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SUSTAINABILITY IN FOOD SUPPLY CHAIN MANAGEMENT AND KEY ENABLERS: A CASE STUDY IN AGRO FOOD INDUSTRY IN SARAWAK.

This report is submitted following the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Technology Management (Supply Chain Management and Logistics) with Honours.

By

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FACULTY OF TECHNOLOGY MANAGEMENT AND TECHNOPRENEURSHIP

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I hereby acknowledge that this project paper has been accepted as part of fulfilment for the degree of BACHELOR OF TECHNOLOGY MANAGEMENT (SUPPLY CHAIN MANAGEMENT AND LOGISTICS) WITH HONOURS.

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Faculty of Technology Management and Technopreneurship
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2022

DECLARATION OF ORIGINAL WORK

I hereby declare that all the work of this thesis entitled **"Sustainability In Food Supply Chain Management And Key Enablers: A Case Study In Agro Food Industry In Sarawak."** is original done by myself and no portion of the work encompassed in this research project proposal has been submitted in support of any application for any other degree or qualification of this or any other institute or university of learning.

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SIGNATURE :

NAME : ALICIA WONG YYE ROUY

DATE : 7 FEBRUARY 2023

DEDICATION

I really would like to express my gratitude for the commitment of my dear family members who encouraged me to pursue a degree via education. I also want to convey my sincere thanks to my professor, Datin Dr Suraya Binti Ahmad, who is also my project supervisor for my senior year. They have given me their complete assistance and counsel during my inquiry. This study cannot be completed in a short amount of time without their support and encouragement.

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ABSTRACT

In order to encounter the future surge among huge population demand as the result of increasing in competition for expanding in scarce resources, the production of food must be augmented as food system has a positive link towards sustainability. Therefore, it is significant to implement some initiatives approaches so sustainability in agro-food supply chain management can be achieved. In this case study, Sarawak Produces Industries Company (SPIC) was selected among the agro-food company to examine their perception of sustainable food supply chain management and their key enablers to implement sustainable initiatives in Sarawak agriculture food supply chain. Exploratory research design and qualitative research method was adopted in this study as it allowed the researcher to develop a better comprehension by gaining information from participants through interview session. The first research objective had been achieved as the perception of sustainable food supply chain management among the Sarawak Produces Industries Company (SPIC) is identified. The second research objective had also been achieved as the key enablers includes pressure by various governmental, regulating agencies and non-government bodies; understanding customer and other stakeholder requirements; and resources allocation and information sharing within and across the hierarchy are analyzed. Other than that, the main enabler is also determined as pressure by various governmental, regulating agencies and non-government bodies. In conclusion, this research is beneficial towards for the researcher and the agro-food industry in Sarawak to build a sustainable healthy eating community and supply chain management.

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Keyword: Sustainability, Supply Chain Management, Agrofood

ABSTRAK

Untuk menghadapi lonjakan masa depan di kalangan permintaan penduduk yang besar berikutan peningkatan persaingan untuk mengembangkan sumber yang terhad, pengeluaran makanan mesti ditambah kerana sistem makanan mempunyai hubungan positif ke arah kemampanan. Oleh itu, adalah penting untuk melaksanakan beberapa pendekatan inisiatif supaya kemampanan dalam pengurusan rantaian bekalan agromakanan dapat dicapai. Dalam kajian kes ini, Syarikat Industri Pengeluaran Sarawak (SPIC) telah dipilih antara syarikat agromakanan untuk mengkaji persepsi mereka terhadap pengurusan rantaian bekalan makanan yang mampan dan pemboleh utama mereka untuk melaksanakan inisiatif mampan dalam rantaian bekalan makanan pertanian Sarawak. Reka bentuk kajian penerokaan dan kaedah kajian kualitatif telah diguna pakai dalam kajian ini kerana ia membolehkan pengkaji mengembangkan kefahaman yang lebih baik dengan mendapatkan maklumat daripada peserta melalui sesi temu bual. Objektif penyelidikan pertama telah dicapai apabila persepsi pengurusan rantaian bekalan makanan yang mampan di kalangan Syarikat Industri Pengeluaran Sarawak (SPIC) dikenal pasti. Objektif penyelidikan kedua juga telah dicapai kerana pemboleh utama termasuk tekanan oleh pelbagai agensi kerajaan, pengawal selia dan badan bukan kerajaan; memahami keperluan pelanggan dan pihak berkepentingan lain; dan peruntukan sumber dan perkongsian maklumat dalam dan merentas hierarki dianalisis. Selain itu, pemboleh utama juga ditentukan sebagai tekanan oleh pelbagai agensi kerajaan, pengawal selia dan badan bukan kerajaan. Kesimpulannya, penyelidikan ini memberi manfaat kepada penyelidik dan industri agromakanan di Sarawak untuk membina komuniti pemakanan sihat yang mampan dan pengurusan rantaian bekalan.

Kata kunci: Kemampanan, Pengurusan Rantaian Bekalan, Agromakanan

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This chapter outline the sustainability and key enablers in food industry particularly in Sarawak agri-food industry. Topics that will be discussed in this chapter includes background of study, problem statement, research questions, research objectives, scope and limitation of the study, significant of study as well as thesis outline.

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1.2 BACKGROUND OF STUDY

According to United Nations Brundtland Commission (1987), sustainability is defined as encountering present obligation without compromising the ability of future generations to meet their own needs and these resources may be in terms of natural, social and economic resources. Additionally, in order to encounter the future surge among huge population demand as the result of increasing in competition for expanding in scarce resources, the production of food must be augmented as food system has a positive link towards sustainability (Maria et al, 2021). Based on research done by Holden (2018), sustainability in food supply chain is known as the systems and processes that are non-polluting which at the same time conserve and preserve the eradicating non-renewable energy as well as natural resources. Also, the system should be efficient in terms of economic towards nations, being hazard-proof for workers, communities as well as consumers, and should not be compromising the future generations'

needs.

Based on Food and Agriculture Organization (FAO) Food Waste Index Report (2021), it has about 931 million tons of the food produced is wasted for global human consumption including households, retail establishments and the food service industries, which indicates an amount of more than 1.3 billion tons a year. However, there are no particular consensus among scholars regarding to the denotation of food wastes, it is found that a few thesauruses have the similar meaning namely food loss, kitchen and bio waste. The majority of the company agreed with the definition of food waste provided by FAO, which said that it might include edible items meant for human use but accidentally exiting the human food chain and being lost, wasted, degraded, or eaten by pests instead (Forbes, 2021). Not only that, food supply chain industry also has to encounter various other obstacles such as oil reliance, consumer pattern, climate change, fair trade and localism, social and environmental concerns, etc.

Agri-food industry includes commercial production of food by farming, in Sarawak, the most popular agri-food is pepper cultivation industry which Sarawak yields around 98% of Malaysian pepper (Adama, 2018). Besides pepper cultivation, there are other agricultural activities running within Sarawak and these activities surely contributes to some environmental issue if not managed sustainably. In facts, major food waste had caused a huge impact on our dearly mother earth and will eventually reflected to humans' daily life. This is because man-made activities such as mass food production is one of the main causes of climate change, greenhouse effect, soil degradation, water scarcity, and the destruction of biodiversity. According to research, crop and animal production and mass forestry had directly caused about 25% of the total global greenhouse emissions (Meier, 2020). With that being said, it is crucial that food companies are aware of the issue and do their very best to conquer it as sustainability in food supply chain does not only benefits the environment, it surely brought some advantages to firms and food companies. In other words, sustainability is vital along the entire food supply chain, for instance, food companies will be able to increase financial gain in the long run by reducing food waste, restricting energy and water consumption and creating more sustainable business models.

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1.3 PROBLEM STATEMENT

According to data recorded by landfill operator SWCorp Malaysia, In 2019, 16,687 tonnes of the country's daily waste production—or around 37,890 tonnes—was food trash, which is about 44% of the overall waste produced (Zainal, 2021). Apart from that, it had surged to 17,000 tonnes as a daily basis in 2022 which contributes a weekly average of 26.5 tonnes of food waste, and 3.8 tonnes daily, (Hani, 2022). Food waste is one of the crucial aspect in sustaining food supply chain, in addition to that, sustainable food supply chain must be based on resources distribution efficiency so that the negative impact towards environment is minimized. Mena (2011) indicates that food waste is a global issue for the environmental consequences of inefficient use of natural resources as well as ethical reasons in general. Besides, it is alarming for its economic influence throughout the supply chain as production of methane from the operation are polluting our planet in terms of environmental issues (Dhir, 2020). In shorts, awareness in food waste issues should be manage as a problem that must be tackled appropriately in order to maintain sustainable development on our planet.

European Commission (2015) had identified a few approaches that could be carried out by the firm in order to make food supply chain more sustainable, one of the approaches is by facilitating natural resources in a more efficient way. Not only that, it is crucial to protect the quality of natural resources while exploiting. Besides natural resources on land, marine resources should also be protected by implementing sustainable fishing practices that allow marine lives to restock instead of over exploiting marine resources. Also, it is a must to procure food ingredients from sustainable sources and use environmental friendly food packaging such as biodegradable packages. Last but not least, reduce food waste is regarded as the most significant way to make food supply chain more sustainable. The Sarawak Government had announced a 10-year strategy which is known as the Post COVID-19 Exit Economy Strategy 2030, which the strategy evolve around Digital Economy and Environmental Sustainability (PCDS, 2021). These approaches are crucial especially when natural resources are depleting. Achieving sustainable food supply chain would not only save the planet and restore it back to optimum state, it also enable food companies to save cost by spending less on handling unwanted food waste (Blum, 2020).

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1.4 RESEARCH QUESTIONS

i. What is the perception of sustainability in food supply chain?
i. What are the key enablers to implement sustainable food supply chain?
ii. What is the main enabler for sustainable fresh food supply chain in Sarawak?

1.5 RESEARCH OBJECTIVES

i. To investigate the perception sustainability in food supply chain.
ii. To analysis the key enablers to implement sustainable food supply chain.
iii. To identify the main enabler for sustainable fresh food supply chain in Sarawak.

