THE IMPACT OF SUPPLY CHAIN MANAGEMENT AND THE ENVIRONMENTAL PERFORMANCE

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BY

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DECLARATION

I hereby declare that:

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

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

(3) Sole contribution has been made by me in completing the FYP.

(4) The word count of this research report is 12695.

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LP	Logistics Practices
SC	Supply Chain Practices
RL	Reversed Logistics
FM	Fleet Management
EN	Environmental Performance
SPSS	Statistical Package of the Social Science
SFFLA	Selangor Freight Forwarder and Logistics Association

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PREFACE

Environmental sustainability becomes essential in every business currently, and conserving environment is responsible to every sector of business to reach the customers' expectation and satisfaction towards the company's operational performance.

In freight forwarding industry, their responsibilities are to help their customers to arrange the imports and exports, transportation, and returning goods to the customers. All these activities are involving in supply chain management, but these activities may make an impact towards the environment. According to the National Transport Policy from Ministry of Transport Malaysia (Prime Minister's Office of Malaysia, 2019), the total carbon pollutant in the transportation sector is 7.9tonne/capita in Malaysia, which is higher than the other countries (an average of 5.4tonne/capita).

Thus, the researcher would like to conduct research to see whether these practices: logistics practices, supply chain practices, reversed logistics, and fleet management are affecting the environmental performance in Malaysia freight forwarding industry.

ABSTRACT

The objective of conducting this research is to investigate how supply chain management has an impact on the environmental performance in Malaysia freight forwarding industry. Thus, the independents variables have been selected in this research: logistics practices, supply chain practices, reversed logistics, and fleet management. Environmental performance is picked as the dependent variable.

This research provides valuable insight and bring awareness to the freight forwarders to understand how these 4 independent variables have impacts on environmental performance. Institutional theory, legitimacy theory, and resource-based view have been applied to study research.

The data has been collected from 152 respondents who are from Selangor Freight Forwarder and Logistics Association (SFFLA) through survey questionnaire. All questionnaires are sent through e-mails, and the collected data has been analysed by Statistical Package of the Social Science (SPSS) software. The results are shown in table and figure forms in the research.

Lastly, this research provides implication to the management, policy makers, and the government to make further improvement towards environmental performance in this industry. Limitations and recommendations have been addressed in this research to the future researchers in this study field.

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

This research is aimed to study and investigate how the freight forwarders apply supply chain management and impact on the environmental performance.

1.1 Research Background

Freight forwarder is a person that helping companies to do the import and export, returning goods, and arrange transportation. Most of their customers are small and medium-sized manufacturers (Huang et al., 2019). In Malaysia, freight forwarders provide airfreight and seafreight services to their customers. They offer the most quality services including punctuality, cost reduction, reliability, and high customer satisfaction (with providing broad range of services in freight forwarding, distribution, warehousing etc.) (Freight Forwarding Malaysia, n.d.).

Supply chain management is very important for freight forwarders. Supply chain management is used to manage the flow of goods, and the process of transforming raw materials into final goods and distributing them to the end customer (Fernando, 2021). Supply chain management includes activities of sourcing and purchasing raw materials, transformation, logistics, inventory management, transportation, partnership with suppliers, third-party service provides across the world (Janvier-James, 2011). In the freight forwarders' perspective, it is can plan, apply, and control the activities in supply chain, and they apply supply chain management to store and transport the goods from manufacturers to the end customers, provide consultant services to companies which involving in foreign trades and cross-border businesses, and provide legal procedures (documents and certifications) ("Role Of Freight Forwarding Companies In Supply Chain Management", 2017).

A good supply chain management enables the freight forwarders to gain competitive advantages: cut excessive costs, maximize customer value by delivering goods and services faster, gain market information efficiently, strengthening relationships with suppliers and different lines of the business (Wei & Xiang, 2013; Perepa, 2014; Reuters, 2018). Supply chain management builds an opportunity for companies to align the purpose of supply chain with business strategy (Quayle, 2003), strengthen a company's competitiveness and cater customer needs (Langley et al., 2008).

In the freight forwarder's perspective, a good environmental performance can help to save costs, raw materials, power, and energy. Environmental performance is defined as an activity to create green practices and improve environmental conservation (Bukit et al., 2018). According to Brundtland Report, sustainable development is to meet the current requirement without hurting the abilities to reach the needs of next generations (Gallego-Alvarez et al., 2014). Nishant et al. (2012) also summarized that environmental performance have both positive and negative relationship with organizational performance; it depends on whether it affects the organization's financial, operation, or the overall vision of the business.

People also start to concern about environmental issues. The study of Global Scan was found out that: (1) 74% of people across the world desire to minimize their impact on environmental issues; (2) 50% of people desire companies to offer goods and services that make better for both customers and the environment ("Study Finds People Want to Make Healthy and Sustainable Living Choices but Do Not Know Where to Start", 2020). Malaysia also practices on environmental sustainability: it is ranked at 38th out of over 140 countries worldwide, and 2nd in Asia countries (Kasayanond et al., 2019). Hence, environmental performance becomes one of the current practices for most companies, including freight forwarders.

1.2 Research Problem

Due to the increasing market demand, most of the companies are relying on freight forwarders to maximize profits and minimize the production cost, but some pollutions occurred around worldwide due to the logistics management. The fleet management in freight forwarding industry also affect the environment; oil spill accidently, air emissions, inland construction, throwing non-biodegradable wastes into the ocean, and noise pollution occurred, and there were a lot of supporting data shown in the documents (Organisation for Economic Co-operation and Development [OECD], 1997; Rajeev et al., 2017). Freight forwarders also contributed a lot of air pollutants on transportation, such as nitrogen oxides (50%) and volatile organic compounds (30%) (United States Environmental Protection Agency, n.d.). Moreover, companies' supply chains had created over 80% of environmental cost (including greenhouse gas emission) and 90% of impacts on air, land, and water resources (Bové and Swartz, 2016). Reversed logistics' activities also can produce hazardous waste and destroy environment if the freight forwarders did not dispose goods properly, especially for those electronic and medical products (Saravanan & Kumar, 2016).

The green supply chain's implementation enables to enhance environmental performance and freight forwarders' competitive advantage (Chiou et al., 2011), but uncertainty on supply chain towards environmental performance becomes a pressure towards freight forwarders since they are unsure whether the practices are effective to environmental performance. Vachon and Hajmohammad (2016) found that as uncertainty arises in supply chain, it increases resource constraints and decrease resource allocation. Hence, freight forwarders are forced to focus increasingly on the operations rather than green issues. Previous studies also stated uncertainty on supply chain too (Gupta & Maranas, 2003; Wang, 2018).

Rising awareness towards environmental performance also influences freight forwarders to apply green supply chain. It is proven by the study of Thorlakson et al. (2018), which stated that over 52% of 449 publicly listed companies contribute sustainability through global supply chain; they apply at least one sustainable

sourcing practices. Mukhtar et al. (2019)'s study also has addressed several environmental risks that arises during supply chains operations, including hazardous materials and carbon emissions, which drive the companies who looking for competitive advantage for their operational performance in the developed countries to give concerns on green supply chain management. But they study of Aziz et al. (2016) showed that the awareness of applying green logistics practices in Malaysia logistics industry are still considered as low since their low mentality on green issues. Moreover, rising awareness on environmental performance also pressure the companies to apply reversed logistics for disposing, returning goods, and improving operational performance in Malaysia (Abdullah & Yaakub, 2014).

1.3 Research Objectives

1.3.1 General Objective

The main objective is to understand and investigate how supply chain management has an impact on the environmental performance in Malaysia freight forwarding industry.

1.3.2 Specific Objectives

1. To examine the relationship between logistic practices and environmental performance in Malaysia freight forwarding industry.
2. To examine the relationship between supply chain practices and environmental performance in Malaysia freight forwarding industry.
3. To examine the relationship between reversed logistics and environmental performance in Malaysia freight forwarding industry.
4. To examine the relationship between fleet management and environmental performance in Malaysia freight forwarding industry.

1.4 Research Questions

1. Do logistic practices affect environmental performance?
2. Do supply chain practices affect environmental performance?
3. Do reversed logistics affect environmental performance?
4. Does fleet management affect environmental performance?

1.5 Research Significance

This research provides valuable insight for the freight forwarders to understand how those 4 independent variables have impacts on environmental performance, so they able to apply those practices to improve the influence towards competitors and customers (Khan et al., 2018).

Secondly, this research can bring awareness to most industries including freight forwarders for making improvement and prevention on supply chain management towards environmental issues. Moreover, uncertainty also can be reduced by comprehending this research.

Thirdly, freight forwarders will have the mentality on reducing pollution through logistic practices, supply chain practices, reversed logistics, and fleet management. Contribution of this research will benefit freight forwarders to improve operational efficiency and environmental performance too (Lai & Wong, 2012).

1.6 Chapter Layout

1.6.1 Chapter 1: Introduction

This chapter explains about the overall background of the study, research problems, objectives, questions, and the significance of the study.

1.6.2 Chapter 2: Literature Review

This chapter provides the literatures of each variable. Then, theories and hypothesis will be further discussed.

1.6.3 Chapter 3: Methodology

This chapter constructs the research methodology, and the results are discussed on the next chapter.

1.6.4 Chapter 4: Data Analysis

This chapter illustrates on the data collection, and those data was analysed by Statistical Package of the Social Science (SPSS) v28 in this research.

1.6.5 Chapter 5: Discussion, Conclusion and Implication

This chapter explains the summary of the study, findings, statistical analysis and various implication of study.

1.7 Conclusion

Chapter 1 summarizes on how supply chain management impacts on the environmental performance in freight forwarding industry. Further discussion of this study is conducted in Chapter 2.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

This chapter will provide literature reviews and conceptual framework to analyse the relationship among variables.

2.1 Underlying Theories

2.1.1 Institutional Theory

Institutional theory is defined as traditional research that will trace its origin back to foundational articles (Meyer & Rowan, 1977). It helps to determine how organizational founding and change were driven less by functional considerations and more by symbolic actions and external influences than the theory at the time assumed. This theory will be seen as source of managerial decision-making rules and change the company's behaviour on managing environment protection in supply chain management (Greve & Argote, 2015). Applying into this research, institutional pressures motivate the freight forwarders to achieve goals (environmental and operational performance) with the prevailing guidelines and norms of the business environments (Touboulic & Walker, 2015).

2.1.2 Legitimacy Theory

Companies should disclosure environmental information and performance to gain legitimacy from stakeholders or publics with proactive and reactive approach (Arafat, et al., 2012). With reactive approach, companies disclose environmental information in reaction to some crisis facing either the company or the industry; while with proactive approach, companies disclose environmental information to prevent crisis happened in the future.

According to Luo et al. (2020), reversed logistics require legitimacy to dispose drugs waste to protect the environment. Legitimacy theory is applied to have a strict environmental regulation to force the freight forwarders to discover on environmental improvement.

2.1.3 Resource-based View

Resource-based view is a popular theory to be applied in supply chain management research (Defee et al., 2010). This theory was introduced by Barney (1991), and resource creates value to company; they help to minimize cost of inputs, which affects the overall cost of manufacturing and benefit more values on outputs (Ahuja, 2000). Moreover, Vachon and Mao (2008) stated that resources saving in production, sourcing, and distribution can improve environmental performance.

2.2 Literature Review

2.2.1 Dependent Variable: Environmental Performance

Environmental performance was defined in relation to the business field. Lober (1996) stated that environmental performance needs to be committed by company to preserve and protect the nature, including maintain the quality of air, water, noise etc. Ilinitch et al. (1998) considered that it is an effect of business activities and products on the nature, such as resource consumption, waste generation and emissions.

In the freight forwarder's perspective, environmental performance becomes essential as to: (1) increase business image and customer awareness on environmental issues; (2) reduce risk of legal non-compliance; (3) improve quality, efficiencies, productivity, and environmental management (Danish Ethical Trading Initiative [DIEH], 2010). DIEH (2010) also provides some

practices for companies to cooperate with suppliers for identifying source of pollution and waste and implementing measures for waste and pollution prevention.

This research will determine the environmental performance from the aspects of logistics practices, supply chain practices, reversed logistics, and fleet management.

2.2.2 Independent Variable: Logistics Practices

Logistic was once introduced in military by General Jomini, describing that logistic as a storing goods, planning and resalization of marches, transporting and supplying troops (Szymonik, 2012).

In the freight forwarder's perspective, logistics involve organization, inventory and transportation planning, warehousing, controlling and execution of the flow of products from manufacturing to distribution (Coyle et al., 2003). Other researchers also define logistic as planning and organizing activities which make sure the process can be done efficiently and effectively (Mellat-Parast & Spillan, 2014). According to Lambert and Burduroglo (2000), 2 types of logistics can be divided, which are inbound logistic (procurement of materials, warehousing and transportation) and outbound logistic (collection, maintenance, and distribution of the products to end customer).

Logistic is important to freight forwarders; a good logistic practice can help to reduce cost and improve efficiency on production and delivery. It acts as a blueprint of supply chain to handle, monitor, and deliver resources in a cost-effective way. An efficient logistic practice also enables to reduce time and cost for shipping fee and warehousing cost to the end customer. But due to the governmental and environmental regulation, environmental legislation, and public awareness on environmental conservation, logistic is

designed to be more "green" (Lau, 2011; Zhang, Thompson, Bao & Jiang, 2014). Green logistic – a strategy to reduce environmental issue on freight distribution, and focus on waste management, material handling and packaging (Kumar, 2015). Green logistic can maintain the high standards and minimize the environmental impact and cost during logistic process (Wannaruk & Nakkiew, 2018).

2.2.3 Independent Variable: Supply Chain Practices

Supply chain is defined as a manufacturing process of raw materials into finished good and expand to the delivery goods to end customer (Beamon, 1998). Another definition for supply chain is a value chain network of manufacturers, distributors, and transportation cooperated to provide goods to the customers, which involved in the flows of resources and information in direct manner (Porter, 1985; Chow & Heaver, 1999; Mentzer et al., 2001; Jain et al., 2010).

The total cost of supply chain (convey information, produce, store and transport materials) becomes higher due to running the global business and freight charges (Borade & Bansod, 2007). By implementing an effective supply chain, production schedule and distribution can reduce the inventory cost, time, and energy (Varma et al., 2006). Moreover, supply chain activities involve order fulfilment, international procurement, acquiring information, manufacturing, deliver products and service immediately (McIvor, 2000). Supply chain is important for freight forwarders as it helps to reduce operating cost, improve financial performance, product quality and quantity, and deliver right products to the right place in the right time (Kleab, 2017).

