

**SUPPLIER SELECTION AND EVALUATION IN FOOD
MANUFACTURING SECTOR**

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SECTOR

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ABSTRACT

Many organizations invest a lot in ensuring efficient supply selection and have come up with various criteria to ensure that the process of supplier selection is efficient, flawless, and can result in value-adding outcomes. However, very often, many organizations tend to encounter problems when it comes to selecting suppliers that are competent enough to supply it with what it needs. Hence, this leads to the generation of the main objective of this study to examine the supplier selection criteria and evaluation towards the food industry sector, from 3 different dimensions, including economic, environmental, and social dimensions. The research methodology was developed to answer the research question in this study via 4 phases, which include problem identification, literature review, framework development, and validation and verification. Through an identified rating scale, the performance of the supplier was determined by the respondents via the scores they provided. From the data analysis shown, the suppliers are expected to fulfil the criteria of the rating score which is expected achieving 80% and above to certify as “Excellent” supplier. At the end of the research, the researcher can conclude that economic sustainability, social sustainability, and environmental sustainability were very important sustainability- based factors that need to be given attention to when engaged in the process of choosing suppliers. The suggestion that the procurement department will focus efforts on ensuring that the suppliers they choose to become their partners in the supply chain are able to exhibit the required and accepted levels of economic, social, and environmental sustainability.

Keywords: *supplier selection, food manufacturing sector, economic dimension, environmental dimension, social dimension*

PEMILIHAN DAN PENILAIAN PEMBEKAN DI DALAM SEKTOR PEMBUATAN MAKANAN

ABSTRAK

Kebanyakan organisasi melabur di dalam memastikan pemilihan pembekal yang cekap dan telah menghasilkan pelbagai kriteria untuk memastikan bahawa proses pemilihan pembekal adalah cekap, sempurna, dan dapat menghasilkan hasil tambah nilai. Namun, kebanyakan organisasi cenderung menghadapi masalah ketika memilih pembekal yang cukup kompeten bagi membekalkan keperluan yang dikehendaki. Oleh itu, ini membawa kepada penghasilan objektif utama kajian ini adalah untuk mengkaji kriteria pemilihan pembekal dan penilaian terhadap industri makanan dari 3 dimensi yang berbeza iaitu termasuklah dimensi ekonomi, persekitaran, dan sosial. Metodologi kajian dikembangkan untuk bagi menjawab beberapa persoalan di dalam penelitian melalui 4 fasa yang meliputi identifikasi masalah, tinjauan literatur, pengembangan kerangka, dan pengesahan dan pelaksanaan. Melalui skala penilaian yang dikenal pasti, prestasi pembekal ditentukan oleh responden melalui skor yang diperolehi. Dari analisis data yang ditunjukkan, pembekal diharapkan dapat mencapai skor yang ditetapkan iaitu melebihi dari 80% bagi mencapai kategori “Cemerlang”. Pada akhir penyelidikan, penyelidik dapat menyimpulkan bahawa kelestarian ekonomi, kelestarian sosial, dan kelestarian alam sekitar adalah faktor-faktor berdasarkan kelestarian yang sangat penting yang perlu diberi perhatian ketika terlibat dalam proses pemilihan pembekal. Saranan bahawa jabatan perolehan akan memfokuskan usaha untuk memastikan bahawa pembekal yang mereka pilih untuk menjadi rakan mereka dalam rangkaian bekalan dapat menunjukkan tahap keberlanjutan ekonomi, sosial, dan persekitaran yang diperlukan dan diterima.

Katakunci: *pemilihan pembekal, sektor pembuatan makanan, dimensi ekonomi, dimensi persekitaran, dimensi sosial*

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LIST OF SYMBOLS / ACRONYMS

AHP	- Analytical Hierarchy Process
CEO	- Chief Executive Officers
CFO	- Chief Finance Officers
Cp/Cpk	- Process Capability
ESG	- Environment, Social and Governance
FSMS	- Food Safety Management System
GR&R	- Gage Repeatability & Reproducibility
ISM	- Interpretive Structural Modelling
ISO	- International Organization of Standard
MS	- Malaysian Standard
OSHMS	- Occupational Safety and Health Management System
PPM	- Part per Million
QMS	- Quality Management System
SCM	- Supply Chain Management
SERVQUAL	- Services Quality
SQM	- Supplier Quality Management
SSSC	- Sustainability Supplier Selection Criteria

CHAPTER 1

INTRODUCTION

1.1 Introduction into the Research

The primary purpose of this chapter is to provide the introduction to the research project on the topic. It will entail a discussion of the research background and in this part, the primary purpose will be to detail background information concerning the topic selected. The problem statement is then introduced and this is where the researcher will discuss the problems that were highlighted from literature and which this research is focused on solving. After this, the researcher will proceed to discuss the significance of the research and the purpose here is to outline what benefit the findings of this research will bring to theory, practice and policy making. The research aims will be described and also discussed are the research objectives and research question. The hypothesis of the research will also be laid out here. A definition of terms is provided together with a summary of introduction.