1.6 SCOPE AND LIMITATION OF THE STUDY

This research paper is emphasised on the sustainability in food supply chain and key enablers in implementation. The selected participants will be chosen from the related field. The participants include the headquarters' office management level staff and executives with a minimum of one years' experience. The researcher will conduct an interview with the participants to collect relevant data and information.

The limitation of this study is that the result of this research will only be applicable to the food industry, which the outcomes of literature, theoretical proposition, data analysed and conclusion made could be generalised for the similar food industry only.

The key assumption of this study is that the researcher assumes that all participants have answered the questions honestly, within the capability of their better understanding, as well as the knowledge and experience that they have to provide the best possible answer.

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1.7 SIGNIFICANT OF THE STUDY

In terms of sustainability, this study identifies and examines the factors that distinguish food supply networks from those of other industries. Additionally, the main factors that promote sustainability in the food supply chain were examined in this article. The researcher will comprehend the relationship between these enablers inasmuch as it contributes to the efficient use of resources and the achievement of sustainability in the food supply chain. In emerging nations like Malaysia, food security and safety are also among the most pressing problems. As a result, creating a sustainable supply chain had been an industry concern at the global level for many years. The food supply chain must also address a number of other challenges, including fair trade, localism, energy dependence, climate change, consumer patterns, and social and environmental concerns. Therefore, in order to fulfil the needs for nutritious and secure food that can be made available to the general people, the researcher hopes that senior executives and policy makers would create a highly sustainable food supply chain. The idea of "sustainability" has a beneficial relationship with the food supply chain since it emphasises the significance of researching this area and focuses on resource usage in the most efficient manner.

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1.8 THESIS OUTLINE

In this research paper, 5 chapters is included and each chapter consists of various contents regarding to the topic of this research which is Sustainability In Food Supply Chain Management and Key Enablers: Agri-Food Industry in Sarawak. Chapter 1 is about the introduction of the entire research, the background of study, problem statement, research questions, research objectives, scope and limitation of the study, significant of study will be discussed in this chapter. Chapter 2 will examine examine the literature review and relevant theoretical model. At the end of this chapter, the proposed research framework can describe the theory and develop the hypothesis. Chapter 3 will discuss and explain deeply regarding to the research methods that were conducted in this particular research. Chapter 4 indicates the findings and discussion intended to include further dialogue and interpretation of the topics under consideration. Lastly in Chapter 5, the discussion on the findings had already been discussed in the foregoing chapter and will be concluded in this chapter.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter will examine the literature review and relevant theoretical model. 2.2 will be discussing about supply chain management and its components. 2.3 is about supply chain management in food industry and 2.4 analyze sustainability in food supply chain. 2.5 will then link both supply chain management and sustainability in food industry. By reading the relevant kinds of literature, the dependent variables and independent variables were defined. The literature review is required to develop a suitable research methodology method such as qualitative or quantitative research. At the end of this chapter, the proposed research framework can describe the theory and develop the hypothesis.

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2.2 SUPPLY CHAIN MANAGEMENT IN FOOD INDUSTRY

According to the new definition of supply chain management, a systematic process intended to improve the long-term performance of the supply chain aims to transfer goods, services, and information from the supplier to the final customer as well as add value for the customer and sustainably develop the supply chain (Min, 2019). Traditionally, wholesalers which is also known as vendors, warehouses or distribution centers, stores, and customers are the four key components of a conventional retail supply chain (Ge, 2019). Other entities like manufacturers and the suppliers are further upstream in the supply chain management. The supply chain network that are accessible to the retailer, on the other hand, becomes far more

complex in a more modern configuration. In another research done by Berthhold (2019), it is said that managing the flow of goods and services, commonly referred to as supply chain management, comprises moving raw materials, holding inventories of goods still being produced, and storing finished goods from the place of production to the location of consumption. The competitive nature of supply networks has led to firms competing with one another. Supply chain management is a profession that heavily relies on procurement, computer technology, marketing, system integration, manufacturing engineering, and other related topics.

Supply chain management is the traditional business functions and techniques that are strategically coordinated across all business activities inside a firm and across industries to enhance a specific enterprise's long-term performance and the supply chain as a whole. According to a definition that focuses on customer first, supply chain management refers to a set of tactics that depend on all the links in the chain functioning concurrently and effectively to satisfy the customer at the time of delivery to the consumer. As a result, the total cost must be reduced along the supply chain by reducing surplus expenses, movements, and managing. The main concern is turning the system to efficient and adding value in consumer. Additionally, efficiency have to be increased, and the bottlenecks must be removed. Besides that, it is necessary to ensure that the supply chain management is responsive to customers expectation. With that being said, the measurement approaches of the performance concentrate on the complete supply chain efficiency and the equitable monetary reward distribution to supply chain components. The organisation and planning of all activities associated with sourcing, procurement, transformation, and logistics management is referred to as supply chain management by the Council of Supply Chain Management Professionals (CSCMP). Additionally, It also includes collaboration and coordination with channel partners including suppliers, intermediaries, outside service providers, or clients. Supply-chain management combines demand and supply management both within and across businesses. In more recent times, the term "Extended Enterprise" has been used to represent a network of businesses that are loosely connected and self-organizing and work together to create product and service offerings. (Richards, 2018)

Nowadays, establishing sustainable industries in terms of supply chain management is one of the long-term goals in every organization (Tseng, 2018). Most of the organization would want to achieve supply chain that are sustainable towards the economic, environmental and social point of view (Lahane, 2020). The processes within the food supply chain are

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substantially categories by mass manufacturing and include interconnected marketing, procurement, and logistics that meet international standards. A key component of operations management, the supply chain has a significant influence on the environment, including emissions, pollution, and threats to public health, among other things. By incorporating environmental concerns into their supply chain activities, businesses are now seeking to minimize their influence on the environment. The ways food is handled, processed, delivered, and completely consumed has a significant impact on supply chain sustainability. These food supply chains attempt to achieve a higher level of consumer satisfaction while reducing food waste.

2.3 SUPPLY CHAIN MANAGEMENT AND ITS COMPONENTS

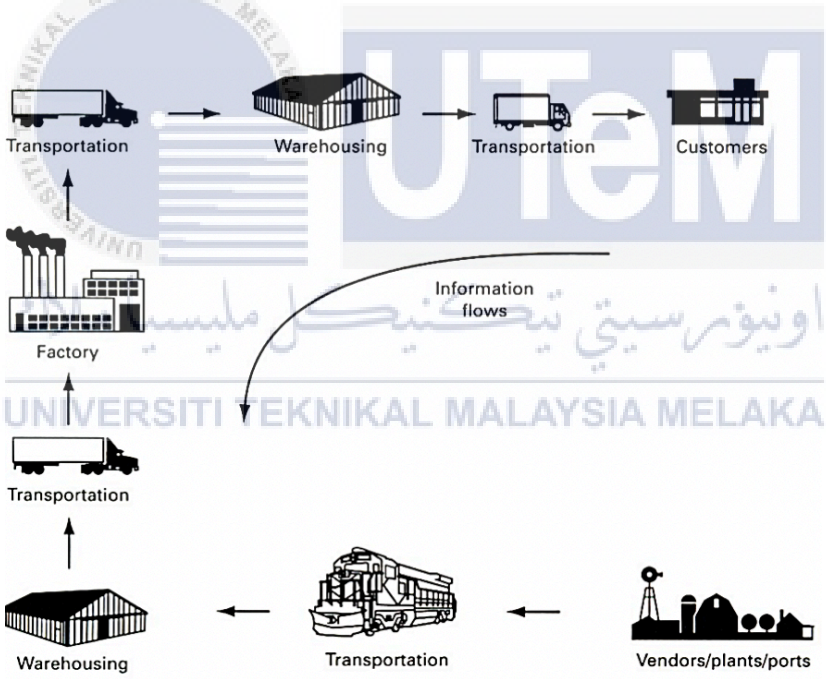

Figure 1: Components in Supply Chain Management

Sources: Nguyen et al, 2019

The supply chain, which is made up of businesses working together to gain from strategic positioning and improve overall operational performance, is also referred to as the value chain or the demand chain. Each of the collaborating companies has made a deliberate choice to integrate their supply chains. A supply chain approach is a channel structure based on recognised dependency and relationship management. For supply chain operations to be

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successful, management actions that connect clients and business partners across organisational boundaries are required. These processes must bridge functional boundaries within particular organisations. Supply chain management is the coordination of activities along the supply chain that link consumer orders, wholesaler orders, inventor orders, producer orders, vendor orders, and eventually related money flows.

There are a few components that are included in the supply chain management, these includes vendors, plants, ports, transportation, warehousing, factory, and customers (Nguyen et al, 2019). Each component associates in different tasks which can be divided into two main activities namely key activities and support activities. Customer service standards establish the amount of output and level of readiness required of the supply chain system, which is one of the major activities. As a result, establishing the standard for service also influences the logistics expenses required to sustain that quality service. Supply chain costs increased in direct proportion to the quality of customer service offered.

Besides that, transportation is one of the key activities. It is the primary cost-absorbing supply chain activity. Transportation occupied one-half to two-thirds within the total supply chain cost. Not only that, it added place value to products and services of a firm, on the other hand, inventories added time value within the supply chain. Since no modern business can operate without arranging for the movement of its raw materials, replacement parts, semi-finished goods, and/or final goods, The financial pressures put on many businesses by national crises, like a nationwide railroad strike, highlight its critical aspect. As a result, if the market cannot be satisfied, the goods that are currently in the supply chain pipeline will degrade and become out of date.

Apart from that, inventory is the next crucial to supply chain management as it is basically not possible or practical to supply immediate production or Just-In-Time delivery to customers. Additionally, stocks act as stopgaps between supply and demand to preserve product availability for consumers while providing production and the supply chain with the flexibility they need to adopt and build effective ways for creating and delivering the finished goods.

Lastly, the final key activity in this particular circumstance is the order processing. However, it usually cost a minimum portion of the overall expenses as compared to

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transportation or inventory maintenance costs. It is still an essential component in the supply chain as it not only ensures that the customer will receive satisfying goods and services at the same time it is also the activity that activate the product transportation and service delivery.