Due to the rising awareness on environmental issues and government legislation, some manufacturing firms consider applying green supply chain – it reduces energy, raw material usage, and waste. Greening basically

applies on forward supply chain components include purchasing, warehousing distribution, and transport logistics (El Saadany et al., 2011).

2.2.4 Independent Variable: Reversed Logistics

Reverse logistic is a process of returning goods from end customer to a producer in a channel of distribution (Murphy & Poist, 1989). It is also defined as a company's management of obtaining material resources from customers, and reducing, managing, and disposing of harmful or non-hazardous packaging and products' wastes (Giuntini & Andel, 1995; Kroon & Vrijens, 1995). Reverse Logistic Executive Council (RLEC) also explained reverse logistic as an opposite direction of movement to regain value or to dispose of waste, and the reverse activity consists of return damaged goods, renewal of product through remanufacturing of packaging materials, reuse of containers etc. (Ritha & Vinoline, 2014).

It is important to have reverse logistic for the companies as it let them become more efficient in environment through 5R (return, reselling, repackaging, recycle, repair) (Quesada, 2003). Reddy (2011) provided a lot of definition, challenges of reverse logistics, and fundamentals of reverse logistics such as why companies use reverse logistics, how reverse logistics take as practical, and what product can be returned.

In freight forwarder's perspective, they apply this practice to return damaged goods, incorrect shipment, reduce waste, and increase their service range from collecting raw materials to production line, deliver final goods to end customer, until discard or recycle the goods and turn into useful materials to the companies (Richey et al., 2005; Stănciulescu, 2011).

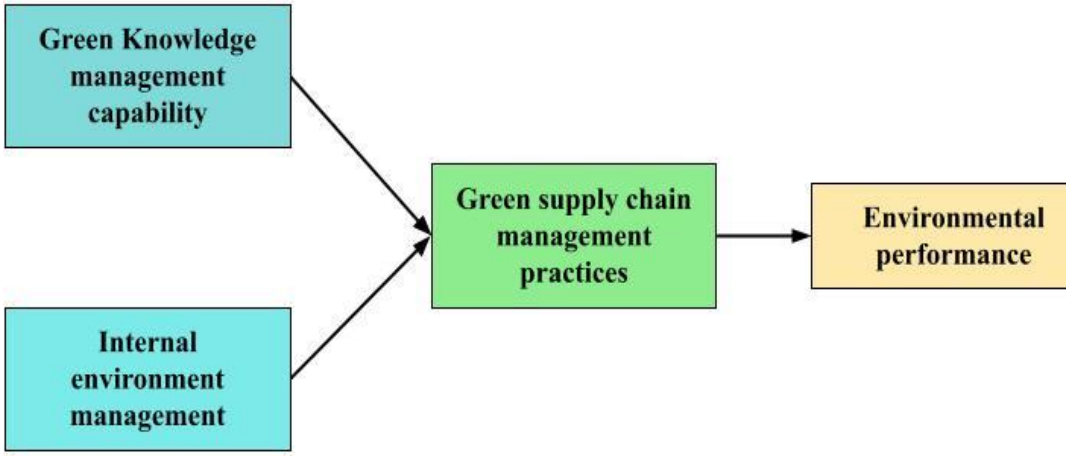
2.2.5 Independent Variable: Fleet Management

Fleet management is defined as the activities of planning, budgeting, vehicle acquisition, and vehicle disposal. Fleets have several types of shapes and size, such as cars, ships, vans, and trucks. While fleet management includes activities such as financing vehicles, managing speeds, fuel, and health. The main objective of fleet management is to minimize the risk in vehicle operation and decrease the transportation and staff cost (Aflabo et al., 2020). Due to the changes in business environment, many companies start to outsource the fleets to freight forwarders so they can reduce cost on managing fleets (Akkartal & Aras, 2021).

Resource-based theory will help freight forwarders to identify their long-term competitiveness by making distinctive and unique capabilities (Rumelt, 2008). Transportation has evolved to improve business organization and saving. Inefficient fleet management will cause customer compliant, bad image and reputation (Aflabo et al., 2020). Freight forwarders apply this practice to deliver the goods safe and punctual. Fleet management also plays an important role in freight forwarding industry for overseeing, organizing, and distributing goods to the local and overseas; according to Rogic et al. (2007), fleets can be divided into local operation, regional operation, and national operation. Vehicles manufacturers are encouraged to produce more energy efficient vehicles with lower emission of pollutants too, hence green fleet management is introduced then. Previous research provided the strategies of green fleet management under environmental regulation (Stasko & Gao, 2012).

2.3 Review of Relevant Theoretical Model

Figure 2.1: Theoretical Model of Showing Supply Chain Management Towards Environmental Performance

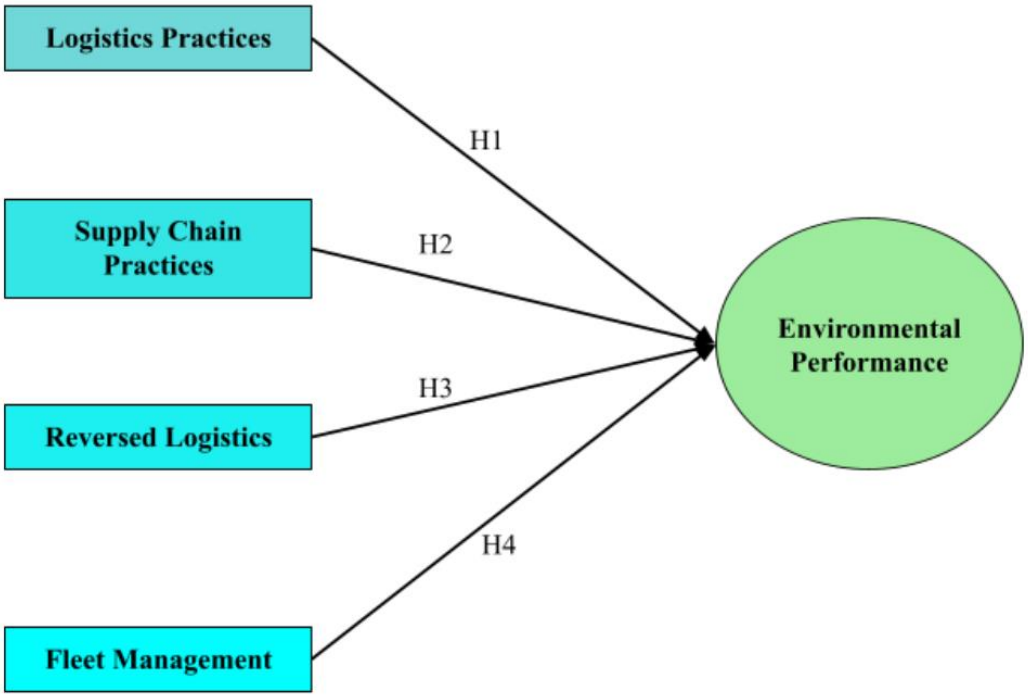


Source: Jermsittiparsert, K., Siriattakul, P., & Sangperm, N. (2019). Predictors of environmental performance: mediating role of green supply chain management practices. *International Journal of Supply Chain Management*, *8*(3), 877-888.

This research is conducted by Jermsittiparsert, Siriattakul, and Sangperm (2019) to examine the relationship of green supply chain management and environmental performance. They also proved the results that green supply chain management has relations to environmental performance.

2.4 Proposed Conceptual Framework

Figure 2.2: Proposed Conceptual Framework of Supply Chain Management Towards Environmental Performance



Source: Developed for the research.

This theoretical model is applied from Jermsittiparsert et al. (2019) as reference. However, this framework is applied to identify whether logistics practices, supply chain practices, reverse logistics, and fleet management affect the environmental performance in Malaysia freight forwarding industry.

2.5 Hypothesis Development

2.5.1 Relationship between logistics practices and environmental performance

Previous research shows positive relationship between logistics practices and environmental performance (Tambovceva & Tambovcevs, 2012; Subramaniam, 2021). Tambovceva and Tambovcevs (2012) stated that inbound logistics (mode selection, carrier selection, material's handling, warehousing) and outbound logistics (network design, inventory decision, packaging, mode selection, carrier selection, material's handling, warehousing) can produce different degree of pollutants and wastes.

Logistics also becomes the second largest source of greenhouse gasses (GHGs) emissions. An increase of 52% of GHGs in 2050 is predicted with increasing over 2.5ºC by 2050. Researcher also pointed out that improper management and reckless application of logistics release more CO2 emissions. It is unavoidable since logistic activities involve fossil fuel consumption, and Asia countries practices less on green logistics (Subramaniam, 2021). Freight movement is also expected to grow up to 8billion ton-kilometres by 2050. Speeding the shipments and enhancing the efficiency of shipping arrangement can reduce carbon dioxide (CO2) emissions (Liu et al, 2018).

Due to rising awareness and government legislation, companies have to conduct environmental plan on logistics to reduce pollutants and wastes (Zhang et al., 2014). Hence, freight forwarders can contribute to the environmental protection by choosing the location of warehouses. A good warehouse location is beneficial to handle transportation more promptly, reduce storage and delivery time (Ristovska, 2017).

H1: There is positive relationship between logistics practices and environmental performance.

2.5.2 Relationship between supply chain practices and environmental performance

There has positive relationship in the past research (Perera et al., 2013; Jermsittiparsert et al., 2019), but show no significant relationship in the research of Jum'a et al. (2021). Manufacturers often use scarce resources and release wastes into water, air and occur pollution. Researchers also stated that environmental performance assess the capability of company to reduce the waste and pollution on the environment. Moreover, the rising environmental concerns have let the companies to reconsider their supply chain practices (Jermsittiparsert et al., 2019).

Packaging becomes one of the criteria for environmental performance evaluation of the company's supply chain. Mahmoudi and Parviziomran (2020) also included a lot of studies related to reusable packaging on environmental impacts. According to Perera et al. (2013), recycled packaging is the most crucial aspect that impact on environmental. Goellner and Sparrow (2014) conducted research on single-use and reusable containers in transportation, and the result showed that reusable containers emit less CO2 than single-use containers.

H2: There is positive relationship between supply chain practices and environmental performance.

2.5.3 Relationship between reversed logistics and environmental performance

Previous research shows positive relationship between reverse logistics and environmental performance (Jayaraman & Luo, 2007; Ali et al., 2020). The process of the reverse logistics is as similar as glass bottle and paper recycling, and its purpose is to recycle, remanufacturing, disposal, and emphasizes on using less raw and hazardous materials for product (Wu &

Dunn, 1995). According to Jayaraman and Luo (2007), due to the environmental policy, manufacturers have obliged to take back and recover the used products to reduce the waste disposal. Hence, the freight forwarders can assist their customers to take back the products and dispose, recycle, and return to them.

According to Ali et al. (2020), reverse logistic activities from products and packaging drive companies towards environmentally friendly, such as resell, refurbish, remanufacture, donate, reclaim materials etc. The researchers also conduct hypothesis testing, resulted that time (remanufacturing time, disposal time etc.), cost (disposal cost, remanufacturing cost etc.), technology (packaging, greening technique etc.), and green consciousness (green culture and innovation) have impacts on environmental performance.

Reverse logistic also include disposal of products, especially to those pharmaceutical medicines. According to Saravanan and Kumar (2016), the disposals of medicines are: throw, flush into toilets/sinks, bury, and burn, and it can be imagined that these disposal practices definitely produce water, soil, and air pollutions since the nature business of freight forwarders' customers include medical products. El Saadany et al. (2011) also pointed out that reverse logistics are beneficial to environment, but it is challenging to collect disposed products in the reverse flow.

H3: There is positive relationship between reversed logistics and environmental performance.

2.5.4 Relationship between fleet management and environmental performance

Previous research shows positive relationship between fleet management and environmental performance (Fraselle et al., 2021; Rodriguez et al., 2022). According to Besiou et al. (2012), fleet management is a practice that

seeks for minimizing environmental impact through the integration of cleaner vehicles and fuels, fuel-efficient operation and driving. Fraselle et al.'s (2021) research is focused on transport and freight services (such as courier, express, and parcel delivery), which handling shipments up to 30kg, and their findings are the electric vehicles are producing less carbon dioxide equivalent than petroleum vehicles.

Researchers pointed out that transport is among the main factor to GHGs emissions, including bus, truck, cars, vans, airplanes, rail, ships and boats. Nearly 5% of the total emissions are from transportation and 1% from logistics facilities. An increase of vehicles usage tends to generate higher GHGs emission and leads to environmental issue including global warming, biodiversity loss and air pollution (Subramaniam, 2021). International Maritime Organization (IMO) also found that international shipping carried an average of 840million tonnes of CO2 and 860million tonnes of GHGs during 2007-2012, and this accounts for nearly 2.6% of the annual global CO2 and 2.4% of the annual global GHGs. The forecast of the international shipping production of CO2 emissions will grow up to 250% by 2050 (Rodriguez et al., 2022).

H4: There is positive relationship between fleet management and environmental performance.

2.6 Conclusion

In this chapter, literature reviews and hypotheses are discussed and evaluated. The research method will be discussed in the next chapter.

CHAPTER 3: RESEARCH METHODOLOGY

3.0 Introduction

This chapter will discuss the methodology and data collection analysis of this research.

3.1 Research Design

Research design is a detailed outline for the gathering and analysing data based on the research questions and objectives. Research design is important as it can explain the relationship between one variable to another (Hassan & Khairuldin, 2020).

The objective of this research is to identify the relationship between supply chain management and environmental performance in Malaysia freight forwarding industry. The research will implement quantitative research to measure the statistical result from the collected data. Quantitative research is a method to analyse the collection of numerical data into description, explanation, or prediction; from quantitative perspective, conclusion will be drawn after direct observation and measure of reality (Mertler, 2016).

Moreover, this research also will apply descriptive and exploratory research approach for data analysis. Descriptive analysis allows to describe the demographic segment's nature, and this analysis involves observation (must be based on scientific methods), measurement, and exploration of correlation between 2 or more variables (Williams, 2007). Through descriptive analysis, it enables to answer the how, what, when, and where questions of the research problem, and tabulated in numerical form. Basically, it often uses in graphs and charts to understand the data distribution (Sahin & Mete, 2021).

Survey research, another approach of descriptive research, also applied in this research. Survey research is to explain the characteristics of population by conducting questionnaire to analyse and describe their attitudes, opinions, behaviours, and other characteristics of the population (Mertler, 2016). In this research, questionnaires will be distributed to the Malaysia freight forwarders through electronic survey (e-mails).

Exploratory analysis is conducted to scope out the extent of certain phenomenon, issue, or behaviour, as to generate ideas about the phenomena, and test the possibility of undertaking more extensive study for the phenomenon. Through this analysis, the relationship between variables can be identified.