1.2 Research Background

This research is about supplier selection and evaluation in food manufacturing. The process of supplier selection is a very critical process in any organisation and this is because the criteria used to select suppliers can determine whether or not the supplier is compatible, efficient and is able to supply the required raw materials to the satisfaction of the organisation. Many organisations invest a lot in ensuring efficient supply selection and have come up with various criteria in order to ensure that the process of supplier selection is efficient, flawless and can result in value adding outcomes. However, very often, many organisations tend to encounter problems when it comes to selecting suppliers that are competent enough to supply it with what it needs.

There are numerous instances when organisations do not have proper criteria to select suppliers and as a result, the suppliers whom they choose are unable to satisfy its requirements. Usually, the suppliers are selected in a way that does not align with the requirements of the organisation and as a result, there is usually supplier incompatibility and the inability of the organisation to ensure that its suppliers can work with it towards achieving its strategic business objectives (Ahmadi et al., 2017). This would require that the organisation invest time and resources to ensure that it chooses the right suppliers that align with its business objectives.

The supplier selection process involves several steps, starting with identification and specification of needs and continuing with the formation of criteria (Fallahpour et al., 2017). The traditional supplier selection method was based on conventional consumer-centric criteria such as cost, quality, and service, but now criteria increased as environmental, economic, and social aspects have come into picture leading to a sustainable practice. The emphasis on sustainability in these present times stems from organisations wanting to ensure that their business partners are responsible organisations that focus on sustainability as part of the business model. An increasing number of business organisations are starting to realise that a sustainable business model that can bring about greater sustainability is desirable and ultimately result in better business performance and to ensure sustainability of the organisation, the suppliers must be sustainable as well (Ahmadi et al., 2017). There are organisations that have encountered difficulties in dealing with suppliers that are irresponsible and lack sustainability and as a result, the organisations have attracted criticisms. Therefore, to avoid such a negative image cast upon themselves, many organisations are making it mandatory to ensure that they do business with suppliers that are sustainable. For example, certain organisations choose to only social suppliers that have a sustainability code or adhere to ineffective sustainability business model. Many organisations are also implementing sustainability as the main criteria for selecting suppliers. Sustainability criteria play a significant role in long-term success of an upstream supply chain (Ahmadi et al., 2017).

Sustainability is generally defined as “a development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. Further views show that collaboration with economic, environmental, social and effective suppliers can improve the sustainability performance of the supply chain (Azadnia et al., 2015). Sharma and Kodali (2012) also investigated the role of suppliers in green initiatives for achieving manufacturing excellence. Chai and Ngai (2019), in their review, highlighted the sustainability aspect for developing green and strategic supplier selection.

Sustainability is starting to become an important concept in the supply chain and many organisations are starting to be attracted by this concept and they believe that to enable themselves to become sustainable, they must deal with suppliers that are sustainable themselves. As a result, certain organisations have started to experiment with incorporating sustainability criteria in the supply selection mechanisms implemented at the organisation. This study will examine the sustainability concept and research the effectiveness of environmental, economic, and social stability in influencing the supplier selection and evaluation in the process of food manufacturing.

1.3 Problem Statement

Supplier related problems are very commonplace and plague many organisations. The wrong choice of suppliers that do not tally with the requirements of the organisation can bring the organisation numerous problems. Increasingly, organisations are giving emphasis on the concept of sustainability. Many organisations are striving to be as sustainable as possible to ensure that they can project a very sound image of themselves within the industry they operate within. These organisations embrace sustainability quite extensively to make sure that they engage in sustainable business practices (Ahmadi et al., 2017). Many of these organisations goes a step further towards making sure that the sustainability concept is embraced at the highest level possible, and they usually go to the extent of ensuring that the suppliers are also sustainable. They believe that if their suppliers are sustainable then, they will most likely become sustainable themselves (Amindoust et

al., 2012). This is because suppliers that embrace sustainability are likely to supply them with raw materials that are sourced in a sustainable way and therefore, by doing business with such a supplier, the company will also enhance its sustainability image in the eyes of its stakeholders (Ahmadi et al., 2017).