On the other hand, support activities include warehousing and materials handling-products. However, if goods or raw materials are momentarily stopped on their journey to the market, storage and material handling are frequently regulated. Furthermore, because it contributes to the effectiveness of carried out operations, protective packaging may be seen as one of the support activities for transportation, inventory, warehousing, and materials handling.

Furthermore, the other component that should pay more attention on is the purchasing and product scheduling. As it affects the whole logistical effort and, in particular, the effectiveness of transportation and inventory management, it is likely to be viewed as a production method. Additionally, information maintenance allows the flow of data required for planning and management throughout the intricate supply chain, which contributes to all supply chain operations.

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2.4 SUSTAINABILITY IN SUPPLY CHAIN MANAGEMENT

Sustainability can be view in various lenses, one of the views is through John Elkington's triple bottom line which can be addresses through profits, planet and people, the other one is the multi-generational philosophy from Brundtland Report (1987) which shows that addressing current needs without sacrificing the capacity of future generations to address their own needs. In reality, the sustainable supply chain oversees the management of material resources, flow of information, capital flow, as well as the coordinated operations of supply chain businesses, achieving goals in all three aspects of sustainable development, namely economic, environmental, and social (Halisçelik, 2019). Sustainability is becoming more and more of a strategic effort in the industry. Sustainable methods may be environmentally friendly, produce additional money, and boost consumer and staff happiness, as both small and large businesses are aware. Multilevel structures for the supply chain sustainability offer academics and supply chain specialists a practical measuring tool that helps in the creation of sustainable enterprises in the areas of the economic, environmental, and social supply chains. The sector

has the ability to promote long-term growth, which in turn may help the industry to develop (Borland, 2019).

The field of supply chain management now has a solid foundation for sustainable supply chain research, particularly that with a greening focus (Hallinger , 2020). We must carefully examine the demands, functions, and outcomes of managing sustainable supply chains. Although there is environmental and social sustainability progress, it is slow, erratic, and myopic, and it is simple to fall into unsustainable behaviors (Sarkis, 2021). When tackling the sustainability issues, organisations usually choose the easiest route possible and focus on win-win scenarios; sustainability initiatives that do not result in large short-term economic rewards are ignored or rejected (Nikolaou, 2019). Thus, solid sustainability is required for long-term success. In order to create long-term, dynamic, self-sustaining local, national, and global development projects, learning, practise, and change must all be undertaken (Agbedahin, 2019). In the growth of supply chains, sustainability is significant as a competitive advantage. As a result, monitoring and regulating their long-term viability is critical (Qorri, 2019).

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2.5 SUSTAINABLE SUPPLY CHAIN MANAGEMENT IN FOOD INDUSTRY

Enhanced product quality and more effective supply chain design are critical considerations in the food supply chain for any nation's economy (Govindan, 2018). Food wastage had surged dramatically due to the complicated coordination that are persisted within the components of food supply chain management. Not only that, there are a significant increase in the awareness of avoidable perishable food waste in the society (Sgarbossa, 2017). However, establishing a sustainable food supply chain is still one of the global challenges in the industry of any nation (Mangla et al, 2018). The biggest drivers to this waste are poor supply chain management and a lack of integration of business innovations in terms of process and technology. The success of the food industry has an impact on most components of the economy, politics, and the majority of the people. Food production, processing, and distribution are essential components of one of our society's most vital supply requirements for life and well-being. The contemporary food supply chain (SC) is unsustainable in terms of waste creation and emissions (CO2e), scarcity of food to feed an expanding population, and water and energy needs for food processing. (Beitzen-Heineke, 2017).

According to United Nations (2015) aims to make the world more sustainable by 2030, the food supply chain may be sustainable by mitigating such waste production. Food items are mostly wasted in the form of residual, defective packet, by product, and specimens saved for analysis (Raak, 2017). Food that is thrown or discarded at the store or household level is the next category. It is explored that the processing procedures and quality assurance criteria for research of first waste, as well as the physical, chemical, or biological processes by which food products become unsatisfactory and are classified as second trash (Hussein, 2018). As the society advances, so does food production and consumption, which must keep up with the demand (Aday, 2020). Food waste, pollutants, and greenhouse gas emissions have all escalated as a result of this increase in consumption and production (Buzby, 2022). Although each of these concerns has an impact on environmental, economical, and social aspects of sustainability, they are all intensified when the role of operations in the food supply chain and the resulting interdependencies and externalities are ignorantly neglected (Accorsi 2018).

2.6 SARAWAK SUSTAINABLE FOOD SUPPLY CHAIN MANAGEMENT

In Malaysia, Farmers are under peer pressure to produce and practise sustainability because of the need for safe, sanitary, organic, and high-quality food items. Sustainable agricultural practices (SAPs) must be followed across every farm that produces food in order to ensure the supply of sanitary, safe food and to address pesticide-residue issues on the way to a healthier lifestyle (Semuroh et al, 2021). The agriculture industry in Malaysia is facing unprecedented difficulties in rising environmental conservation and green consciousness consumption issues at the global and national levels. Without thorough adaptation measures, the industry's long-term potential to contribute to the nation's socio-economic growth, particularly in rural areas, may be hampered (Jamal et al, 2014). Malaysia has been successful in expanding agricultural productivity. Consumers and producers, however, have acknowledged that crop yields are increasingly damaging the public health and the environment. As a result, consumers are becoming increasingly concerned about this issue as they become more educated and demand sanitary and safe product for their health (Petrescu et al, 2019).

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Today, pepper is grown in many different nations. Major producers of pepper in the world include Brazil, India, Indonesia, Malaysia, Vietnam, and Sri Lanka, all of which are members of the International Pepper Community (IPC). IPC was founded in 1972 as an international association of nations that grow peppers. The largest pepper-producing regions in Sarawak are Sarikei, Betong, and Serian, which together make up around 61 percent of the state's total production area of 17,087 hectares in 2017 (Entebang et al, 2020). After Vietnam, which led the globe in pepper production with a production of 200,000 metric tonnes, Malaysia came in seventh with a total production of 23,500 metric tonnes in 2017, according to an IPC study published in October 2018 (IPC, 2018). With the growth of the oil palm industry, discussions about its sustainability have been more heated, the European Union (EU) recently decided to phase out the use of palm oil in biofuels by 2020. Malaysia threatened to cease importing items from the EU if the phase-out was carried out in response to the action (The Straits Times, 2018).

Additionally, Sarawak dairy farming generates a significant amount of trash that must be properly handled to prevent environmental contamination. A dairy cow is thought to create 4.6 kg of waste for every 100 kg of body weight. When managed appropriately, nitrogen, phosphorus, and potassium (NPK), which are plant nutrients, are abundant in livestock manure (EPA, 2021). Therefore, it is important to take efficient waste management seriously in order to prevent environmental degradation and from a positive perspective. This is because well waste management would be able to generate fertilizers for the pastures or sold as organic fertilizers.

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2.7 EMPIRICAL LITERATURE REVIEW

Despite the fact that many studies on the sustainability of the agricultural supply chain concentrated on the difficulties in organic farming and linked them to rural development. (Pugliese, 2001), these studies nevertheless address production that is already heavily reliant on organics and sustainability awareness (Bhaskaran et al., 2006). The fusion of technical and scientific applications, as well as the straightforward transfer of technology across stakeholders, is one of the facilitators for the sustainable agricultural supply chain (Clement et al, 2006). In line with this, a key enabler of sustainable adoption has been highlighted as the use of

information and communication technology (ICT) and the interchange of real-time information on climate change across supply chain partners (Grunfeld and Houghton, 2013). Before designing any supply chain strategy, it is critical to define procedures and practises that align with a relevant sustainability plan. Therefore, managers developing a supply chain strategy should decide on the important success factors, or enablers, for a successful adoption of the supply chain plan (Hartono et al., 2015). In this study, enablers are defined as the key features and resources that lead to the adoption of sustainability in A-FSCs (Business Dictionary, 2016).

2.7.1 PRESSURE EXERTED BY VARIOUS GOVERNMENTAL, REGULATING AGENCIES AND NON-GOVERNMENT BODIES

There are a few key enablers to implement sustainable initiatives in agriculture food supply chain that are addressed in this paper by referring to research studies. As according to Ding et al (2018), one of the key enablers is the pressure exerted by various governmental, regulating agencies and non-government body. Various institutions, such as NGOs, the media, civil society, and regulatory bodies, exert significant pressure on businesses and firms to embrace sustainability.

In order to define sustainability goals for the food value chain within an economy, the government surely hold a very important role (Marx, 2021). In order to cope with infrastructure challenges like transportation and dependable electricity, coordination between national and international governments, and regulatory framework are important. Open market policies, farmer education programs, incentives for organizations to help with risk management, and other government-supported policies can help to encourage sustainable practices throughout the food value chains.

According to the analysis's findings, the biggest obstacles to implementing sustainable practises in A-FSC are " government inaction in setting the vision for sustainability and the responsibilities of food retailers " and "lack of financial resources." The case corporation is not currently under any pressure from any governmental, regulatory, or non-governmental entities. Without external constraints and incentives, sustainability is exceedingly challenging. The influence of governmental rules and customer expectations on the growth of sustainable businesses has also been validated by prior studies (Al Zaabi et al., 2013). According to

research, the agri-food sector needs pressure and incentives from both governmental and non-governmental organisations to encourage sustainable activities (Bloom, 2015).

2.7.2 UNDERSTANDING CUSTOMER AND OTHER STAKEHOLDER REQUIREMENTS

Secondly, another key enabler to establish sustainable initiatives in agriculture food supply chain is to understands customer and other stakeholder requirements (Gunasekaran et al, 2018). In this case, the sharing of crucial resources and information about sustainability activities across supply chain partners especially between customer and other stakeholder is critical for sustainability adoption. In other words, The interest of customer demands and supply chain partners in sustainable agriculture goods is critical in executing sustainable projects. (Kumar, 2013).