3.2 Data Collection Method

Primary data is used to analyse the relationship between logistics practices, supply chain practices, reversed logistics, fleet management and environmental performance.

3.2.1 Primary Data

Primary data is defined as data that collected from first-hand-experience, and it is more reliable and valid since the data is not been published yet and not been altered by human beings. Primary data can be collected from experiments, survey, questionnaire, interview etc. (Ajayi, 2017). Its advantage to use primary data is the researcher can collect specific data to the research problem. Hence, questionnaire is distributed through the respondents' e-mails in this research.

3.3 Sampling Design

3.3.1 Target Population

The target respondents of this research are Selangor Freight Forwarder and Logistics Association (SFFLA), which consists of 645 companies on the list (n.d.). Those companies provide services include freight services, warehousing, transportation, and custom brokerage.

3.3.2 Sampling Frame and Sampling Location

Census method is applied in this research. It is a method of attempting to whole population; it provides a detailed information on all elements in the population (Lavrakas, 2008). Hence, the questionnaires have been distributed to the whole population (645 companies).

3.3.3 Sampling Element

Sampling element in this research is those freight forwarders in Malaysia, especially to those companies that are applying green supply chain management. This is because those questions might raise awareness on environmental issues to those companies that do not applying green supply chain management, and those companies that applying green supply chain management can provide suggestions and advice to support the writings.

3.3.4 Sampling Technique

Convenience sampling is applied in this research. It is a non-probability sampling that self-selecting the respondents (Stratton, 2021). This sampling is applied because some respondents cannot be reached due to the Covid-19

pandemic (temporarily closed) and some e-mails have been bounced back. Hence, roughly 570 questionnaires have been sent out.

3.3.5 Sample Size

The usable sample size for this research is total of 152 respondents. All respondents are Malaysia freight forwarders.

3.4 Research Instrument

3.4.1 Objective of Questionnaires

It is to collect relevant data from the target respondents as analysis tool. Moreover, questionnaire is an efficient tool as data collection, and all questions are designed for this research's context; thus, the data will be more accurate.

3.4.2 Questionnaire Design

The questionnaire design is based from: (1) What to ask?; (2) How to phrase the questions?; (3) How to arrange the questions?; and (4) How the questionnaire be pre-tested, and any correction needed? (Zikmund et al., 2013). As a result, close-ended questions will be applied on Section B for respondents to choose the level of agreement.

Table 3.1 Questionnaire Structure

Questionnaire	**Number of Items**
Section A – Demographic Profile	11
Section B – Construct Measurement i. Reversed Logistics	5

ii. Supply Chain Practices	5
iii. Logistics Practices	5
iv. Fleet Management	5
v. Environmental Performance	6

Source: Developed for the research.

A total of 37 questions are distributed in Google Form, and generate a pre-filled link to the target respondents through e-mails (Gmail). Section A contains respondents' general information and their companies' general profile. Meanwhile, Section B is assessed with 5-Point Likert Scale to see the respondents' level of agreement on the supply chain management towards environmental performance.

3.4.3 Pilot Test

According to Borges et al. (2020), respondent errors occur when the respondents misunderstand the questions, or refuse to provide honest responses. Hence, using a pilot test can reduce the respondent errors and identify whether there is any issue on Statistical Package for Social Science (SPSS) software while testing on reliability. 30 respondents' data are used for pilot test. To more reliability, Cronbach's Alpha will be tested too.

Table 3.2: Rule of Thumb for Cronbach's Alpha Coefficient Range

Alpha Coefficient Range	**Strength of Association**
< 0.6	Poor
0.6 to < 0.7	Moderate
0.7 to < 0.8	Good
0.8 to < 0.9	Very Good
0.9 >	Excellent

Source: Nawi, F. A. M., Tambi, A. M. A., Samat, F., Mustapha, W. M. W. (2020). A Review on the Internal Consistency of a Scale: The Empirical Example of the Influence of Human Capital Investment

on Malcom Baldridge Quality Principles in Tvet Institutions. *Asian People Journal, 3*(1), 19-29.

The pilot test of this research was developed as below:

Table 3.3: Pilot Test's Result

Variable	**Cronbach's Alpha**	**Number of Items**	**Range**	**Strength of Association**
Logistics Practices	.913	5	0.9>	Excellent
Supply Chain Practices	.863	5	0.8 to < 0.9	Very Good
Reversed Logistics	.907	5	0.9>	Excellent
Fleet Management	.782	5	0.7 to < 0.8	Good
Environmental Performance	.964	6	0.9>	Excellent

Source: Developed for the research.

3.5 Construct Measurement

3.5.1 Origin of Constructs

All questions are adopted and adapted from past research studies.

Table 3.4: Source of Questions

Variables	**Sample of Items**	**Sources**
Logistics Practices	1. Choose a better layout of warehouse space for optimizing	(Wannaruk & Nakkiew, 2018)

	warehouse order picking strategies. 2. A decrease of using the transport packaging, recycling containers, and other logistics' packaging materials. 3. Use environmentally friendly packaging materials and logistics containers. 4. Choose a transport route, load distribution and vehicle driving mileage that can avoid harmful environmentally activities. 5. Setting KPI (key performance indicators) to monitor the logistics performance.	(Zhang, Thompson, Bao & Jiang, 2014)
Supply Chain Practices	1. Company shareholders (Customers, government authorities, NGO, employee, suppliers…etc.) involvement in adopting green supply chain practices. 2. Increase awareness and behavior requirements of the employees about green supply chain practices. 3. Increase supplier commitment on green supply chain practices by collaboration among supply chain members internally and externally.	(Govindan, Kaliyan, Kannan & Haq, 2014)

	4. Implement green supply chain programs to improve the competitiveness of the company. 5. Increase the company green public image.	
Reversed Logistics	1. Created a system or procedure for online tracking and tracing of returned products and inventory status. 2. Develop a reverse logistics program for integrating the whole supply chain of the company. 3. Stringent government regulations on environmental protection let our company to understand the reversed logistics requirement. 4. Lack of environmental consciousnesses of consumers on reverse logistics. 5. Supported proactively by the top management for reversed logistics implementation.	(Richey, Chen, Genchev & Daugherty, 2005) (Ye, Zhao, Prahinski & Li, 2013)
Fleet Management	1. Choose the right mode of transport fleet with an efficient management. 2. Vehicle repairing strategy is implemented. 3. Vehicle's life span is monitored from year to year.	(Zhang, Thompson, Bao & Jiang, 2014)

	4. Vehicle fuel consumption is monitored. 5. Pollutants that are emitted by vehicle are monitored.	
Environmental Performance	1. Reduction in consumption of hazardous materials. 2. An increase in reuse, recycle and recovery of materials of the components. 3. Reduction in air emission, water, and solid waste. 4. Reduction in frequency of environmental accidents. 5. Reduction in energy consumption. 6. The overall environmental performance of our company has improved a lot.	(Lai & Wong, 2012)

Source: Developed for the research.

3.5.2 Scale of Measurement

3.5.2.1 Nominal Scale

Nominal scale is the most fundamental level of measurement; it is used for identification purpose (Zikmund et al., 2013), such as types of business, gender, working position.

Figure 3.1: Example of Nominal Scale in the Research

1. Gender: ☐ Male ☐ Female	2. Working Position: ☐ Director ☐ Manager ☐ Executive

Source: Developed for the research.

3.5.2.2 Ordinal Scale

Ordinal scale is used when the items are arranged in order, such as satisfaction level, ratings, Likert scale etc. (Zikmund et al., 2013).

Figure 3.2: Example of Ordinal Scale in the Research

1. Age:	
☐ 20 – 30	☐ 41 – 50
☐ 31 – 40	☐ > 50

Source: Developed for the research.

3.5.2.3 Likert Scale

According to Zikmund et al. (2013), Likert scale uses a series of statements with which respondents to rate at 1 = Strongly Disagree to 5 = Strongly Agree.

Figure 3.3: Example of Ordinal Scale in the Research

	During the past 2 years, there were	1	2	3	4	5
LP3	Use environmentally friendly packaging materials and logistics containers.					

RL2	Develop a reverse logistics program for integrating the whole supply chain of the company.					

Source: Developed for the research.

3.6 Data Processing

3.6.1 Data Checking

Firstly, data checking involves checking whether there is any missing value during data collection. This might occur because some respondents might skip or miss the questions; thus, Google Form helps researcher to ensure all the questions marked as required to be answered, and respondents will not miss out any question before submitting the questionnaire to researcher.

3.6.2 Data Editing

Secondly, the raw data is collected from the respondents. According to Zikmund et al. (2013), data editing involves checking whether the data collected are omission, legible, and consistent. After checking the data, researcher will start to correct issues such as interviewer errors, ambiguity responses etc. before the data are transferred to the computer.

3.6.3 Data Coding

Thirdly, the raw data is transferred to the computer, and all data will be grouped and assigned to numerical value. The numerical value will be created for each question before tabulating the data (such as Male = 1, Female = 2) as to interpreting data easily.

3.6.4 Data Transcribing

Fourthly, the coded data is inserted in table or chart forms. In this research, Statistical Package for Society Science (SPSS) Version 28 is used to transcribe the coded data. SPSS software helps to avoid transcription error, and accuracy is promised.

3.6.5 Data Cleaning

Finally, data cleaning helps to ensure that no data is missing before researcher analyses the data in the next chapter. Moreover, it prevents the data is out of range.

3.7 Data Analysis

3.7.1 Descriptive Analysis

Descriptive analysis is a process that describing and summarizing the data in an organized form (Kaur et al., 2018). In this research, pie chart, percentage and frequency tables are used on summarizing the demographic profile of the research. It makes decision making process becomes easier as descriptive analysis describes the relationship among variables (Kaliyadan & Kulkarni, 2019).

3.7.2 Scale Measurement

3.7.2.1 Reliability Test

As mentioned in Chapter 3.4.3, Cronbach's Alpha enables to test the reliability and consistency among the data set, especially for Likert scale in the research (Whitley, 2002). The alpha values are between

0 and 1, and the reliability usually is higher than 0.6 (Borges et al., 2020).

Table 3.5: Rule of Thumb for Cronbach's Alpha Coefficient Range

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

Source: Nawi, F. A. M., Tambi, A. M. A., Samat, F., Mustapha, W. M. W. (2020). A Review on the Internal Consistency of a Scale: The Empirical Example of the Influence of Human Capital Investment on Malcom Baldridge Quality Principles in Tvet Institutions. *Asian People Journal*, *3*(1), 19-29.

3.7.3 Inferential Analysis

3.7.3.1 Pearson Correlation Analysis

Pearson Correlation Analysis measures the direction and strength of linear correlation between 2 variables (Zikmund et al., 2013; Profillidis & Botzoris, 2019). According to Borges et al. (2020), the value of correlation coefficient is between -1 and +1; when the *r* is close to zero, the variation of the data will be greater, whereas the *r* is close to ±1, the variation of the data will be smaller.

Table 3.6: Rule of Thumb for Pearson Correlation Coefficient

Size of Correlation	**Interpretation**
± 0.90 to ± 1.00	Very high positive / negative correlation

± 0.70 to ± 0.90	High positive / negative correlation
± 0.50 to ± 0.70	Moderate positive / negative correlation
± 0.30 to ± 0.50	Low positive / negative correlation
± 0.10 to ± 0.30	Negligible correlation

Source: Hinkle, D. E., Wiersma, W., & Jurs, S. G. (2003). *Applied statistics for the behavioral sciences* (Vol. 663). Houghton Mifflin College Division.

3.7.3.2 Multiple Regression Analysis

It examines the effects of independent variables simultaneously on a dependent variable. According to Zikmund et al. (2013), this analysis is used to: (1) forecast something based on known information, such as to predict independent variable A is affecting on the dependent variable; (2) explain the drivers of something, such as comparing different independent variables impact the most on the environmental performance. Another definition is to find out the correlation between 2 or more variables having causal relationship and make forecast by applying the relation (Uyanik & Güler, 2013). Zikmund et al. (2013) has presented the multiple regression equation below:

$$Y = b0 + b1X1 + b2X2 + b3X3 + \ldots + bnXn + e$$

Where *Y = dependent variable;*
b0 = constant, y-intercept, where x value = 0;
b = slope of coefficient;
X = each independent variable (b1, b2, …, bn) to forecast Y;
E = error value.

By applying the equation above, it will be shown as:

$$Y = b0 + b1X1 + b2X2 + b3X3 + b4X4 + e$$

Where *Y = environmental performance;*
b0 = constant value;
b1, b2, b3, b4 = slope of coefficient;
X1 represents logistics practices;
X2 represents supply chain practices;
X3 represents reversed logistics;
X4 represents fleet management;
e = error value.

3.8 Conclusion

This chapter has analysed on the methodologies, and the target respondent is those freight forwarders in Malaysia. The next chapter will be discussed on the detailed analysis of data.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

This chapter explains on the data analysis results. SPSS v28 is used to test the validity of hypothesis and summarize all the data.

4.1 Descriptive Analysis

4.1.1 Demographic Profile

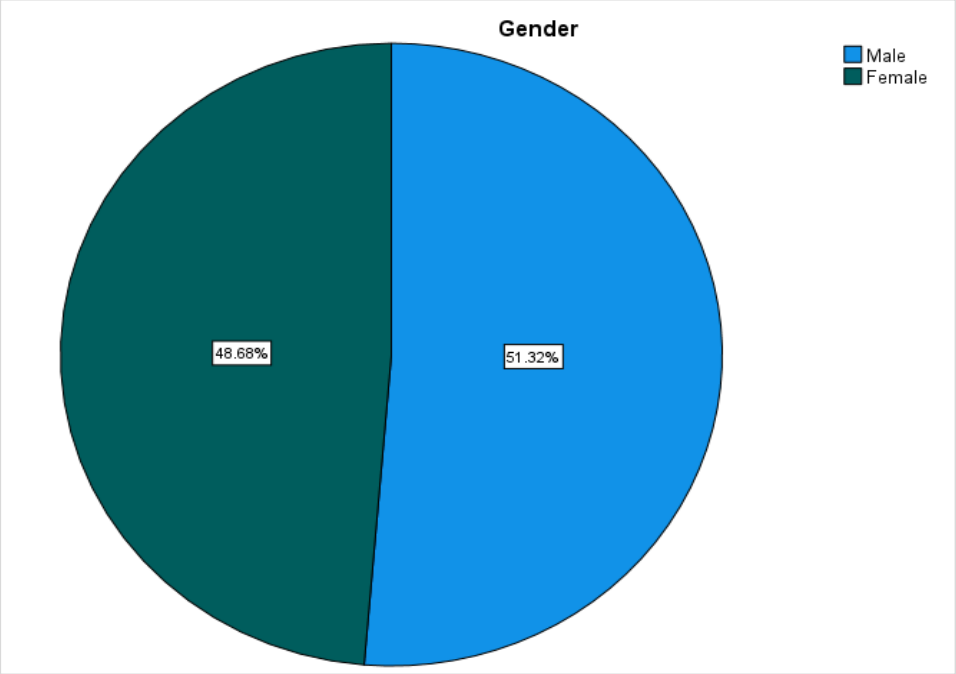
152 respondents' (Malaysia freight forwarders) answers were collected, and all data was analysed in SPSS v28. The following tables and figures are arranged according to the questionnaire's sequence.

