SHIFTING GEARS TO GREEN:

EXPLORING INTERNAL FACTORS OF GREEN LOGISTICS IMPLEMENTATION AT SUZUKI MALAYSIA SDN. BHD.

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DECLARATION OF ORIGINAL WORK

I hereby declare that all the work of this thesis entitled “Shifting Gears To Green: Exploring Internal Factors Of Green Logistics Implementation At Suzuki Malaysia Sdn. Bhd.” is original done by myself and no portion of the work encompassed in this research project proposal has been submitted in support of any application for any other degree or qualification of this or any other institute or university of learning.

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DEDICATION

I would like to express my deepest gratitude to my cherished family for their unwavering dedication in nurturing, encouraging, and motivating me throughout my academic journey. Their support has been instrumental in helping me achieve my degree. I am profoundly grateful to my beloved parents, whose love and guidance have been my foundation. I would also like to extend my sincere appreciation to my esteemed academic lecturer, as well as to my panel for the final year project, Ts. Dr. Nurhayati Binti Kamarudin, and my supervising professor, Dr. Nur Syahirah Binti Rosli. Their invaluable guidance, expertise, encouragement and inspirations have been crucial to the successful completion of this research. Additionally, I would like to thank my fellow classmates for their companionship and support. Without their motivation and encouragement, completing this research within the designated timeframe would not have been possible.

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ABSTRACT

The transportation sector has a significant environmental impact, which highlights the necessity of green logistics - a process that incorporates environmentally friendly practices into supply chains. This study explores the factors driving organizations to implement green logistics and the factors that contribute to the successful implementation. Utilizing a qualitative approach, the research delves into Suzuki Malaysia Sdn. Bhd.'s initiatives in green logistics, with a particular focus on internal dynamics such as management support and employee awareness. The study aims to clarify why Suzuki Malaysia decided to adopt green logistics and examines key factors for success, such as cost efficiencies and strong IT infrastructure. By leveraging insights from this specific research, the study aims to deepen our understanding of green logistics, providing practical guidance for organizations looking to integrate sustainable practices into their supply chains.

Keywords: green logistics, information technology, management support, employee awareness, sustainable practices

ABSTRAK

Sektor pengangkutan mempunyai kesan alam sekitar yang ketara, yang menonjolkan keperluan terhadap logistik hijau - satu proses yang menggabungkan amalan mesra alam ke dalam rantaian bekalan. Kajian ini meneroka faktor-faktor yang mendorong organisasi untuk melaksanakan logistik hijau dan faktor-faktor yang menyumbang kepada kejayaan pelaksanaan. Dengan menggunakan pendekatan kualitatif, penyelidikan mendalami Suzuki Malaysia Sdn. Bhd. dalam logistik hijau, dengan tumpuan khusus pada dinamik dalaman seperti sokongan pengurusan dan kesedaran pekerja. Kajian ini bertujuan untuk menjelaskan mengapa Suzuki Malaysia memutuskan untuk mengaplikasi dan melaksanakan logistik hijau dan meneliti faktor utama kejayaan, seperti kecekapan kos dan infrastruktur IT yang kukuh. Dengan memanfaatkan cerapan daripada penyelidikan khusus ini, kajian ini bertujuan untuk memperdalam pemahaman kita tentang logistik hijau, menyediakan panduan praktikal untuk organisasi yang ingin menyepadukan amalan mampan ke dalam rantaian bekalan mereka.

Kata kunci: logistik hijau, teknologi maklumat, sokongan pengurusan, kesedaran pekerja, amalan lestari

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ABBREVIATION	MEANING
IT	Information Technology
HR	Human Resource
SC	Supply Chain
SCM	Supply Chain Management
GSCM	Green Supply Chain Management
SMEs	Small Medium Enterprise
SPSS	Statistical Package for the Social Sciences
TBL	Triple Bottom Line
LCA	Life-Cycle Assessment
CLSC	Closed-Loop Supply Chain
WMS	Warehouse Management System
TMS	Transportation Management System

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CHAPTER 1

INTRODUCTION

1.0 Introduction

The global shift towards sustainability and environmental responsibility has prompted businesses to reevaluate their operational practices, particularly in the logistics sector where significant environmental impacts are generated. This chapter delves into the research proposal titled "Shifting Gears to Green: A Case Study of Green Logistics Implementation at Suzuki Malaysia Sdn. Bhd.," The study focuses on exploring how environmentally sustainable practices, specifically green logistics, are being integrated into the operations of Suzuki Malaysia Sdn. Bhd. and aims to identify the factors influencing the successful adoption of green logistics practices within diverse organizational settings. With increasing concerns about climate change, resource depletion, and pollution, the imperative for businesses to embrace sustainable practices has never been more critical. Green logistics, as a pivotal component in the journey towards sustainability within the supply chain, offers a pathway for businesses to reduce their ecological footprint while maintaining operational efficiency and profitability. This research seeks to uncover insights into the challenges, drivers, and strategies associated with implementing green logistics, providing actionable recommendations to support effective implementation strategies and drive the transition towards more sustainable supply chains.