Management should work to organise educational and training events to raise the level of consumer and farmer awareness (Chuang, 2022). Both farmers and customers will benefit from this as they begin to shift their preferences for sustainably produced food. Some of its notable advantages include the employment of better technology, a decrease in food waste on both domestic and agricultural fields, and others. It's also crucial to regularly train the personnel and educate stakeholders about the sustainability implications for the food business (Beltrami, 2021).

Whether it be managing supplier or client relationships, relationship management is an essential ability for the new breed of managers (Nguyen et al, 2019). A good supply chain management programme must have excellent relationships planning with all of its trade partners as a fundamental prerequisite. The chance that supply chain management projects will be completely and successfully executed may be greatly increased by such ties. Through thorough training and education, one may best build relationship management skills and abilities. According to Capon (2021), strong connections with trading partners are crucial, and senior management has to understand this and show their commitment by funding these training initiatives.

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2.7.3 RESOURCES ALLOCATION AND INFORMATION SHARING WITHIN AND ACROSS THE HIERARCHY

The next critical enabler for implementing sustainable activities in the agricultural food supply chain is managing resource allocation and information exchange within and across the structure (Grimm et al, 2014). The adoption of sustainability depends on supply chain partners providing the necessary essential resources and information about the sustainability activities. As a result, technology adoption is essential to the adoption of sustainability since it necessitates cooperation among supply chain players, integration of partner performance, and expansion of present plant capacity.

In order for a company to establish sustainability orientation in its food supply chain, it is crucial that it has sufficient cash and resources (Mangla et al, 2018). In order to embrace cutting-edge technology, new machinery, and equipment, management must guarantee that there are sufficient cash and resources. To encourage sustainability, top management should provide enough resources and money for research and development projects.

Apart from that, the information technology network is critical to improving the sustainability of food industry. (Serbulova et al, 2019). Food waste may be considerably decreased through efficient information exchange and timely delivery. For improved food safety and sustainability, top management should integrate contemporary information technology like RFID and electronic seals. Additionally, food policy administrators are urged to use the GPS approach to cut down on food waste and boost efficiency.

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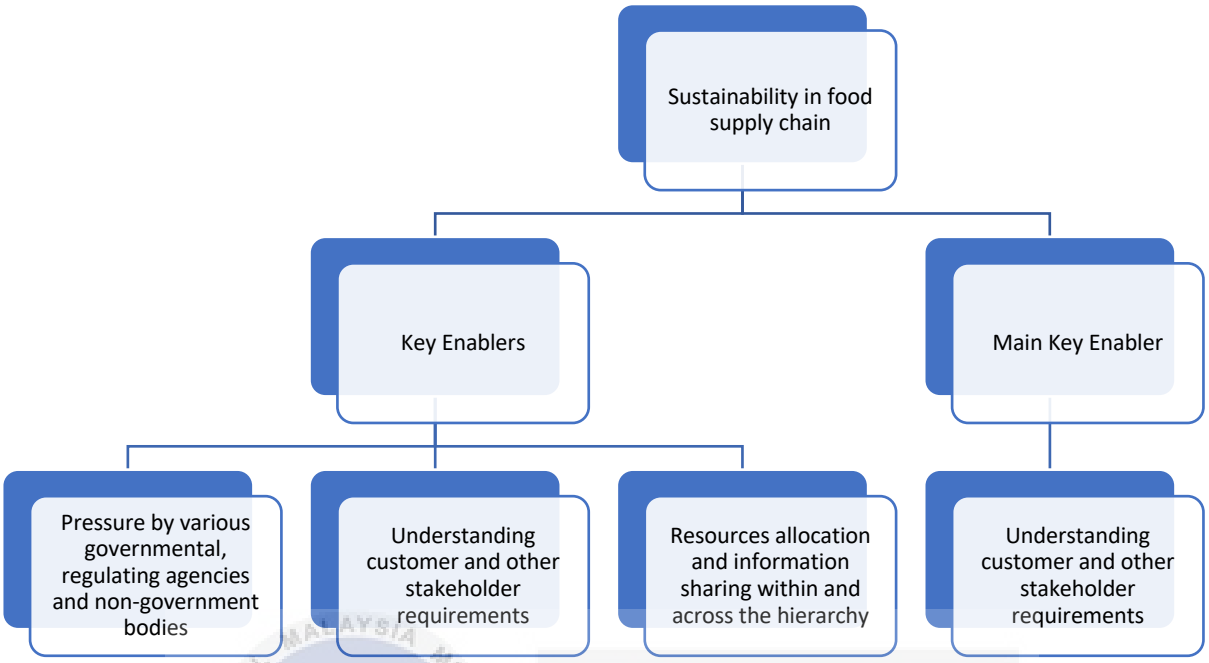
2.8 CONCEPTUAL FRAMEWORK



Sources:
Ding et al, 2018
Grimm et al, 2014
Klassen, 2003

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2.9 SUMMARY

In conclusion, the researcher had briefly explained the past studies and articles related to the sustainability in food supply chain and the key enablers to implement sustainable initiatives in agriculture food supply chain. There are a few key enablers namely, pressure by various governmental, regulating agencies and non-government bodies; resources allocation and information sharing within and across the hierarchy; and Understanding customer and other stakeholder requirements. At the end of this chapter, the researcher builds a framework as a supportive system to accomplish the research objective while conducting this research.

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CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

Saunders et al. (2019) state that research methodology can be defined as a process that should undertake systematically with an obvious purpose in a study and find out things in describing, explaining, understanding, criticizing and analyzing. This chapter will discuss and explain deeply the research methods conducted in this research. It started with section 3.2 research design that discussed exploratory research design. Section 3.3 described the methodological choice, which adopted the qualitative method in this research followed by section 3.4 primary and secondary data resources, which explained the resources used in this research. Section 3.5 discussed the location of the research, section 3.6 explained the research strategy, and section 3.7 illustrated the time horizon. Section 3.8 described the scientific canon and section 3.9 outlined the research framework of the research objectives of this research. Lastly, section 3.10 is the summary for this chapter.

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3.2 RESEARCH DESIGN

According to Ghauri et al. (2020), a research design is an overarching strategy for linking theoretical research topics with pertinent and useful empirical research. The research design enabled the researcher to identify ways to answer research questions and prepare them for success. A study's objective might be descriptive, exploratory, explanatory, evaluative, or a mix of these (Sekaran and Bougie, 2016). Exploratory research is a type of research that reach

new insight into phenomena, ask questions, and assess the phenomena in a new light (Saunders et al., 2016). Thus, in order to identify the important factors that would make it possible to undertake sustainable initiatives in the Sarawak agricultural and food supply chain, exploratory research was chosen as the research design for this study.

Ghauri et al. (2020) state that exploratory research requires few skills during the research process, the key skill requirements are included with observe, collect information and construct an explanation. Therefore, the researcher need associated with qualitative data collection approaches such as casual conversations with clients, staff or management level through interviews, focus group and case studies (Sekaran and Bougie, 2016). After the researcher gets the information from six professionals and experienced personnel directly, the researcher able to capture a clearer insight into existing problems.

Exploratory research is utilized when the researcher was lack of information and source. Besides, exploratory research is useful for the researcher to clarify the understanding of certain issues, problem and phenomenon. This study shed light on how people perceive sustainability in the food supply chain and identified crucial factors that might help Sarawak agriculture execute sustainable initiatives. Other than the description above, the design of the study was exploratory research.

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3.3 METHODOLOGICAL CHOICES

According to Saunders et al. (2016), there are three types of methodological choices: quantitative, qualitative or mixed methods, defined by whether they concentrate on the data of words, numbers, or both. The research approach is a framework that describes how research is conducted. It covers methods and procedures for conducting specific studies or research. An analytical approach is a group of methods implemented in various forms of research (Walliman, 2015). Therefore, it is necessary to choose an approach that is appreciated to the purpose of the study. The qualitative research approach was used in this study because it allowed the researcher to better understand the participants' opinions and perspectives by conducting an interview session. It is a thorough research strategy since it enables researcher to find information and knowledge by becoming involved in current events (Creswell, 2003; Williams, 2007).

After the identifying the research problems, the focus is to conduct research that are refined and determined, the researcher will conduct research studies with Sarawak agricultural company. The researcher has chosen a qualitative method in which the researcher will provide some questions related to perception of sustainability in food supply chain and key enablers to implement sustainable initiatives in Sarawak agriculture food supply chain. The researcher has obtained a release from some of the managers of these companies to conduct interview activities. Virtual interviews were also conducted by using WhatsApp video calls, Webex and Zoom meeting.

The qualitative method will be applied to several focus groups among Sarawak agricultural company, by providing some questions related to the perception of sustainability in food supply chain and key enablers to implement sustainable initiatives in Sarawak agriculture food supply chain. participants consisted of workers in various departments such as the operation department, inventory department, warehousing department, production department, distribution manager and customer service department. The purpose of implementing this qualitative method is to ensure that researcher can successfully obtain accurate information related to research objectives and extract that information in research writing.

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3.4 PRIMARY DATA SOURCES AND SECONDARY DATA SOURCES

Data collection is an important key to form the research successfully. There are two types of data sources utilised in the study, which are primary data and secondary data. The primary data can be conducted through observation, semi-structured, in-depth, group interviews and questionnaires. The secondary data are separated into three types which are called a documentary, multiple sources and survey secondary data. In this research, primary and secondary data were used by the researcher to determine the precise direction and guidance to complete the research.

Ghauri et al. (2020) stated that the primary data is able to collect data with the specific research objective and questions. Therefore, the primary data can help the researcher to solve particular issues. The primary data for this research was gathered by interviewing six

participants who were made up of experienced management staff and executives from Sarawak agricultural company. The options and standpoint provided by the selected participants were explicitly reported as the primary data resources to help in attending the research questions.

According to Saunders et al. (2016), resources that were first gathered for another reason are considered secondary data and are then further examined to offer new or different information, insights, or conclusions. Meanwhile, the collecting and examination of the source material might result in new or different information, interpretations, or conclusions, which is why it is important (Bishop and Kuula- Luumi, 2017). The secondary data is to support the research objectives of this thesis. The researcher used articles such as WWF Malaysia. Also, social media platforms and official website are utilised to collect extra information. Therefore, the research of information helped to achieve accuracy in understanding the research question. In conclusion, analysed data collected from secondary and primary sources ensure validity and reliability in this investigation.