Table 4.1: Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	78	51.3	51.3	51.3
	Female	74	48.7	48.7	100.0
	Total	152	100.0	100.0	

Source: Developed for the research.

Figure 4.1: Gender



Source: Developed for the research.

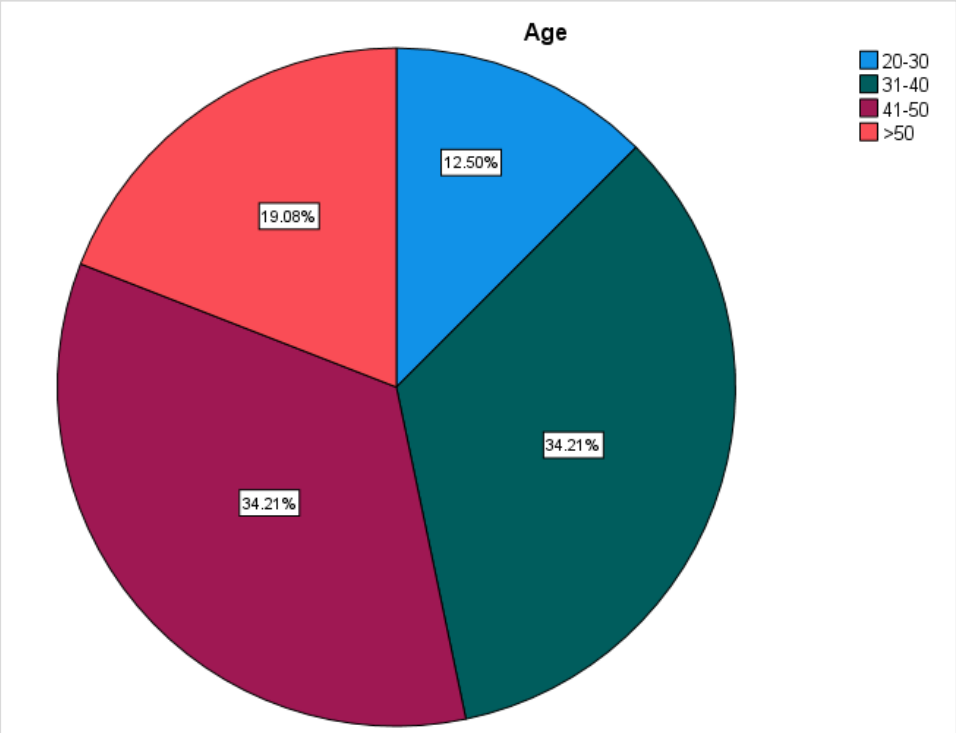
Based on the result above, the genders of the respondents are equally; 78 out of 152 are males, and the remaining of 74 respondents are females.

Table 4.2: Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-30	19	12.5	12.5	12.5
	31-40	52	34.2	34.2	46.7
	41-50	52	34.2	34.2	80.9
	>50	29	19.1	19.1	100.0
	Total	152	100.0	100.0	

Source: Developed for the research.

Figure 4.2: Age



Source: Developed for the research.

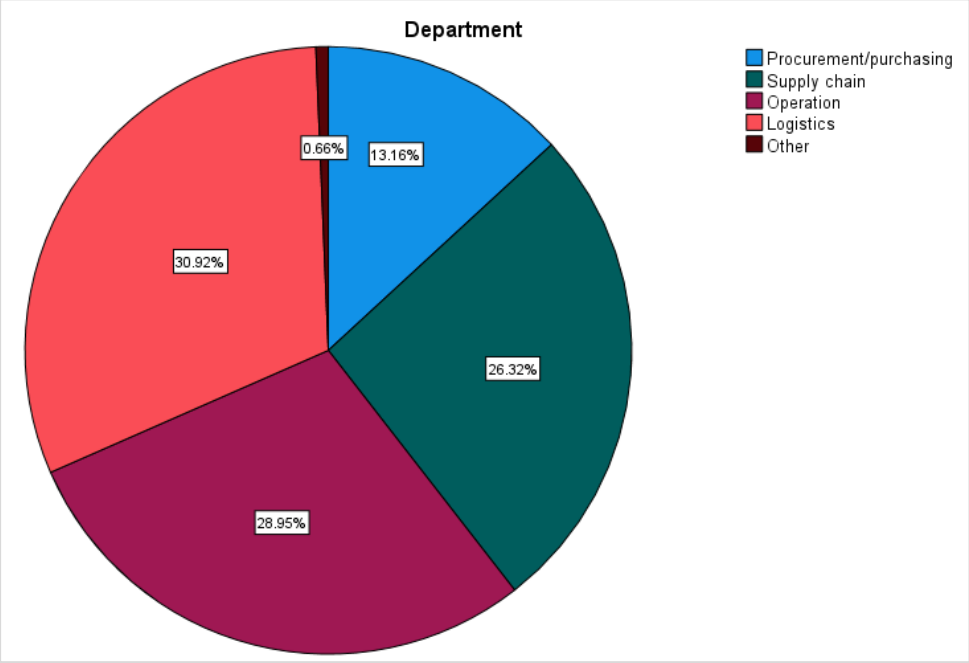
Most of the respondents are aged of 31-40 and 41-50 years old (34.2% each), followed by > 50 years old (19.08%) and 20-30 years old (12.50%).

Table 4.3: Department of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Procurement/ purchasing	20	13.2	13.2	13.2
	Supply chain	40	26.3	26.3	39.5
	Operation	44	28.9	28.9	68.4
	Logistics	47	30.9	30.9	99.3
	Other	1	.7	.7	100.0
	Total	152	100.0	100.0	

Source: Developed for the research.

Figure 4.3: Department of Respondents



Source: Developed for the research.

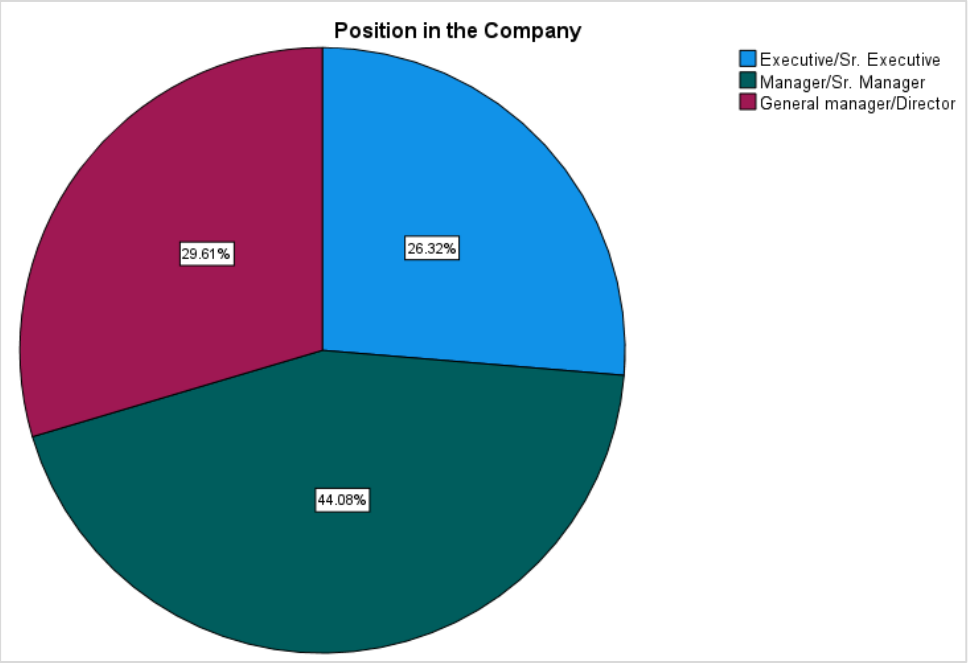
The results show most of the respondents are from logistics department (30.92%), followed by operation department (28.95%), and the least are from the other departments (0.66%), which is finance department.

Table 4.4: Position in the Company

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Executive/Sr. Executive	40	26.3	26.3	26.3
	Manager/Sr. Manager	67	44.1	44.1	70.4
	General manager/Director	45	29.6	29.6	100.0
	Total	152	100.0	100.0	

Source: Developed for the research.

Figure 4.4: Position in the Company



Source: Developed for the research.

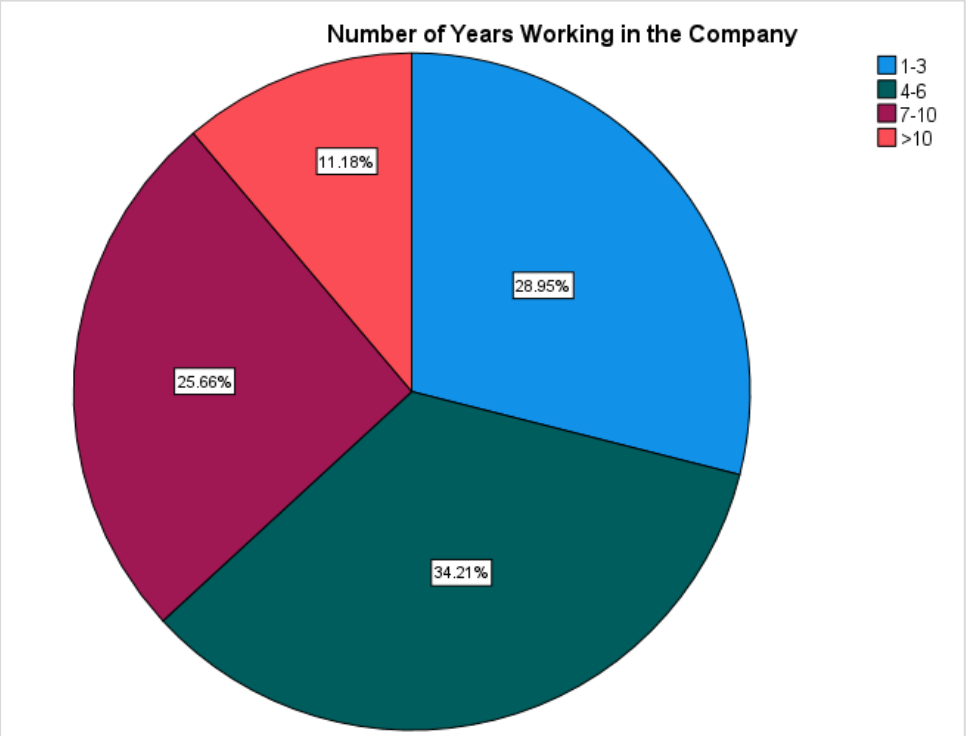
67 out of 152 respondents are managers / senior managers, while 45 respondents are general managers / directors, and the remaining of 40 respondents are executives / senior executives.

Table 4.5: Years of Working

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-3	44	28.9	28.9	28.9
	4-6	52	34.2	34.2	63.2
	7-10	39	25.7	25.7	88.8
	>10	17	11.2	11.2	100.0
	Total	152	100.0	100.0	

Source: Developed for the research.

Figure 4.5: Years of Working



Source: Developed for the research.

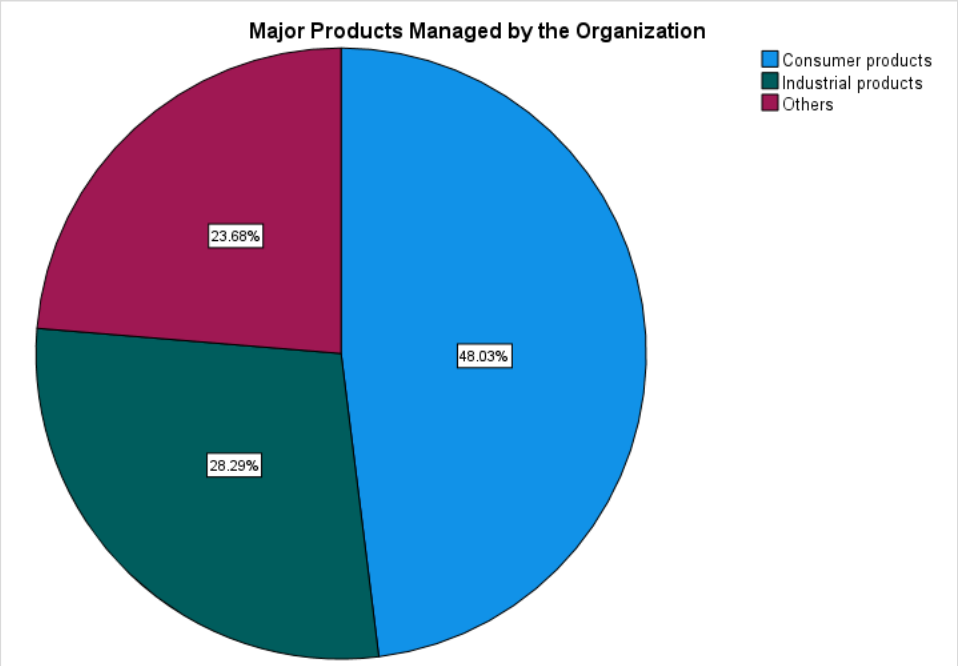
From the results, most of the respondents have worked 4-6 years in the company (34.21%), whereas the least of the respondents have over 10 years in the company (11.18%).

Table 4.6: Major Products Managed by Respondents' Organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Consumer products	73	48.0	48.0	48.0
	Industrial products	43	28.3	28.3	76.3
	Others	36	23.7	23.7	100.0
	Total	152	100.0	100.0	

Source: Developed for the research.

Figure 4.6: Major Products Managed by Respondents' Organization



Source: Developed for the research.