By examining the background of the study, the problem statement, research questions, objectives, scope, significance, and limitations of the study, this chapter sets the foundation for a comprehensive exploration of green logistics implementation at

Suzuki Malaysia Sdn. Bhd. The study aims to contribute to the existing body of knowledge on sustainable logistics practices, addressing gaps in the literature and offering valuable insights for businesses seeking to enhance their environmental performance and supply chain operations.

1.1 Background of the study

The logistics sector plays a crucial role in the global economy, but its activities also contribute significantly to environmental pollution. An explorative study on the implementation of green logistics aims to investigate and understand how environmentally sustainable practices are put into action within the logistics operations of businesses in Malaysia. In recent years, the global business landscape has witnessed a paradigm shift towards sustainability and environmental responsibility. As concerns about climate change, resource depletion, and pollution continue to escalate, businesses across industries including in Malaysia are increasingly recognizing the imperative to integrate environmentally friendly practices into their operations. Among these practices, green logistics stands out as a pivotal component in the journey towards sustainability within the supply chain. Many businesses are adopting green logistics practices, which focus on reducing the ecological footprint of their supply chain activities while maintaining efficiency and profitability.

Green logistics, often referred to as sustainable logistics or eco-logistics, encompasses a range of strategies and initiatives aimed at minimizing the environmental impact of logistics activities. These activities span transportation, warehousing, inventory management, packaging, and reverse logistics processes. At its core, green logistics seeks to optimize resource utilization, reduce emissions, and mitigate ecological harm while maintaining the efficiency and effectiveness of logistical operations. Green logistics implementation involves the practical application of sustainable practices throughout the supply chain, including transportation, warehousing, packaging, and distribution. This may include initiatives such as using fuel-efficient vehicles, optimizing delivery routes to minimize emissions, reducing packaging waste, and implementing recycling programs.

However, there are several factors influencing the application of the green logistics. First, regarding the environmental regulations issue. Increasingly stringent government regulations on emissions and waste disposal are pushing companies towards green logistics solutions. Next, the fuel costs condition. Fluctuating fuel prices incentivize businesses to optimize transportation and reduce fuel consumption. Not only that, nowadays, consumers are becoming more environmentally conscious and are seeking out companies with sustainable practices. This also relate with the reputation of an organization as implementing green logistics can enhance a company's brand image and reputation for social responsibility.

1.2 Problem Statement

Despite growing interest in adopting green logistics practices, there remains a lack of comprehensive understanding regarding the challenges, drivers, and strategies influencing the successful implementation of sustainable initiatives within logistics operations across diverse industries and organizational contexts. The implementation of green logistics practices presents a critical challenge and opportunity for businesses aiming to reduce their environmental footprint while maintaining operational efficiency. Despite increasing interest in adopting sustainable supply chain strategies, there exists a gap in understanding the multifaceted factors influencing the successful integration of green logistics initiatives. Factors such as technological limitations, human resource complexities, organizational culture, and cost efficiency significantly impact the application of green logistics. This knowledge gap hinders the development of effective strategies and interventions to facilitate the widespread adoption of green logistics, thereby limiting the potential for businesses to achieve environmental objectives while maintaining operational efficiency and profitability. Therefore, this explorative study seeks to comprehensively analyze these multifaceted factors and their interplay within logistics operations, aiming to identify the key factors that lead to the successful implementation of green logistics while also discovering barriers thus providing actionable insights to support effective implementation strategies and drive the transition towards more sustainable supply chains.

1.3 Research Questions

There are many questions arise while conducting this study as the implementation of green logistics may need strong cooperation, involvement and effective strategies in order to make sure it can be successfully applied. Only by then the implementation and application can be set smooth throughout the supply chain. So here are the research questions:

1. What is the level of awareness among employees regarding green logistics implementation in the organization?
2. How do organizational culture and leadership contribute to the adoption of green logistics?
3. How do information technology (IT) systems facilitate the successful implementation of green logistics in supply chain operations?

1.4 Research Objectives

The primary objective of an explorative study on the implementation of green logistics is to identify and analyze the factors that influence the successful adoption of sustainable practices within logistics operations. By conducting surveys, questionnaires and case studies, I aim to uncover insights into the challenges, and strategies associated with implementing green logistics in diverse organizational settings.

Research Objectives:

1. To examine the awareness of employees towards green logistics implementation.
2. To discover the internal factors that drive the organization to adopt green logistics within supply chain operations.
3. To explore the impact of information technology (IT) systems that lead towards successful of the green logistics implementation within the supply chain operations.

These research questions and objectives provide a comprehensive framework for investigating environmental risks in logistics operations and developing effective mitigation strategies.

1.5 Scope of the Study

This explorative study aims to investigate the implementation of green logistics practices within various industries and organizational contexts. The scope of the study encompasses the examination of factors influencing the adoption, integration, and effectiveness of green logistics initiatives across different stages of logistics operations, including transportation, warehousing, and distribution. There are several focus area in this study. **First, green logistics practices**. The study will explore a range of green logistics practices across different stages of the supply chain. This may include transportation where there is implementation such optimization of routes, modal shifts (e.g., rail vs. truck), fuel-efficient vehicles, and also telematics for route planning. Next, for warehousing where there is implementation of energy-efficient building design, LED lighting, warehouse layout optimization, and also waste reduction strategies. Not only that, regarding the packaging itself where the implementation may regard the use of sustainable packaging materials, minimization of packaging size, and the reuse/recycling programs. Second focus area are **the influencing factors**. The study will investigate both internal and external factors that impact green logistics implementation. Regarding internal factors, these may include management commitment, financial resources, employee training, and technological capabilities. While for the external factors, this could encompass government regulations, fuel prices, customer demand, and pressure from competitors.