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3.5 LOCATION OF RESEARCH

In this study, research are done in agricultural company that are based in Sarawak namely, Sarawak Produces Industries Company (SPIC). This company are profession in agriculture industry with years of experience in particular field such as pepper cultivation. The study participants only consider the management staff and executive position, which the participants are well known for the industry operation procedure. As a result, the researcher can collect adequate information and consolidate the research objective.

3.6 RESEARCH STRATEGY

Sekaran and Bougie (2016) have illustrated the research strategy will assist the researcher in achieving the research aim and addressing the research questions. The strategy is one of the components to achieving the goal. Experiment, survey, documentary research, case study, ethnography, action research, grounded theory, and narrative inquiry are just a few of

the research methods that might be used in this study. In light of the study purpose and research questions, the researcher must select the research strategy.

A case study was the method of research that the researcher decided to use to carry out this investigation. Sekaran and Bougie (2016) have explained The case study research technique focuses on gathering data with respect to a single thing, event, or action, such as a certain business unit or company. Other than that, the case study is also suitable by using the qualitative exploratory method. Therefore, the case study is relevant to investigate the perception of sustainability in food supply chain and key enablers to implement sustainable initiatives in Sarawak agriculture food supply chain.

SAMPLING METHODS

The quality of the sampling positively impacted the reliability and validity of the collected data and findings of the research. Saunders et al. (2019) mention that the volume of data collected can be lessened by gathering data from a specific subgroup instead of all potential participants and candidates. It would be time-consuming and costly if the researcher was to analyse and collect data from all the population.

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Therefore, the researcher selected managers and executives that had one years' experience as participants because their knowledge about the topic can increase the quality and accurate data in this research study. In addition, the researcher used the judgmental sampling technique to choose the best possible participants to answer the research questions. This will be highly accurate with a minimum margin of error.

Purposive sampling, sometimes referred to as judgmental sampling, is used to choose participants who are most likely to provide relevant and helpful information (Kelly, 2010). Additionally, it is a method of discovering and picking situations that will efficiently employ the limited research resources available (Palinkas et al, 2015).

3.7 TIME HORIZON

The amount of time a researcher spends gathering data and finishing the investigation is referred to as the time horizon. According to Saunders et al. (2007), the time horizon is not dependent on the types of research strategy used or pursued. Generally, the time horizon is distinguished into two categories which are cross-sectional studies and longitudinal studies. Sekaran and Bougie (2016) illustrate the cross-sectional studies, also known as 'one-shot' and 'snapshot' studies. The cross-sectional studies are suitable for the research undertaken to collect data at once, perhaps over days or weeks or months.

Saunders et al. (2016) state that cross-sectional studies conducted on a particular phenomenon or phenomena at a specific time. Meanwhile, cross-sectional studies may be used in qualitative or mixed methods of research strategies. The characteristic and criteria of the cross- sectional were fulfilled for the research, therefore the cross-sectional study selected in this research. The researcher was obligated to conduct this academic research within eight months and collect the data resources through an interview session in a short time.

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3.8 SCIENTIFIC CANONS

The scientific canons of internal validity, generalizability, construct validity, and reliability will be thoroughly examined in this section. Scientific canons are designed to assist researchers in producing high-quality research and accurate results. Sekaran and Bougie (2016) determine validity as the ability of an established tool to measure a specific concept that is supposed to be measured. In contrast, accuracy refers to a measuring tool's capacity to continually measure any idea. Reliability, on the other hand, relates to replication and consistency, whilst validity refers to the suitability of the measurements utilized (Saunders et al. 2016).

3.8.1 Internal validity

Sekaran and Bougie (2016) illustrate the level of trust is referred to as internal validity. placed on the relationship between cause and effect. Significantly, the internal validity helps the researchers determine the extent to which the research design permits them to claim that the independent variable influences the dependent variable. Besides, internal validity defines how well an experiment is being carried out in research. It shall have the potential to avoid any confusion or confounding from happening.

To ensure internal validity, the scope of this study must remain within the constraints of the research subject, research question, and research objective. This research focuses on the perception of sustainability in food supply chain and determine the key enablers in implementing sustainable initiatives in Sarawak agriculture food supply chain. Hence, in order to produce amazing research, it is vital to adhere to the research questions and objectives. Despite that, the researcher has to be attention to a few possible threats to internal validity, as described in Table 3.1 below:

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Table 3.1: Threat to Internal Validity

Threat	Definition and Explanation
Testing	The effect of the testing on participants' attitudes or behaviour. When participants are made aware of a research project, they may change how they behave or react throughout the study if they fear negative implications in the future. Therefore, the researcher declared to these participants, this research is merely for academic purpose, as a prerequisite for a bachelor's degree dissertation. Besides this research is meant to find out the perception of sustainability in food supply chain and determine the key enablers in implementing sustainable initiatives in Sarawak agriculture food supply chain without the intention to find out weaknesses, problem faces or some negative issues face by those company. With this in mind, the research did not aim to find out those sensitive information which

	might not be revealed by the participants. Next, all participants can be remained anonymous where their names would not be spelt out in the dissertation. This can ensure the privacy of the participants are protected while the participants can share his/her opinion freely during the interview session took place.
Mortality	The effects of study participant withdrawal. During studies, people frequently change jobs or are promoted. As for mortality, another interview was appealed to second participant if it happens that the first participant leaves the job or is no longer around. The second participant acted as a backup.
Maturation	The effect of a change in participants' attitudes or actions that occurs independently of the research. For instance, management training can require participants to edit their answers during a later phase of the research. Participants were requested politely that if they have a change of mind regarding their opinions towards the questions asked during the interview before the research is published, they are to contact the interviewer if possible.

Source: Research Methods For Business Studies (2016)

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3.8.2 Generalizability/ External validity

The degree of belief in the correlations is referred to as internal validity, whereas external validity refers to the extent to which results of a causal investigation may be generalised to other settings, people, or situations. In other words, it helps the researcher determine how much the findings are generalizable or transferrable to genuine organisational or other field situations (Sekaran & Bougie, 2016). In short, to ensure the external validity of the research, the findings and results of that specific research must be transferable or applicable to another situation with similar contexts. The results and outcomes of the research allow the researcher to generalize the perception of sustainability in food supply chain and determine the major facilitators in executing sustainable projects in Sarawak agriculture food supply chain.

3.8.3 Construct validity

Sekaran and Bougie (2016) illustrate the construct validity of a measure demonstrates how well the findings gained from its use fit the ideas around which the test is developed. According to Saunders et al. (2016), construct validity is determined as the extent to which a set of questions measures what is intended to access. In other words, construct validity refers to the degree of items that have been tested, coherent with fundamental theory.

Construct validity may be assessed using convergent and discriminant validity. When results from two different tests of the same concept are strongly linked, convergent validity has been proven. Additionally, discriminant validity is defined as the consistency between ratings gained from testing two variables and empirical findings that they are uncorrelated (Sekaran and Bougie, 2016).

Construct validity can be improved by sourcing and referring to proven theories to validate the legality of the measures. In a way, it can be said that it acted as a guideline for researchers to stay focused on the research scope. In brief, construct validity is a test of generalization, but the difference is that it measures whether this research addressed the tested variable, such as factors from research questions.

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3.8.4 Reliability

The dependability of a measure refers to its ability to regularly and precisely measure a concept, this also adds to the assessment of the quality of a measure, Sekaran and Bougie (2016) said. Reliability is an indicator of measuring internal consistency, according to Zikmund et al. (2010). In the measure that taps the construct, the internal consistency of measurements is an indication of item homogeneity. The results and findings were considered reliable when other researchers can obtain consistent results from different data collection techniques, similar observations or the same overall meaning. Alternatively, on another occasion, The findings

would also be regarded as credible if a researcher were to repeat an earlier study design and still come up with the same outcomes. In this study, many instances were examined in order to acquire findings that could be duplicated across cases, guaranteeing the accuracy of the findings. Nevertheless, several threats to reliability that need to be taken into account in Table 3.2:

Table 3.2 Threats to Reliability

Threats	Definition and Explanation
Participant error	Any element that negatively affects a participant's performance. For instance, giving a participant a questionnaire right before lunch may influence how they reply as opposed to giving them the questionnaire at a less critical moment, when they might not be as serious about their answers and be rushing to finish it. The researcher scheduled the interview sessions with participants to avoid the threat of participant error. In this study, the interview sessions were carried out on weekdays. This is because the selected participants are worked under office operation hours. Therefore, the managerial staff and executives able to arrange the time for interview sessions with the researcher.
Participant bias	any element that contains a false answer. For instance, doing an interview in a public place may cause participants to provide untruthful affirmative responses in situations when they worry about being overheard rather than maintaining their anonymity. The interview session or data collection process had to be conducted in a close-up to solve the threat of participant bias in order to allow participants to express their honest opinions and responses.
Researcher error	any element that modifies the understanding of the researcher. For instance, a researcher could be drained or underprepared and misinterpret some of the more nuanced interpretations of the people they interviewed. The researcher must be energetic and well-prepared during the interview sessions to overcome the threat of research error. The researcher was required to take note of each phrase said or answered by the participants. Before conducting the interview sessions,

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	the researcher should plan ahead, such as writing down correct questions that need to be asked to avoid disrupting the interview session. In addition, the researcher had to repeat the answer or data recorded after the interview session to the participants. This is to ensure that the data obtained by the researcher was consistent with the interpretation and consensus of the participants.
Researcher bias	Any element that introduces bias into the replies the researcher records. A researcher could, for instance, allow their personal biases to prevent them from properly and accurately documenting and interpreting participant replies. Moreover, the researcher had to hold an impersonal perspective and judgment on the studied topic to threaten research bias. The researcher was not allowed or must not affect the participants' thinking, point of view and opinion. The results and outcomes generated in this way would be real, precise and reliable.

