure*

The structured questionnaire was created through Google Form and using Likert-scale in the section B and C. Besides that, this self-administered questionnaire will be distributed by Whatsapp and email. The participants have to answer the questions by picking the optimal answer from their own preference for each question. Section A personal information consists of gender, age, number of the years servicing in the current company and level position in the company, it mainly for understanding the fundamental background of our respondents in this study. Moreover, in Section B general profile of company include nature of business, number of the employees, duration of the company's operation period, number of the major suppliers, numbers of years working with Top 5 supplier and number of years cooperation with the Top 5 suppliers. Through Section B we get the nature of business that our participants are engage currently and also can collect some information regarding their current status

relationship with their existing suppliers. In Section C and D those questionnaires are created to get different opinion of each respondent on the supplier selection criteria impact the supplier and firm performance. All question in Section C and D will be evaluate by using Likert scale where “1” meant “strongly disagree” and “5” meant “strongly agree”.

### **3.6 Pre-Test and Pilot test**

Pre-Test is make sure the questionnaire is clear by respondents through distribute small portion of it. Previous research illustrates the caused that a pre-testing is required before conducting a pilot study to identify potential constraints. Next, the pilot test is the next step once the pre-test is done. The purpose of the pilot test was to find out the error in an experimental activity, then make relevant change to a modified questionnaire to reduce any hazard that might have an impact on the overall researches (Kothari, 2004). Therefore, a pilot test should be carried out first and provide simplify and understandable questionnaire to the respondent before conduct the research. An accuracy of questionnaire survey data is important when analysis the response from participants. There are several concerns regarding the accuracy of the survey data that is implemented into the data file.

Cronbach’s Alpha will apply in this study for testing the reliability and measuring the internal consistency of scale (Zikmund, 2003). Based on the study from Joseph and Rosmary (2003) mentions that the ranges of Cronbach’s Alpha reliability coefficient normally are between 0 to 1. The closer alpha coefficient to 1.0, the better the internal consistency of the products in the scale.

Alpha Coefficient Range	Strength of Association
Less than 0.6	Poor
0.6 to 0.69	Moderate
0.7 to 0.79	Good
0.8 to 0.89	Very Good
0.9 and above	Excellent

*Table 3: Rules of thumb about Alpha Cronbach’s Coefficient Size*

### **3.7 Construct Measurement**

#### **3.7.1 Origin of Construct**

All questions are adopted and adapted from past research studies.

Variable	Sample of items	Sources
Pricing and Costing	Price and cost is the priority criteria that I will concern about as my supplier selection	Zeger Degraeve, Eva Labro & Filip Lammings (1993).
	I agree that supplier must comply with their price schedule and payment term as part of the agreed contract	Roodhooft (1998).
	My suppliers always offered competitive pricing to our company	Dickson, (1966); Lehmann and O'Shaughnessy, (1982)
	The supplier clearly states the maintenance cost price for the warranty and post-warranty period	Giunipero et al, (2006)
	Any possible future price increases within the contract period should be agreed upon before order awarded	
	Any future switching or hidden cost are considered and discussed before an issue purchase order	
Delivery Performance	Delivery performance is the priority criteria that I will concern about as my supplier selection	Michael Tracey & Chong Leng Tan, (2001).
	Suppliers must be able to deliver the product, machinery, services on time	Ellram, (1990)
	There is compliance with the quantity requirement	Kannan and Keah (2002).
	The supplier should offer short or reasonable product delivery lead times	
	It is beneficial to have the supplier located nearby our company	
Quality of products and services	Quality of products is the priority criteria that I will concern as my supplier selection	Alex Sharland, Reham A. Eltantawy & Larry C. Guinipero, (2003).
	The products/machinery/services offered by the supplier fulfil the technical specifications and requirements of my company	Mark A. Vonderembse &



Supplier Selection: A case study of Malaysian manufacturing industry.

		Michael Tracey, (1999).
	The supplier offers a product's warranty	Dickson, (1966); Waber et al. (1991)
	The supplier offers a reliable product with the recognition of SIRIM	
	The supplier offers a reasonable life span for the products	
Buyer-Sellers' Relationship	Buyer-seller's relationship is the priority criteria that I will concern as my supplier selection	Dickson, 1966; Lehmann and O'Shaughnessy, 1982)
	This supplier ability to become a good partner with our company	Guinipero et al., 2006
	This supplier is known to be concerned about their customers	Narasimhan, 2002
	This supplier willing to share proprietary information with our company	Kannan 2002
	This supplier consider a long-term cooperation with our company	Ellram, 1990
	The sales representative has a good personality, communication skills and responsibility	
Suppliers' Reputation	Supplier's reputation is the priority criteria that I will concern as my supplier selection	Aguezoul (2012)
	This supplier is a very large company	Chiles & McMackin, (1996)
	This supplier is the industry's biggest contributor to these products	
	This supplier has a good company background	
	This supplier has strong financial stability and staying power	
	This supplier provides luxury branding	
Supplier and Firm performance	Increase the Gross Profit Margin of the company by reducing the cost of goods sold	Y.-J. Chen / Information Sciences 181 (2011)
	A company able to offer competitive pricing among their rivals	Vijjay R Kannan & Keah Choon Tan, (2002)
	Vendors able to achieve On-time delivery to support their customers' company operation	Narasimhan and Kirn (2002)
	Supplier provide the shortest lead time to support their customers' production line	

	Reduce defect rate of the faulty or damaged goods and material that fail to meet the requirement from the buying firm	
	The supplier provides professional customer services with assists their customer to overcome the problem	
	Strong collaboration to build reputation and image for the company	

Table 4: Construct of measurement

### **3.8 Data Processing**

Some authors have driven the further development of data collection and data analysis need a delegate phase of work which is data processing (Tajfia Islam Tiba, 2011). Data processing contains checking questionnaire, data editing, interpretation of data and data clearing. In addition, data processing process is an unescapable cycle to defend the precision and fulfilment of data. Besides that, this process also assist researcher to distinguished the unessential data and gather this issue data.

#### **3.8.1 Questionnaire Checking**

This is the first step of data processing. This process is to make sure all data collected from respondents are completed based on the instruction provide. Questionnaire checking is the process must be done before those questionnaires is distributed.

#### **3.8.2 Prevent missing value**

Missing value is the value that are absent from the raw data gathered. The possible of the missing value happened during the data collection is there are some of our respondents may miss to answer some of the questionnaire. Therefore, Google Form can be used to avoid this issue due to Google Form can ensure all of the question answered by respondents through pop out the reminder once respondents have miss to answer some of the questionnaire before submit.

#### **3.8.3 Data Editing**

Data editing is the second step in data processing. Data editing is ensured that the data collected are clear after the raw data is collected from the respondents. The objective of data editing is to make sure all the data collected are valid before proceed to next step.

### **3.8.4 Data Coding**

The fourth step on the data processing is data coding. This is a primary step in data processing process which assists the researcher to gather and allocate the value from the observed data. The purpose of data coding is not only to dispose of the huge quantity of data but also need to investigate the meaning of the data observed from the questionnaire survey from participants. A mathematical value will be distributed to each question prior to organizing the data all together make it simpler for researcher interpret.

### **3.8.5 Data Transcribing**

The fifth step on the data processing is data transcribing. Data transcribing is an essential interaction for quantitative data analysis that some examination applied. In this step, coded data was sent out from the questionnaire into form of table or excel sheets. Statistical Package Science Version 21.0 (SPSS) will be applied in the research to transcribe the data. Moreover, data transcribing can enhance data preciseness and make sure the transcription mistakes were being changed in this process.

### **3.8.6 Data Cleaning**

Data Cleaning is the final step in data processing. Data clearing is a vital step in data processing before the researcher continue to analyse the data. The purpose of the data clearing is to ensure there is no missing response during data transferring into the data analysis software. Examination the data regularly can avoid the data out of range as to be focused in maximizing the preciseness of the data collected from the questionnaire.

## **3.9 Data Analysis**

### **3.9.1 Descriptive Analysis**

According to the study from Churchill (2001) highlight that the main significant in descriptive research is “calculate the rate of recurrence with which something happen which two variables co varies”. Besides that, previous studies have emphasized the purpose of descriptive research are recognize realities which concentrate on well-defined entity and gauge these aspects methodically and exactly, to speculate the feedback from respondents and to evaluate the relationship (Jenny L. Singleton, 1993). Moreover, a recent study by Cooper and Schindler (2003) conclude that the main

purpose of descriptive studies is to recognize the relations between the various factors, to decide the description of the qualities in relations to the specific population, to estimate the part of population that depicts these attributes.

### **3.10 Scale Measurement**

#### **3.10.1 Reliability Test**

Cronbach's Alpha shows how various characteristic of a develop are purportedly estimated by the different items (Zeller, 1980); (Churchill, 1979); (Hair, 2006); (Tabachnick, 1989). Besides that, there is exits a considerable body of literature on the purpose of reliability test is determine the "goodness" of measuring the research (Cavana, 2001). The function of alpha coefficient range is to find the reliability for each item in this research show in table

Alpha Coefficient Range	Strength of Association
Less than 0.6	Poor
0.6 to 0.69	Moderate
0.7 to 0.79	Good
0.8 to 0.89	Very Good
0.9 and above	Excellent

*Table 5: Alpha Coefficient Range*

### **3.11 Inference Analysis**

#### **3.11.1 Normality Test**

Normality test can determine as pre-test and also a process that use to identify is there any group of data or a sample has normal distribution. Based on the study from Zikmund et al. (2010) mentions that normal distribution is a bell curve and the bell curve was symmetrical. Normality test can investigate that whether the dependent variable is normally distributed for the independent variables. In this study, we will carry out the assumption of the normality, linearity, multicollinearity and homoscedasticity and ensure there have no violation of the assumption during preliminary analyses.

#### **3.11.2 Multiple Linear Regression**

Multiple Linear Regression is a statistical technique to investigate the relationship between one dependent variable and several independent variables. The purpose of

Supplier Selection: A case study of Malaysian manufacturing industry.

multiple regression is to find a linear equation that can precisely decide the value of dependent variable Y based on different value of independent variables X (Civelekoglu, 2007) There are five independent variables are used in this study to impact the dependent variable, hence the multiple linear regression for an explanation of the independent variable and the dependent variable are most suitable carry out in this research. The general multiple linear regression equation is as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + \dots + e$$

Where Y = dependent variable, a = constant value, X = independent variable, b<sub>1</sub>; b<sub>2</sub>; b<sub>3</sub> = unstandardized coefficients, e = model's error term

### **3.12 Hypothesis developments**

$H_1$  = There has the significant relationship between *pricing and costing* impact the supplier and firm performance.

$H_2$  = There has the significant relationship between *Delivery Performance* impact the supplier and firm performance.

$H_3$  = There has the significant relationship between *Quality of products and services* impact the supplier and firm performance.

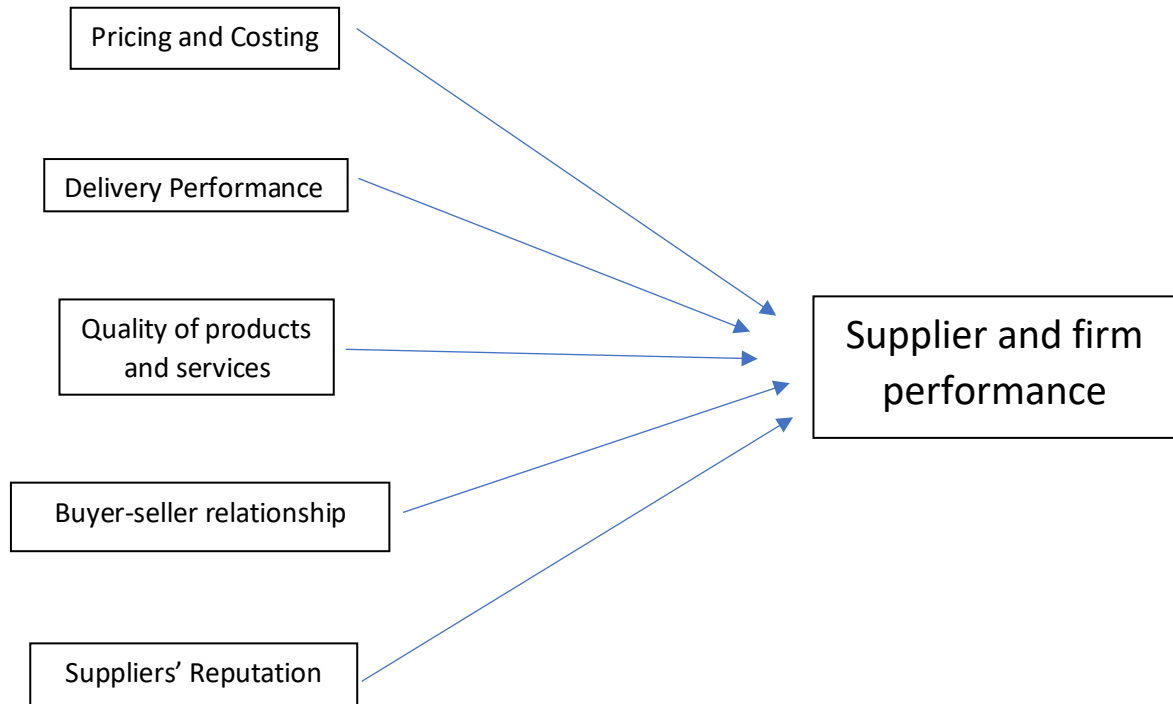
$H_4$  = There has the significant relationship between *Buyer-seller relationship* impact the supplier and firm performance.

$H_5$  = There has the significant relationship between *Suppliers' reputation* impact the supplier and firm performance.

### **3.13 Conceptual Framework**

Independent Variable

Dependent Variable



### **3.14 Conclusion**

As conclusion, we have discussed the details of research methodologies that we will applied in this study which include sampling design, data collection method, research instrument, and construct measurement. In addition, this research also carrying out how the data is being process after collected by our participants of the questionnaire. Lastly, chapter 3 also explained the data analysis method that can apply in this study. Those methods including scale measurement, descriptive analysis and inferential analysis. The further chapter will discuss the detailed analysis of data.