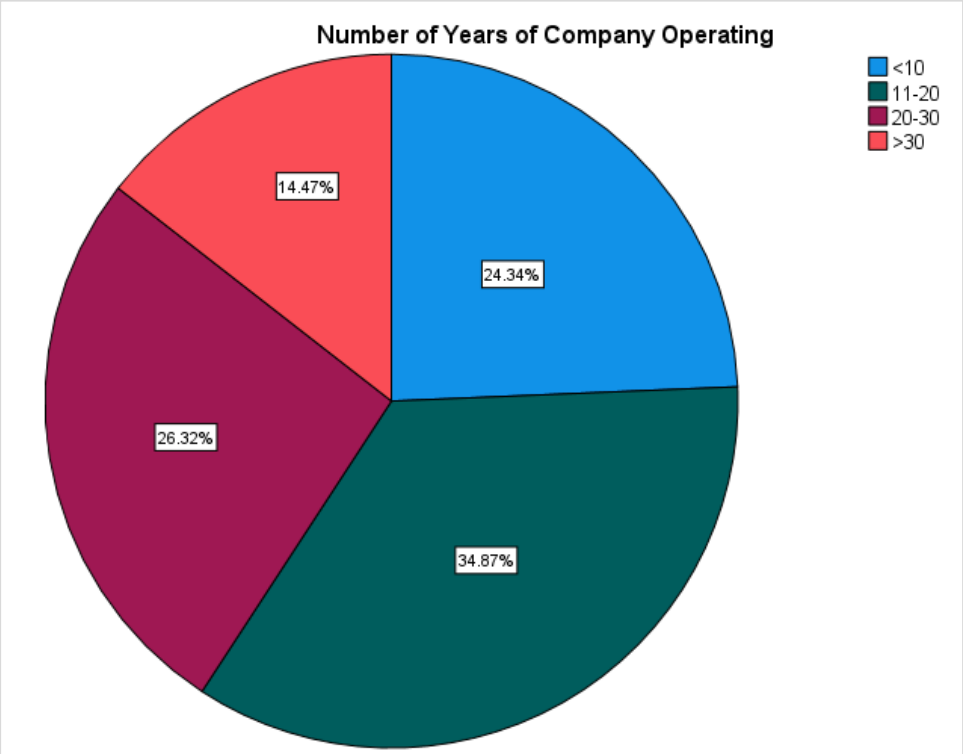
The overall results show that most of the respondents' organization managed consumer products (48.03%), followed by industrial products (28.29%) and other products (23.68%).

Table 4.7: Number of Years Operating the Business

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<10	37	24.3	24.3	24.3
	11-20	53	34.9	34.9	59.2
	20-30	40	26.3	26.3	85.5
	>30	22	14.5	14.5	100.0
	Total	152	100.0	100.0	

Source: Developed for the research.

Figure 4.7: Number of Years Operating the Business



Source: Developed for the research.

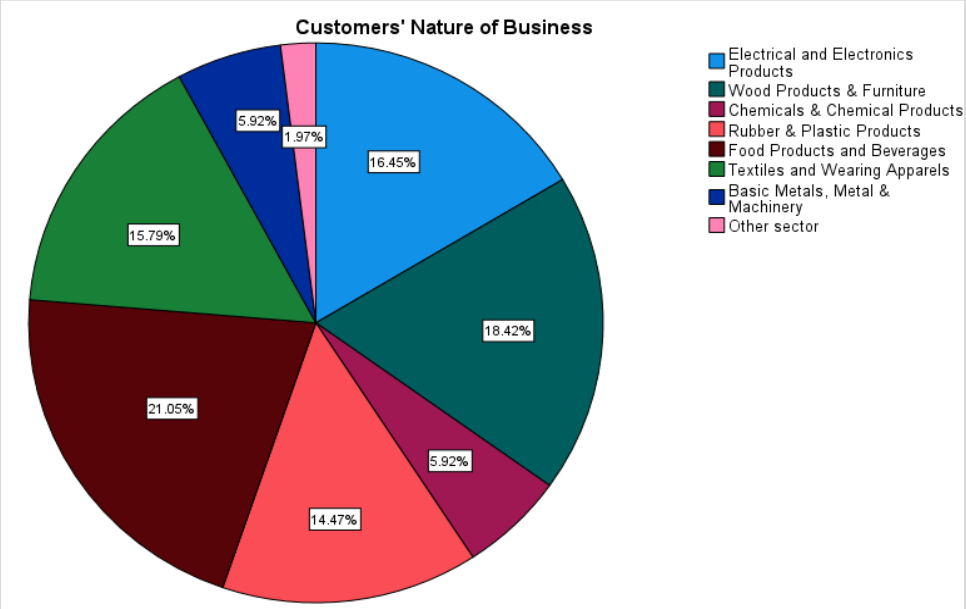
From the results, most of the respondents' companies had over 11-20 years of operating the business (34.87%), while the least of the respondents' companies had over 30 years of operating the business.

Table 4.8: Customers' Nature of Business

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Electrical and Electronics Products	25	16.4	16.4	16.4
	Wood Products & Furniture	28	18.4	18.4	34.9
	Chemicals & Chemical Products	9	5.9	5.9	40.8
	Rubber & Plastic Products	22	14.5	14.5	55.3
	Food Products and Beverages	32	21.1	21.1	76.3
	Textiles and Wearing Apparels	24	15.8	15.8	92.1
	Basic Metals, Metal & Machinery	9	5.9	5.9	98.0
	Other sector	3	2.0	2.0	100.0
	Total	152	100.0	100.0	

Source: Developed for the research.

Figure 4.8: Customers' Nature of Business



Source: Developed for the research.

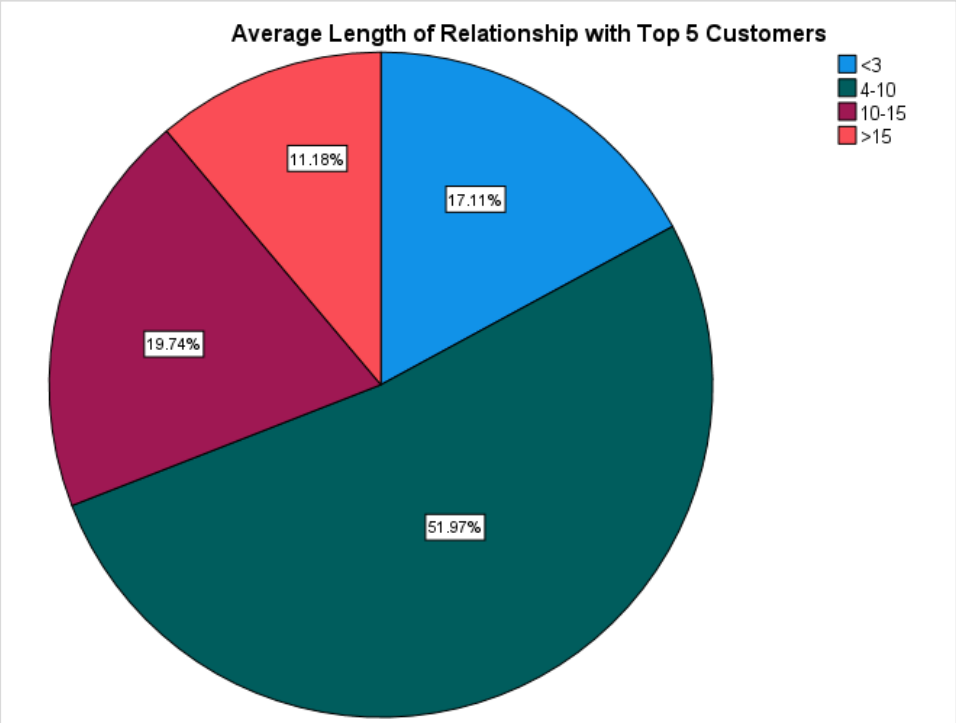
The results show that 21.05% of customers' nature of businesses are from food and beverages products, which is the highest percentage in total, while the least is other sectors (1.97%), including automotive, transportation services etc.

Table 4.9: Average Length of Relationship with Top 5 Customers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<3	26	17.1	17.1	17.1
	4-10	79	52.0	52.0	69.1
	10-15	30	19.7	19.7	88.8
	>15	17	11.2	11.2	100.0
	Total	152	100.0	100.0	

Source: Developed for the research.

Figure 4.9: Average Length of Relationship with Top 5 Customers



Source: Developed for the research.

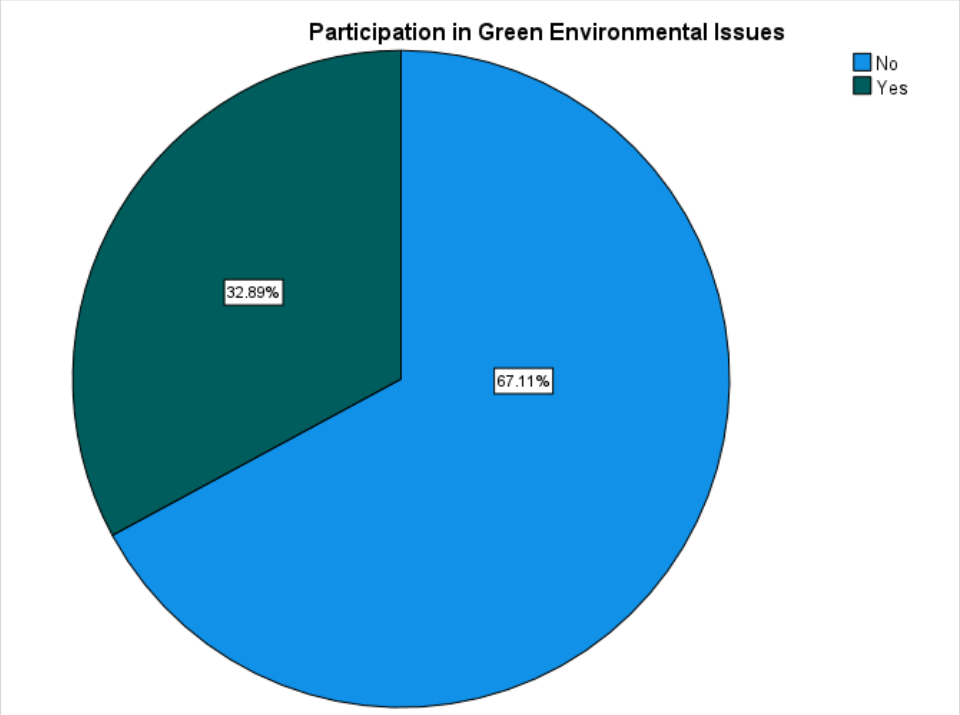
Most of the respondents' companies have an average of 4-10 years relationship with their top 5 customers (51.97%), while some of the respondents' companies have over 15 years relationship with their top 5 customers, which is the least in total (11.18%).

Table 4.10: Participate in Green Environmental Issues

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	102	67.1	67.1	67.1
	Yes	50	32.9	32.9	100.0
	Total	152	100.0	100.0	

Source: Developed for the research.

Figure 4.10: Participate in Green Environmental Issues



Source: Developed for the research.

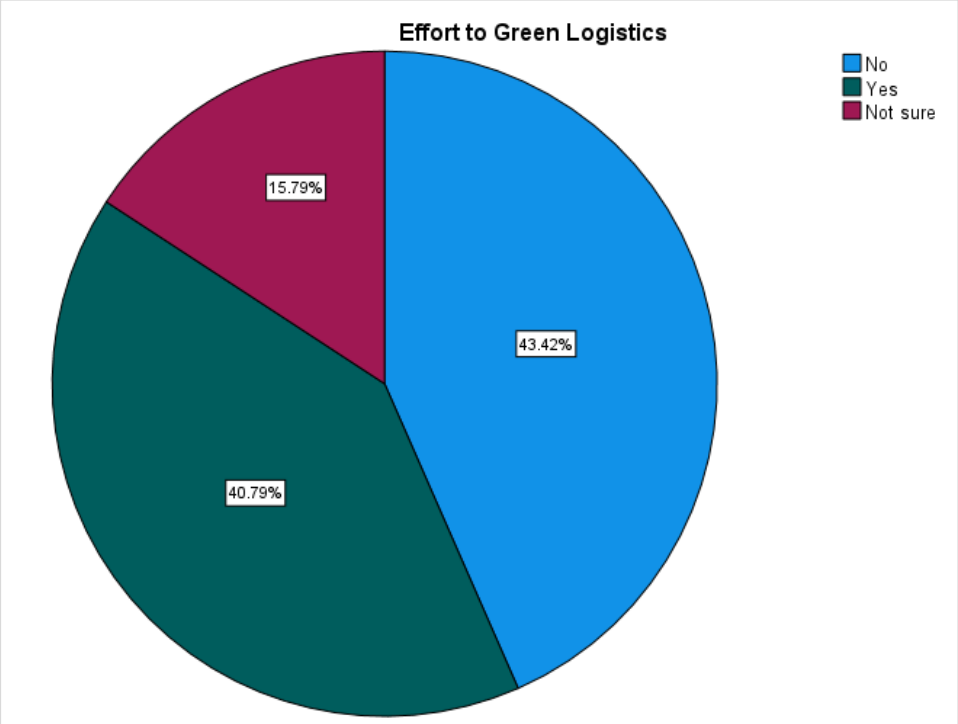
From the results, most of the respondents' companies do participate, but not active in any association and programs that related to green environmental issues (67.11%).

Table 4.11: Concerted Effort to Green Logistics

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	66	43.4	43.4	43.4
	Yes	62	40.8	40.8	84.2
	Not sure	24	15.8	15.8	100.0
	Total	152	100.0	100.0	

Source: Developed for the research.

Figure 4.11: Concerted Effort to Green Logistics



Source: Developed for the research.

43.42% of respondents' companies do not apply any green logistics practices, whereas 40.79% of respondents' companies put effort in applying green logistics. There are 15.79% of respondents do not sure whether their companies do applying the green logistics in the business operation.

4.1.2 Central Tendencies of Measurement

5-Point Likert Scale are applied in this research as 1 = Strongly Disagree to 5 = Strongly Agree.

Table 4.12: Logistics Practices

	Statement	**1 (%)**	**2 (%)**	**3 (%)**	**4 (%)**	**5 (%)**	**Mean**	**Std. Deviation**	**Rank**
LP 1	Choose a better layout of warehouse space for optimizing warehouse order picking strategies.	1.3	8.6	40.8	44.1	5.3	3.43	0.7778	1
LP 2	A decrease of using the transport packaging, recycling containers, and other logistics' packaging materials.	3.3	15.1	51.3	25.7	4.6	3.13	0.8432	5
LP 3	Use environme	3.3	9.2	50.0	32.9	4.6	3.26	0.8198	4

	ntally friendly packaging materials and logistics containers.								
LP 4	Choose a transport route, load distribution and vehicle driving mileage that can avoid harmful environmentally activities.	2.6	7.2	43.4	41.4	5.3	3.39	0.8069	2
LP 5	Setting KPI (key performance indicators) to monitor the logistics performance.	3.3	9.2	45.4	35.5	6.6	3.33	0.8595	3

Source: Generated from SPSS v28.