Source: Research Methods For Business Studies (2016)

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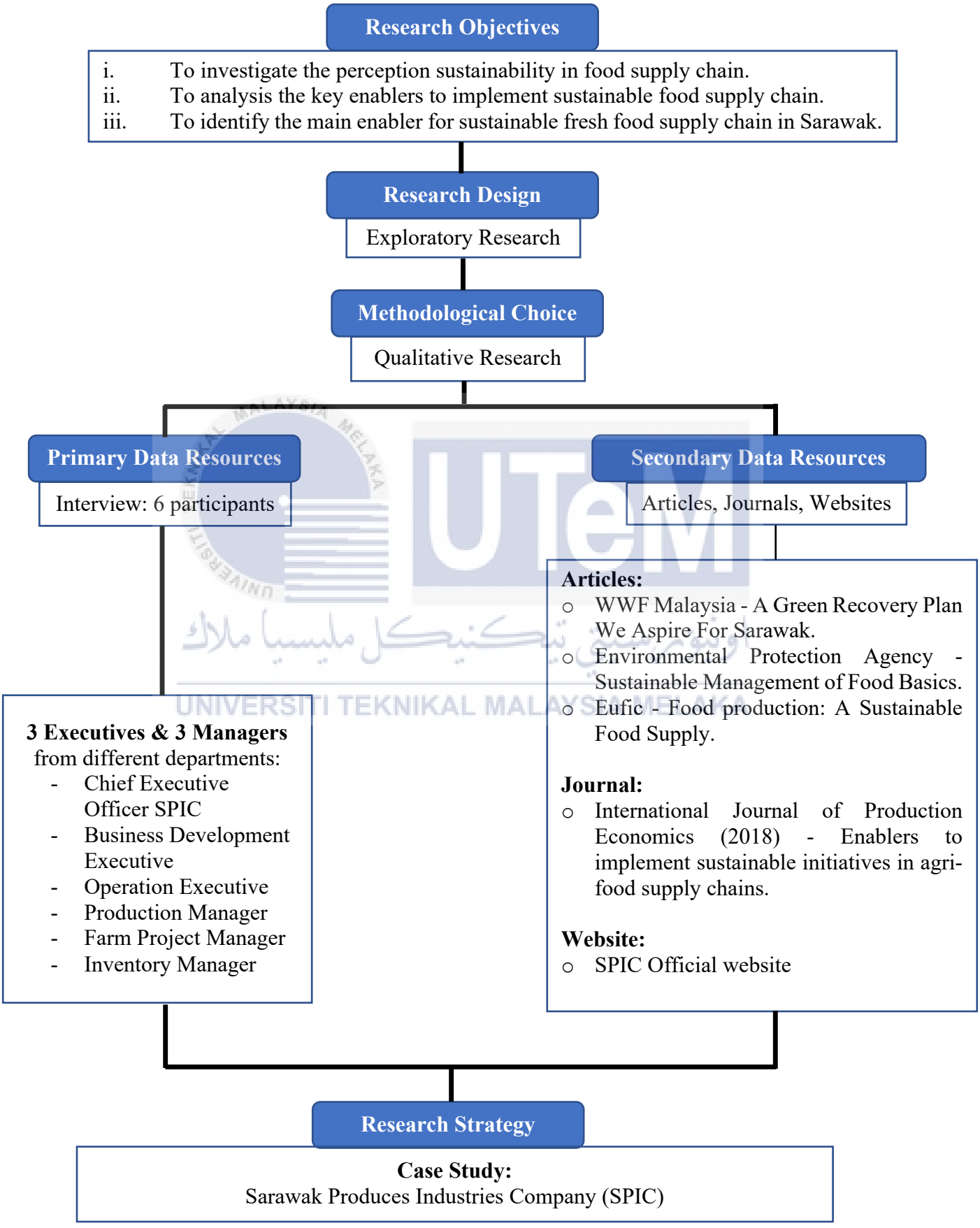
3.9 RESEARCH FRAMEWORK



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3.10 SUMMARY

The researcher will describe the procedure employed to carry out this research in more detail in this chapter. As a research design, exploratory research was used. The exploratory research technique allows the researcher to analyse and study perception of sustainability in food supply chain and key enablers to implement sustainable initiatives in Sarawak agriculture food supply chain. The methodological approach employed in this study to obtain data and information was qualitative research. Additionally, qualitative research was chosen as the methodological approach for obtaining data and information for this study since it enables in-depth analysis and removes neutral bias from the data collection process.

Besides, the primary data of this research were gathered through an interview session with six participants who were made up of experienced managerial staff and executives from Sarawak Agri-food companies. On the other hand, the researcher obtained the secondary data from articles, journals, websites and books as a reference to complete this research. A case study was chosen as the research methodology for this study because it provided a real-world context for the analysis and study of a research case. The research technique was chosen because it enables the researcher to analyse and investigate real examples to obtain relevant data to address the study's goals and research issue. Additionally, the cross-section was chosen as the temporal horizon for this study because most academic research projects use a short time frame. The researcher also reviewed the research's validity and reliability, outlining how they were met in order to provide valid and trustworthy results.

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CHAPTER 4

DISCUSSION AND ANALYSIS

4.1 INTRODUCTION

In this chapter, the findings and discussion intended to include further dialogue and interpretation of the topics under consideration. Results are targeted to indicate significance or relevance depending on the objective and scope of the researcher's study. The results are analysed with the qualitative method. The data are collected with a total of three experienced managers and three executives.

The research study examines the perception of sustainable food supply chain management and the key enablers to implement sustainable initiatives in Sarawak agriculture food supply chain. The first section described the perception of sustainable food supply chain management among the Sarawak Produces Industries Company (SPIC) and the second section showed the discussion of key enablers which includes pressure by various governmental, regulating agencies and non-government bodies; understanding customer and other stakeholder requirements; and resources allocation and information sharing within and across the hierarchy. The respondents' profile also presented in this chapter.

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4.1.1 DATA COLLECTION

Considering the safety issue during the pandemic covid-19, some of the data collection proceeds through online platforms such as social media, email and Google meeting. During the interview session, the voice recordings are used as evidence of interviews with participants. All of the information received during virtual interview sessions was confidential and only used for research purpose.

4.1.2 Description of Respondents

The profiles of participants from Sarawak Produces Industries Company (SPIC) are presented in the table below. The participants' names are listed in respondent code to protect their privacy and confidentiality.

Table 4.1: Profile of Participants

Participants Code	Years of Experience	Job Scope
Chief Executives Officer SPIC (I-01)	8 years of experience in F&B industry	- Making significant managerial decisions, - Managing a company's entire operations and resources, - Serving as the primary point of contact between the board of directors and business operations.
Business Development Executive (I-02)	5 years of experience in SPIC	- Leasing and expand business outlet - Develop business strategies to enhance sales performance - Deal and communicate with constructors for outlet renovation and new outlet project

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		- Explore the potential place for opening new branches
Operation Executive (I-03)	4.5 years of experience in SPIC	- Communicate with an outlet manager with the latest information - Schedule the logistic with food delivery enquires - Support to other departments with latest promotion activities and catering events
Inventory Manager (I-04)	3 years of experience in SPIC	- Coming up with ideas for improving inventory control processes - Checking the availability of raw materials and business suppliers to spot shortages - Ensuring that product supply is sufficient for all distribution channels and can meet consumer demand directly
Production Manager (I-05)	4 years of experience in SPIC	- Coordinating with other managers to develop goals and comprehend needs - Making budgets and cost estimates - Planning workflow to adhere to requirements and timelines
Farm Project Manager (I-06)	2 years of experience in SPIC	- Examining current operations, crops, animals, personnel, and financial records and making improvements where necessary. - Making plans and timetables for planting and harvesting while ensuring that staff members are aware of their responsibilities. - Making plans and timetables for planting and harvesting while ensuring

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		that staff members are aware of their responsibilities.

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4.1.3 Background of SPIC

One of the best providers of this extraordinary spice in the country is Sarawak Produces Industries Company (SPIC), which is proud of its accomplishment. The SPIC pepper is 100% pure and MESTI and HALAL-certified. Over 95% of the nation's total pepper production is produced in Sarawak, the primary pepper-producing region in Malaysia. On Borneo's northwest coast, in Sarawak, is where Sarawak pepper is cultivated. As early as the 1970s, Sarawak Pepper made a sustainable entry into countries including the United States, Japan, and Spain. They have been in business since 1987 and are a well-known pepper production firm with headquarters in Kuching, Sarawak. They purchase, prepare, and package pepper in a variety of forms for consumers, food producers, and caterers. Additionally, they manufacture downstream value-added goods including pepper candies, sauce, and desserts.

The Sarawak Produces Industries Company (SPIC) started out as a plant that processed and packaged peppers in 1987. Modern tools and machines are employed to guarantee that every bottle meets the highest requirements for cleanliness and quality. Traditional washing, drying, and steaming techniques are used to retain the particular flavour of Sarawak Pepper, giving SPIC's Sarawak pepper products an unmistakably deeper, stronger, and more distinct scent and taste than anything else. From common household users to spice packers and the culinary sectors, SPIC has a broad line of goods designed to suit all applications. When working with customers, vendors, employees, and other business partners, SPIC believes in being honest and fair. We adhere to the principle of treating you how you want to be treated. In SPIC's opinion, this means offering our customers the most affordable items while maintaining the highest standards for both our products' quality and our company's conduct.

The objective of the study is to examine the perception of sustainability in food supply chain and determining the key enablers in implementing sustainable supply chain in the industry. Hence, the researcher acknowledged that SPIC can be considered in this research as it is a restaurant implementing the healthy and sustainable food supply chain management concept in Malaysia.

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4.2 DATA ANALYSIS ON PERCEPTION ON SUSTAINABLE FOOD SUPPLY CHAIN MANAGEMENT

4.2.1 Define The Concept of 'Sustainable'

According to I-01, sustainability is defined as "being able to maintain the resources for a long period of time without compromising resources for future generation". This aligned with the definition given by United Nations Brundtland Commission (1987) which indicated that sustainability is "encountering present obligation without compromising the ability of future generations to meet their own needs and these resources may be in terms of natural, social and economic resources". Besides, sustainable is "related to food security and the availability of particular item or in this case, food to the public in local community in a long term" (I-01). In terms of environmental sustainability, it is agreed that it is essential to protect global ecosystems and conserve natural resources in order to maintain both health and welfare today and in the future (I-05). However, most of the participants agrees that Sarawak is yet to prepare for a 100% sustainable supply chain in any industry.