## **Chapter 4 Data Analysis**

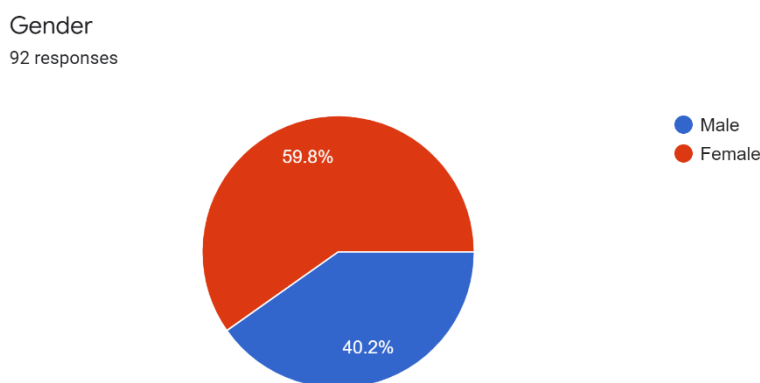
### **4.0 Introduction**

This chapter is divided into three parts to look into further analysis and explained the collection data. The Statistical Package for Social Science (SPSS) version 21.0 were used to analyse the data. The test procedures and results were discussed based on the test findings.

### **4.1 Descriptive Analysis (Personal Information & General Profile of Company)**

There are few questions of demographic profile have been added as part of a questionnaire to our participants in this study. The demographic profile is separate into two section which are the Personal Information consists of gender, age, number of years with the organization and position of your company while another section is General profile of company consists of type of business nature, number of employees in the organization, duration of company operation period, number of the suppliers in the company, years of cooperation between company and top 5 major suppliers and average length of relationship with top 5 supplier.

#### **Part 1: Personal Information Analysis**



---

*Chart 1: Gender*

## Supplier Selection: A case study of Malaysian manufacturing industry.

### Age

92 responses

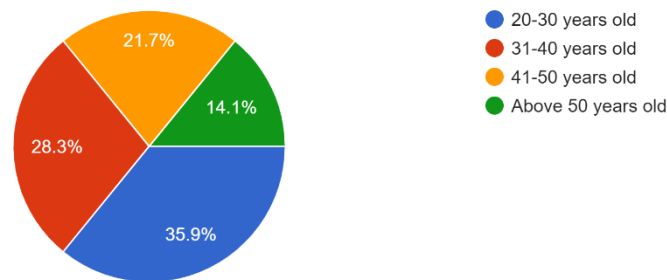


Chart 2: Age

### Number of years with the organization

92 responses

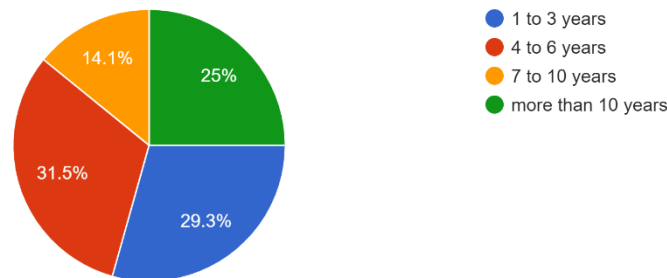
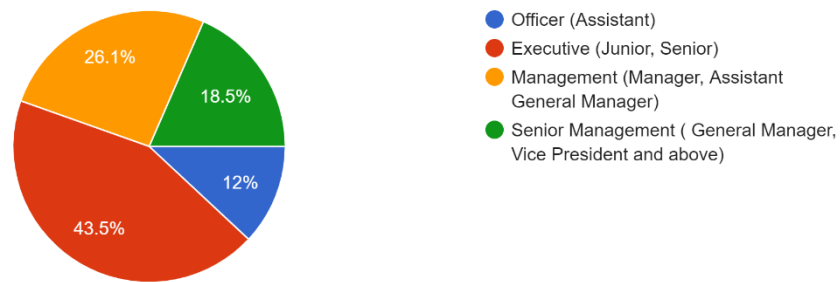


Chart 3: Number of years with organization

According to the chart 1 above, we can get 37 people (40.2%) from our respondent is male while total 55 people (59.8%) are female among our respondent. Another chart (*chart 2*) shown that majority of our respondents are come for the range of age between 20 to 30 years old, it occupied 35.9% which is total 33 people and the second is the participants which are 31 to 40 years old, sum of the people are 26 unit and it occupied 28.3% among the chart. In addition, we are able to get 20 unit (21.7%) of our participant is comes from 41 to 50 years old and only 13 people (14.1%) of respondents who are above 50 years old. This can be indicated that the majority of the respondent in this study is young generation. At the same times (*refer chart 3*), we are able to get 27 unit (29.3%) of respondents that have served their company between 1 to 3 years; 29 unit (31.5%) of the respondent have served in their existing current along 4 to 6 years; we also able to get 13 unit (14.1%) of respondents who have served in their current company along 7 to 10 years. Lastly, we are able to get 23 unit (25%) of respondents who are served in their current organization more than 10 years period.

## Supplier Selection: A case study of Malaysian manufacturing industry.

Position of your company  
92 responses

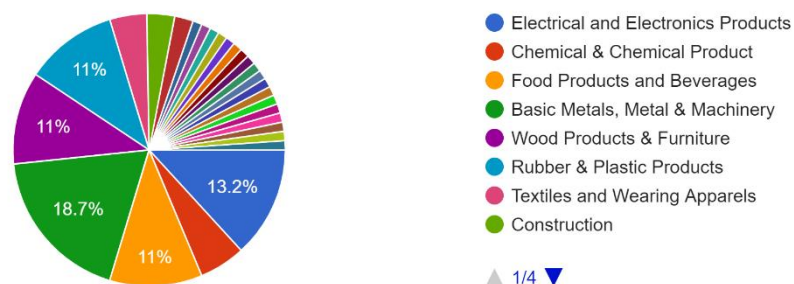


*Chart 4: Position of your company*

Chart 4 above shown the position level from our respondents in their organization. Majority of our respondents are holding executive level regardless junior or senior level in their firm which occupied 40 unit of respondents (43.5%). Secondly is the respondent who holding management level position such as manager, assistant general manager in their company and it occupied 24 unit (26.1%) from whole study. Thirdly are the respondents who are holding senior management such as general management or vice president in their company and occupied 17 unit (18.5%) and the least is the respondents holding officer level such as assistance in their company, which have only 11 unit (12%) of them.

### **Part 2: General profile of company**

What is the nature of your business?  
91 responses



*Chart 5: Nature of the business*

Next, we will analysis the nature of business (*refer chart 5*) from our respondents in this study. Since there are some our respondents have precisely declared what the actual industry that they involving instead of choosing the alternative in the questionnaire.

Supplier Selection: A case study of Malaysian manufacturing industry.

Based on the chart given (refer chart 5), we able to get that 17 unit of our respondents are engage in basic metal, metal and machinery, it occupied 18.7%. Electrical and electronics products industry is the second highest manufacturing industry area that our participants engaged, total 12 unit (13.2%) of them. Thirdly, there have 3 of the industries that have same number of the respondents engages in this study. The 3 industrials are wood product and furniture, rubber and plastic products and food and beverages which have occupied 11% from the total percentage of chart accordingly. In addition, we will not further explain the other nature of business that our respondents which comes from other various of industry such as IT, construction, silicon and other since there have only few of number respondents who engaged in this study.

How many employees currently are working in your company?  
92 responses

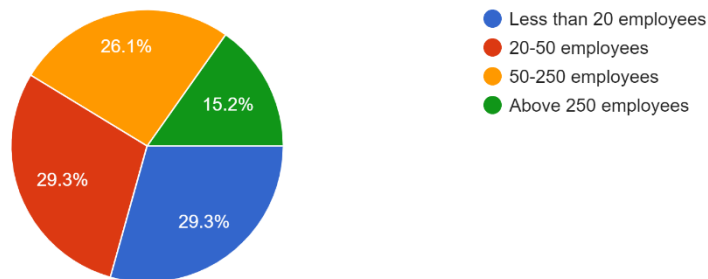


Chart 6: Number of employees currently working in company

How long has your company operate this business?  
92 responses

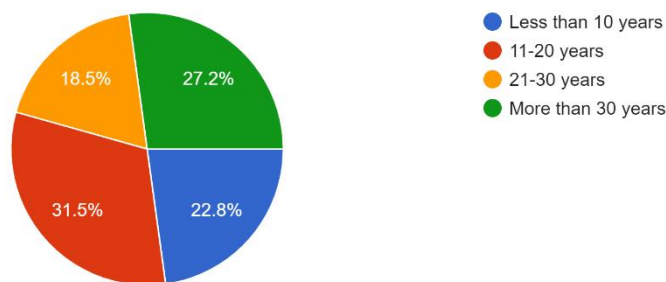


Chart 7: Number of the years that company operate

The chart 6 shown that the number of employees from our respondents in their existing organization and we are able to get 27unit (29.3%) each who having the number of staffs between 1 to 50. On other hands, there have 24unit (26.1%) of our respondents

Supplier Selection: A case study of Malaysian manufacturing industry.

having 50 to 250 unit of employees in their company while only 14 unit (15.2%) of the respondents having more than 250 employees in their company. Another chart shown that the number of years that the respondent's company have been operate. Based on the chart 7 given, we are able to get that there have 29 unit (31.5%) of the respondents mentions that their existing company have been operating between 11 to 20 years, while there have 25 unit (27.2%) of respondents declare that their company have operate more than 30 years. Besides that, there are 21 units (22.8%) participants mention that their company had operated less than 10 years while there have only 17 unit (18.5%) of respondents' organization had operate between 21 to 30 years old.

For each of the major item, how many suppliers you have maintained at the moment?

92 responses

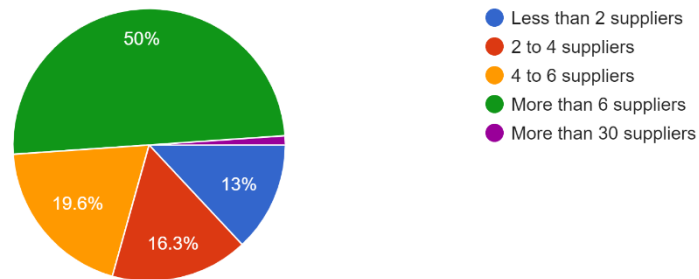


Chart 8: Number of suppliers have maintained at the moment

How long have you been working with top 5 suppliers?

92 responses

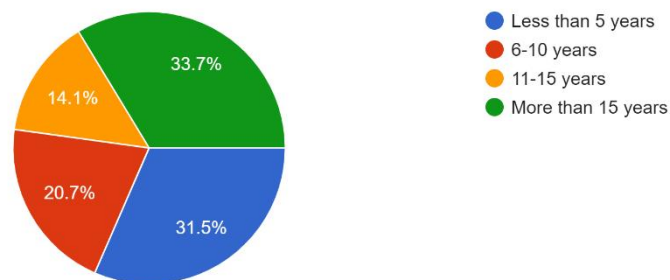
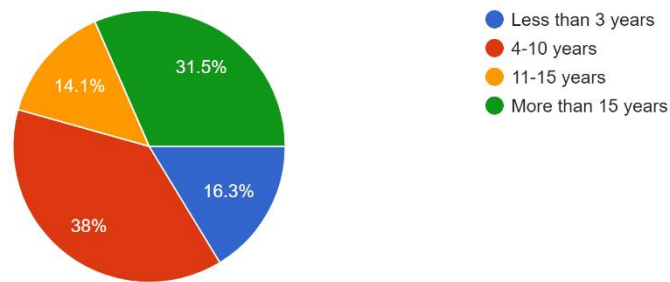


Chart 9: Number of years working with top 5 supplier

## Supplier Selection: A case study of Malaysian manufacturing industry.

What is the average length of relationship with top 5 suppliers?

92 responses



*Chart 10: Number of years working with top 5 supplier*

These 3 charts (*refer chart 8 to 10*) shows that the demographic questionnaire related the relationship between the participants current organization and their existing vendors. Those 3 charts are numbers of the supplier currently, top 5 of suppliers in the company and numbers of years that the company cooperation with their vendors.

Chart 8 shown that the number of suppliers that having in our respondent's organization currently. Based on the result of the chart given, we can get the majority of 46 unit (50%) of our participants have cooperate with more than 6 vendors in their company, while there have 18 unit of respondents declare that they are working with 4 to 6 suppliers currently in their company it occupied 19.6% in this study. Thirdly will be 15 unit (16.3%) of the participants who maintain 2 to 4 suppliers in their company at the moment while there are only 12 unit (13%) have maintained less than 2 suppliers in their company.

Chart 9 shown the numbers of years that the organization has working with their top 5 suppliers. The majority of our respondents declare that the numbers of the year's cooperation with their top 5 major suppliers are more than 15 years, it has recorded 31 unit (33.7%) among the whole chart. Second, thee have 29 unit (31.5%) of our respondents has mentions that their currently company is cooperating with their top5 major suppliers are only less than 5 years while there have another 19 unit (20.7%). Lastly there have only 13 unit (14.1%) of our respondents have working with their top 5 supplier between 11 to 15 years.

The chart 10 shown that the average length of years that the respondents working with their top 5 supplier. Based on the chart given, we can know that the majority of our

Supplier Selection: A case study of Malaysian manufacturing industry.

respondents have working with their top 5 supplier along 4 to 10 years who occupied 38% from the whole chart. Second is there have 29 unit (31.5%) of our respondent have declare that their currently company have working with their top 5 suppliers. Moreover, there have 15 unit (16.3%) of participants mention that they have cooperate less than 3 years with their top 5 supplier while there have only 13 unit (14.1%) of the respondents have working between 11 to 15 years with their top 5 vendors.

**4.2 Descriptive Statistic**

		<b>Statistics</b>					
		Price and Cost	Delivery Performance	Quality of product and services	Buyer-sellers' Relationship	Suppliers' Reputation	Supplier and Firm Performance
N	Valid	92	92	92	92	92	92
	Missing	0	0	0	0	0	0
Mean		4.2283	4.2625	4.3348	4.2482	4.0576	4.2609
Median		4.1667	4.2000	4.4000	4.2500	4.0833	4.2857
Std. Deviation		.49027	.48565	.48730	.46717	.54679	.42389
Variance		.240	.236	.237	.218	.299	.180

Based on the chart above, we can get the highest mean is Quality of products and services with the number of 4.3348 while Delivery performance is second highest mean which has 4.2625. Thirdly will be the Supplier and firm performance it has get 4.2609 means value, followed by Buyer-sellers' relationship recorded as 4.2482. The fifth means value among the six variables is Price and cost while the lowest means value's variable is Suppliers' reputation, it only gets 4.0576. Therefore, this result can prove that quality of products and services plays a vital role in supplier and firm performance, while suppliers' reputation in this study has a low impact of supplier and firm performance.