Recently, many organisations have focused on combining sustainability dimensions i.e., economic, social, and environmental to each other in supplier selection problem (Khoshfetrat et al., 2019; Azadnia et al., 2012). These organisations have researched how these dimensions of sustainability can help overcome supply selection problems in organisations. Usually, what these organisations have done is that they have used the concept of sustainability as the main criteria as to ensure that the suppliers the source are free of problems and can help it achieve their own sustainability -related goals (Amindoust et al., 2012). Many of organisations have gained many benefits by engaging in the selection of sustainable suppliers such as having a better image of themselves, having more efficiently performing suppliers and achieving greater overall organisational efficiencies (Yadav and Sharma, 2015). Hence, selection of sustainable suppliers is an important decision in the organisation having a sustainability-concentrated supply chain, and it needs to be explored systematically to implement the sustainability creativities in supply chains (Yu et al., 2018). There is a lack of studies which accurately investigate the interdependencies among the selection criteria; hence, this study brings a novel outlook towards understanding various supplier selection criteria. Till now, there is no conclusive, comprehensive, and precise study done about this research topic in Malaysia. This itself is a very important apparent research gap that is overwhelmingly evident in the present literature that concern supply selection. It is the researcher's objective to examine this research problem and carry out a qualitative research that is solely focused on identifying the role of the three variables in affecting the selection of sustainable suppliers in Malaysia.

1.4 Significance of the Research

The significance of the research will be presented in accordance with the main facets and these are the significance of the study to the research world, the significance of the research to managers in food manufacturing industry in Malaysia and the significance of the research tool governmental policymakers in the country.

1.4.1 Significance to Research

This kind of a research will give many important findings that will be of great use to researchers that are doing a study about the factors that affect supplier selection. More interestingly, many researchers will find this topic very novel due to the fact that it focuses on sustainability concept. This means that research concerning this topic will be enhanced by the findings made in this study. The study will generate insights and findings that are of great use to future researchers as they will be able to use this study to understand better about this topic and make better contributions to the research topic to new research is done within the area of sustainable supply selection.

1.4.2 Significance to Managers

Supply chain managers are often tasked with the very important decision of choosing suppliers. Very often, these supply chain managers use various techniques to evaluate the efficacy of supplier and their ability to be used to supply vital raw materials for the organisation. Very often, this decision-making processes are very complicated and managers are usually faced the challenge of understanding what kind of factors that are the best and should be taken into account when determining which supplier to accept and which to reject. The findings that will be made here can help supply chain managers to understand what kind of factors can motivate for excellent supplier selection based on the concept of sustainability. This will ensure that only the best suppliers are chosen and which fit with the organisational goals.

1.4.3 Significance to Policy

It is hoped that the findings of this study will also have a Significant on policymakers. Thereafter, government agencies create policies that are meant to assist both public and private organisations to ensure better supplier selection and more sustainable suppliers supply selection as well. The findings here will assist these organisations by paving the way for greater policy making by government agencies that can take into account the factors discussed in this paper and to also formulate policies accordingly. It essentially will enable policymakers in the organisations within the Malaysian government to create policy guidelines and recommendations that can be embraced by organisations which can help them choose suppliers that are sustainable for their benefit and the benefit of all stakeholders.

1.5 The Aims of the Research

The objectives of this research are to identify various supplier selection criteria in the extant literature and to identify underlying interdependencies among prominent supplier selection criteria. The first objective is achieved by analysing the literature related with sustainable supplier selection criteria (SSSC). For investigating the interdependences among several criteria in each dimension of sustainability, an interpretive structural modelling (ISM) methodology introduced by Warfield (1974), which has been proved as a powerful tool for appraising the interrelationships of different factors is used. ISM methodology has been applied to understand the interdependences among supplier selection criteria and to identify the driving and dependence criteria. This study provides an application of ISM methodology for the qualitative analysis of the inter-dependences among SSSC.

1.6 The Research Objectives

The research objectives implies that the activities and directions that would be conducted by the researcher in a study. The research objectives that the researcher created are provided here.

1. To study current methods and approaches of supplier selection and evaluation in food manufacturing

2. To develop a systematic framework of supplier selection and evaluation in food manufacturing
3. To verify and implement the developed framework of supplier selection and evaluation in food manufacturing

1.7 Research Questions and Hypothesis

The research question that the researcher created are provided here.

1. Why supplier selection is important supply chain of manufacturing?
2. Who are involve in selection of suppliers in industry?
3. When the suitable to to evaluate the suppliers performance?
4. What is the role of environmental sustainability in supplier selection and evaluation in food manufacturing?
5. What is the role of economic sustainability in supplier selection and evaluation in food manufacturing?
6. What is the role of social sustainability in supplier selection and evaluation in food manufacturing?
7. How the process of supplier selection in food industry?