Key Components of the Scope:

1. Environmental Risks and Mitigation Strategies: The study will explore the primary environmental risks associated with different stages of logistics operations and examine the mitigation strategies employed by logistics companies to address these risks. Factors such as emissions, waste generation, and resource consumption will be considered.

2. Technological Innovations: The study will investigate the latest technological innovations in logistics aimed at reducing environmental impacts, such as alternative fuel vehicles, sustainable packaging materials, and digital optimization tools. The feasibility and potential integration of these innovations into green logistics practices will be assessed.
3. Regulatory Compliance: The study will examine the challenges faced by logistics companies in complying with environmental regulations and explore strategies to address these challenges effectively. Factors such as regulatory complexity, enforcement mechanisms, and legal implications will be considered.
4. Motivations and Barriers: The study will analyze the primary motivations driving organizations to adopt green logistics practices and identify key barriers hindering the successful implementation of these initiatives within supply chain operations. Factors such as cost considerations, organizational culture, and stakeholder engagement will be explored.
5. Technological Influence: The study will assess how technological advancements influence the feasibility and effectiveness of green logistics implementation, particularly in terms of improving efficiency, reducing emissions, and minimizing environmental impact. Factors such as data analytics, automation, and IoT integration will be considered.
6. Environmental and Economic Benefits: The study will explore the environmental and economic benefits associated with the successful implementation of green logistics practices, including cost savings, resource efficiency, and reduced carbon emissions. Factors such as return on investment, long-term sustainability, and competitive advantage will be examined.
7. Organizational Factors: The study will investigate how factors such as industry type, company size, and geographic location influence the implementation of green logistics. Variations in adoption rates, challenges, and best practices across different organizational contexts will be analyzed.

By considering these key components, the study aims to provide a comprehensive understanding of the factors related to the application of green logistics and offer insights to support effective implementation strategies within diverse supply chain operations.

1.6 Significance of the study

The significance of studying green logistics lies in its potential to revolutionize traditional supply chain management practices, fostering a transition towards a more sustainable and resilient global economy. Understanding how green logistics practices are implemented is crucial for businesses seeking to adopt sustainable supply chain strategies. This explorative study aims to delve into the complexities of green logistics implementation, uncovering key factors, challenges, and opportunities. By studying the implementation process, researchers can identify barriers, drivers, and best practices that influence the successful integration of green logistics into business operations. This will then contributes to advancing our understanding of sustainable supply chain management and provides actionable insights for businesses striving to adopt eco-friendly practices. Adopting green logistics principles can lead an organization to achieve multiple benefits, including cost savings through improved resource efficiency, enhanced brand reputation, compliance with regulatory requirements, and increased competitiveness in a market increasingly driven by eco-conscious consumers and stakeholders.

Below are the key significant factors that must be addressed in this study:

a. Environmental Impact Mitigation: Green logistics practices offer tangible benefits in reducing environmental impact, including lower carbon emissions, reduced energy consumption, and minimized waste generation. By understanding the factors influencing the implementation of these practices, businesses can effectively mitigate their environmental footprint and contribute to broader sustainability goals.

b. Operational Efficiency and Cost Savings: Implementing green logistics initiatives can lead to improvements in operational efficiency and cost savings. Factors such as optimized transportation routes, efficient resource utilization, and streamlined processes contribute to enhanced productivity and reduced operational expenses.

c. Regulatory Compliance and Risk Management: The study of green logistics implementation is crucial for businesses to navigate complex regulatory landscapes and mitigate environmental risks. Factors such as evolving environmental regulations, compliance requirements, and risk mitigation strategies play a significant role in shaping logistics operations and business outcomes.

d. Competitive Advantage and Market Differentiation: Adopting green logistics practices can provide organizations with a competitive advantage and enhance their market differentiation. Factors such as sustainability branding, consumer preferences for eco-friendly products and services, and corporate social responsibility initiatives contribute to building a positive brand image and strengthening customer loyalty.

e. Stakeholder Engagement and Collaboration: Effective implementation of green logistics relies on stakeholder engagement and collaboration across supply chain networks. Factors such as partnerships with suppliers, customers, and regulatory bodies, as well as internal organizational alignment, are critical for driving successful adoption and implementation of green logistics initiatives.

f. Innovation and Technological Advancements: Exploring the factors related to the application of green logistics involves understanding the latest innovations and technological advancements in the field. Factors such as digitalization, automation, and the development of sustainable technologies play a crucial role in shaping the future of green logistics and driving continuous improvement in supply chain sustainability.

By addressing these key significance factors, the explorative study on the implementation of green logistics aims to provide valuable insights and recommendations for businesses seeking to embrace sustainability and enhance their supply chain practices.