### **4.3 Missing Data**

**Case Processing Summary**

Variables	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Price and Cost	92	100.0%	0	0.0%	92	100.0%
Delivery Performance	92	100.0%	0	0.0%	92	100.0%
Quality of products and services	92	100.0%	0	0.0%	92	100.0%
Buyer-sellers' Relationship	92	100.0%	0	0.0%	92	100.0%
Suppliers' reputation	92	100.0%	0	0.0%	92	100.0%
Supplier and firm performance	92	100.0%	0	0.0%	92	100.0%

Missing questionnaire survey data is the ordinary and frequently happened during data analysis. Missing information happens for a scope of various reasons, long surveys or participants who occasionally pass up a great opportunity responding to specific inquiries are the most well-known ones as indicated by sociology. The purpose to shown the missing data table is to identify whether there have any unaccomplished or losing data can be clearly in the data collection. The above table shown all of the losing data has been eliminated and the total number of 92 valid respondents' data that will be used for further analysis. Based on the study from Tabachnick and Fidell (2007) mentions that how much is missing, design of the missing survey question and data and justification behind absent data are among the main components that display the reality of missing information.

### **4.4 Outlier**

Based on the study from Tabachnick and Fidell (2007) a mark with a trademark that is unmistakable from the other information is what we call an outlier. This occurs with an incredible worth on single variable or a blend of scores on at least two factors to digress the statistic. Other researcher Hair (2006) pointed that the outlier is decided become an uncommonly high or low worth on a variable, or a particular mix of values across various factors that mentions the observable fact stand apart from the rest. Also, this researcher is classifying the outlier into four groups based on the source for the distinctiveness.



Supplier Selection: A case study of Malaysian manufacturing industry.

1. It may happen by a programmed blunder, for example a blunder on mistake in data entry or mix-up in coding.
2. A perception happens as the result of a strange occasion which obliges for the peculiarity of the underlying perception
3. It consists of peculiar impressions that the researcher is not accountable for.
4. It comprises of investigations that occur under the conventional scope of values on each of the variables.

There are Three (3) ways to discover the outlier. The three ways are univariate detection, bivariate detection and multivariate detection. Each of the ways to test the outlier are based on the different number of the variables constructed in the study. In this study, we are going to apply multivariate detection to test whether there are any outliers exist that can be found in our study. Multivariate outlier is a combination of score on at least two variables. Hence, multivariate is a better pick compare to bivariate since there have a number of graphs and restricted number of variables observations. In conclusion, the multivariate detection method of dealing with exceptions is more utilizable for multi-faceted positions of variables. The study from Hair et al. (2006) pointed out that outlier cannot be portrayed as either problematic or beneficial however they could skew the mean and raise the standard deviation (Field and Hole, 2003). Therefore, Field (2006) suggests to keep up with attention to such value since outlier may change the model research fit to the data. Cook's distance case was applied to find multivariate outlier and prove their impact on the objective of the study.

**Residuals Statistics<sup>a</sup>**

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	.5117	.6906	.6272	.03484	92
Std. Predicted Value	-3.316	1.818	.000	1.000	92
Standard Error of Predicted Value	.004	.014	.007	.002	92
Adjusted Predicted Value	.5180	.6921	.6273	.03479	92
Residual	-.09501	.08452	.00000	.02918	92
Std. Residual	<b>-3.165</b>	<b>2.815</b>	.000	.972	92
Stud. Residual	-3.412	2.855	.000	1.013	92
Deleted Residual	-.11042	.08694	-.00002	.03175	92
Stud. Deleted Residual	-3.648	2.984	-.001	1.037	92
Mahal. Distance	.377	20.182	4.946	4.071	92
Cook's Distance	.000	<b>.315</b>	.015	.039	92
Centered Leverage Value	.004	.222	.054	.045	92

a. Dependent Variable: Supplier and Firm Performance

According to the study from Field (2009) concluded that any situation with a standard residual value of greater than 3 could be an outlier. In addition, any Cook's Distance value greater than 1 indicated in the data may influence the research model. However, in this study, all of the outlier is fall in within the appropriate range refer from the standard residual between -3.165 and 2.815 and the value of the Cook's distance were not more than 1. Therefore, none of the outlier was eliminated.

#### **4.5 Normality, Linearity and Homoscedasticity**

Normality, Linearity and Homoscedasticity plays an important role to be make sure the data is normally distributed before the result from the data is inferred. The relationship among those variables must also be verified. Variation is given when the fundamental assumption shapes it in multivariate analysis. According to the study from Tabachnick and Fidell (2007) mentions that factors related to each other must be normally distributed.

##### **4.5.1 Normality (Kolmogorov-Smirnov)**

Data distribution that shapes the major presumption in estimating the variety of factors is alluded to as normality in statistic. It is ordinary better assuming that the factors are typically normal distributed despite the fact that it isn't generally fundamental for data analysis (Tabachnick, 2007). In addition, Hair (2006) highlight that assuming the variety from the data normal distribution is conclusively large, all subsequent statistical test is invalid due to normality being essential to use the F test and t statistic. The normality of data distribution can be measured by carry out the Kolmogorov and Shapiro-Wilk analysis test. Table below (ref. test of Normality Test) shown the result test of normality of Kolmogorov-Smirnov and Shapiro-Wilk. We can acknowledge that all of the variables are normally distributed since all of the significant value in Kolmogorov-Smirnov is less than 0.05 ( $p < 0.05$ ).

Tests of Normality						
	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Price and Cost	.119	92	.003	.944	92	.001
Delivery	.118	92	.003	.944	92	.001
Performance						
Quality of products and services	.137	92	.000	.928	92	.000
Buyer-sellers' Relationship	.114	92	.005	.943	92	.001
Suppliers' Reputation	.140	92	.000	.933	92	.000
Supplier and firm performance	.141	92	.000	.925	92	.000

a. Lilliefors Significance Correction

#### **4.5.2 Linearity (Pearson's Correlations)**

Linearity can be defined as the correlation between variables that is represented by a straight line. Being know about the intensity of relationship on variables in data analysis is basic. Hair et al. (2006) mentions that linearity is a certain assumption of all multivariate techniques predicated on co-social proportion of affiliation, including factor analysis, multiple regression, structural equation modelling and logistic regression. Therefore, it is significance to distinguish any take-offs that might affect the connection in looking at the relationships of variables (Field, 2006; Tabachnick and Fidell, 2007; Hair et al., 2006). Based on the result of Pearson' correlations on the chart below, we can get that all independent assessed at the level of 0.01 (2-tailed) toward supplier and firm performance. As conclusion, all the independent variables in this study have a strong impact on the dependent variable. Based on the chart below, we can get that price and cost get the highest level due to get the r value is at 0.634. Besides that, delivery performance gets the has the second highest r value of 0.615 toward supplier and firm performance. Suppliers' reputation is the third highest r value of 0.596 while buyer-sellers' is the fourth highest r value of 0.572 in this study. The lowest r value is quality, it only gets 0.536. Therefore, the result reveals price and cost has the strongest correlation to supplier and firm performance, whereas quality of the products and services is the weakest correlation to supplier and firm performance.

**Correlations**

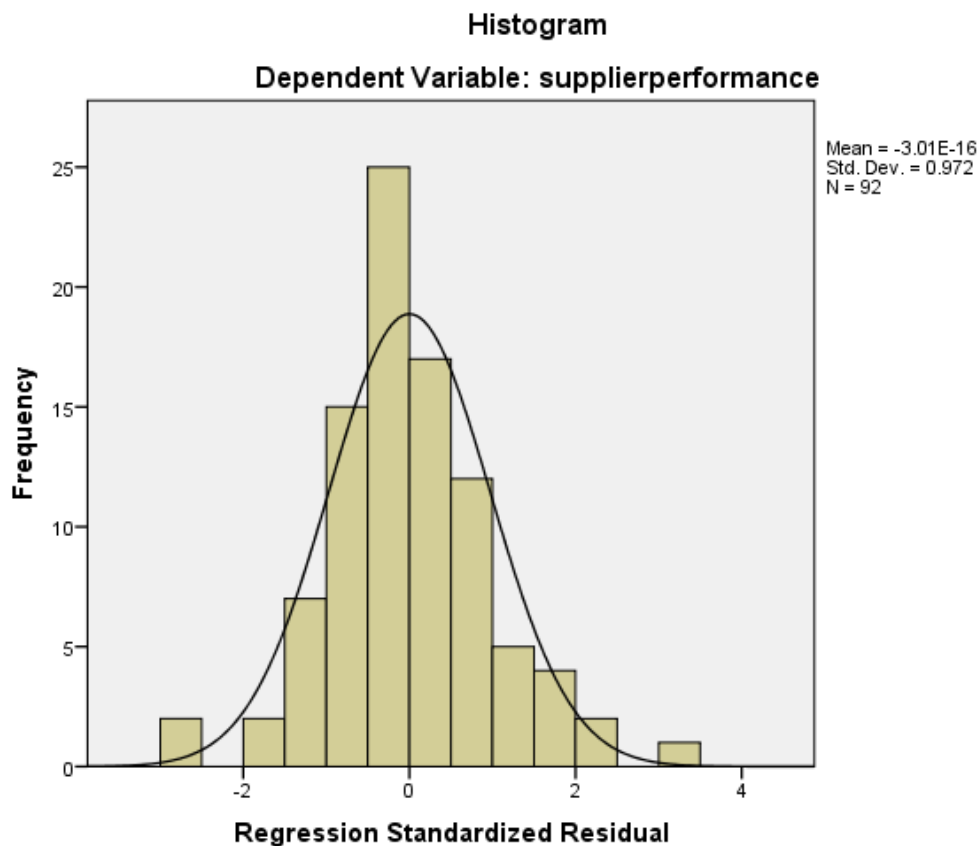
		Price Cost	Delivery	Quality	BS Relationship	reputation	Supplier performance
Price Cost	Pearson Correlation	1	.639**	.511**	.547**	.546**	.634**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	92	92	92	92	92	92
Delivery	Pearson Correlation	.639**	1	.667**	.556**	.371**	.615**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	92	92	92	92	92	92
Quality	Pearson Correlation	.511**	.667**	1	.508**	.506**	.536**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	92	92	92	92	92	92
BS Relationship	Pearson Correlation	.547**	.556**	.508**	1	.476**	.572**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	92	92	92	92	92	92
reputation	Pearson Correlation	.546**	.371**	.506**	.476**	1	.596**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	92	92	92	92	92	92
Supplier performance	Pearson Correlation	.634**	.615**	.536**	.572**	.596**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	92	92	92	92	92	92

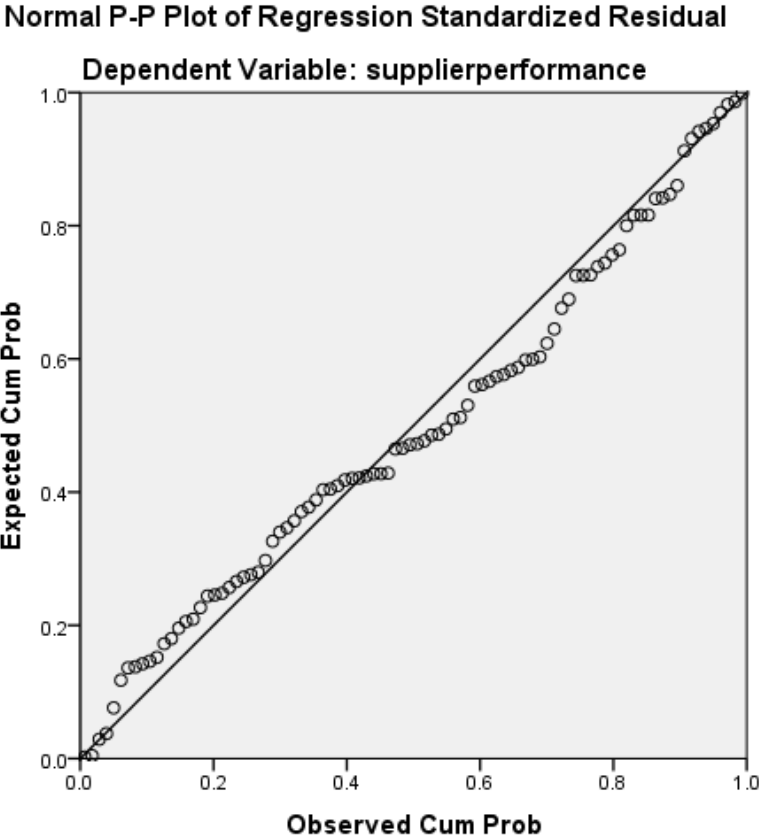
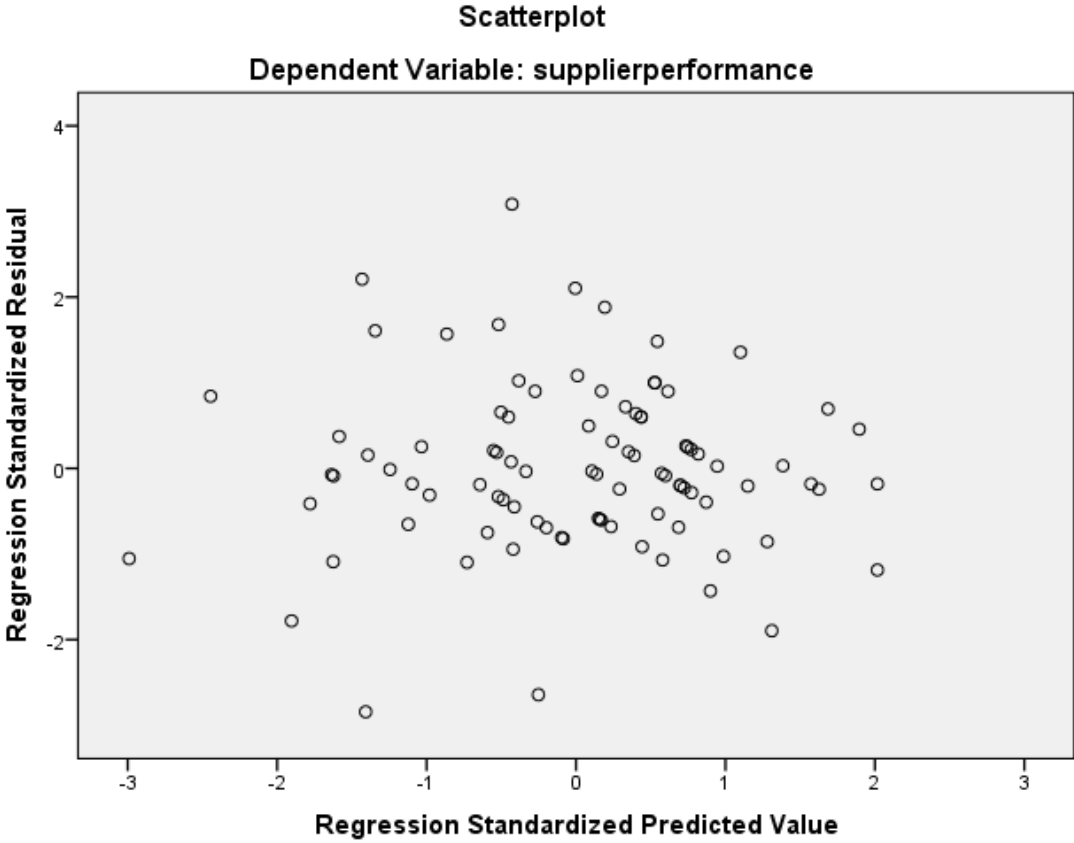
\*\* . Correlation is significant at the 0.01 level (2-tailed).