LP1 scores the highest rank among these 5 questions with the mean of 3.43. It has 1.3% of respondent rate as strongly disagree, 8.6% rate as disagree, 40.8% rate as neutral, 44.1% rate as agree, and 5.3% rate as strongly agree.

LP4 gets the second rank in these questions with the mean of 3.39. It has 2.6% of respondent rate as strongly disagree, 7.2% rate as disagree, 43.4% rate as neutral, 41.4% rate as agree, and 5.3% rate as strongly agree.

LP5 gets the third rank in these questions with the mean of 3.33. It has 3.3% of respondent rate as strongly disagree, 9.2% rate as disagree, 45.4% rate as neutral, 35.5% rate as agree, and 6.6% rate as strongly agree.

LP3 gets the fourth rank in these questions with the mean of 3.26. It has 3.3% of respondent rate as strongly disagree, 9.2% rate as disagree, 50% rate as neutral, 32.9% rate as agree, and 4.6% rate as strongly agree.

LP2 gets the lowest rank in these questions with the mean of 3.13. It has 3.3% of respondent rate as strongly disagree, 15.1% rate as disagree, 51.3% rate as neutral, 25.7% rate as agree, and 4.6% rate as strongly agree.

Table 4.13: Supply Chain Practices

	Statement	**1 (%)**	**2 (%)**	**3 (%)**	**4 (%)**	**5 (%)**	**Mean**	**Std. Deviation**	**Rank**
SC 1	Company shareholders (Customers, government authorities, NGO, employee,	5.9	11.8	59.2	19.7	3.3	3.03	0.8295	4

	suppliers…etc.) involvement in adopting green supply chain practices.								
SC 2	Increase awareness and behavior requirements of the employees about green supply chain practices.	5.9	15.8	58.6	15.8	3.9	2.96	0.8448	5
SC 3	Increase supplier commitment on green supply chain practices by collaboration among supply chain members internally and externally.	6.6	10.5	52.6	25.0	5.3	3.12	0.9057	3
SC 4	Implement green supply	4.6	11.2	48.7	26.3	9.2	3.24	0.9349	2

	chain programs to improve the competitive ness of the company.								
SC 5	Increase the company green public image.	2.0	12.5	46.7	26.3	12. 5	3.35	0.9226	1

Source: Generated from SPSS v28.

SC5 scores the highest rank among these 5 questions with the mean of 3.35. It has 2% of respondent rate as strongly disagree, 12.5% rate as disagree, 46.7% rate as neutral, 26.3% rate as agree, and 12.5% rate as strongly agree.

SC4 gets the second rank in these questions with the mean of 3.24. It has 4.6% of respondent rate as strongly disagree, 11.2% rate as disagree, 48.7% rate as neutral, 26.3% rate as agree, and 9.2% rate as strongly agree.

SC3 gets the third rank in these questions with the mean of 3.12. It has 6.6% of respondent rate as strongly disagree, 10.5% rate as disagree, 52.6% rate as neutral, 25% rate as agree, and 5.3% rate as strongly agree.

SC1 gets the fourth rank in these questions with the mean of 3.03. It has 5.9% of respondent rate as strongly disagree, 11.8% rate as disagree, 59.2% rate as neutral, 19.7% rate as agree, and 3.3% rate as strongly agree.

SC2 gets the lowest rank in these questions with the mean of 2.96. It has 5.9% of respondent rate as strongly disagree, 15.8% rate as disagree, 58.6% rate as neutral, 15.8% rate as agree, and 3.9% rate as strongly agree.

Table 4.14: Reversed Logistics

	Statement	**1 (%)**	**2 (%)**	**3 (%)**	**4 (%)**	**5 (%)**	**Mean**	**Std. Deviation**	**Rank**
RL 1	Created a system or procedure for online tracking and tracing of returned products and inventory status.	3.3	10.5	36.8	44.7	4.6	3.37	0.8588	1
RL 2	Develop a reverse logistics program for integrating the whole supply chain of the company.	3.9	14.5	50.0	28.3	3.3	3.12	0.8403	5
RL 3	Stringent government regulations on environmental protection let our company to	2.0	11.8	52.0	30.3	3.9	3.22	0.7822	3

	understand the reversed logistics requirement.								
RL 4	Lack of environmental consciousnesses of consumers on reverse logistics.	3.9	15.8	46.7	26.3	7.2	3.17	0.9191	4
RL 5	Supported proactively by the top management for reversed logistics implementation.	2.6	9.2	48.7	32.9	6.6	3.32	0.8333	2

Source: Generated from SPSS v28.

RL1 scores the highest rank among these 5 questions with the mean of 3.37. It has 3.3% of respondent rate as strongly disagree, 10.5% rate as disagree, 36.8% rate as neutral, 44.7% rate as agree, and 4.6% rate as strongly agree.

RL5 gets the second rank in these questions with the mean of 3.32. It has 2.6% of respondent rate as strongly disagree, 9.2% rate as disagree, 48.7% rate as neutral, 32.9% rate as agree, and 6.6% rate as strongly agree.

RL3 gets the third rank in these questions with the mean of 3.22. It has 2% of respondent rate as strongly disagree, 11.8% rate as disagree, 52% rate as neutral, 30.9% rate as agree, and 3.9% rate as strongly agree.

RL4 gets the fourth rank in these questions with the mean of 3.17. It has 3.9% of respondent rate as strongly disagree, 15.8% rate as disagree, 46.7% rate as neutral, 26.3% rate as agree, and 7.2% rate as strongly agree.

RL2 gets the lowest rank in these questions with the mean of 3.12. It has 3.9% of respondent rate as strongly disagree, 14.5% rate as disagree, 50% rate as neutral, 28.3% rate as agree, and 3.3% rate as strongly agree.

Table 4.15: Fleet Management

	Statement	**1 (%)**	**2 (%)**	**3 (%)**	**4 (%)**	**5 (%)**	**Mean**	**Std. Deviation**	**Rank**
FM 1	Choose the right mode of transport fleet with an efficient management.	2.0	7.2	42.1	36.2	12.5	3.50	0.8765	1
FM 2	Vehicle repairing strategy is implemented.	3.9	11.2	46.1	28.3	10.5	3.30	0.9423	3
FM 3	Vehicle's life span is	4.6	7.2	44.7	32.9	10.5	3.38	0.9336	2

	monitored from year to year.								
FM 4	Vehicle fuel consumption is monitored.	2.0	9.9	50.7	32.9	4.6	3.28	0.7841	4
FM 5	Pollutants that are emitted by vehicle are monitored.	3.9	11.8	48.0	28.3	7.9	3.24	0.9062	5

Source: Generated from SPSS v28.

FM1 scores the highest rank among these 5 questions with the mean of 3.50. It has 2% of respondent rate as strongly disagree, 7.2% rate as disagree, 42.1% rate as neutral, 36.2% rate as agree, and 12.5% rate as strongly agree.

FM3 gets the second rank in these questions with the mean of 3.38. It has 4.6% of respondent rate as strongly disagree, 7.2% rate as disagree, 44.7% rate as neutral, 32.9% rate as agree, and 10.5% rate as strongly agree.

FM2 gets the third rank in these questions with the mean of 3.30. It has 3.9% of respondent rate as strongly disagree, 11.2% rate as disagree, 46.1% rate as neutral, 28.3% rate as agree, and 10.5% rate as strongly agree.

FM4 gets the fourth rank in these questions with the mean of 3.28. It has 2% of respondent rate as strongly disagree, 9.9% rate as disagree, 50.7% rate as neutral, 32.9% rate as agree, and 4.6% rate as strongly agree.

FM5 gets the lowest rank in these questions with the mean of 3.24. It has 3.9% of respondent rate as strongly disagree, 11.8% rate as disagree, 48% rate as neutral, 28.3% rate as agree, and 7.9% rate as strongly agree.

Table 4.16: Environmental Performance

	Statement	**1 (%)**	**2 (%)**	**3 (%)**	**4 (%)**	**5 (%)**	**Mean**	**Std. Deviation**	**Rank**
EN 1	Reduction in consumption of hazardous materials.	2.6	9.2	57.9	27.0	3.3	3.19	0.7523	2
EN 2	An increase in reuse, recycle and recovery of materials of the components.	3.3	10.5	53.3	30.3	2.6	3.18	0.7841	3
EN 3	Reduction in air emission, water, and solid waste.	5.9	11.2	51.3	27.6	3.9	3.12	0.8788	4
EN 4	Reduction in frequency of	5.3	6.6	56.6	27.6	3.9	3.18	0.8253	3

	environmental accidents.								
EN5	Reduction in energy consumption.	3.9	9.9	53.9	28.9	3.3	3.18	0.8064	3
EN6	The overall environmental performance of our company has improved a lot.	2.6	9.2	54.6	27.6	5.9	3.25	0.8077	1

Source: Generated from SPSS v28.

EN6 scores the highest rank among these 5 questions with the mean of 3.25. It has 2.6% of respondent rate as strongly disagree, 9.2% rate as disagree, 54.6% rate as neutral, 27.6% rate as agree, and 5.9% rate as strongly agree.

EN1 gets the second rank in these questions with the mean of 3.19. It has 2.6% of respondent rate as strongly disagree, 9.2% rate as disagree, 57.9% rate as neutral, 27% rate as agree, and 3.3% rate as strongly agree.

There are three questions get the third rank in these questions, which are EN2, EN4, and EN5, with the mean of 3.18. Three of them also has the highest percentage in neutral rate, which are 53.3% (EN2), 56.6% (EN4), and 53.9% (EN5).

EN3 gets the fourth rank in these questions with the mean of 3.12. It has 5.9% of respondent rate as strongly disagree, 11.2% rate as disagree, 51.3% rate as neutral, 27.6% rate as agree, and 3.9% rate as strongly agree.

4.2 Scale Measurement

4.2.1 Descriptive Statistic

Table 4.17: Descriptive Statistics on Variables

Variable	N	Mean	Std. Deviation	Skewness	Kurtosis
Logistics Practices	152	3.3105	.71272	-.3880	1.4731
Supply Chain Practices	152	3.1395	.75714	-.3336	.9792
Reversed Logistics	152	3.2408	.71404	-.4568	.6369
Fleet Management	152	3.3408	.6769	-.5741	2.0114
Environmental Performance	152	3.1853	.7383	-.3409	.8779

Source: Generated from SPSS v28.

Firstly, fleet management has the highest mean (3.3408), followed by logistics practices (3.3105), reversed logistics (3.2408), environmental performance (3.1853), and lastly is supply chain practices (3.1395). It can indicate that all variables have a tendency of all respondents have an average level of agreement on “Agree” or “Strongly Agree.

Secondly, skewness measures asymmetry of a distribution; a positive value as long right tail, and a negative value as long left tail (IBM, 2022).

According to Griffin and Steinbrecher (2013), skewness value is accepted between -3 and +3. In this research, all 5 variables are within -3 and +3.

Thirdly, kurtosis measures whether there are outliers occur; a positive kurtosis as more outliers, and negative kurtosis as less outliers (IBM, 2022). According to Griffin and Steinbrecher (2013), skewness value is accepted between -10 and +10. In this research, all 5 variables' kurtosis statistics are fallen within -10 and +10.

4.2.2 Reliability Test Analysis

Table 4.18: Reliability Test of the Survey

Variable	**Cronbach's Alpha**	**Items**	**Range**	**Strength of Association**
Logistics Practices	0.918	5	0.9>	Excellent
Supply Chain Practices	0.906	5	0.9>	Excellent
Reversed Logistics	0.897	5	0.8 to < 0.9	Very Good
Fleet Management	0.817	5	0.8 to < 0.9	Very Good
Environmental Performance	0.959	6	0.9>	Excellent

Source: Generated from SPSS v28.

Environmental performance earns the first place in Cronbach's Alpha (0.959), followed by logistics practices (0.918), supply chain practices (0.906), reversed logistics (0.897), and lastly is fleet management (0.817).

Based on Table 3.6, it can conclude that all 5 variables are reliable as they have reached the parameter of 0.7.

4.3 Inferential Analysis

4.3.1 Pearson Correlation Analysis

It analyses the strength relationship among each variable in the research.

Table 4.19: Rule of Thumb for Pearson Correlation Coefficient

Size of Correlation	**Interpretation**
± 0.90 to ± 1.00	Very high positive / negative correlation
± 0.70 to ± 0.90	High positive / negative correlation
± 0.50 to ± 0.70	Moderate positive / negative correlation
± 0.30 to ± 0.50	Low positive / negative correlation
± 0.10 to ± 0.30	Negligible correlation

Source: Hinkle, D. E., Wiersma, W., & Jurs, S. G. (2003). *Applied statistics for the behavioral sciences* (Vol. 663). Houghton Mifflin College Division.

Table 4.20: Hypothesis Testing

Hypothesis 1: There is positive relationship between logistics practices and environmental performance.	**Hypothesis 2**: There is positive relationship between supply chain practices and environmental performance.
Hypothesis 3: There is positive relationship between reversed logistics and environmental performance.	**Hypothesis 4**: There is positive relationship between fleet management and environmental performance.

Source: Developed for the research.

Pearson Correlation Coefficient will be conducted to analyse these 4 hypotheses at Table 4.20.

Table 4.21: Logistics Practices and Environmental Performance

Correlations

		LP	EN
LP	Pearson Correlation	1	.859**
	Sig. (2-tailed)		0.000
	N	152	152
EN	Pearson Correlation	.859**	1
	Sig. (2-tailed)	0.000	
	N	152	152

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

Source: Generated from SPSS v28.

Table 4.21 examines the Hypothesis 1 of the research, and the correlation coefficient of logistics practices and environmental performance is 0.859. Based on the rule of thumb on Table 4.21, it is high positive correlation (± 0.70 to ± 0.90). Moreover, the significant level at 1% is larger than p-value (0.000). Hence, there is sufficient evidence to support the Hypothesis 1.

Table 4.22: Supply Chain Practices and Environmental Performance

Correlations

		SC	EN
SC	Pearson Correlation	1	.705**
	Sig. (2-tailed)		0.000
	N	152	152
EN	Pearson Correlation	.705**	1
	Sig. (2-tailed)	0.000	
	N	152	152

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

Source: Generated from SPSS v28.