Supplier selection is the process including identify, evaluate, and contract with suppliers. The supplier selection process deploys an enormous amount of a organization's financial resources and plays crucial role for the successful of the supply chain process. With the effective supplier selection process it's able to reduce a purchase risk, maximize overall performance to the purchaser, and create a closeness and long-term relationships between customers and suppliers. Based on the results of the literature review from published articles on the supplier selection criteria, the methods of supplier selection is full of various analytical approaches. Several researchers have developed hybrid models of supplier selection which is combining more than one type of selection methods. The effectiveness of the supplier selection

methods consists of supply chain management, supplier selection criteria and supplier selection evaluation methods. In overall, the effectiveness of process supplier selection can be helpful for an organizations to have a clear understanding of the concept in order to improve their success and competitiveness. The effectiveness of the suppliers selection indirectly impacted the environmental, economic, and social sustainability especially under the complex conditions that include both qualitative and quantitative criteria.

In food supply chain management, the competitiveness has been growing. The challenges faced in food supply chains is cost minimization concern. Particularly, in the process food industry, companies have to deal with higher uncertainties both upstream and downstream of the supply chain. These uncertainties including increasing product variety, more demanding customers and a highly interconnected distribution network. This implies that companies operating in the process food industry need to manage the several potential risks related with suppliers.

The hypothesis results of the supplier selection can be summarized as follows:

1. Hypothesis 1: There is a positive relationship between environmental sustainability and supplier selection and evaluation in food manufacturing
2. Hypothesis 2: There is a positive relationship between economic sustainability and supplier selection and evaluation in food manufacturing
3. Hypothesis 3: There is a positive relationship between social sustainability and supplier selection and evaluation in food manufacturing

1.8 Definition of Terms

Supplier selection is an important part of supply chain management process by which are identify, evaluate, and establish contracts with suppliers. Several processes are involved such as analysis, several suppliers' criteria were considered, namely quality,

delivery, completeness, quality loss and environmental management. Based on this situation, several terms have been used as follows:

Environmental sustainability: This involves the ability of the supplier to demonstrate environmental sustainability which requires them to ensure that their supply chain activities do not harm the environment. In this study, it will be researched whether supplier selection can be enhanced by sourcing for suppliers that are environmentally sustainable.

Economic sustainability: This involves the ability of the supplier to demonstrate economic sustainability which requires them to ensure that their supply chain activities can bring about economic sustainability to the organisation sourcing for their supply. In this study, it will be researched whether supplier selection can be enhanced by sourcing for suppliers that are economically sustainable.

Suppliers: These are individuals or group of individuals or even organisations that supply important raw materials to businesses that require them. Suppliers come in all different shapes and forms and they are a very essential component of any business organisation and it is important for businesses to deal with suppliers that can satisfy the requirements.

Supplier Selection: This is the process involved in choosing suppliers on the basis of certain factors to determine the appropriateness and efficiency in being able to supply raw materials to the satisfaction of the organisation requiring the supplies. The choice of suppliers can be motivated by numerous factors and perhaps the most important factor during these times the sustainability of the supplier. This analysis will be all about researching the topic concerning the supplier selection sustainability within the food manufacturing industry.

Supplier quality: A supplier's ability to deliver goods or services that will satisfy customers' needs.

Supplier quality assurance: Confidence a supplier's product or service will fulfill its customers' needs. This confidence is achieved by creating a relationship between the customer and supplier that ensures the product will be fit for use with minimal corrective action and inspection. According to Joseph M. Juran, nine primary activities are needed: 1) define product and program quality requirements; 2) evaluate alternative suppliers; 3) select suppliers; 4) conduct joint quality planning; 5) cooperate with the supplier during the execution of the contract; 6) obtain proof of conformance to requirements; 7) certify qualified suppliers; 8) conduct quality improvement programs as required; and 9) create and use supplier quality ratings.

Supplier quality management: A system in which supplier quality is managed by using a proactive and collaborative approach. This management approach begins early in the product design and supplier selection process. It continues through the entire life cycle of a product and for the duration of the relationship with that particular supplier.

Supply chain: The series of suppliers to a given process.

Surveillance: The continual monitoring of a process; a type of periodic assessment or audit conducted to determine whether a process continues to perform to a predetermined standard.

Survey: The act of examining a process or questioning a selected sample of individuals to obtain data about a process, product or service.

Social sustainability: This involves the ability of the supplier to demonstrate social sustainability which requires them to ensure that their supply chain activities can bring about social sustainability to the organization sourcing for their supply. In this study, it will be researched whether supplier selection can be enhanced by sourcing for suppliers that are socially sustainable.

1.9 The Summary of Introduction

In overall, this research chapter give an account of certain important matters that concern the introduction of the research. The chapter had provided a description of the research background and here important elements of the research topic were discussed. Then the research problem statement was introduced and it was here that the main problem which the researcher wanted to solve was described in detail. The significance of the research were discussed in several different perspectives, such as the significance to the research, significance to the managers as well as the significance to the policy. Next, there was a discussion of the general aim of the research followed by discussion of the objectives and research questions. After that, what the researcher talked about was the significance of the research. Then, the description was done about the definition of important terms as well.

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