### **4.5.3 Homoscedasticity**

The purpose of the Homoscedasticity calculates an estimate of the variance of independent with dependent variables. Field (2006) agrees that the assumption of variety of factors ought to be constant in multiple regression analysis. On other hand, Hair et el. (2006) also support that Homoscedasticity is the assumption that dependent

variables show comparable forces of fluctuation across the scope of indicator variable. Therefore, this compares to the theory of normality due to the way that when the theory of multivariate is accomplished, the correlation between variables and homoscedasticity (Field, 2006; Tabachnick, 2007). Homoscedasticity can be measured by either using graphical or statistical methods (Hair et al., 2006; Field, 2006). In this study, we will carry out the graphical method to determine whether the homoscedasticity exist. The histogram below shown that the normality distributed exist since there normality distributed pattern in histogram chart is supported. Besides that, based on the chart pattern in scatterplot of, it can indicate that the normality distributed exist since there have no pattern can be found on the chart of scatterplot. Lastly, we can get that the data point in the Normal P-P plot of Regression Standardized Residual is close to the line of least square, hence the normality distributed is supported. As conclusion, the assumption of the homoscedasticity exists based on those three results of graphical data analyses given on below charts.





**4.5.4 Multicollinearity**

Multicollinearity exists when there is solid relationship between at least two indicators in the model. Elevated degree of multicollinearity represents a danger to the model because of the explanation that the normal mistakes of the b-coefficients will increment, which thus influences if these coefficients are viewed as measurably huge. Besides that, Field (2005) mentions that multicollinearity will restrict the size of R and make it hard to evaluate the singular significance of an indicator. One method for distinguishing the multicollinearity is to examine the variance influence factor (VIF) in the coefficient table.

Based on the study from Myers (1990) highlighted that, if the biggest VIF is greater than 10 and the tolerance is less than 0.2, then it demonstrates there is a serious problem in the data; another researcher Menard (1995) also suggested that Tolerance should be more than 0.2. It likewise shows whether an indicator has areas of strength for a relationship with different indicators. The result of multicollinearity had developed as per Table below:

**Coefficients<sup>a</sup>**

Model	Collinearity Statistics	
	Tolerance	VIF
Price and Cost	.473	2.112
Delivery Performance	.384	2.601
Quality	.447	2.236
Buyer-Seller Relationship	.573	1.745
Supplier Reputation	.594	1.682

a. Dependent Variable: Supplier and Firm Performance

In summary, we can get that all of the value of VIF from our independent variable (Price and Cost; Delivery Performance; Quality of products; Buyer-Seller Relationship and Supplier Reputation) is lower than 10 and their tolerance value is larger than 0.2, it can conclude that our data collection is fulfil multiple-collinearity assumption.

## **4.6 Factor analysis**

Gathering or bunches of factors were recognized by carry out the factor analysis strategies for information decrease. The element which creates bunch factors demonstrates the relationship of the factors towards the component. Based on the study from Field (2006) conclude that there are three major use of factory analysis:

1. To grasp the design of the brunch of factors
2. To develop a survey to evaluate any underlying variables
3. To decrease an informational collection to a more reasonable size while holding however much of the first information as could be expected

Field (2006) also suggested that underlying dimension at which factors are brunched by and large in a huge manner are remembered for a variable examination. This is gotten through distinguishing factors that correspond emphatically with a gathering of another variable, however don't show a relationship with factors outside that gathering. In addition, factor analysis gives the devices for analysing the design of the interrelationship (correlations) between a huge number of variables by characterizing sets of factors that are exceptionally interrelated, distinguished as elements (Hair et. al, 2006). Exploratory Factor Analysis or Confirmatory Factor Analysis can be carried out in this study due to both method suitable for data reduction or to configure group of variables. The authors also pointed out that the Exploratory Analysis method is applied using the available data while Confirmatory Factor Analysis incorporate bunching factors together on an element or the exact number of variables for testing hypothesis.

Testing the accuracy of data is the goal of data analysis, factor analysis was work on complex arrangements of quantitative information by investigating the relationship between its factor to uncover the most modest number of variables which can make sense of the correlation. The target of the factor analysis is to ensure that the ideas are accurately estimated for this research. For this study, the sample size of 92 is considered adequate for factor analysis.

### **4.6.1 Exploratory Factor Analysis**

As we know that there are many procedures and methods that can be carry out for rotation and factor exploratory in SPSS software. Based on the study from Tabachnick and Fidell (2007) agreed that the most notable among these methods is the key part



extraction procedure and a default in SPSS programs which extricates the greatest difference from the informational index alongside every part. There are not many ways are accessible to evaluate the sufficiency of extraction and the quantity of factors yet the most normal are Screen Plot and Eigenvalue. Field (2006) concluded that it is most significant to process the fluctuation in score (the variance) for any given measures or variables before proceed to extract factors. The explanation of this study is to play out this investigation and further inspect and comprehend the element stacking of the thing factors. It also helps to simplify the factors which can then be utilized as a reason for additional examination through investigating and surveying the factor loading.

#### **4.6.2 Eigenvalues**

Eigenvalues are connected with a change that illustrate the considerable meaning of the figure an important part extraction procedure. As a feature of a primer run with head part extraction, quick calculate on the quantity of variables is receive from the size of the eigenvalues announced (Tabachnick, 2007). Besides that, if a component analysis variance of each variable is contributing 1 while a component with an eigenvalue less than 1 is not significant. (Tabachnick, 2007; Field, 2006; Hair, 2006). Therefore, only the factors get eigenvalue more than 1 are important otherwise all elements with latent roots less than 1 are thought of as not significant and disregarded (Hair ,2006). Based on the result of Total Variance Explained, there are *eleven* factors have been found which having eigenvalues larger than 1. The underlying component recorded a high worth, followed progressively by factors with more modest eigenvalues. The quantity of variables to be held for further analysis was decided based on Kaiser's Criterion or the eigenvalue rule of 1.0, which can say that only factors with eigenvalue of 1.0 or more were taken for further analysis.

Supplier Selection: A case study of Malaysian manufacturing industry.

**Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.668	27.623	27.623	9.668	27.623	27.623
2	2.895	8.271	35.895	2.895	8.271	35.895
3	1.816	5.188	41.082	1.816	5.188	41.082
4	1.737	4.964	46.046	1.737	4.964	46.046
5	1.440	4.115	50.161	1.440	4.115	50.161
6	1.381	3.947	54.108	1.381	3.947	54.108
7	1.340	3.827	57.936	1.340	3.827	57.936
8	1.282	3.662	61.598	1.282	3.662	61.598
9	1.211	3.459	65.057	1.211	3.459	65.057
10	1.116	3.188	68.245	1.116	3.188	68.245
11	1.016	2.903	71.148	1.016	2.903	71.148
12	.960	2.742	73.890			
13	.884	2.527	76.417			
14	.791	2.260	78.677			
15	.748	2.138	80.815			
16	.683	1.952	82.767			
17	.651	1.859	84.626			
18	.602	1.720	86.345			
19	.563	1.609	87.954			
20	.550	1.571	89.525			
21	.488	1.393	90.918			
22	.396	1.131	92.049			
23	.360	1.028	93.076			
24	.323	.924	94.000			
25	.297	.849	94.849			
26	.295	.842	95.691			
27	.263	.750	96.442			
28	.236	.675	97.117			
29	.201	.575	97.691			
30	.181	.518	98.209			
31	.166	.474	98.682			
32	.140	.400	99.082			
33	.114	.327	99.409			
34	.107	.304	99.714			
35	.100	.286	100.000			

Extraction Method: Principal Component Analysis.

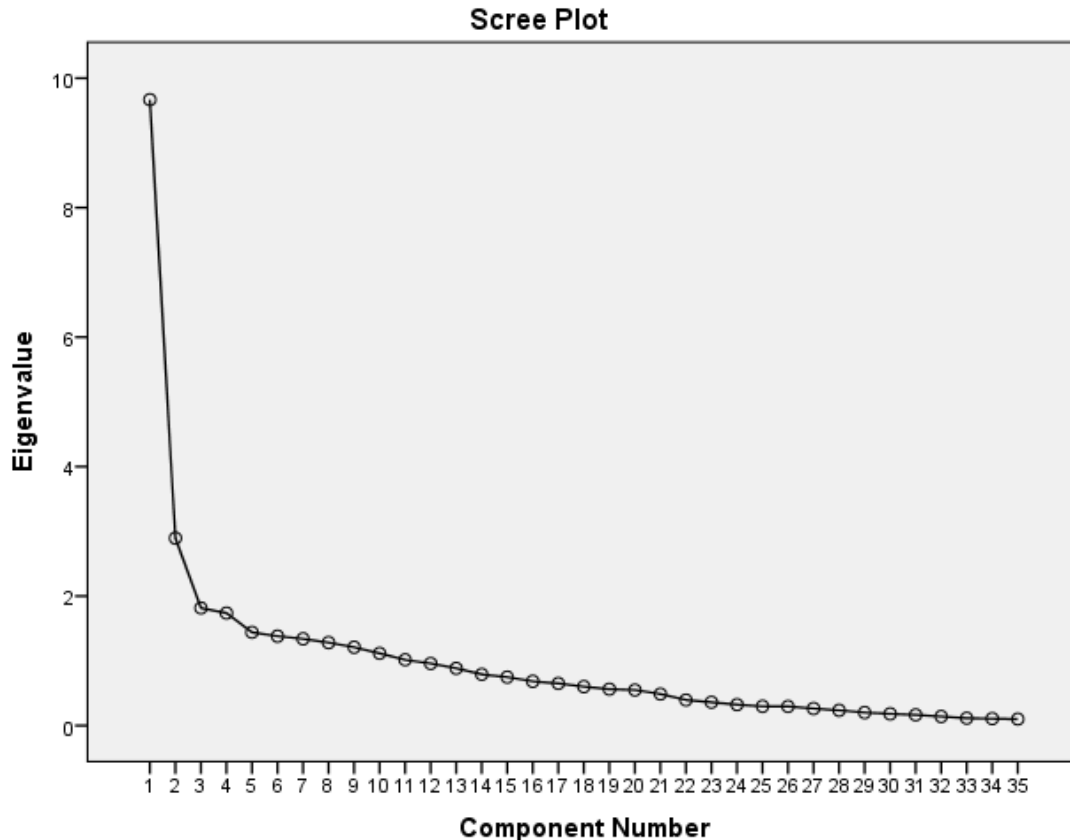
Principal Component Analysis shows the existence of eleven components with eigenvalues greater than 1.0 explaining 27.623%, 8.271%, 5.188%, 4.964%, 4.155%,

3.947%, 3.827%, 3.662%, 3.459%, 3.188%, 2.903% of variance corresponding. A clear cut-off of these components was explored by the screen plot.

### **4.6.3 Screen Plot**

A screen plot normally uses to prove the most extreme quantity of variables when the extraction factors by eigenvalues are recognized. Making the decision to extract elements with high eigenvalues might be helped by plotting a screen graph. Plotting the idle roots against the number of items in their request for extraction will reveal the screen test, and to survey the endpoint, the state of the resulting curve is utilized. Moreover, scree plot adversely diminishes by which the eigenvalue is most noteworthy for the underlying variable and decrementing for the following couple of elements prior to coming to minutely microscopic qualities for the last a few variables (Tabachnick and Fidell, 2007).

The chart below is the result of exploiting a screen plot test on data to verify the extracted factors through eigenvalue, the same numbers of factors (eleven factors) was established.



After the extraction of the factors, it is important to perceived how much factors load onto those factors. In working on the interpretability and arrangement's logical utility, revolution is of significance. It is normally applied to augment high relationship among factors and limit low ones. Varying techniques may used to construct factors from factors however the revolution strategy is extremely valuable (Field, 2006). Although, different technique of extraction provides regarding the same results with a good quality of data set, various procedures of revolution also tend to give comparable outcomes however provided that the example of connections in the information is very clear (Tabachnicks, 2007). Varimax orthogonal methods which are normally employed in pivot and maximizing variance were applied in this review. According to the study from Fidell (2007) pointed out that the purpose of Varimax rotation is to maximize the component loading variance by increasing high loadings and lessening low ones for each variable.

#### **4.6.4 Kaiser-Meyer-Olkin**

The Kaiser-Meyer-Olkin (KMO) sampling adequacy measure was estimated to justify data preciseness and adequate between connection for factor examination. The primary stage in factor analysis is the underpinning of whether the arrangement of things is sensible. Kaiser-Meyer-Olkin is one of a statistical that normally applied to measure the adequacy and reasonability of sampled items. The range of the value is between 0 to 1 while 0.70 being a result can consider as relatively high otherwise the value which has 0.5 or lower can be consider as significantly unsatisfactory. A value over 0.9 is considered to be excellent. Based on the study from Blaikie (2003) pointed out that KMO should not less than 0.60 and Bartlett's test of sphericity was made use of to test for the overall significant correlation among all item ( $p < 0.05$ ). The chart of result below is KMO and Bartlett's Test in this study and we are able to get 0.836 of KMO value which is greater than the suggested value of 0.6 and the Bartlett's Test of Sphericity has a statistically significant, supporting the factorability of the correlation matrix.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		<b>.836</b>
Approx. Chi-Square		272.168
Bartlett's Test of Sphericity	df	15
	Sig.	<b>.000</b>

#### **4.6.5 Factor Loading Based on Rotated Component Matrix**

A Varimax Rotation was complete to assists the explanation of those eleven components. The presence of a straightforward structure showing areas of strength for various, with all factors stacking on parts was shown by the pivoted arrangement. The table below show the result of the rotated component matrix in our study.