Table 4.22 examines the Hypothesis 2 of the research, and the correlation coefficient of supply chain practices and environmental performance is 0.705. Based on the rule of thumb on Table 4.21, it is high positive correlation (± 0.70 to ± 0.90). Moreover, the significant level at 1% is larger than p-value (0.000). Hence, there is sufficient evidence to support the Hypothesis 2.

Table 4.23: Reversed Logistics and Environmental Performance

Correlations

		RL	EN
RL	Pearson Correlation	1	.806**
	Sig. (2-tailed)		0.000
	N	152	152
EN	Pearson Correlation	.806**	1
	Sig. (2-tailed)	0.000	
	N	152	152

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

Source: Generated from SPSS v28.

Table 4.23 examines the Hypothesis 3 of the research, and the correlation coefficient of reversed logistics and environmental performance is 0.806. Based on the rule of thumb on Table 4.21, it is high positive correlation (± 0.70 to ± 0.90). Moreover, the significant level at 1% is larger than p-value (0.000). Hence, there is sufficient evidence to support the Hypothesis 3.

Table 4.24: Fleet Management and Environmental Performance

Correlations

		FM	EN
FM	Pearson Correlation	1	.723**
	Sig. (2-tailed)		0.000
	N	152	152
EN	Pearson Correlation	.723**	1
	Sig. (2-tailed)	0.000	
	N	152	152

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

Source: Generated from SPSS v28.

Table 4.24 examines the Hypothesis 4 of the research, and the correlation coefficient of fleet management and environmental performance is 0.723. Based on the rule of thumb on Table 4.21, it is high positive correlation (± 0.70 to ± 0.90). Moreover, the significant level at 1% is larger than p-value (0.000). Hence, there is sufficient evidence to support the Hypothesis 4.

In conclusion, all independent variables (logistics practices, supply chain practices, reversed logistics, and fleet management) have high positive correlation with the dependent variable (environmental performance). Moreover, the p-value of each independent variable is lower than 0.01.

4.3.2 Multiple Regression Analysis

In this research, 99% confidence level is applied in this research with the p-value lower or equal than 0.01.

Table 4.25: 4 Independent Variables and Environmental Performance

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.890[a]	.793	.787	.34046

a. Predictors: (Constant), LP, SC, RL, FM

b. Dependent Variable: EN

Source: Generated from SPSS v28.

Table 4.25 shows the summary of multiple linear regression of all variables. The coefficient, R, equals to 0.890, which has high correlation value, and it is correlated with the data. Higher R square has better model fits to the data; R square equals to 0.793, which means 4 independent variables account for 79.3% of the variance in environmental performance, and it's also close to the regression line.

Table 4.26: 4 Independent Variables and Environmental Performance

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	65.269	4	16.317	140.772	.000[b]
	Residual	17.039	147	.116		
	Total	82.308	151			

a. Dependent Variable: EN

b. Predictors: (Constant), LP, SC, RL, FM

Source: Generated from SPSS v28.

Table 4.26 shows the ANOVA result of the research. The alpha value of 0.01 is higher than p-value (0.000). F-value is used to test whether it is significant (IBM, 2021), and the result is 140.772, which is significant. The alternative method to test hypothesis is using significant level. When the significant level at 1%, the whole multiple linear regression model is significant ($p < 0.01$), it has relation on dependent variable (EN) and independents variables (LP, SC, RL, and FM).

Table 4.27: 4 Independent Variables and Environmental Performance

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.112	.149		-.756	.451
	LP	.498	.082	.481	6.090	.000
	SC	.196	.050	.201	3.897	.000
	RL	.242	.071	.234	3.405	.001
	FM	.074	.066	.068	1.122	.264

a. Dependent Variable: EN

Source: Generated from SPSS v28.

The multiple regression equation has been constructed as:

Y = b0 + b1X1 + b2X2 + b3X3 + b4X4 + e

Where *Y = environmental performance;*

b0 = constant value;

b1, b2, b3, b4 = slope of coefficient;

X1 represents logistics practices;

X2 represents supply chain practices;

X3 represents reversed logistics;

X4 represents fleet management;

e = error value.

By applying the equation on Table 4.27, the linear equation of this research is constructed as below:

Environmental performance = -0.112 + 0.498 (Logistics Practices) + 0.196 (Supply Chain Practices) + 0.242 (Reversed Logistics) + 0.074 (Fleet Management)

From Table 4.27, there are 3 independent variables have a positive significant relationship with environmental performance, which are logistics practices (0.000), supply chain practices (0.000), and reversed logistics (0.001). It can clearly see that these 3 independent variables' p-values are lower than 0.01 (at 99% confidence level). Whereas fleet management has insignificant relationship with environmental performance as it exceeds p-value at 0.01 (0.264 > 0.01).

In the logistics practices' perspective, when a company applies 1 unit more on logistics practices, on average, the impact on environmental performance will be increased by 0.498 units, ceteris paribus.

In the supply chain practices' perspective, when a company applies 1 unit more on supply chain practices, on average, the impact on environmental performance will be increased by 0.196 units, ceteris paribus.

In the reversed logistics' perspective, when a company applies 1 unit more on reversed logistics, on average, the impact on environmental performance will be increased by 0.242 units, ceteris paribus.

In the fleet management's perspective, when a company applies 1 unit more on fleet management, on average, the impact on environmental performance will be increased by 0.074 units, ceteris paribus.

Furthermore, the standardized coefficient beta is applied to investigate the influential level among the variables. It can be concluded that logistics practices have the greatest significant influence on environmental performance as it gets the highest standardized coefficient beta value at 0.481.

4.4 Conclusion

In conclusion, all 152 respondents' data has been investigated through SPSS v28. 4 hypotheses also have been tested in this chapter. Further discussion on analysed results will be made in Chapter 5.

CHAPTER 5: DISCUSSION, CONCLUSION, AND IMPLICATION

5.0 Introduction

This chapter summarizes the statistical analysis and discussion on findings. Limitation and recommendation will be conducted too.

5.1 Statistical Analysis

5.1.1 Demographic Profile

Table below shows the overall results of 152 respondents' demographic profile.

Table 5.1: Summary of Respondents' Demographic Profile

Demographic Profile	Category	Frequency	Percentage (%)
1. Gender	Male	78	51.3
	Female	74	48.7
2. Age	20-30	19	12.5
	31-40	52	34.2
	41-50	52	34.2
	>50	29	19.1
3. Department	Procurement/ purchasing	20	13.2
	Supply chain	40	26.3
	Operation	44	28.9
	Logistics	47	30.9
	Other	1	0.7
4. Position in the company	Executive/Sr. Executive	40	26.3

	Manager/Sr. Manager	67	44.1
	General manager/Director	45	29.6
5. Number of years working in the company	1-3	44	28.9
	4-6	52	34.2
	7-10	39	25.7
	>10	17	11.2
6. What are the major products managed by your organization?	Consumer products	73	48.0
	Industrial products	43	28.3
	Others	36	23.7
7. How long has your company operate in this business?	<10	37	24.3
	11-20	53	34.9
	20-30	40	26.3
	>30	22	14.5
8. What is your customer's(s') nature of business?	Electrical and Electronics Products	25	16.4
	Wood Products & Furniture	28	18.4
	Chemicals & Chemical Products	9	5.9
	Rubber & Plastic Products	22	14.5

	Food Products and Beverages	32	21.1
	Textiles and Wearing Apparels	24	15.8
	Basic Metals, Metal & Machinery	9	5.9
	Other sector	3	2.0
9. What is the average length of relationship with your top 5 customers?	<3	26	17.1
	4-10	79	52.0
	10-15	30	19.7
	>15	17	11.2
10. Does your company actively participate in any association and programs that related to green environmental issues?	No	102	67.1
	Yes	50	32.9
11. Does your company apply any green logistics?	No	66	43.4
	Yes	62	40.8
	Not sure	24	15.8

Source: Developed for the research.

5.1.2 Central Tendencies Measurement of Constructs

Table 5.2: Summary of All Variables' Statements

	Statement	Mean	Std. Deviation
LP1	Choose a better layout of warehouse space for optimizing warehouse order picking strategies.	3.43	0.7778
LP2	A decrease of using the transport packaging, recycling containers, and other logistics' packaging materials.	3.13	0.8432
LP3	Use environmentally friendly packaging materials and logistics containers.	3.26	0.8198
LP4	Choose a transport route, load distribution and vehicle driving mileage that can avoid harmful environmentally activities.	3.39	0.8069
LP5	Setting KPI (key performance indicators) to monitor the logistics performance.	3.33	0.8595
SC1	Company shareholders (Customers, government authorities, NGO, employee, suppliers…etc.) involvement in adopting green supply chain practices.	3.03	0.8295
SC2	Increase awareness and behavior requirements of the employees about green supply chain practices.	2.96	0.8448
SC3	Increase supplier commitment on green supply chain practices by collaboration among supply chain members internally and externally.	3.12	0.9057

SC4	Implement green supply chain programs to improve the competitiveness of the company.	3.24	0.9349
SC5	Increase the company green public image.	3.35	0.9226
RL1	Created a system or procedure for online tracking and tracing of returned products and inventory status.	3.37	0.8588
RL2	Develop a reverse logistics program for integrating the whole supply chain of the company.	3.12	0.8403
RL3	Stringent government regulations on environmental protection let our company to understand the reversed logistics requirement.	3.22	0.7822
RL4	Lack of environmental consciousnesses of consumers on reverse logistics.	3.17	0.9191
RL5	Supported proactively by the top management for reversed logistics implementation.	3.32	0.8333
FM1	Choose the right mode of transport fleet with an efficient management.	3.50	0.8765
FM2	Vehicle repairing strategy is implemented.	3.30	0.9423
FM3	Vehicle's life span is monitored from year to year.	3.38	0.9336
FM4	Vehicle fuel consumption is monitored.	3.28	0.7841
FM5	Pollutants that are emitted by vehicle are monitored.	3.24	0.9062

EN1	Reduction in consumption of hazardous materials.	3.19	0.7523
EN2	An increase in reuse, recycle and recovery of materials of the components.	3.18	0.7841
EN3	Reduction in air emission, water, and solid waste.	3.12	0.8788
EN4	Reduction in frequency of environmental accidents.	3.18	0.8253
EN5	Reduction in energy consumption.	3.18	0.8064
EN6	The overall environmental performance of our company has improved a lot.	3.25	0.8077

Source: Developed for the research.

In logistics practices (LP), LP1 has the highest mean (3.43), which indicates that warehousing strategies are so essential to the freight forwarders, while LP2 has the lowest mean (3.13).

In supply chain practices (SC), SC5 has the highest mean (3.35), which indicates that the freight forwarders also emphasize on green public image, whereas SC2 has the lowest mean (2.96).

In reversed logistics (RL), RL1 has the highest mean (3.37), which indicates that most of the freight forwarders agreed that online tracking is efficient on reducing the environmental issues, while RL2 has the lowest mean (3.12).

In fleet management (FM), FM1 has the highest mean (3.50), which indicates that choosing an appropriate fleet is efficient towards operational and environmental performance, while FM5 has the lowest mean (3.24).

In environmental performance (EN), EN6 has the highest mean (3.25), which indicates that the freight forwarders have put efforts on environmental performance, while EN3 has the lowest mean (3.12).

5.2 Scale Measurement

5.2.1 Reliability Test

The Cronbach's Alpha of logistics practices (0.918), supply chain practices (0.906), reversed logistics (0.897), fleet management (0.817), and environmental performance (0.959) indicate that all variables are high reliability and strong association.

5.3 Inferential Analysis

5.3.1 Pearson Correlation Analysis

Table 5.3: Summary of Pearson Correlation Coefficient

		LP	SC	RL	FM	EN
LP	Pearson Correlation	1	.656**	.829**	.772**	.859**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	152	152	152	152	152
SC	Pearson Correlation	.656**	1	.628**	.609**	.705**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	152	152	152	152	152
RL	Pearson Correlation	.829**	.628**	1	.686**	.806**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	152	152	152	152	152
FM	Pearson Correlation	.772**	.609**	.686**	1	.723**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	152	152	152	152	152

EN	Pearson Correlation	.859**	.705**	.806**	.723**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	152	152	152	152	152

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

Source: Developed from the research.

Logistics practices has the highest correlation with environmental performance (0.859), followed by reversed logistics (0.806), fleet management (0.723), and supply chain practices (0.705).

5.3.2 Multiple Regression Analysis

Table 5.4: Summary of Multiple Linear Regression

R-Square	0.793	
Adjusted R-Square	0.787	
F-value	140.772	
Dependent Variable	**Independent Variable**	**P-value**
Environmental Performance (EN)	Logistics Practices (LP)	0.000
	Supply Chain Practices (SC)	0.000
	Reversed Logistics (RL)	0.001
	Fleet Management (FM)	0.264

Source: Developed from the research.

R-square for this research is 0.793, which indicates that 79.3% of these 4 independent variables are accounted for the variance of environmental performance. LP, SC, and RL are significant with EN since their p-values are lower than 0.01, whereas FM is insignificant with EN because it exceeds p-value of 0.01.

5.4 Discussions of Major Findings

Table 5.5: Summary of Hypothesis Testing

Hypothesis	Significant Level	Result
H1: There is positive relationship between logistics practices and environmental performance.	p-value = 0.000 p-value < 0.01)	Supported
H2: There is positive relationship between supply chain practices and environmental performance.	p-value = 0.000 (p-value < 0.01)	Supported
H3: There is positive relationship between reversed logistics and environmental performance.	p-value = 0.001 (p-value < 0.01)	Supported
H4: There is positive relationship between fleet management and environmental performance.	p-value = 0.264 (p-value > 0.01)	Not supported

Source: Developed from the research.

5.4.1 Relationship between Logistics Practices and Environmental Performance

H1 is supported since p-value is 0.000 < 0.01, and it is complied with the previous research of Tambovceva and Tambovcevs (2012), and Subramaniam (2021). The researchers proved that logistics practices are significant with environmental performance; environmental-focused logistics can reduce wastes and resource consumption, and logistics are affecting the environmental quality in developing countries (Malaysia) since the current logistics practices are still not enough to "green logistics".

5.4.2 Relationship between Supply Chain Practices and Environmental Performance

H2 is supported as p-value is 0.000 < 0.01, and it is complied with the previous research of Perera et al. (2013) and Jermsittiparsert et al. (2019). The researchers proved that supply chain practices are significant with environmental performance; green supply chain can improve the environmental performance since supply chain can produce wastes like greenhouse emission, carbon monoxide, packaging materials etc.

5.4.3 Relationship between Reversed Logistics and Environmental Performance

H3 is supported because p-value is 0.001 < 0.01, and it is complied with the previous research of Jayaraman and Luo (2007) and Ali et al. (2020). The researchers proved that reversed logistics are significant with environmental performance; reverse logistics can eliminate wastes and utilize on the reusing, recycling, and remanufacturing process by following the legislation in Malaysia.