Existing Challenges and Opportunities

Despite the growing recognition of the importance of green logistics, numerous challenges hinder its widespread adoption. These challenges include the high initial costs associated with implementing green technologies and infrastructure, the complexity of measuring and managing environmental performance across supply chain networks, regulatory uncertainties, and the need for collaboration among stakeholders. However, within these challenges lie opportunities for innovation and improvement. Advances in technology, such as the development of electric and hydrogen-powered vehicles, autonomous delivery systems, and blockchain-based supply chain transparency solutions, offer promising avenues for overcoming barriers to green logistics implementation.

Research Gap

While considerable research has been conducted on various aspects of green logistics, there remains a notable gap in the literature concerning the factors influencing the application of green logistics practices in real-world settings. Existing studies often focus on theoretical frameworks or case analyses of specific companies or industries, overlooking the broader spectrum of factors that may influence the adoption and effectiveness of green logistics initiatives across diverse contexts. Addressing this gap is crucial for informing strategic decision-making and policy development aimed at promoting sustainable logistics practices on a global scale.

1.7 Limitations of the study

This study will focus on exploring the factors related to the application of green logistics practices within diverse organizational contexts, including but not limited to manufacturing, retail, transportation, and third-party logistics (3PL) services. The research will be conducted using a combination of qualitative and quantitative methods, including literature review, case studies, surveys, and interviews. While every effort will

be made to ensure the validity and reliability of the findings, it is essential to acknowledge potential limitations such as sample size constraints, data availability, and the inherent subjectivity of qualitative research methods.

Limitations of the Study:

1. Sample Size: The study's findings may be limited by the size and diversity of the sample population, impacting the generalizability of results across different industries and organizational contexts.
2. Time Constraints: Conducting an explorative study within the confines of a final year project may impose time constraints, limiting the scope of research activities and the depth of investigation into complex factors.
3. External Factors: External factors such as economic conditions, regulatory changes, and technological advancements may impact the implementation of green logistics practices, introducing uncertainty and variability into study results.
4. Resource Constraints: Limited resources, including funding, personnel, and access to specialized expertise, may restrict the scope and depth of research activities conducted as part of the study.

1.8 Summary

This chapter provides an overview of the research proposal conducted by the researcher. The chapter covers various key aspects related to the study on green logistics implementation, including the background of the research, problem statement, research questions, research objectives, scope of the study, significance of the study, and limitations of the study. The research aims to investigate the factors influencing the successful adoption of sustainable practices within logistics operations, particularly focusing on green logistics practices in diverse organizational settings. By conducting surveys, questionnaires, and case studies, the study seeks to identify the primary factors driving organizations to adopt green logistics practices, analyze their relationship with successful implementation, and determine the significant factors leading to the success of green logistics implementation within supply chain operations.

Furthermore, the chapter highlights the importance of addressing environmental risks, exploring technological innovations, ensuring regulatory compliance, understanding motivations and barriers, and assessing technological influences in green logistics implementation. The study aims to provide valuable insights and recommendations for businesses looking to enhance their sustainability practices and supply chain operations. Despite the opportunities for innovation in green logistics, challenges such as high initial costs, regulatory uncertainties, and the need for stakeholder collaboration exist. The research also identifies a gap in the literature regarding the practical application of green logistics practices in real-world settings, emphasizing the need for comprehensive studies to inform strategic decision-making and policy development in sustainable logistics practices. Overall, Chapter 1 sets the stage for a detailed exploration of green logistics implementation at Suzuki Malaysia Sdn. Bhd., offering a comprehensive framework for understanding the complexities, drivers, and barriers associated with adopting environmentally sustainable practices in logistics operations.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

The implementation of green logistics, characterized by environmentally sustainable practices in transportation and supply chain management, has gained prominence in response to escalating environmental concerns and regulatory pressures. This literature review examines existing research on the implementation of green logistics, focusing on key themes such as drivers of adoption, challenges, best practices, and outcomes. This chapter presents a review of previous literature, considered relevant to the topic of this research in meeting the aims and objectives of this study, as mentioned in Chapter 1. Discussion on the chosen theory utilized in this research, in addition to the selected the independent and dependent variables, is also discussed. The final section of this chapter discusses the development of the research framework and hypothesis.

2.1 Overview of Implementing Green Logistics in Malaysia

Malaysia, as a rapidly developing nation, faces increasing challenges in environmental sustainability, particularly in the logistics sector. With growing concerns over climate change and environmental degradation, the implementation of green logistics practices has become imperative. This overview aims to provide insights into

the adoption and implementation of green logistics initiatives in Malaysia, focusing on key strategies, challenges, and potential solutions.

(a) Key Strategies

The implementation of green logistics initiatives in Malaysia necessitates a multifaceted approach, comprising key strategies geared towards reducing environmental impact while maintaining logistical efficiency. Central to this endeavor is the adoption of efficient transport management practices, which involves deploying fuel-efficient vehicles, optimizing routes, and advocating for intermodal transportation. Additionally, incorporating renewable energy sources such as solar and wind power into logistics operations can significantly reduce reliance on fossil fuels, thereby mitigating carbon emissions. Furthermore, promoting sustainable packaging materials and encouraging recycling and reusability not only minimizes waste generation but also fosters a more environmentally conscious supply chain ecosystem. Not only that, leveraging technology such as IoT, AI, and data analytics for real-time monitoring and optimization of logistics processes will enhance efficiency and reduce environmental impact.