**Rotated Component Matrix<sup>a</sup>**

	Component										
	1	2	3	4	5	6	7	8	9	10	11
SR3	.839	.077	.004	.031	.075	.162	-.011	-.001	.080	.101	.153
SR2	.823	-.024	.079	.222	.137	.043	.129	.090	.035	.080	-.003
SR6	.730	-.132	.104	.197	-.037	-.047	.158	-.005	.305	.192	-.148
Qua4	.537	.363	.132	.013	.114	.162	.294	.094	.101	-.142	.193
DP2	-.078	.760	.162	.150	.004	.105	.075	.189	.105	.022	.022
DP1	-.068	.715	.224	-.001	.127	-.099	.050	.224	-.026	.100	.189
PC6	.330	.653	.008	.047	.267	-.024	.024	.016	.258	-.004	-.034
PC1	.043	.480	.301	.120	.223	.254	-.053	-.237	.026	.386	.052
SFP4	.300	.376	.158	.019	-.049	.324	.277	.247	-.134	.174	-.367
Qua5	.260	.151	.746	.045	.047	.065	-.058	.239	.056	.020	.107
Qua2	-.130	.145	.702	.182	.247	-.039	.181	.049	.222	-.056	.105
DP4	.180	.316	.579	-.040	.192	.318	.149	-.129	-.192	.036	.127
BSR2	.123	.050	.030	.760	.172	-.009	.006	.101	-.034	.102	.024
BSR3	.121	.106	.295	.595	.019	.148	.174	-.065	.233	.339	.229
DP3	.054	.382	.231	.450	-.125	.261	.244	-.081	.110	.042	.258
SFP7	-.085	.001	.085	.253	.686	.127	.119	.218	.326	.020	-.022
PC5	.255	.264	.230	-.010	.637	.016	.064	-.039	.076	.066	-.001
SFP5	.071	.225	.292	.154	.463	.371	.331	.263	-.216	-.066	.109
SR1	.246	.050	.088	.440	.459	-.051	-.042	.195	-.129	.102	.256
BSR6	-.016	-.137	.180	.140	-.030	.711	.127	.260	.256	.046	.127
SFP2	.354	.150	-.037	-.143	.304	.608	.059	-.018	.000	.198	.156
SFP3	.323	.287	.129	.381	.067	.469	-.046	.062	.014	.047	-.186
BSR4	.287	.043	.163	.126	.157	.093	.712	.099	.051	.095	.115
DP5	.478	.099	.089	-.181	.060	.184	.502	-.074	.194	.200	.137
SR5	.370	-.002	.171	.022	.359	.105	-.424	.284	.226	.099	.300
PC4	.177	.243	-.166	.373	.397	.318	.410	.008	.240	-.072	.124
SR4	.042	.169	.081	.041	.216	.117	-.022	.810	.156	.105	-.002
Qua1	-.052	.347	.449	.172	-.095	.114	.294	.529	.108	-.135	.035
PC2	.231	.092	.208	-.146	.133	.069	.025	.186	.689	.137	.134
PC3	.330	.229	-.115	.252	.156	.099	.223	-.045	.562	-.040	-.087
SFP6	.190	.281	.392	.203	.075	.188	-.139	.191	.426	-.023	.185

Supplier Selection: A case study of Malaysian manufacturing industry.

SFP1	.216	.016	-.079	.119	-.023	.198	-.034	.022	.003	.836	-.074
BSR1	.050	.147	.020	.223	.159	-.197	.410	.127	.139	.635	.165
BSR5	.063	.112	.258	.168	.056	.124	.173	.025	.093	.058	.742
Qua3	.351	.347	.095	.091	.052	.129	.065	.520	-.082	-.109	.529

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 22 iterations.

As the result of Rotated Component Matrix, we can see that the factor loadings and cross loading inspect through the principal components analysis with Varimax rotation to extract the smallest number of factors that best indicate the underlying relationship among variables. During the initial step, we will use the weight of 0.50 as the minimum cut-off to verify that a single item reflected the construct that each element is built on. Hair et al. (2006) suggested that the cut-off of 0.50 is based on the guideline for determining factor loading. The next step is to minimise cross-loading issue, each item should explicitly reflect only one component. Only those items that met this condition were submitted to additional scrutiny.

#### **4.7 Reliability Test- Cronbach's Alpha**

The application of Cronbach's Alpha is use to analysis each of the factors after developing the independent and dependent variables in this study.

##### **4.7.1 Variable: Price and Cost**

**Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.733	.733	6

**Item-Total Statistics**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PC1	21.217	6.634	.386	.173	.719
PC2	20.957	6.987	.397	.209	.716
PC3	21.120	6.436	.498	.329	.689

Supplier Selection: A case study of Malaysian manufacturing industry.

PC4	21.261	6.041	.511	.320	.683
PC5	21.130	6.137	.484	.258	.692
PC6	21.163	5.742	.542	.306	.673

**4.7.2 Variable: Delivery Performance**

**Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.657	.674	5

**Item-Total Statistics**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
DP1	16.989	4.255	.465	.332	.586
DP2	16.912	4.014	.485	.346	.572
DP3	17.033	3.988	.461	.224	.582
DP4	17.033	4.121	.425	.192	.599
DP5	17.176	4.102	.270	.093	.688

**4.7.3 Variable: Quality of products**

**Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.760	.763	5

**Item-Total Statistics**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Qua1	17.264	4.041	.598	.428	.694
Qua2	17.275	4.268	.437	.350	.748
Qua3	17.330	4.135	.570	.446	.704
Qua4	17.440	4.005	.480	.327	.735
Qua5	17.462	3.807	.571	.344	.700

**4.7.4 Variable: Buyer-Sellers' Relationship**

**Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.717	.715	6

**Item-Total Statistics**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
BSR1	21.283	5.436	.458	.318	.677
BSR2	21.293	5.924	.394	.231	.695
BSR3	21.185	4.965	.638	.448	.613
BSR4	21.293	5.858	.481	.261	.670
BSR5	21.185	6.086	.429	.211	.685
BSR6	21.207	6.320	.311	.157	.717

**4.7.5 Variable: Suppliers' Reputation**

**Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.766	.754	6



**Item-Total Statistics**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SR1	20.022	8.955	.362	.254	.764
SR2	20.538	6.762	.714	.654	.670
SR3	20.418	6.868	.675	.566	.682
SR4	20.099	9.335	.266	.141	.783
SR5	20.198	8.249	.475	.335	.740
SR6	20.538	7.185	.555	.540	.719

**4.7.6 Variable: Supplier and Firm Performance**

**Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.701	.704	7

**Item-Total Statistics**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SFP1	25.772	7.255	.227	.153	.718
SFP2	25.598	6.199	.508	.307	.639
SFP3	25.478	6.604	.528	.301	.639
SFP4	25.609	6.505	.437	.243	.660
SFP5	25.533	6.581	.514	.360	.641
SFP6	25.380	6.986	.388	.216	.673
SFP7	25.587	7.410	.301	.179	.692

No.	Construct	Cronbach's Alpha	Number of items	Ranking	Strength of Association
1	Price and Cost	0.733	6	3	Good
2	Delivery Performance	0.657	5	6	Moderate
3	Quality products	0.760	5	2	Good
4	Buyer-sellers' Relationship	0.717	6	4	Good
5	Suppliers' Reputation	0.766	6	1	Good
6	Supplier and Firm Performance	0.701	7	5	Good

Table 6: Summary of the result Cronbach's Alpha

The Cronbach's Alpha of independent variable and dependent variable is shown on the table above. We can get the value of the Cronbach's Alpha is between 0.657 to 0.766, overall is consider has a good reliability. As we can see that, suppliers' reputation with a value of 0.766 is the highest variable in this study. Secondly will be the quality of products with 0.76 alpha value while the price and cost will be ranked third since the alpha value is 0.733. Buyer-sellers' relationship is ranked fourth which has a value of alpha 0.717 and the supplier and firm performance will be ranked fifth with the alpha value of 0.701. Lastly, delivery performance has a 0.657 lowest alpha value in this study.

#### **4.8 Multiple Regression Analysis**

Multiple regression was used to assess of the Five independent variable price and cost; delivery performance; quality of products and services; buyer-sellers' relationship and suppliers' reputation. Preliminary analyses were conducted to ensure no violation of the assumption of normality, linearity, homoscedasticity and multicollinearity.

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.767 <sup>a</sup>	.588	.564	.03002

a. Predictors: (Constant), Price and Cost, Delivery Performance, Quality of the products and services, Buyer-Sellers' Relationship, Supplies' Reputation

Supplier Selection: A case study of Malaysian manufacturing industry.

b. Dependent Variable: Supplier and Firm Performance

The table above shown that R square value is 0.588, which means that the independent variables were explaining 58.8% of the variance in Supplier and firm performance. However, 41.2% of the five independent variables are not explained. This is because there may be other variables that will explain and affect supplier and firm performance during supplier selection process.

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.110	5	.022	24.521	.000 <sup>b</sup>
	Residual	.078	86	.001		
	Total	.188	91			

a. Dependent Variable: Supplier and firm performance

b. Predictors: (Constant), Price and Cost, Delivery Performance, Quality of the products and services, Buyer-Sellers' Relationship, Suppliers' Reputation

The F value of 24.521 is significant at the p value of 0.000, which is below 0.05 ( $p < 0.05$ ), as shown in the output in table ANOVA above. Therefore, it can prove that all of the five independent variables have a major impact on supplier and firm performance.

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.127	.047		2.676	.009
	Price	.230	.087	.265	2.638	.010
	Delivery	.244	.099	.275	2.467	.016
	Quality	.027	.093	.030	.290	.773
	Relationship	.115	.084	.125	1.369	.175
	Reputation	.190	.065	.262	2.919	.004

a. Dependent Variable: Supplier and firm performance

Based on the table of coefficient result, the linear equation is formed as below:

$$\text{Supplier and firm performance} = 0.127 + 0.23 (\text{Price and Cost}) + 0.244 (\text{Delivery Performance}) + 0.027 (\text{Quality of products and services}) + 0.115 (\text{Buyer-sellers' Relationship}) + 0.19 (\text{Suppliers' Reputation})$$

The intercept was 0.127 when all independent variables are zero. When delivery performance, quality of products and services, buyer-sellers' relationship and suppliers'

#### Supplier Selection: A case study of Malaysian manufacturing industry.

reputation have remained constant, the supplier and firm performance will increase by 0.230 units for each additional increase in price and cost. Supplier and firm performance will increase by 0.244 units for every unit increase in delivery performance when other independent variables remain constant. Besides that, holding price and cost, delivery performance, buyer-sellers' relationship and suppliers' reputation in supplier and firm performance will increase by 0.027 for unit increase in quality of products and services. Furthermore, the buyer-sellers' relationship in supplier and firm performance will rise 0.115 unit for each unit increase when other independent variables remain constant. Lastly, the supplier and firm performance will increase 0.190 unit for each extra increase in suppliers' reputation while the other variables keep constant. In general, we can know that quality of the products and services which have the significant value of 0.773 and buyer-sellers' relationship which have the significant value of 0.175 indicate that both of the independent variables are insignificant relationship toward supplier and firm performance since both of the significant value is greater than 0.05 ( $p > 0.05$ ). Meanwhile, price and cost, delivery performance and suppliers' reputation have a significant relationship toward supplier and firm performance due to their significant is below than 0.05 ( $p < 0.05$ ).

A value in the column of the standard coefficient beta will determine the strength of the relationship between independent and dependent variables. Therefore, the greater standardize coefficients beta value is 0.275 for delivery performance. This can prove that delivery performance has strongest impact on the supplier and firm performance, followed by price and cost (0.265), suppliers' reputation (0.626), buyer-sellers' relationship (0.125) and quality of products and services (0.03).

## **4.9 Analysis Hypothesis**

***H1: There has significant relationship between pricing and costing impact the supplier and firm performance. -Accepted***

Hypothesis H1 posits that there has significant relationship between pricing and costing impact the supplier and firm performance. It widely perceived that pricing and costing has significant attributes which will positively impact the supplier and firm performance among the manufacturing industry in Malaysia. We can get the significant value of 0.010 and t-value of 2.638, the statistical result indicated that this factor is positively related supplier and firm performance for the supplier selection among the manufacturing industry in Malaysia. Therefore, this hypothesis is supported by the result.

***H2: There has significant relationship between delivery performance impact the supplier and firm performance. -Accepted***

Hypothesis H2 posits that there has significant relationship between delivery performance impact the supplier and firm performance. It widely perceived that delivery performance has significant attributes which will positively impact the supplier and firm performance among the manufacturing industry in Malaysia. We can get the significant value of 0.016 and t-value of 2.467, the statistical result indicated that this factor is positively related supplier and firm performance for the supplier selection among the manufacturing industry in Malaysia. Therefore, this hypothesis is supported by the result.

***H3: There has no significant relationship between quality of products and services impact the supplier and firm performance. -Rejected***

Hypothesis H3 posits that there has no significant relationship between quality of products and services impact the supplier and firm performance. It widely perceived that quality of products and services has no significant attributes which will negatively impact the supplier and firm performance among the manufacturing industry in Malaysia. We can get the significant value of 0.773 and t-value of 0.029, the statistical result indicated that this factor is negatively related supplier and firm performance for the supplier selection among the manufacturing industry in Malaysia in the supplier

selection among the manufacturing industry in Malaysia. Thus, this hypothesis is not supported by the result.

***H4: There has no significant relationship between buyer-sellers' relationship impact the supplier and firm performance. -Rejected***

Hypothesis H4 posits that there has no significant relationship between buyer-sellers' relationship impact the supplier and firm performance. It widely perceived that buyer-sellers' relationship has no significant attributes which will negatively impact the supplier and firm performance among the manufacturing industry in Malaysia. We can get the significant value of 0.773 and t-value of 0.029, the statistical result indicated that this factor is negatively related in the supplier selection among the manufacturing industry in Malaysia. Thus, this hypothesis is not supported by the result.

***H5: There has significant relationship between suppliers' reputation impact the supplier and firm performance. -Accepted***

Hypothesis H5 posits that there has significant relationship between suppliers' reputation impact the supplier and firm performance. It widely perceived that suppliers' reputation has significant attributes which will positively impact the supplier and firm performance among the manufacturing industry in Malaysia. We can get the significant value of 0.004 and t-value of 2.919, the statistical result indicated that this factor is positively related supplier and firm performance for the supplier selection among the manufacturing industry in Malaysia in the supplier selection among the manufacturing industry in Malaysia. Thus, this hypothesis is supported by the result.