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4.2.2 Perception On Sustainability in The Food Industry

As I-05 mentioned that sustainability in food supply chain is "the ability to bear load wanted or unwanted, at the same time be able to maintain it". In addition to this, the wanted or unwanted is directly link to renewable and non-renewable energy which in other words define sustainability in food supply chain as "systems and processes that are non-polluting which at the same time conserve and preserve the eradicating non-renewable energy as well as natural resources"(Holden, 2018).

I-01 also stated that "Malaysia not able to serve sustainably because we are highly dependent on imported goods especially protein-based food" this has a positive link with the adoption of sustainability approaches that depends on supply chain partners in providing the necessary essential resources and information about the sustainability activities (Grimm et al, 2014).

4.2.3 How Modern Agricultural Yield Sufficiently To Fulfil Local Food Supply

"In Sarawak, we are still in the process of planning to acquire these kind of technology particularly in livestock industry" (I-01). This is solely because the agriculture industry in Malaysia is facing unprecedented difficulties in rising awareness of environmental sustainability and green consumption issues at the global and national levels (Jamal et al, 2014).

"The most fertile grounds in Sarawak are in Lawas, Trusan, Long Sukang, Long Luping, Long Semadoh, and Ba Kelalan, where agricultural operations shouldn't be an issue given that all Lun Bawangs are skilled farmers." (I-05). However, farmers are under peer pressure to produce and practise sustainability because of the need for safe, sanitary, organic, and high-quality food items (Semuroh et al, 2021).

"The state government is constantly working to promote the application of sophisticated technologies in the agriculture-based industry" mentioned by I-03. In fact, smart agriculture initiative introduced by the Sarawak state government includes a projected RM1 million investment in Semenggok SARTECH (Sarawak Agro-Technology Park) as part of the 12th Malaysia Plan (12MP), while RM4 million in alternative funding will be used to finance Tarat SARTECH according to The Modernisation of Agriculture and Regional Development Minister, Dato Sri Dr Stephen Rundi Utom in a press conference by the Borneo Post 2022.

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4.2.4 Main Enabler To Achieve Sustainable Food Supply Chain

"The government need to extend the campaign in future definitely for a better world" (I-05). In order to define sustainability goals for the food value chain within an economy, government plays a very important role (Marx, 2021). I-01 also introduced that "they have this scheme of agri-food, which is the scheme of Agro-Food Takaful Insurance empowered by Ministry of Agriculture and Food Industries (MAFI)". "The state government is actively pursuing the adoption of modern technology in the agro-based sector and along the agriculture supply chain to enhance competitiveness and sustainability of the agriculture sector" (I-01). Not only I-01 and I-05, the majority of the participants also thought that pressure exerted by

various governmental, regulating agencies and non-government bodies is the main enabler to achieve sustainable food supply chain. Only I-03 thought that sustainable food supply chain is achieved by understanding customer and other stakeholder requirements.

4.2.5 Extent Of Agricultural Intensification

"In the case of Sarawak, we are known with our huge plantation of oil palm which is our main agriculture sector" (I-01). Indigenous agriculture was mentioned by I-04 that are "a plant species that is native to a locality, originated there, or was long-time introduced there from another location by natural processes or human choices.". Besides, I-06 stated that our farmers are planting on a small scale and scattered. So we want to identify an area, for example in the Mukah area, that is suitable for pineapple and coconut and honey lemon". This has a positive link towards the commercial agriculture in Sarawak. The similar statement was mentioned by I-01 as well, thus, both agrees that Sarawak has potential in achieving sustainable food supply chain. Additionally, smart agriculture was also proposed, "The development of precision farming park in Rampangi, Kuching; Sungai Sebiew, Bintulu and Kabuloh, Miri, will include modern agriculture facilities such as automated machines, sensors, and Internet of Things (IoT). It focuses on the production of high value food crops with private sector participation. In 2023, a sum of RM21mil will be provided for this development under Alternative Funding" (I-02).

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4.3 DATA ANALYSIS ON ENABLERS TO ACHIEVE SUSTAINABLE FOOD SUPPLY CHAIN

4.3.1 Key Enablers To Implement Sustainable Food Supply Chain

There are a few key enablers that were mentioned by the participants, for instance, I-01 indicates that one of the key enablers include "awareness of our local community on the importance of having a sustainable food security and supply in terms of the environmental and economic aspects". They also stated that "if local community understand how important for us

to produce our own food, crops or livestock, we can help the national economy very well because importing food is costing way more than production itself" (I-01). This statement can be supported by research declared that "the agriculture industry in Malaysia is facing unprecedented difficulties in rising awareness of environmental sustainability and green consumption issues at the global and national levels" (Semuroh et al, 2021).

Other than that, I-03 declare that "resilient waste management is crucial in the sense that it does not put more pressure to the environment". In this case, major food waste had caused a huge impact on our dearly mother earth and will eventually reflected to humans' daily life (Meier, 2020). With that being said, food waste is an important part of sustaining the food supply chain; also, the sustainable food supply chain must be built on resource distribution efficiency in order to limit the negative influence on the environment (I-04).

4.3.2 Local Government Efforts To Promote Evidence-Based Policy For Sustainable Food System

"The first step that had been done to help food sustainability is through MAFI, we have scheme insurance which is the Agro-Food Takaful Insurance" (I-01). The Malaysian government's Ministry of Agriculture and Food Industries (MAFI) is renowned for being a pioneer in agricultural transformation (Malaysia Pavilion, 2022). He also mentioned about the Agro-food Takaful Insurance which "Farmers can benefit from the government-supported Agro-Food Takaful Insurance Scheme policies offered by MAFI. It tries to make up for losses and damages suffered by farmers as a result of natural catastrophes." (Asian Economist, 2022).

I-02 mentioned about the National Food Security Policy Action Plan, taking into account problems and difficulties along the food supply chain, from agricultural inputs to food waste, a detailed action plan to increase national food security has also been devised. (Portal MAFS, 2023).

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4.3.3 Local Government Effort In Supporting Prevention And Mitigation Of Specific Risks

The National Action Plan (NAP) for 2021-2023 stated that they are trying to implement the technology to modernize our agro-food production by developing a more sustainable, resilient system to promote economic growth and to improve the well-being of the local community especially the one that are working in the industry (I-01). This is because consumers are becoming increasingly concerned about this issue as they become more educated and demand sanitary and safe product for their health (Petrescu et al, 2019). Therefore, it is necessary that the government put efforts in mitigation of risk (I-02). Towards this, a sum of RM975,000 is allocated for various ICT and Smart Farming Programme in 2023 (I-05). In fact, the government is putting out a number of measures and attempts to ensure that the public has access to a sufficient and safe food supply at a fair price (MIFC, 2022). This approach is related to the Agro-Food Takaful Insurance that I-01 had mentioned previously.

4.3.4 How To Prioritize Sustainable Food System Over Other Sectors

For this particular issue "Involving CSR company members to have this maybe one program that engage with MAFI, or the local food producer to actually know more on how to work with them on site to see how the farmers produce food" (I-01). While most other participants do not have much knowledge regarding to this issue.

According to I-05, "our company can prioritize sustainable food system by looking at data from its own past and other company and their projects". They also stated that "maintaining a sustainable food system requires information and data". Food production, processing, and distribution are essential components of one of our society's most vital supply requirements for life and well-being (Beitzen-Heineke, 2017). It is "important to know how much your product cost and important how public view your product" (I-05).

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4.3.5 How Does Local Community Promote And Encourage The Cultivation Of Local Indigenous Varieties

Example was given by I-05, which indicated that “in Sarawak we have all the institutions such as UPMKB and UNIMAS, so these university actually held a few conferences sometimes international conference focusing on food production in Sarawak”. “The majority of these native plants are found growing wild in the forests, but they are also grown in small orchards in the village areas for the residents' self-sufficiency” (I-01). Therefore, it is significant that research and development is carried out in institutions to study on this precious treasures we have here in Sarawak. The cultivation of local indigenous varieties is by promoting them through agro-tourism (I-01).

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CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

There are three main objectives of this research which are to investigate the perception sustainability in food supply chain and to analysis the key enablers to implement sustainable food supply chain, lastly to identify the main enabler for sustainable fresh food supply chain in Sarawak.. To achieve the objective of this study, the researcher has selected Sarawak Produces Industries Company (SPIC) to conduct this case study. The findings have already been discussed in the previous chapter and will be concluded in this chapter. In addition, the researcher proposed a new conceptual framework based on the findings of the study. The concluding section of this chapter also includes future recommendations for further research.

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5.2 RESEARCH OBJECTIVE 1: TO INVESTIGATE THE PERCEPTION OF SUSTAINABILITY IN FOOD SUPPLY CHAIN.

As specified in Chapter 1, the first objective of this research was to investigate the perception sustainability in food supply chain management. The qualitative findings were collected by conducting semi-structured interview session with the participants. Besides, the findings were analyzed and processed with secondary data and theories from the conceptual framework. In addition, the following sections were explained detail by using explanation building analysis. The generated outcome will be discussed in the following sections by using explanation building analysis.

According to United Nations Brundtland Commission (1987), the definition given to sustainability is encountering present obligation without compromising the future generations' capacity to satisfy their own demands, including those related to ecological, social, and economic resources. Sustainable methods may be environmentally friendly, produce additional money, and boost consumer and staff happiness, as both small and large businesses are aware (Borland, 2019). In this case, it is agreed among employees from SPIC that sustainability is related to food security and the availability of particular item or in this case, food to the public in local community in a long term.

Referring to the discussion of the qualitative findings of the preceding chapter, it can be concluded that sustainability is being able to maintain the resources for a long period of time without compromising resources for future generation which at the same time insisting on the food security and availability, this is brought up by I-01 and agreed by most of the other participants and also supported by various study. However, the participants also stated that the approaches of sustainability in Malaysia is yet to perfection. Therefore to summarize the excerpts of the participants, most of the participants agrees that Sarawak is yet to prepare for a 100% sustainable supply chain in any industry.