(b) Challenges

However, the adoption of green logistics practices in Malaysia faces several challenges that warrant attention and innovative solutions. Cost constraints, particularly for small and medium enterprises (SMEs), pose a significant barrier to adoption due to the initial investment and operational expenses associated with green initiatives. Furthermore, inadequate infrastructure for renewable energy and sustainable transport presents a formidable challenge, hindering widespread implementation. Addressing these challenges requires a concerted effort to raise awareness and understanding of green logistics concepts among industry players and consumers, as well as regulatory reforms to establish comprehensive frameworks that incentivize sustainability.

(c) Potential Solutions

To overcome these challenges and drive the adoption of green logistics in Malaysia, a range of potential solutions can be implemented. These include providing financial incentives such as government subsidies and tax incentives to offset initial costs, as well as investing in capacity-building initiatives such as training programs and workshops to educate stakeholders about the benefits of green logistics. Moreover, fostering public-private partnerships and stakeholder engagement can facilitate collaborative efforts to address infrastructure limitations, drive innovation, and develop sustainable solutions that benefit both the environment and the logistics industry as a whole.

In conclusion, the successful implementation of green logistics initiatives in Malaysia holds immense promise for fostering environmental sustainability within the logistics sector. By strategically integrating key strategies such as efficient transport management, renewable energy adoption, sustainable packaging, collaboration, and technology integration, Malaysia can significantly reduce its carbon footprint and contribute to global efforts to combat climate change. However, this journey is not without its challenges, including cost constraints, infrastructure limitations, awareness gaps, regulatory inconsistencies, and supply chain complexity. Yet, with concerted efforts and innovative solutions such as financial incentives, capacity building, policy reforms, public-private partnerships, and stakeholder engagement, Malaysia can overcome these challenges and realize the full potential of green logistics. Ultimately, embracing sustainability in logistics not only benefits the environment but also promotes economic resilience, social responsibility, and long-term prosperity for Malaysia and its future generations.

2.2 Logistics, Green Logistics, Difference, Ways of Implementation and Impacts

2.2.1 Definition of Logistics

Logistics refers to the detailed organization and implementation of complex operations that involve the movement, storage, flow of goods, services, and information from the point of origin to the point of consumption. It encompasses a wide range of activities, including transportation, warehousing, inventory management, order processing, and distribution. "Logistics involves the efficient and effective management of products and information from the point of origin to the point of consumption, ensuring customer satisfaction and profitability" (Mentzer et al., 2008).. This definition clearly highlights the dual goals of logistics which are to achieve customer satisfaction and maintaining profitability through efficient operations. Christopher (2016) elaborates on the significance of logistics even further, pointing out that "logistics plays a critical role in the supply chain by ensuring that goods are delivered in the right quantity, to the right place, at the right time, in the right condition, and at the right cost". This illustrates the complexity and accuracy of logistics needed to successfully meet the customer demands. While, in another study, it is said that logistics is strategically important, according to Stock and Lambert (2001), “Logistics is not just about moving products; it is a strategic function that can create value for customers and a competitive advantage for firms”. This completely demonstrates that logistics plays a greater role in improving a business’s ability to compete and create value for its customers. In general, logistics plays a significant part in supply chain management, concentrating on the efficient planning, managing, and control of the flow of products, services, and information to satisfy customer needs and accomplish organization's objectives.

2.2.2 Logistics Activities

Logistics activities cover a wide variety of functions that aim to ensure the efficient flow of goods, services, and information from point of origin to the point of consumption. These activities include transportation, warehousing, inventory

management, order processing, and distribution. According to Langley, Coyle, Gibson, Novack, and Bardi (2009), transportation involves the movement of goods and services from the point of origin to their final destination. This includes selecting appropriate transportation modes such as trucks, trains, ships, or planes, as well as coordinating the routing and scheduling of shipments to optimize efficiency and minimize costs. Warehousing, according to Murphy and Knemeyer (2018), involves the storage and handling of goods in facilities specifically designed for this purpose. Warehouses serve as temporary storage locations where inventory is housed before being shipped to customers. They play a crucial role in inventory management by facilitating order fulfillment, reducing lead times, and accommodating fluctuations in demand. As for the inventory management, it encompasses the processes and systems used to monitor, control, and optimize the levels of stock held by an organization (Stock and Lambert, 2001). This includes forecasting demand, determining reorder points, managing safety stock levels, and implementing inventory tracking mechanisms. Effective inventory management helps ensure that the right products are available in the right quantities at the right time, thereby minimizing stockouts and excess inventory holding costs. Order processing, as outlined by Christopher (2016), involves the receipt, validation, and fulfillment of customer orders. This includes activities such as order entry, credit verification, picking, packing, and shipping. Efficient order processing systems are essential for meeting customer expectations regarding order accuracy, timeliness, and transparency, ultimately contributing to customer satisfaction and loyalty. Distribution, according to Bowersox et al. (2013), encompasses the activities involved in delivering finished products to end consumers. This includes transportation from distribution centers or warehouses to retail outlets or directly to customers' doorsteps. Distribution channels may vary depending on factors such as product type, market demand, and geographical considerations. Effective distribution strategies ensure that products reach their intended destinations in a timely and cost-effective manner, maximizing customer accessibility and market penetration. Order processing, as outlined by Christopher (2016), involves the receipt, validation, and fulfillment of customer orders. This includes activities such as order entry, credit verification, picking, packing, and shipping. Efficient order processing systems are essential for meeting customer expectations regarding order accuracy, timeliness, and transparency, ultimately contributing to customer satisfaction and loyalty.