## **Chapter 5: Summary, Findings and Recommendation**

### **5.0 Introduction**

In this study, the criteria of the supplier selection have been studied, along with the examination of the impact supplier and firm performance from the buying organization particularly focus on manufacturing industry in Malaysia. A quantitative approach is carrying out in this study for data collection through distribute the survey questionnaire through Whatsapp and email to our target respondents. Hence, quantitative research method may collect the data result from our respondents which can help us in address the critical criteria of supplier selection along with the overall impact on supplier and firm performance among the manufacturing industry in Malaysia.

Those data collected for this study from our respondents who come from various nature business such as electronic, metal, wood and more among the manufacturing industry in Malaysia and represent our target population. There are total number of 92 units of the respondents have participated in our survey during the month from February to June 2022. The Statistical Package for the Social Sciences (SPSS) version 21.0 have been applied in this study for investigate the normality, multicollinearity, homogeneous, reliability, factor analysis and multiple regression analysis between the independent and dependent variables. In addition, the extra information and insight was interpreted based on each of the model, not only look into the criteria and influencing factors of the supplier selection, but also proving direct and indirect relationship between factors of the supplier selection and how the supplier and firm performance affected by those supplier selection criteria. We will discuss the contribute to theoretical implication, major findings, managerial implication and also limitation and recommendation that can be found in this study as well as the important conclusion that can be reach.

### **5.1 Contribute to Theoretical Implications**

In this study is organized in newly by the structure of a comprehensive theoretical framework that studies the significant criteria of supplier selection impact the supplier and firm performance from the buying firm among the manufacturing industry in Malaysia. There are some of the past researchers such as Ellram (1990), Tam and Tummala (2001), Kannan (2002) have not been directed in that frame of checking out at supplier selection criteria, yet rather on supply chain management in the more

generally perceived regions that are considered affecting factors. However, there are some of local researcher such as Suzari (2013) has done the study of empirically test and examined the theoretical framework of business ethical and government policies on the supplier selection topic.

In view on the past literature of supplier selection by form researchers in the examination history of this field, critical criteria carried out by Dickson (1966) include price and costing, capacity, delivery performance, quality, communicate system, supplier relationship management, service standard, financial and management capability, geographical location and other 23 unit of factors. In addition, another research highlighted that the significant factors of price and cost, delivery performance standard and quality have always been verified as playing an important role in the decision of the supplier selection (Ellram, 1990). However, a completing reflection that can consider the detailing of supplier selection and impacting components through the ideation on manufacturing industry in Malaysia has only done by few of the researchers. We will conduct the analysis by combining all the variables and proof the normality, validity and reliability to make sure there have no assumption on each of the analysis result and multiple linear regression which has been applied as measurement model.

Firstly, the study contributed new knowledge on supplier selection because it was conducted in the manufacturing industry in Malaysia. Previous studies on supplier mostly covered other major industries such as automotive, construction, textile and food and beverage industry. Hence, it can be considering as a one of an interesting topic that can be carrying out to investigate the preference and the criteria of supplier selection assessment among the manufacturing industry in Malaysia especially during the pandemic of Covid-19 currently.

Secondly, since there have many past researchers had carrying out their study regarding supplier selection majority took place in foreign country such as China, United State, Europe and UK. This is considering few of the supplier selection topic research that held on Malaysia, making it huge in empowering an assessment of a more extensive scope of disclosures recovered from research led in an Asian setting.



## 5.2 Discuss of Major Findings

Objective of the study	Hypothesis	Outcome	Determination
To study the relationship between pricing and costing impact the supplier and firm performance during supplier selection	H1: There have significant relationship between pricing and costing impact the supplier and firm performance	Multiple Linear Regression Analysis Result:	Accepted
		T-value: 2.638	
		Significant value: 0.010, $p < 0.05$	
To determine the relationship between delivery performance impact the supplier and firm performance during supplier selection	H2: There have significant relationship between delivery performance impact the supplier and firm performance	Multiple Linear Regression Analysis Result:	Accepted
		T-value: 2.467	
		Significant value: 0.016, $p < 0.05$	
To examine the relationship between quality of products and services impact the supplier and firm performance during supplier selection	H3: There have no significant relationship between quality of products and services impact the supplier and firm performance	Multiple Linear Regression Analysis Result:	Rejected
		T-value: 0.029	
		Significant value: 0.773, $p > 0.05$	
To access the relationship between buyer-sellers' relationship impact the supplier and firm performance during supplier selection	H4: There have no significant relationship between buyer-sellers' relationship impact the supplier and firm performance	Multiple Linear Regression Analysis Result:	Rejected
		T-value: 1.369	
		Significant value: 0.175, $p > 0.05$	
To investigate the relationship between suppliers' reputation impact the supplier and firm performance during supplier selection	H5: There have the significant relationship between suppliers' reputation impact the supplier and firm performance	Multiple Linear Regression Analysis Result:	Accepted
		T-value: 2.919	
		Significant value: 0.004, $p < 0.05$	

H1: The costing and pricing have positive relationship to impact the supplier and firm performance among the manufacturing industry in Malaysia.

The result show that there have a positive relationship of costing and pricing impact the supplier and firm performance among the manufacturing industry in Malaysia in this study. Based on the result given, it can be indicated that costing and pricing are the main factors that the purchasing manager and buying firm will concern as the assessment of supplier selection. Although there have some of the previous past researchers such as O Pal; Ak Gupta (2013) mentions that costing and pricing is not the priority criteria that the purchasing manager and purchase organization during the supplier selection stage but they need to develop a multi-criteria approach. However, there are some of the recent researchers had indicated that the price and cost play a vital during supplier selection for sustainability advantages (Fallahpour, 2017); (Kannan, 2020) and (Stevic, Sustainable supplier selection in health industries using a new MCDM method: Measurement of alternatives and ranking according to Compromise solution (MARCOS), 2020). Thus, the buying firm among manufacturing industry in Malaysia realized that costing and pricing is plays an important factor which impact the supplier and firm performance and they will support their vendors who are always offer competitive pricing among their rivals and increase the gross profit margin of the company by reducing the cost of goods sold through the cost saving.

H2: The delivery performance have positive relationship to impact the supplier and firm performance among the manufacturing industry in Malaysia

The result show that there have a positive relationship of delivery performance impact the supplier and firm performance. Based on the result given, it can also proof that delivery performance are one of the main criteria that the purchasing manager and buying firm will concern as the assessment of supplier selection. There have some of the authors had agreed that delivery performance are the most vital criteria during supplier selection such as the study from Vonderembse and Tracey (1999) pointed out that punctual delivery is critical for a supplier and satisfy their clients' deadlines for being ready for action and also highlight purchasing managers should also take into account delivery performance and other factors while choosing supplier. The buying firm among manufacturing industry in Malaysia agree that delivery performance play an important factor during supplier selection and it will impact the supplier and firm

performance. Based on the questionnaire given by the respondents regarding how delivery performance impact the supplier and firm performance, we can get that the majority of the respondent agree that their supplier who are able to punctual arrange delivery as per requested can support their production line and vendor who provide the shortest lead time to support their customers' production line, hence it will improve their supplier and firm performance.

H3: The quality of products and services have negative relationship to impact the supplier and firm performance among the manufacturing industry in Malaysia.

The result show that there have a negative relationship of quality of products and services impact the supplier and firm performance. Based on the result given, it can get that quality of the products and services are not playing a significant factor to assess and select the supplier. Although there have some of the past researchers such as Dickson (1996) and Waber et al. (1991) highlighted that quality of products and services are the most important factors that procurement manager and buying firm need to priority to look into as the assessment for the supplier selection. According to the questionnaire distribute to our respondents and can conclude that most of the buying firm are more concentrating on the costing and pricing of the material and willing to seek for interchangeable goods or lower spec quality products and services to mitigate their costing especially during the pandemic of Covid-19. Besides that, our respondents respond that the defect rate of the damaged goods and material that fail to meet the requirement from them are not so important and those buying firm are more concentrate on the costing, delivery performance and suppliers' reputation as the criteria of supplier selection and impact the supplier and firm performance in their company. However, some of the recent authors such as Gao (2020); Jain & Singh (2020) and Khan et al. (2018) remind us to put high important on quality enhancements for completing sustainability benefits. Hence, the research gap has been developed since there have some of the past researchers had pointed out that quality of the products and services is the vital criterial during supplier selection process.

H4: The buyer-sellers' relationship have negative relationship to impact the supplier and firm performance among the manufacturing industry in Malaysia.

The result show that there have a negative relationship of buyer-sellers' relationship impact the supplier and firm performance. Based on the result given, it can determine

that buyer-sellers' relationship are not play a significant relationship to impact the supplier and firm performance from the buying organization in our study. Based on the questionnaire distribute to our respondents, we can know that those respondents not really support that their supplier provide professional customer services with assists their customers to overcome problem will impact the supplier and firm performance. Besides that, there have possible of the respondents think that their company need a transparency purchasing cycle process between both parties to avoid any interest conflict. On the other hand, there have some of the studies from previous researcher proof that a good buyer-sellers' relationship may enhance the supplier and firm performance between both parties. These have shown gains to the purchaser from successful connection in terms of financial (Carr and Pearson, 1999; Martin and Grbac, 2003; Johnston et al., 2004) and the lead time performance (Larson and Kulchitsky, 2000). Hence, the research gap has been developed since there have some of the past researchers had pointed out that buyer-sellers' relationship is the vital criterial during supplier selection process.

H5: The sellers' reputation have positive relationship to impact the supplier and firm performance among the manufacturing industry in Malaysia.

The result show that there have a positive relationship of suppliers' reputation impact the supplier and firm performance. Based on the result given, it can find out that suppliers' reputation plays an important role on the supplier selection and will impact the supplier and firm performance among the manufacturing industry in Malaysia. Based on the questionnaire given by our respondents, our respondents agree that a strong collaboration to build reputation and image of the company will enhance the supplier and firm performance between both parties. Moreover, there have some of the authors concluded that consider suppliers' reputation as one of a supplier selection factors such as the study from A. Manello, G. Calabrese (2019) both vendors and buyers may desire to collaboration to improve their company's reputation in order to improve its overall desirability.

### **5.3 Managerial Implication**

The determination of critical factors of supplier selection impact the supplier and firm performance among manufacturing industry in Malaysia. However, the research findings of this study can carry out some of the practical implications. Some significant implications for managers and academics are as follow:

Firstly, this study finds out that the significant of criteria for supplier selection impact the supplier and firm performance among manufacturing industry in Malaysia. The result show that costing and pricing, delivery performance and suppliers' reputation were found to be important factors that will impact supplier and firm performance while the result show that buyer-sellers' relationship and the quality of products and services is less important to impact the supplier and firm performance. Therefore, we can know that quality of the products and services is the least important to impact the supplier and firm performance among the manufacturing industry in Malaysia due to our respondent is more focus on the pricing and delivery performance as their criteria during supplier selection. There has the negative relationship between the pricing and the quality of the products and services. This is due to the reason that it will increasing the material costing when the buying firm more focus on the quality of the products and services with higher price compare to second grade material. However, the purchasing manager and buying organization can classify the frequency of the usage of the material and services. For example, purchasing manager can look into the higher quality of machinery with good after sales services and warranty provide to reduce the cost of maintenance in the future period while some material like wear and tear can look for cheaper and low quality since it is need to change frequently such as bolts and nuts, bearing and other material.

Besides that, this study also shows that the buyer-sellers' relationship is not an important factors of supplier selection to impact the supplier and firm performance among the manufacturing industry in Malaysia. The buyer-sellers' relationship were found to be less vital to impact the supplier and firm performance possibly leading to involve any interest conflict or any unhealthy competitive advantages among their rivals. Purchasing manager and the buying firm need to develop a transparency standard operational, purchasing policy and compliance to ensure those suppliers always offer a competitive price, maintain the quality of the material, on-time delivery and provide

good after sales services without involve any conflict of interest which will influence the image between both parties. Moreover, the purchasing manager can develop more similar industry suppliers to have a price comparison, credit term, quality control to improve the supplier and firm performance.

Secondly, the research findings can provide reference to managers who comes from other industries regarding the factors evaluate on supplier selection that impact the firm and performance in their company. Through this study, those purchasing manager from other industries can reference what are the main criteria that the buying firm among manufacturing industry utilized to assess and select their vendors. Besides that, this research also provides the guideline and reference to government policies for the evaluation ISO 9001 to the companies which are qualified. Based on the checklist of ISO 9001 for purchasing department in the official website, three area that the auditors will evaluate are: supplier evaluation, purchase order and goods receipt checks. Supplier evaluation set up and retain control of the purchasing process to determine the level of control to be applied for suppliers, establish criteria of supplier selection and evaluate suppliers to ensure they are fulfilling the company requirement. Hence, this study is useful to utilize as reference or indicator to evaluate and measure the ISO 9001 on the purchasing department from various industries.

Finally, an effective supplier selection should lead to improve the supplier and firm performance. Picking a suitable supplier could enhance the competitive advantages to the company in term of selling price reducing and cost saving. In addition, buying firm need to develop planning, organize and synchronize their plans and strategic business planning in order to achieve their organization goals and objective.

## **5.4 Limitation of the study**

### **5.4.1 Time constrains of data collection**

The first limitation that can be found in this study is the time constrain for data collection. This study is given 2 trimester or 8 months period to complete this study, hence it has only 4 months period to collection after complete the introduction, literature review and methodology part. This study is cross-sectional and it only investigate the relationship between the independent variable and dependent variable at the specific point of period. The chance of various in independent variable may have

Supplier Selection: A case study of Malaysian manufacturing industry.

the possible to change and will fail to detect the change in factors impact the dependent variable. Our target are collect 100 unit of the response from our participants in this 4 months period. However, we only manage to collect 92 unit of data from our respondents in the end.

#### **5.4.2 Low respond rate from targeted population**

The purpose of this study is to investigate the critical criteria of supplier selection impact the supplier and firm performance among manufacturing industry in Malaysia. Hence, our target population is the respondents who comes from manufacturing industry. However, the challenges that will encounter in this study is the low response rate from our target population since we have precisely point out our target population. Besides that, it is possible that some of the respondents will think that there are some of the questionnaires they not fully understand to answer it.

#### **5.4.3 Questionnaire development**

Likert scale is psychometrics scale usually apply in research that employs questionnaire. Our respondents will be rating those questionnaires from strongly disagree to strongly agree accordingly based on their opinion and perception and they don't have a chance to do any choice besides the above selection given and raise up their opinion on those variables accordingly.

### **5.5 Recommendation**

#### **5.5.1 Develop of open-ended question into the questionnaire**

We can develop some of the open-ended question into our questionnaire to let our respondents have a chance to provide their valuable suggestion and answer more detail on the questionnaire. Besides that, we can have a face-to-face interview with our respondents to ensure that they are clear direction and fully understanding to answer the questionnaire precisely.