5.4.4 Relationship between Fleet Management and Environmental Performance

H4 is not supported since p-value is 0.264 > 0.01, and it is not complied with the previous research of Fraselle et al. (2021) and Rodriguez et al. (2022). It might because Malaysia freight forwarders are not concern on the environmental issues towards fleet management, and the government and stakeholders' pressures not as high as needed to take consideration on environmental protection in fleet management.

5.5 Implications of the Study

5.5.1 Management

The management of freight forwarders can focus on why fleet management is not related to the environmental performance. Although there are some previous research shows positive relationship between fleet management and environmental performance, but it might be insignificant in Malaysia context. The manager can use this model as reference to explore how fleet management does not effect on environment.

5.5.2 Top Management

This research also helps the top management to identify which practices are affecting the environmental performance. Effective logistics and supply chain practices totally improve the freight forwarders' operational and environmental performance since both practices have the higher reliability; hence they should design their logistics and supply chain activities towards the environmental performance in "greener" way.

5.5.3 Policy Maker

This research will urge the policy maker to recognize which practices are making impacts on environmental performance. They can provide support to the freight forwarding industry by developing and promoting new assessment systems for implementing green related activities towards those 4 independent variables.

5.5.4 Government

Malaysia government should provide incentives to promote for more "green" programs or activities to the freight forwarders since 67.11% of freight forwarders are not actively participated in green environmental issues. Recently, the government provides the tax incentive on green technology (MyHIJAU, n.d.), but there is lack of incentives on green supply chain management. Hence, this research can bring awareness to Malaysia government.

5.6 Limitations of the Study

5.6.1 Limited Sampling Size

Due to the Covid-19 pandemic and the bounced emails occurred, there are only 152 respondents to be applied in this research instead of 645 respondents. Moreover, all freight forwarders are in Selangor area; hence, the result cannot represent as a whole Malaysia.

5.6.2 Limited on Expressing Own Opinions Throughout the Survey Questionnaire

The respondents do not have their own opinions to answer the questionnaires since they can only choose the level of agreement. Hence, they cannot express their true feelings or opinions more accurately.

5.6.3 Limited Journal Articles on Malaysia Freight Forwarder's Context

Although there are plenty of previous research are related to logistics and supply chain practices, reversed logistics, and fleet management, but there

is lack of information regarding those 4 independent variables towards Malaysia freight forwarder's context.

5.7 Recommendations for Future Research

5.7.1 Increase Sampling Size

In the future research, it is recommended to increase sampling size up to 500-600 respondents since there are total of 645 freight forwarding companies in Selangor; the greater the number of sample size collected, the more reliability and accuracy to explain on the Malaysia freight forwarders' current practices towards environmental performance.

5.7.2 Adopting Open-ended Questions

It is recommended to add some open-ended questions for the respondents to express and clarify their answers. This will let the researcher has better understanding on their viewpoints on those 4 independent variables towards environmental performance.

5.7.3 Adopt Face-to-Face Interviews

To have better understanding on Malaysia freight forwarder's perspective of impact of supply chain management towards environmental performance, it is recommended to adopt face-to-face interview with the respondents to collect different point of views and opinions.

5.7.4 Apply Qualitative Research in Future Research

In the future research, qualitative research is recommended to be applied to study why there is insignificant relationship between fleet management and environmental performance. By applying qualitative research, the researcher can find out and understand the reasons behind the relationship.

5.8 Conclusion

In conclusion, logistics practices, supply chain practices, and reversed logistics have impacts on environment, while fleet management do not have impact on environment.

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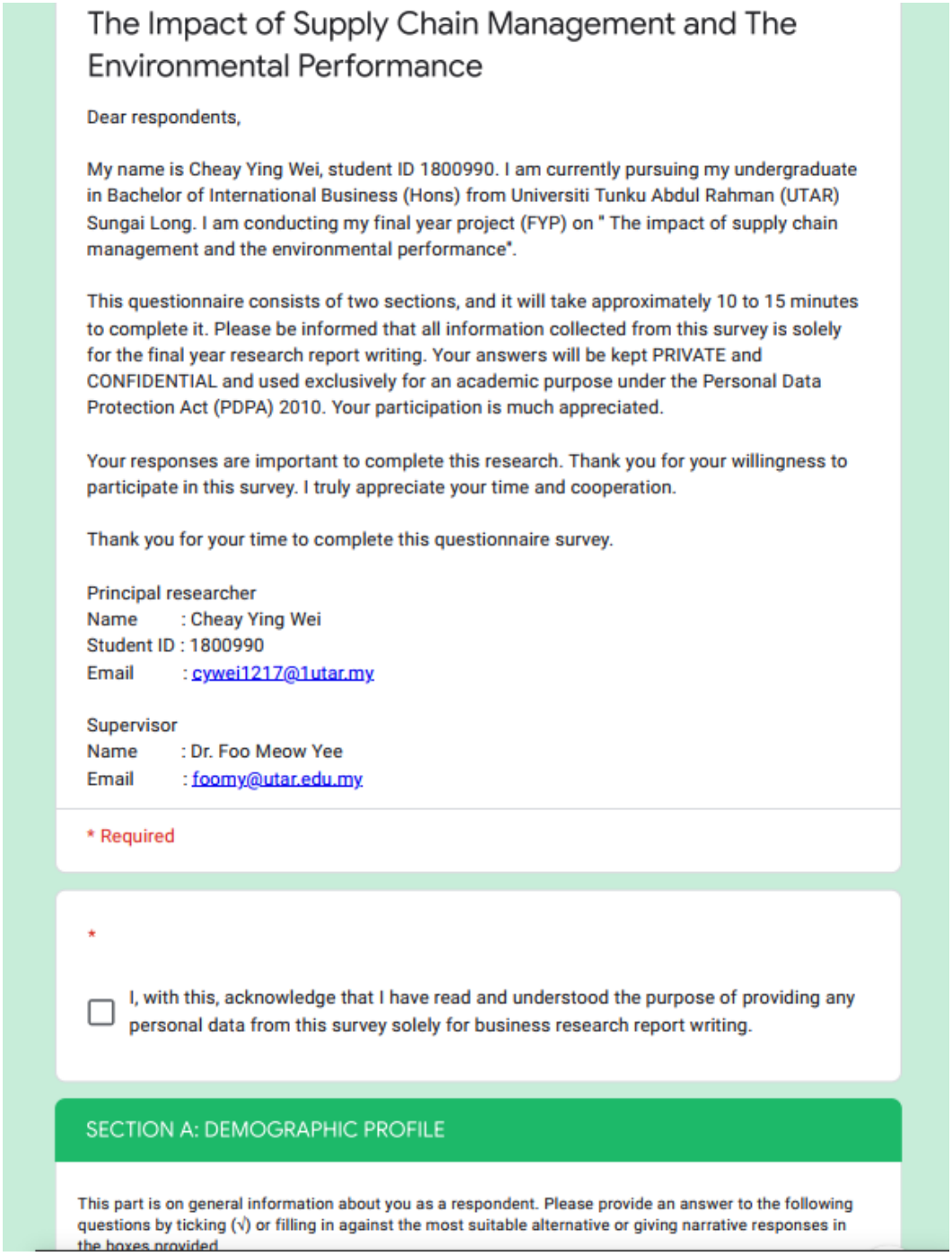
APPENDICES

APPENDIX I: Questionnaire



The Impact of Supply Chain Management and The Environmental Performance

Dear respondents,

My name is Cheay Ying Wei, student ID 1800990. I am currently pursuing my undergraduate in Bachelor of International Business (Hons) from Universiti Tunku Abdul Rahman (UTAR) Sungai Long. I am conducting my final year project (FYP) on " The impact of supply chain management and the environmental performance".

This questionnaire consists of two sections, and it will take approximately 10 to 15 minutes to complete it. Please be informed that all information collected from this survey is solely for the final year research report writing. Your answers will be kept PRIVATE and CONFIDENTIAL and used exclusively for an academic purpose under the Personal Data Protection Act (PDPA) 2010. Your participation is much appreciated.

Your responses are important to complete this research. Thank you for your willingness to participate in this survey. I truly appreciate your time and cooperation.

Thank you for your time to complete this questionnaire survey.

Principal researcher
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Supervisor
Name : Dr. Foo Meow Yee
Email : foomy@utar.edu.my

* Required

*

I, with this, acknowledge that I have read and understood the purpose of providing any personal data from this survey solely for business research report writing.

SECTION A: DEMOGRAPHIC PROFILE

This part is on general information about you as a respondent. Please provide an answer to the following questions by ticking (√) or filling in against the most suitable alternative or giving narrative responses in the boxes provided.

Q1. Gender: *

- ◯ Male
- ◯ Female

Q2. Age: *

- ◯ 20 to 30 years
- ◯ 31 to 40 years
- ◯ 41 to 50 years
- ◯ > 50 years

Q3. Department *

- ◯ Procurement/purchasing
- ◯ Supply Chain
- ◯ Operation
- ◯ Logistics
- ◯ Other: _____

Q4. Position in the company *

- ◯ Executive/Sr. Executive
- ◯ Manager/Sr. Manager
- ◯ General manager/Director

Q5. Number of years working in the company: *

- ◯ 1 - 3 years
- ◯ 4 - 6 years
- ◯ 7 - 10 years
- ◯ > 10 years

Q6. What are the major products managed by your organization? *

- ◯ Consumer products
- ◯ Industrial products
- ◯ Other: _____

Q7. How long has your company operate in this business? *

- ◯ Less than 10 years
- ◯ 11 – 20 years
- ◯ 20 – 30 years
- ◯ More than 30 years

Q8. What is your customer's(s') nature of business? *

- ◯ Electrical and Electronics Products
- ◯ Wood Products & Furniture
- ◯ Chemicals & Chemical Products
- ◯ Rubber & Plastic Products
- ◯ Food Products and Beverages
- ◯ Textiles and Wearing Apparels
- ◯ Basic Metals, Metal & Machinery
- ◯ Other: _____

Q9. What is the average length of relationship with your top 5 customers? *

- ◯ < 3 years
- ◯ 4 - 10 years
- ◯ 10 - 15 years
- ◯ > 15 years

Q10. Does your company actively participate in any association and programs that related to green environmental issues? *

If yes, tick "other" to specify.

- ◯ No
- ◯ Other: _____

Q11. Does your company apply any green logistics? *

- ◯ Yes
- ◯ No
- ◯ Not sure

SECTION B: CONSTRUCT MEASUREMENT

In this section we assess the impact of supply chain management and environmental performance. Please tick (√) appropriate response box according to the best of your knowledge, using the scale below:

1 - Strongly Disagree
2 - Disagree
3 - Neutral
4 - Agree
5 - Strongly Agree

Reversed Logistics

During the past two years, there were:

Created a system or procedure for online tracking and tracing of returned products and inventory status. *

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

Develop a reverse logistics program for integrating the whole supply chain of the company. *

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

Stringent government regulations on environmental protection let our company to understand the reversed logistics requirement. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Lack of environmental consciousnesses of consumers on reverse logistics. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Supported proactively by the top management for reversed logistics implementation. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Supply Chain Practices

During the past two years, there were:

Company shareholders (Customers, government authorities, NGO, employee, suppliers...etc.) involvement in adopting green supply chain practices. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Increase awareness and behavior requirements of the employees about green supply chain practices. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Increase supplier commitment on green supply chain practices by collaboration among supply chain members internally and externally. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Implement green supply chain programs to improve the competitiveness of the company. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Increase the company green public image. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Logistics Practices

During the past two years, there were:

Choose a better layout of warehouse space for optimizing warehouse order picking strategies. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

A decrease of using the transport packaging, recycling containers, and other logistics' packaging materials. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Use environmentally friendly packaging materials and logistics containers. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Choose a transport routes, load distribution and vehicle driving mileage that can avoid harmful environmentally activities. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Setting KPI (key performance indicators) to monitor the logistics performance. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Fleet Management

During the past two years, my firm achieved....

Choose the right mode of transport fleet with an efficient management. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Vehicle repairing strategy is implemented. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Vehicle's life span is monitored from year to year. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Vehicle fuel consumption is monitored. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Pollutants that are emitted by vehicle are monitored. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Environmental Performance

During the past two years, my firm achieved.....

Reduction in consumption of hazardous materials. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

An increase in reuse, recycle and recovery of materials of the components. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Reduction in air emission, water, and solid waste. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Reduction in frequency of environmental accidents. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Reduction in energy consumption. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

The overall environmental performance of our company has improved a lot. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Thank you for your time in completing this questionnaire. Your cooperation and participation are sincerely appreciated.

APPENDIX D

UNIVERSITI TUNKU ABDUL RAHMAN
FACULTY OF ACCOUNTANCY AND MANAGEMENT
UNDERGRADUATE FINAL YEAR PROJECT

Final Year Project Assessment Form - Report

Final Year Project Title: **FYP No.** **40/2110**

The Impact of Supply Chain Management and The Environmental Performance

Name:	**Cheay Ying Wei**	**Student ID:**	**1800990**

Assessment	**Criteria**	**Marks (%)**	**Awarded (%)**	**Subtotal (%)**
Introduction	Background of study	5		
	Problem definition/ research problem	5		
	Objective(s) of study	5		
	Significance of study	5		
Literature Review:	Review of theoretical/empirical model/ conceptual framework	10		
	Hypotheses / propositions development	5		
Research method	Data collection/sources	5		
	Research instruments/techniques	5		
	Theoretical/ empirical model/ conceptual framework	10		
Results and interpretation	Presentation of results (tables, figures, etc.)	5		
	Interpretation on major findings	15		
Conclusion and policy implications	Summary	5		
	Discussion and conclusion	5		
	Limitation and recommendation	5		
Overall presentation of the report	Referencing	5		
	Writing skills	5		
	TOTAL	**100**		

Remarks:

Please circle	**Supervisor**	**2nd Examiner**
Signature:		
Name:		
Date:		

APPENDIX D

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	Hypotheses / propositions development	5		
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	Research instruments/techniques	5		
	Theoretical/ empirical model/ conceptual framework	10		
Results and interpretation	Presentation of results (tables, figures, etc.)	5		
	Interpretation on major findings	15		
Conclusion and policy implications	Summary	5		
	Discussion and conclusion	5		
	Limitation and recommendation	5		
Overall presentation of the report	Referencing	5		
	Writing skills	5		
	TOTAL	**100**		

Remarks:

Please circle	**Supervisor**	**2nd Examiner**
Signature:		
Name:		
Date:		