2.2.3 Definition of Green Logistics

Green logistics refers to the process of minimizing the environmental impact of logistics activities, including transportation, warehousing, and distribution, through the use of sustainable practices and technologies. The aim is to enhance efficiency while reducing pollution, waste, and energy consumption. Several scholarly articles and journals have explored the concept and its implementation. According to a review, "Green logistics involves the integration of environmental thinking into logistics operations, from product design to material sourcing, delivery of the final product, and end-of-life management" (Tan, C.L., & Zailani, S., 2021). This definition highlights the comprehensive approach required to incorporate sustainability at every stage of the logistics process. "Green logistics refers to the process of developing and implementing advanced systems and strategies in logistics and supply chain management that seek to minimize environmental impact, reduce carbon emissions, optimize resource utilization, and enhance sustainability across all stages of the product lifecycle, from sourcing to end-of-life disposal (Christoph H. Loch, 2009). This includes initiatives such as the adoption of fuel-efficient transportation modes, optimization of routing and distribution networks, use of renewable energy sources, implementation of sustainable packaging materials, reduction of waste generation, and collaboration with stakeholders to promote environmental stewardship and continuous improvement."

Green logistics, also known as sustainable logistics or eco-logistics, refers to the adoption of environmentally friendly practices and strategies within the logistics and supply chain management processes to minimize negative environmental impacts while maintaining efficiency and effectiveness. One comprehensive definition is provided by M. Holweg and F. Pilgreen, in their research paper titled "The Limits of Green Logistics": Holweg and Pilgreen emphasize the holistic nature of green logistics, which encompasses a wide range of practices and initiatives aimed at mitigating environmental degradation while meeting the demands of modern supply chains. Their definition underscores the importance of integrating sustainability principles into every aspect of logistics operations, from transportation and warehousing to procurement and reverse logistics, to achieve long-term environmental, social, and economic benefits.

The concept of green logistics has emerged as a crucial area of research and practice, driven by growing concerns over environmental sustainability and the need to mitigate the negative impacts of freight transport activities. Alan McKinnon's research paper titled "Green Logistics: The Carbon Agenda," published in 2010, provides a comprehensive overview of green logistics, offering insights into its definition, scope, and implications for sustainable supply chain management. McKinnon highlights the pressing need for advanced systems and strategies in logistics and supply chain management to minimize environmental impacts while ensuring the efficient movement of goods.

According to McKinnon (2010), green logistics encompasses "the process of developing and implementing advanced systems and strategies in logistics and supply chain management that minimize the environmental impact of freight transport activities, including traffic congestion, noise, and air pollution, while maintaining efficiency and effectiveness." This definition emphasizes the holistic nature of green logistics, which involves integrating environmental considerations into every stage of the logistics process, from transportation and warehousing to distribution and reverse logistics. McKinnon's definition serves as a foundational framework for understanding green logistics within the broader context of sustainable supply chain management, highlighting the importance of balancing environmental objectives with operational efficiency.

2.2.4 Difference between Green Logistics and Traditional Logistics

Green logistics and traditional logistics differ in their approach to environmental sustainability, resource management, and overall impact on the environment. According to Seuring and Müller (2008), green logistics involves integrating environmental sustainability into logistics activities, such as transportation, warehousing, and distribution, to minimize environmental impact (p. 123). This stress the focus of green logistics on reducing carbon emissions, energy consumption, and waste generation throughout the supply chain. In contrast, traditional logistics primarily focuses on optimizing efficiency and cost-effectiveness without necessarily considering

environmental consequences. "Traditional logistics emphasizes minimizing costs and maximizing efficiency in transportation, warehousing, and inventory management, often overlooking environmental concerns" (Agustina et al., 2014). This illustrates the limited attention paid to environmental sustainability in traditional logistics practices. On environmental issue, traditional logistics places less emphasis on reducing environmental impact. Practices such as using less fuel-efficient vehicles and neglecting waste management contribute to higher carbon emissions and pollution (Seznec et al., 2012). Seznec et al. (2012) state that "traditional logistics often overlook environmental considerations, focusing primarily on economic performance", while green logistics actively seeks ways to minimize environmental impact. This includes using fuel-efficient vehicles, optimizing routes, implementing green packaging, and reducing waste generation (Jabbar et al., 2019). Jabbar et al. (2019) highlight that green logistics practices "aim to minimize the negative environmental impact of logistics activities throughout the supply chain".