#### **5.5.2 Improve the respondent rate through social media**

Low respond rate from our target population may delay our progress of data analysis before conclude the study. There are some possible that some of the respondents are not fully understand the objective and the meaning on some of the question and also some of respondents not familiar the credibility of the questionnaire. Hence, we can use

Supplier Selection: A case study of Malaysian manufacturing industry.

some of the social media such as LinkedIn to distribute the questionnaire by introducing the background, objective of the thesis by connect the targeted respondents. Therefore, those our respondents are more understand the purpose of the questionnaire and more confidence to answer the questionnaire.

## **5.6 Conclusion**

The research has achieved the main objective which is to investigate the critical criteria of supplier selection impact the supplier and firm performance among manufacturing industry in Malaysia. The determinants include pricing and costing, delivery performance, quality of products and services, buyer-sellers' relationship and suppliers' reputation. Effects of independent variables on dependent variable have been investigated by the researcher. Last but not least, recommendation also included in the chapter for future study purposed.



## **6.0 Reference**

- A. Sarkar, P. M. (2006). Evaluation of supplier capability and performance: A method for supply base reduction. *Journal of Purchasing and Supply Management*, 148-163.
- Amelia S. Carr, J. N. (1999). Strategically managed buyer–supplier relationships and performance outcomes. *Journal of Operations Management*, 17, 497-519.
- Antony Paulraja, I. J. (2006). Levels of strategic purchasing: Impact on supply integration and performance. *Journal of Purchasing & Supply Management*, 12, 107–122.
- Apuke, O. D. (2017). Quantitative research methods: A synopsis approach. *Kuwait Chapter of Arabian Journal of Business and Management Review*, 33(5471), 1-8.
- Barbarosoglu, G. a. (1997). An application of the analytic hierarchy process to the supplier selection problem. *Prod. Invent. Manage. J*, 38(1), 14-21.
- Belhadi, A. K. (2021). Manufacturing and service supply chain resilience to the Covid-19 outbreak: Lessons learned from the automobile and airline industries. *Technologies Forecasting and Social Change*, 163.
- Bernhard Lienland, A. B. (2013). The undervaluation of corporate reputation as a supplier selection factor: An analysis of ingredient branding of complex products in the manufacturing industry. *Journal of Purchasing & Supply Management*, 19, 84-97. Retrieved from [www.elsevier.com/locate/pursup](http://www.elsevier.com/locate/pursup)
- Boo, M. K. (2010). "Understanding Supplier-Selection Criteria: Meeting Planners' Approaches to Selecting and Maintaining Suppliers". *Journal of Travel and Tourism Marketing*, 27, 507-518.
- Bregman, R. (1995). "Integrating marketing, operations, and purchasing to create value". *Omega*, 159-172.
- Bryman, A. (1984). The Debate about Quantitative and Qualitative Research: A Question of Method or Epistemology? *The British Journal of Sociology*, 35(1), 75-92.
- Busch, G. (1962). "New twist on supplier evaluation". *Journal of Purchasing*, 55, 102-103.
- Calabrese, A. M. (2019). The influence of reputation on supplier selection: An empirical study of the European automotive industry. *Journal of Purchasing and Supply Management*.
- Cannon, P. M. (1997). An Examination of the Nature of Trust in Buyer-Seller Relationships. *Journal of Marketing*, 61, 35-51.
- Cannon, P. M. (1997). An Examination of the Nature of Trust in Buyer-Seller Relationships. *Journal of Marketing*, 61, 35-51.
- Cardozo, R. N. (1971). Experimental study of industrial buyer behavior. *J. Mktg Res.*, 8, 329-334.
- Cavana, R. D. (2001). Applied business research: Qualitative and quantitative method. (A. John Wiley & Sons, Ed.)

Supplier Selection: A case study of Malaysian manufacturing industry.

- Chan K. Hahn, C. A. (1990). The Supplier Development Program: A Conceptual Model. *Journal of Purchasing and Materials Management*.
- Chapman, S. N. (1990). Supplier/customer inventory relationships under just-in-time. *Decis. Sci.*, 35-51.
- Chapman, S. N. (1993). Just-in-time supplier inventory: An empirical implementation model. *Int. J. Prod. Res.*, 27, 1993-2007.
- Chen, I. P. (2004). "Strategic Purchasing, Supply Management, and Firm Performance". *Journal of Operations Management*, 22(5), 505-523.
- Chen, J.-I. Z. (2013). Supplier selection and procurement decisions with uncertain demand, fixed selection costs and quantity discounts. *Computers & Operations Research*, 40, 2703-2710.
- Cheraghi, S. D. (2011). Critical success factors for supplier selection: an update. *Journal of Applied Business Research (JABR)*, 20.
- Choi, T. a. (1996). "An exploration of supplier selection practices across the supply chain". *Journal of Operations Management*, 14, 333-343.
- Choi, T. Y. (2020). Coronavirus is a wake-up call for supply chain management. *Harvard Business Review*.
- Chowdhury, M. M. (2017). Supply Chain resilience: Conceptualization and scale development using dynamic capability theory. *International Journal of Production Economics*, 185-204.
- Churchill, G. A. (1979). A Paradigm for Developing Better Measures of Marketing Constructs. *Measurement and Construct Validity Studies*, 16(1), 64-73.
- CHURCHILL, R. (2001). Development of a quality assessment instrument for trials of treatments for depression and neurosis. *International Journal of Methods in Psychiatric Research*, 10(3).
- Civelekoglu, G. N. (2007). "Prediction of Bromate Formation Using Multi-Linear Regression and Artificial Neural Networks.". *Ozone: Science & Engineering*, 29(5), 353-362. doi:10.1080/01919510701549327
- Cooper, & S. (2006). Marketing research. (3rd ed.).
- Cooper, M. a. (1993). "Characteristics of supply chain management and the implications for purchasing and logistic strategy". *International Journal of Logistic Management*, 4, 13-24.
- Corsten, D. (2004). Efficient Consumer Response Adoption. *Haupt*.
- D.J. Watt, B. K. (2010). The relative importance of tender evaluation and contractor selection criteria. *International Journal of Project Management*, 28(1), 51-60.
- Davis, T. (1993). Effective Supply Chain Management. *Sloan Management Review*, 34(4).
- De Boer, L. L. (2001). A review of methods supporting supplier selection. *Euro. J. Purch. & Supply Manage*, 7, 75-89.

Supplier Selection: A case study of Malaysian manufacturing industry.

- Degraeve, Z. a. (1999). "Effectively selecting suppliers using total cost of ownership". *Journal of Supply Chain Management*, 35, 5-10.
- Deming, W. E. (1982). Out of the Crisis MIT Press.
- Dempsey, W. A. (1978). Vendor selection and the buying process. *Ind. Mktg. Mgmt*, 7, 257-267.
- Dickson, G. (1966). "An analysis of vendor selection systems and decisions". *Journal of Purchasing*, 2(1), 5-17.
- Dickson, G. (1966). "An analysis of vendor selection systems and decisions". *Journal of Purchasing*, 2(1), 5-17.
- Doney, P. M. (1997). An examination of the nature of trust in buyer–seller relationships. *Journal of Marketing*, 61(2), 35–51.
- Ehsan Eshtehardian, P. G. (2012). Using ANP and AHP for the Supplier Selection in the Construction and Civil Engineering Companies; Case Study of Iranian Company. *KSCCE Journal of Civil Engineering*, 17(2), 262-270.
- Ellram, L. M. (1991). The Industrial Organisation Perspective. *Supply Chain Management*, 21, 13-22.
- Eltantawy, R. A. (2003). "The impact of cycle time on supplier selection and subsequent performance outcomes". *Journal of Supply Chain Management*, 39, 4-12.
- Emre Alptekin, S. a. (2009). "A case study: Product improvement by selecting appropriate suppliers". *Journal of Expert Systems with Applications*, 23, 129-134.
- Fallahpour, A. U. (2017). A decision support model for sustainable supplier selection in sustainable supply chain management. *Computers & Industrial Engineering*, 105, 391-410.
- Fantazy, K. K. (2010). Supply management practices and performance in the Canadian hospitality industry. *International Journal of Hospitality Management*, 29(4), 685-693.
- Fombrun, C. J. (1996). Reputation. Realizing Value From the Corporate Image. . *Harvard: Business School Press*.
- Frankwick, C. C. (2008). Buyers' perspectives of buyer–seller relationship development. *Industrial Marketing Management*.
- Gabriel, R. B. (2001). "Reputation, trust and supplier commitment: the case of shipping company/seaport relations". *Journal of Business & Industrial Marketing*, 16(6), 424-438.
- Ganesan, S. (1994). Determinants of long-term orientation in buyer–seller relationship. *Journal of Marketing*, 58(2), 1–19.
- Ghodsypour, S. a. (1998). A decision support system for supplier selection using an integrated analytic hierarchy process and linear programming. *Int. J. Prod. Econ.*, 199-212.

Supplier Selection: A case study of Malaysian manufacturing industry.

- Glass, G. &. (1996). *Statistical methods in education and psychology*. Boston: Allyn and Bacon.
- Goodarzian, F. T. (2021). An integrated sustainable medical supply chain network during COVID-19. *Engineering Applications of Artificial Intelligence*, 100.
- Gurel, O., Acar, A., Onden, I., & Gumus, I. (2015). Determinants of the green supplier selection. *Procedia Soc. Behav. Sci*, 181, 131-139.
- Hair, J. F. (2006). *Marketing research: Within a changing information environment* (3rd ed.).
- Hakansson, H. a. (1975). Supplier selection in an international environment: An experimental study. *J. Mktg. Res.*, 12, 46-51.
- Handfield, R. G. (2006). "Supply management's evolution: key skill sets for the supply manager of the future". *International Journal of Operations and Production Management*, 26(7), 822-844.
- Hill, R. L. (1992). Using the Analytic Hierarchy Process to Structure the Supplier Selection Procedure. *International Journal of Purchasing and Materials Management*, Spring.
- Ho, W. X. (2010). "Multi-criteria decision making approaches for supplier evaluation and selection: A literature review". *European Journal of Operational Research*, 202(1), 16–24.
- Hodapp, R. M. (2017). The Importance of High School Physics Teachers for Female Students' Physics Identity and Persistence. *The physical teacher*, 55.
- Hsiu Mei Wang Chen, S.-Y. C.-K. (2016). A Fuzzy MCDM Approach for Green Supplier Selection from the Economic and Environmental Aspects. *Mathematical Problems in Engineering*, 1-10.
- Humphreys, P. S. (2001). Collaborative buyer–supplier relationships in Hong Kong manufacturing firms. *Int. J. Supply Chain Manage*, 6, 152-162.
- Humphreys, P. S. (2003). Buyer–supplier relationship: Perspectives between Hong Kong and the United Kingdom. *J. Mater. Proc. Tech.*, 138, 236-242.
- Jenny L. Singleton, J. P.-M. (1993). ONCE IS NOT ENOUGH: STANDARDS OF WELL-FORMEDNESS IN MANUAL COMMUNICATION CREATED OVER THREE DIFFERENT TIMESPANS. 683-715. Retrieved from <http://www.jstor.org/stable/416883>
- Johnston, D. M. (2004). "Effects of supplier trust on performance of cooperative supplier relationships". *Journal of Operations Management*, 22, 23-38.
- Jones, C. (October/Novembe, 1989). "Supply Chain Management — Key Issues". *BPICS Control*, 23-7.
- JONES, C. (Oct/Nov, 1989). Supply chain management; the key issues. *BPiC Control*, 23-27.
- Kannan Vijjay, R. a. (2006). "Buyer–Supplier Relationship. The Impact of Supplier Selection and Buyer-supplier Engagement on Relationship and Firm Performance". *International Journal of Physical Distribution and Logistics Management*, 36(10), 755-775.

- Kannan, D. M.-., (2020). Sustainable circular supplier selection: A novel hybrid approach. *Science of The Total Environment*, 722.
- Kannan, V. a. (2002). "Supplier selection and assessment: their impact on business performance". *Journal of Supply Chain Management*, 38(4), 11-22.
- Karmaker, C. L. (2021). Improving supply chain sustainability in the context of Covid-19 pandemic in an emerging economy: Exploring drivers using an integrated model. *Sustainable Production and Consumption*, 26, 411-427.
- Kotler, P. &. (2006). *Marketing management*.
- Krause, D. (1997). "Supplier development: current practices and outcomes". *International Journal of Purchasing & Material Management*, 33, 12-19.
- Krause, D. a. (1997). Success factors in supplier development. *Int. J. Physic. Distrib. Logist. Manage.*, 27, 39–52.
- Kulchitsky, P. D. (2000). The Use and Impact of Communication Media in Purchasing and Supply Management. *The Journal of Supply Chain Management*.
- Kumar, A. M. (2021). Mitigate risks in perishable food supply chains: Learning from Covid-19. *Technology Forecasting and Social Change*, 166.
- Kut, S. (2000). "Price and Time Competition for Service Delivery". *Journal of Manufacturing and Service Operations Management*, 2(4), 392-409.
- La Londe, B. M. (1994). Emerging logistics strategies: blur print for the next century. *International Journal of Physical Distribution and Logistics Management*, 24(7), 35-47.
- Li, C. C. (1997). A new measure for supplier performance evaluation. *IIE Transactions on Operations Engineering*, 29, 753–758.
- Li, C. F. (1997). A new measure for supplier performance evaluation. *IIE Transactions*, 29(1), 753–758.
- Lim, J. (1 July, 2021). *The EDGE Market* . Retrieved from IHS Markit Malaysia Manufacturing PMI slumps as business confidence hits lowest reading on record: <https://www.theedgemarkets.com/article/ihs-markit-malaysia-manufacturing-pmi-down-399-june-513-may>
- Lin, X. (2006). Investigating supplier selection using repertory grid technique. *Sharon Purchase*.
- Lin, X. P. (2006). Investigating supplier selection using repertory grid technique. (I. I. Conference, Ed.) *Service Operations and Logistics, and Informatics*, 432-435.
- Liu, F. a. (2005). The voting analytic hierarchy process method for selecting supplier. *Int. J. Prod. Econ*, 97(3), 308-317.
- Majumdar, A. S. (2020). COVID-19 debunks the myth of socially sustainable supply chain: A case of the clothing industry in South Asian countries. *Sustainable Production and Consumption*, 24, 150-155.

Supplier Selection: A case study of Malaysian manufacturing industry.