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5.3 RESEARCH OBJECTIVE 2: TO ANALYSIS THE KEY ENABLERS TO IMPLEMENT SUSTAINABLE FOOD SUPPLY CHAIN.

In this study, the second research objective is to analysis the key enablers to implement sustainable food supply chain. There are a few key enablers that were stated in different case study which includes, pressure exerted by various governmental, regulating agencies and non-government bodies, understanding customer and other stakeholder requirements and resources allocation and information sharing within and across the hierarchy (Mangla et al, 2018). To break it down one by one, although pressure exerted by various governmental, regulating agencies and non-government bodies, understanding customer and other stakeholder requirements was not frequently mentioned in various case study, it is brought up most by the participants. This is solely because Open market policies, farmer education programs, incentives for organizations to help with risk management, and other government-supported

policies can help to encourage sustainable practices throughout the food value chains (Marx, 2021).

On the other hand, the second key enabler that were brought up by one of the participants is understanding customer and other stakeholder requirements. In this case, the sharing of crucial resources and information about sustainability activities across supply chain partners especially between customer and other stakeholder is critical for sustainability adoption. Additionally, in order to implement sustainable projects, it is important to consider consumer demand and supply chain partners' interest in sustainable agricultural goods (Kumar, 2013). According to I-03, in order to fulfil the local food supply, "SPIC have to be precise on the planning of the planting schedule in order to make sure that they fulfil the customers' needs, the customers' orders such as the supermarkets or the direct customers". Hence, it is significant for the management to organize some educational and training events to raise the level of consumer and farmer awareness (Chuang, 2022).

Moreover, there were no participant brought up resources allocation and information sharing within and across the hierarchy as the key enablers to implement sustainable supply chain management. However, there were researches showing its necessity which indicated that the use of information technology networks significantly improves the sustainability of the food industry (Serbulova et al, 2019). Not only that, the adoption of sustainability depends on supply chain partners providing the necessary essential resources and information about the sustainability activities. Top management should integrate contemporary information technology like RFID and electronic seals in order to food security and sustainability which aligned with the perception of sustainable food supply chain that were discussed earlier in the chapter (Serbulova et al, 2019).

In summary, the second research objective has been achieved that there are 2 key enablers mentioned by the participants and 3 key enablers were discovered from the research papers. These 2 key enablers that were mentioned by the participants from SPIC includes pressure exerted by various governmental, regulating agencies and non-government bodies and understanding customer and other stakeholder requirements. Based on the discussion in Chapter 4, resources allocation and information sharing within and across the hierarchy was not believe to have much influence on sustainability of food supply chain among participants from SPIC.

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5.4 RESEARCH OBJECTIVE 3: TO IDENTIFY THE MAIN ENABLER FOR SUSTAINABLE FOOD SUPPLY CHAIN IN SARAWAK.

According to the discussion of the qualitative findings of the preceding chapter, it can be concluded that pressure exerted by various governmental, regulating agencies and non-government bodies is the main enabler for sustainable food supply chain. They had affirmed that the government plays a vital role in increasing awareness among public on this particular issues. As mentioned in the previous chapter, awareness of our local community on the importance of having a sustainable food security and supply in terms of the environmental and economic aspects truly make a huge differences as a whole.

The government were not only in charge on increasing awareness, they are also responsible on protecting farmers right, this were discussed earlier by one of the participants. In addition to this, a scheme insurance which is the Agro-Food Takaful Insurance were launched by the Malaysian government's Ministry of Agriculture and Food Industries (MAFI) is renowned for being a pioneer in agricultural transformation (Malaysia Pavilion, 2022). The participants briefly introduced on this scheme insurance and the researcher are able to browse more information on the internet regarding to this. The Agro-Food Takaful Insurance Scheme policies, which seek to reimburse farmers for losses and damages brought on by natural catastrophes, are available to farmers (Asian Economist, 2022).

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Besides the scheme insurance, the National Action Plan (NAP) for 2021-2023 was also mentioned by the participants and the research found that it is highly related on how the government can do to promote the sustainability of food supply chain. It is the approach to modernize our agro-food production by developing a more sustainable, resilient system to promote economic growth and to improve the well-being of the local community especially the one that are working in the industry as according to the participants.

To conclude, pressure exerted by various governmental, regulating agencies and non-government bodies is the main enabler for sustainable food supply chain which is different from what had been discussed in Chapter 2 that declared that understanding customer and other stakeholder requirements as the main enabler. In the matter of facts, only one of the participants among 6 mentioned about being understanding customer and other stakeholder requirements.

5.5 JUSTIFICATION FOR THIS STUDY

In this research, the researcher only got a total of 6 informants in accordance with the total number of informants told in Chapter 2. But unfortunately, only 5 informants could be obtained and interviewed for the title sustainability in food supply chain management and key enablers. This is due to the fact that at the time the researchers conducted the survey to obtain information was when the COVID-19 epidemic was still hitting. So many are unable to cooperate well because they are afraid that there will be an impression on them. In addition, another reason is that every enterprise or company has confidential information that they have and cannot be disclosed to the public.

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5.6 CONTRIBUTION OF STUDY

This study discussed the perception of sustainable food supply chain management and their key enablers to implement sustainable initiatives in Sarawak agriculture food supply chain. The findings in the previous chapters help to gain insights into key enablers to implement sustainable initiatives in Sarawak agriculture food supply chain and understand main enabler for sustainable food supply chain in Sarawak. This research is beneficial not only for both the researcher and SPIC but also useful for other relevant agro-food industr. After finish the research, a new conceptual framework is generated and presented below:

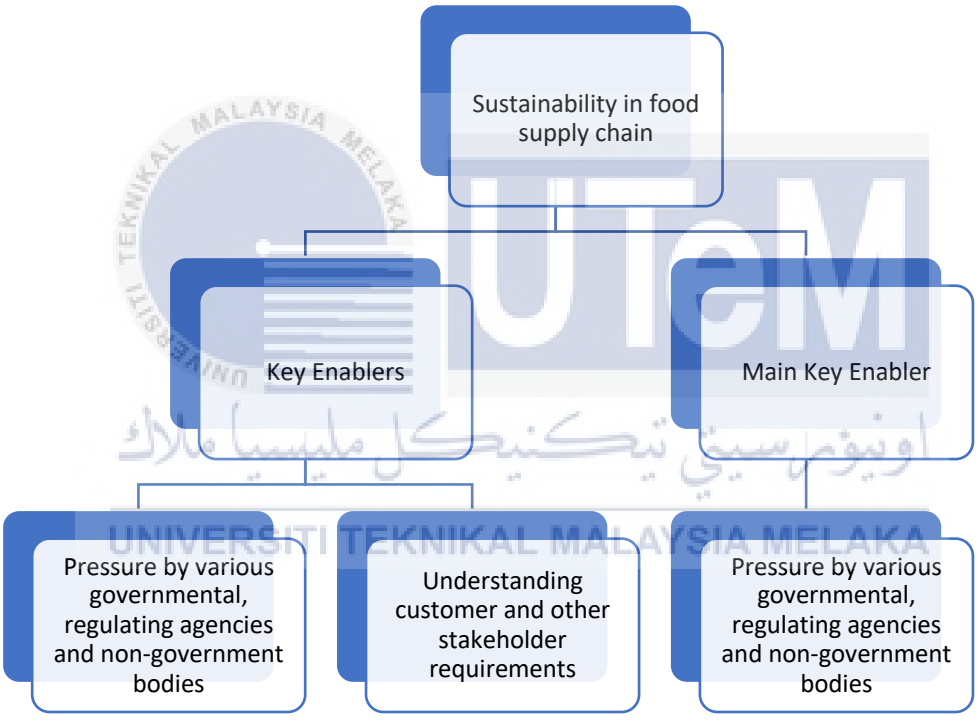

Figure 5.1: Conceptual Framework

Source: Proposed by the researcher Alicia Wong Yye Rouy (2022)

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5.7 FUTURE RECOMMENDATION

Last, but not least, the researcher would like to offer some suggestions for future studies on this topic. Since this study was conducted from the point of view of business enterprise employees, future researchers could conduct a comparable study from the perspective of subordinate employees or larger companies. As a result, future researchers will determine whether the perception on sustainable food supply chain that can be accepted by other large companies as well.

In addition to determine the key enabler in implementing sustainable food supply chain, various other strategies include testing how they are carried out. However, the focus of this study is solely on the perception among the company employees. As a result, future researchers may conduct similar research on how to test these key enablers on whether or not they come in handy. The reason is that the success of an organization is not only about testing its effectiveness but also about the coordination of various types of features that are able to be highlighted.

Finally, this study can be used or developed in similar industries. Citing an example, future researchers can conduct similar research in government business enterprises or such as aquafarms and restaurants.

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APPENDICES

APPENDIX A:

APPENDIX A: GANTT CHART PSM 1

WEEK/ ACTIVITIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
FYP talk																
Search for FYP topic																
Meeting with supervisor																
Topic discussion and Tittle confirmation																
RO & RQ and Construction																
Variables and framework Construction																
Drafting research proposal																
Submission of Chapter 1 and 2 for supervisor's review																
Restructured Chapter 2																
Discussion and Formulation on Chapter 3																
Submission of Chapter 3 for supervisor's review																
Final draft of FYP 1																
Proposal presentation																

MID SEMESTER BREAK

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APPENDIX B:

APPENDIX B: GANTT CHART PSM 2

WEEK/ ACTIVITIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
FYP talk									MID SEMESTER BREAK							
Completion of Questionaire Construction																
Data Collection Through Interview																
Completion of data collection																
Data analysis																
Completion of data analysis																
Write up Chapter 4: Discussion & Analysis																
Completion of Chapter 4: Discussion & Analysis																
Write up Chapter 5: Conclusion																
Turnitin and report amendment																
Final Draft Submission																
Formal Adjustment and document compilation																
Slide preparation																

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