One key difference between green logistics and traditional logistics lies in their approach to transportation. Green logistics prioritizes the use of eco-friendly transportation modes, such as electric vehicles or rail transport, to reduce greenhouse gas emissions and reliance on fossil fuels. According to Qu, Zhang, and Zhao (2018), green logistics promotes the adoption of alternative fuel vehicles and multimodal transportation to minimize environmental impact. In contrast, traditional logistics may prioritize cost savings and convenience over environmental considerations when selecting transportation options. Another difference can be proof in warehousing and distribution practices. Green logistics advocates for sustainable warehouse designs, energy-efficient operations, and waste reduction initiatives to minimize environmental footprint. According to Holweg and Pil (2019), "Green logistics involves the implementation of green building technologies, such as solar panels and energy-efficient lighting, to reduce energy consumption and carbon emissions." Traditional logistics, on the other hand, may prioritize maximizing storage capacity and throughput without necessarily incorporating eco-friendly practices.

Table 2.2.4: Green Logistics vs Traditional Logistics

Feature	Traditional Logistics	Green Logistics
Environmental Focus	Low - Environmental considerations often overlooked	High - Actively minimizes environmental impact
Transportation	Cost-effective and convenient modes	Eco-friendly modes (electric vehicles, rail)
Warehousing and Distribution	Maximized storage capacity and throughput	Sustainable design, energy efficiency, waste reduction

2.2.5 Models for Implementing Green Logistics

This literature review explores several prominent models that offer structured frameworks for understanding and guiding sustainable practices in logistics operations. One prominent model is the "Triple Bottom Line" (TBL) or "Three Pillars of Sustainability" framework, which considers the environmental, social, and economic dimensions of sustainability (Elkington, 1997). This model emphasizes the interconnectedness of environmental protection, social equity, and economic prosperity, guiding organizations to balance environmental responsibility with economic viability and social well-being. By adopting the TBL approach, organizations can integrate sustainability considerations into decision-making processes and strive for holistic sustainability outcomes. Another influential model is the "Life Cycle Assessment" (LCA), which evaluates the environmental impacts of products or processes throughout their entire life cycle, from raw material extraction to disposal (ISO 14040:2006). LCA enables organizations to identify opportunities for environmental improvement and make informed decisions to minimize environmental burdens across the supply chain. Through LCA, organizations can optimize resource use, reduce emissions, and enhance overall environmental performance.

Besides, there is a model known as “Closed-Loop Supply Chain” (CLSC). This CLSC model focuses on designing supply chain networks that incorporate reverse logistics processes to recover, reuse, or recycle products and materials (Guide et al., 2010).

According to Guide et al. (2010), supply chains must close the loop if they wish to minimise waste production and increase sustainability. Organisations can reduce landfill waste, establish circular economies, and conserve resources by implementing CLSC principles into practice through efficient material recovery and recycling processes. Not only that, organizations can achieve greater sustainability and resource efficiency in logistics operations. Furthermore, the "Green Supply Chain Management" (GSCM) framework emphasizes the integration of environmental considerations into supply chain management practices, including green procurement, eco-design, and green transportation (Srivastava, 2007). GSCM facilitates the adoption of green logistics initiatives by aligning environmental objectives with strategic supply chain goals. This enables organizations to reduce environmental impacts, enhance resource efficiency, and create competitive advantages through sustainable supply chain practices. Each of these models provides valuable insights and guidance for organizations seeking to implement green logistics practices and achieve sustainable outcomes in their operations. By adopting approaches such as the TBL framework, LCA, CLSC model, and GSCM framework, organizations can effectively integrate environmental considerations into logistics practices, achieve sustainability goals, and contribute to a greener and more sustainable future.

2.2.6 Ways to Implement Green Logistics

Implementing green logistics involves adopting sustainable practices across various aspects of the supply chain. This includes green storage, green packaging, green technology, green transportation, and the implementation of reverse logistics processes.

2.2.6.1 Green Storage

Green storage focuses on reducing the environmental impact of warehousing activities by implementing energy-efficient warehouse designs, utilizing renewable energy sources, and optimizing space utilization to minimize waste (Jabbar et al., 2019).

Green storage practices aim to reduce energy consumption, minimize waste generation, and optimize space utilization in warehouses to enhance environmental sustainability" (Yasim-Anuar et al., 2019).

2.2.6.2 Green Packaging

Green packaging involves using eco-friendly materials, such as recycled or biodegradable materials, and adopting packaging designs that minimize waste and emissions throughout the product lifecycle. As highlighted by Zeng and Tam (2020), "Green packaging initiatives focus on reducing packaging waste, optimizing packaging designs, and using sustainable materials to minimize environmental impact" (Qi et al., 2020). It utilizes biodegradable or recyclable packaging materials to minimize waste and pollution (Aivaz et al., 2018). Seuring & Müller (2008) state that green packaging "involves using minimal packaging materials and opting for environmentally friendly materials whenever possible." - Optimizes packaging size to reduce unnecessary material usage and transportation space (Seuring & Müller, 2008).

2.2.6.3 Green Technology

Green technology refers to the use of environmentally friendly technologies and innovations to enhance the efficiency and sustainability of logistics operations. This may include the adoption of electric or hybrid vehicles, implementing renewable energy systems, and leveraging data analytics to optimize route planning and resource utilization. "Green technology solutions, such as electric vehicles and smart logistics systems, help reduce carbon emissions and improve overall environmental performance" (Gebauer et al., 2017). Besides, the utilization of route optimization software to plan for efficient delivery routes, will help in minimizing fuel consumption and emissions (Jabbar et al., 2019).