- Mark A. Vonderembse, M. T. (1999). The Impact of Supplier Selection Criteria and Supplier Involvement on Manufacturing Performance. *The Journal of Supply Chain Management*.
- Martin, J. a. (2003). "Using supply chain management to leverage a firm's market orientation". *Industrial Marketing Management*, 32, 25-38.
- Masella, C. a. (2000). A contingent approach to the design of vendor selection systems for different types of co-operative customer/supplier relationships. *Int. J. Op. Prod. Manage.*, 20, 70-84.
- Mason, T. (1996). "Getting your supplier on the team". *Logistics Focus*, 10-12.
- Mihaly, M. (1999). "Strategic sourcing". *Industry Week*, 4, 3-8.
- Min, H. (1994). International supplier selection. *Int. J. Phys. Distrib. Logist. Manage*, 24(5), 24-33.
- Monczka, R. M. (1981). Perceived importance of supplier information. *J.Purch. Mater. Mgmt.*, 17, 21-29.
- Monge, M. E. (2003). Determining the importance of the supplier selection process in manufacturing: a case study. *International Journal of Physical Distribution & Logistics Management*, 34, 492 - 504.
- Morgan, J. (1996). "Integrated supply chain: How to make them work". *Purchasing*, 120, 110-113.
- Motwani, J. Y. (1999). Supplier selection in developing countries: A model development. *Integ. Manuf. Syst.*, 10/3, 154-161.
- Nagurney, A. (. (2021). Supply chain game theory network modelling under labour constraints: Applications to the COVID-19 pandemic. *European Journal of Operational Research*. doi:<https://doi.org/10.1016/j.ejor.2020.12.054>
- Narasimhan, R. a. (1998). "Casual linkages in supply chain management: an exploratory study of North American manufacturing firm". *Decision Sciences*, 3, 579-605.
- New, S. (1997). The scope of supply chain management research. *Supply Chain Management*, 2(1), 15-22.
- New, S. P. (1995). Research frameworks in logistics: three models, seven dinners and a survey. *International Journal of Physical Distribution and Logistics Management*, 25(10), 60-77.
- Nurul Ezaili Alias, N. M. (2014). Examining the Mediating Effect of Employee Engagement on the Relationship between Talent Management Practices and Employee Retention in the Information and Technology (IT) Organizations in Malaysia. *Journal of Human Resources Management and Labor Studies*, 2(2), 227-242.
- Nydick, R. a. (1992). "Using the Analytic Hierarchy Process to Structure the Supplier Selection Procedure". *International Journal of Purchasing and Materials Management*, 28(2), 31-36.

Supplier Selection: A case study of Malaysian manufacturing industry.

- Om Pal, A. K. (2013). Supplier Selection Criteria and Methods in Supply Chains: A Review. *International Scholarly and Scientific Research & Innovation*, 7(10).
- Orji, I. J. (2015). An innovative integration of fuzzy- logic and systems dynamics in sustainable supplier selection: A case on manufacturing industry. *Computers & Industrial Engineering*, 88, 1-12.
- Pani, A. K. (2014). "Exploring the importance of different supplier selection criteria". *Management Research Review*, 37(1), 89-105.
- Poirier, C. (1999). "The convergence of business and technology". *Supply Chain Management Review*, 3(3), 52-58.
- Quinn, F. (1997). "Team up for supply-chain success". *Logistic Management*, 36, 39-41.
- Rao, P. (2002). "Greening the supply chain: a new initiative in South East Asia". *International Journal of Operations and Production*, 13(4), 935-945.
- Rao, P. (2005). "The greening of suppliers in the South East Asian context". *Journal of Cleaner Production*, 13(9), 935-945.
- Rashidi, K. N. (2020). Applying the triple bottom line in sustainable supplier selection: A meta- review of the state- of- the- art. *Journal of Cleaner Production*, 269.
- Riel, G. B. (2004). Corporate Associations in the Academic Literature: Three Main Streams of Thought in the Reputation Measurement Literature. *Corporate Reputation Review*, 161-178.
- Roos, G. (1998). "How to buy switches: purchasers weigh quality, service in sourcing". *Electronic Buyers*, 61-62.
- S. Jharkharia, R. S. (2007). Selection of logistics service provider: An analytic network process (ANP) approach. *Omega*, 35(3), 274-289.
- S.C. Nwanya, J. U. (2017). Optimization of machine downtime in the plastic manufacturing. 4(1335444).
- Schonberger, R. a. (1983). "Just-in-time purchasing challenge for US industry". *California Management Review*, 26(1), 54-68.
- Scott, C. W. (1991). New strategic tools for supply chain management. *International Journal of Physical Distribution and Logistics*, 21(1), 23-33.
- Sedgwick, P. (2013). Convenience sampling. *BMJ*, 347. doi:10.1136/bmj.f6304
- Sharland, A. E. (2003). "The impact of cycle time on supplier selection and subsequent performance outcomes". *Journal of Supply Chain Management: A Global Review of Purchasing and Supply*, 39(3), 4-12.
- Shin, H. C. (2000). "Supply management orientation and supplier/buyer performance". *Journal of Operations Management*, 18(3), 317-333.
- Shingo, S. (1998). Non-Stock Production. Productivity Press.

- Soyoung, M. K. (2010). "Understanding Supplier-Selection Criteria: Meeting Planners' Approaches to Selecting and Maintaining Suppliers". *Journal of Travel and Tourism Marketing*, 27(5), 507-518.
- Stevic, Z. P. (2020). Sustainable supplier selection in health industries using a new MCDM method: Measurement of alternatives and ranking according to Compromise solution (MARCOS). *Computes & Industrial Engineering*, 140.
- Stevic, Z. P. (2020). Sustainable supplier selection in healthcare industries using a new MCDM method: Measurement of alternatives and ranking according to Compromise solution (MARCOS). *Computers & Industrial Engineering*, 140.
- Subrata, M. a. (2013). "A survey of sustainable supply chain management practices in Indian manufacturing firms. *Indian institute of management Calcutta*, 1-66.
- Tabachnick, B. G. (1989). Using multivariate statistics. (2nd ed.).
- Taherdoost, H. (2018). Sampling Methods in Research Methodology: How to Choose a Sampling Technique for Research. *SSRN Electronic Journal*. doi:<https://doi.org/10.2139/ssrn.3205035>.
- Tan, K. C. (2002). Supplier Selection and Assessment: Their Impact on Business Performance. *The Journal of Supply Chain Management*.
- Tan, K. H. (1998a). Enhancing firm's performance through quality and supply base management: an empirical study. *International Journal of Production Research*, 36(10), 2813-2837.
- Tan, V. R. (May, 2010). "Supply chain integration: cluster analysis of the impact of span of integration". *Supply Chain Manag.An Int. J.*, 15(3), 207–215.
- Thomas Y. Choi, J. L. (1996). An exploration of supplier selection practices across the supply chain. *Journal of Operations Management*, 14, 333-343.
- Tookey, S. T. (2011). EVOLVING TRENDS OF SUPPLIER SELECTION CRITERIA AND METHODS. *International Journal of Automotive and Mechanical Engineering (IJAME)*, 4, 437-454. doi:<http://dx.doi.org/10.15282/ijame.4.2011.6.0036>
- Toole, B. D. (2000). "Classifying relationship structures: relationship strength in industrial markets". *Journal of Business & Industrial Marketing*, 15(7), 491-506.
- Tracey, M. a. (2001). "Empirical analysis of supplier selection and involvement, customer satisfaction and firm performance". *Supply Chain Management: An international Journal*, 6(4), 174-188.
- Turner, A. G. (2003). Sampling frames and master samples . *UNITED NATIONS SECRETARIAT*.
- Verma, R. (1998). An Analysis of the Supplier Selection Process. *Omega, Int. J. Mgmt Sci.*, 26(6), 739-750.
- Verma, R. a. (1998). "An Analysis of the Supplier Selection Process". *International Journal of Management Science*, 26(6), 739-750.
- Verma, R. a. (1998). "An Analysis of the Supplier Selection Process". *International Journal of Management Science*, 26(6), 739-750.



Supplier Selection: A case study of Malaysian manufacturing industry.

- Vonderembse Mark, A. a. (1999). "The impact of supplier selection criteria and supplier involvement on manufacturing performance". *Journal of Supply Chain Management*, 35(3), 33-39.
- Vonderemse, M. A. (1999). "The Impact of Supplier Selection Criteria and Supplier Involvement on Manufacturing Performance". *Journal of Supply Chain Management*, 33-34.
- Vos, P. a. (2002). "Tomorrow's offices through today's eyes: effects of office innovation in the working environment". *Journal of Corporate Real Estate*, 4(1), 48-65.
- W Thanaraksakul, B. P. (2009). Supplier evaluation framework based on balanced scorecard with integrated corporate social responsibility perspective. *Proceedings of the International MultiConference of Engineers and Computer Scientists*.
- Wacker, J. G. (1996). A Theoretical Model of Manufacturing Lead Times and Their Relationship to a Manufacturing Goal Hierarchy. *Manufacturing Goal Hierarchy*, 27(3).
- Wagner, J. E. (1989). Vendor selection among retail buyers: An analysis by merchandise division. *Retailing*, 65, 58-77.
- Weber, C. A. (1991). Vendor selection criteria and methods. *Eur. J. Oper. Res*, 50, 2-18.
- Ying Liao, P. H. (2010). Supply Management, Supply flexibility and performance outcome: An empirical investigation of manufacturing firm. *Supply Management, Supply Flexibility and Performance Outcomes*, 46(3).
- Yuanzhu Zhan, L. C. (2021). The impact of sustainability on supplier selection: A behavioural study. *International Journal of Production Economics*, 236.
- Zeller, R. &. (1980). Measurement in the social sciences.
- Zikmund, G. B. (2010). *Business Research Methods (8th ed.)*.
- Zsidisin, G. a. (2001). "Environmental purchasing: a framework for theory development". *European Journal of Purchasing & Supply Management*, 7(1), 61-73.

## **7.0 Appendix**

### **Section A: Personal Information**

**Instruction:** Please read each question carefully and provide the correct information by placing a Tick (√) in the boxes given.

1. Gender

Male

Female

2. Age

20-30 years old

31- 40 years old

41- 50 years old

Above 50 years old

3. Number of years with organization

1-3 years old

4-6 years old

7-10 years old

More than 10 years old

4. Current position in your company

Officer

Executive

Management (Manager, Assistant General Manager)

Senior Management

**Section B General Profile of your company**

**Instruction:** Please read each question carefully and provide the correct information by placing a Tick (√) in the boxes given.

1. What is the nature of your business?

- Electrical and Electronics Products
- Chemical & Chemical Products
- Food products and beverages
- Basic metal, metal & machinery
- Rubber & Plastic products
- Raw material (aluminum, silicon, etc.)
- Other

Please specify: \_\_\_\_\_

2. How many employees currently are working in your company?

- Less than 20 employees
- 20-50 employees
- 50-250 employees
- Above 250 employees

3. How long has your company operated this business?

- Less than 10 years
- 11-20 years
- 21-30 years
- More than 30 years

Supplier Selection: A case study of Malaysian manufacturing industry.

4. For each of the major items, how many suppliers you have maintained at the moment?

- More than 10 suppliers
- More than 30 suppliers
- More than 50 suppliers
- More than 100 suppliers

5. How long have you been cooperating with the top 5 suppliers?

- Less than 5 years
- 6-10 years
- 11-15 years
- More than 15 years

**Section C: Construction Measurement**

**Instruction:** Based on the statement, please circle the most suitable answer to indicate the attribute's importance rating with the statement by placing a circle on the scale of 1 to 5

<b>Price and Cost</b>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Price and cost is the priority criteria that I will concern about as my supplier selection	1	2	3	4	5
2. I agree that supplier must comply with their price schedule and payment term as part of the agreed contract	1	2	3	4	5
3. My suppliers always offered competitive pricing to our company	1	2	3	4	5
4. The supplier clearly states the maintenance cost price for the warranty and post-warranty period	1	2	3	4	5
5. Any possible future price increases within the contract period should be agreed upon before order awarded	1	2	3	4	5
6. Any future switching or hidden cost are considered and discussed before an issue purchase order	1	2	3	4	5

<b>Delivery performance</b>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Delivery performance is the priority criteria that I will concern about as my supplier selection	1	2	3	4	5
2. Suppliers must be able to deliver the product, machinery, services on time	1	2	3	4	5
3. There is compliance with the quantity requirement	1	2	3	4	5
4. The supplier should offer short or reasonable product delivery lead times	1	2	3	4	5
5. It is beneficial to have the supplier located nearby our company	1	2	3	4	5

Supplier Selection: A case study of Malaysian manufacturing industry.

<b>Quality of products</b>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Quality of products is the priority criteria that I will concern as my supplier selection	1	2	3	4	5
2. The products/machinery/services offered by the supplier fulfills the technical specifications and requirements of my company	1	2	3	4	5
3. The supplier offers a product's warranty.	1	2	3	4	5
4. The supplier offers a reliable product with the recognition of SIRIM	1	2	3	4	5
5. The supplier offer a reasonable life span for the products	1	2	3	4	5

<b>Buyer-sellers' relationship</b>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Buyer-seller's relationship is the priority criteria that I will concern as my supplier selection	1	2	3	4	5
2. This supplier ability to become a good partner with our company	1	2	3	4	5
3. This supplier is known to be concerned about their customers	1	2	3	4	5
4. This supplier willing to share proprietary information with our company	1	2	3	4	5
5. This supplier consider a long-term cooperation with our company	1	2	3	4	5
6. The sales representative has a good personality, communication skills and responsibility	1	2	3	4	5

<b>Supplier's Reputation</b>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Supplier's reputation is the priority criteria that I will concern as my supplier selection	1	2	3	4	5
2. This supplier is a very large company	1	2	3	4	5
3. This supplier is the industry's biggest contributor to this products	1	2	3	4	5
4. This supplier has a good company background	1	2	3	4	5
5. This supplier has strong financial stability and staying power	1	2	3	4	5
6. This supplier provides luxury branding	1	2	3	4	5

Supplier Selection: A case study of Malaysian manufacturing industry.

<b>Supplier and Firm Performance</b>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Increase the Gross Profit Margin of the company by reducing the cost of goods sold	1	2	3	4	5
A company able to offer competitive pricing among their rivals	1	2	3	4	5
Vendors able to achieve On-time delivery to support their customers' company operation	1	2	3	4	5
Supplier provide the shortest lead time to support their customers' production line	1	2	3	4	5
Reduce defect rate of the faulty or damaged goods and material that fail to meet the requirement from the buying firm	1	2	3	4	5
The supplier provides professional customer services with assists their customer to overcome the problem	1	2	3	4	5
Strong collaboration to build reputation and image for the company	1	2	3	4	5

**Questionnaire ends.**