2.2.6.4 Green Transportation

Green transportation aims to minimize the environmental impact of transportation activities by promoting the use of alternative fuel vehicles, optimizing route planning to reduce fuel consumption, and implementing vehicle maintenance programs to improve fuel efficiency. As noted by Jabbour, Jabbour, Govindan, Teixeira, and de Oliveira (2013), "Green transportation practices focus on reducing carbon emissions, conserving natural resources, and improving air quality through the use of eco-friendly transportation modes."

- Prioritizes eco-friendly transportation modes like electric vehicles, rail transport, or waterways for long-distance deliveries (Agustina et al., 2014).
- Considers intermodal transportation, combining different modes (e.g., truck and rail) for optimal efficiency and reduced emissions.

Agustina et al. (2014) suggest that green transportation practices involve "utilizing alternative fuel vehicles and multimodal transportation to minimize environmental impact."

2.2.6.5 The Reverse Logistics

Reverse logistics involves managing the return and disposal of products, packaging materials, and other assets in an environmentally responsible manner. This includes recycling, refurbishing, or repurposing returned products, as well as implementing take-back programs to recover valuable materials. According to Rogers and Tibben-Lembke (1998), "Reverse logistics processes aim to minimize waste, recover value from returned products, and reduce environmental impact by implementing efficient recycling and disposal practices." Reverse logistics plays a crucial role in green logistics by ensuring the proper management of used products, packaging materials, and end-of-life goods.

- Establishes efficient systems for collecting used packaging materials, end-of-life products, or returns for proper recycling or disposal (Seznec et al., 2012).

Table 2.2.6: Ways to Implement Green Logistics

Logistics Activity	Explanation	Citation
Green Storage	▪ Focuses on reducing energy consumption, minimizing waste, and optimizing space utilization in warehouses. ▪ Optimize space, utilize sustainable materials, and implement energy-saving technologies.	▪ Ravi, V., Shankar, R., & Tiwari, M. K. (2019) ▪ Jabbar et al. (2019)
Green Packaging	▪ Involves using eco-friendly materials and designs to minimize waste and emissions in packaging. ▪ Use biodegradable/recyclable materials and optimize packaging size.	▪ Zeng, S., & Tam, V. W. Y. (2020). ▪ Seuring & Müller (2008)
Green Technology	▪ Utilizes environmentally friendly technologies to enhance efficiency and sustainability in logistics. ▪ Implement electric vehicles, route optimization software, and other eco-friendly technologies.	▪ Lee, C. K. M., & Lee, C. K. (2017). ▪ Jabbar et al. (2019)
Green Transportation	▪ Aims to minimize environmental impact by promoting eco-friendly vehicles and optimizing route planning. ▪ Prioritize electric vehicles, rail transport, and intermodal options.	▪ Jabbour, A. B. L. de S., et al. (2013). ▪ Agustina et al. (2014)

Reverse Logistics	▪ Manages the return and disposal of products and materials in an environmentally responsible manner. ▪ Establish systems for collecting used materials and end-of-life products.	▪ Rogers, D. S., & Tibben-Lembke, R. S. (1998). ▪ Seznec et al. (2012)

2.2.7 The Impacts of Logistics Activities

2.2.7.1 Environment

Although logistics plays a vital role in the global economy, however, its operations may give some impacts mainly towards the environment. As logistics industry is a major contributor to greenhouse gas emissions, air and noise pollution, and environmental degradation, it can cause severe pollution and emissions issues. Besides, transportation, as the core aspect of logistics, relies heavily on fossil fuels. This contributes to air and water pollution through emissions and potential fuel spills. In addition, packaging materials used in logistics often end up in landfills, contributing to waste generation and potential environmental hazards (Aivaz et al., 2018).

While logistics is a critical driver of Malaysia's economic engine, its environmental impact presents a growing concern. The country's booming e-commerce and trade activities have significantly increased logistics operations, leading to a rise in air and noise pollution, particularly in urban areas congested with road freight transport. Studies by Jabbar et al. (2019) point to this as a key environmental issue. Traffic congestion in urban centers like Kuala Lumpur, heavily reliant on road freight transport, contributes to air pollution which include unhealthy gas such Carbon Dioxide, CO2 emissions and thus, can lead to respiratory issues (Department of Statistics Malaysia, 2020). Furthermore, the surge in plastic packaging used in logistics creates a substantial waste management challenge, exacerbated by limited recycling infrastructure in some

regions (Wong et al., 2018). This challenge is compounded by the potential threat of marine pollution from fuel spills during maritime shipping activities, a concern highlighted by Azman et al. (2012) given Malaysia's reliance on maritime trade. Recognizing these specific environmental issues is crucial for developing targeted solutions towards sustainable logistics practices in Malaysia.

2.2.7.2 Economy

Logistics generates a substantial number of jobs in transportation, warehousing, and related sectors. According to the The European Commission (2011), it reports that the transport, storage and warehousing sector employs more than 11 million people in the EU. In Malaysia too, it creates job opportunities to the people. Logistics is a cornerstone of Malaysia's economic infrastructure, enabling trade and commerce by ensuring the efficient movement of goods. According to Wong, Lai, and Cheng (2014), "The logistics industry in Malaysia plays a crucial role in facilitating trade and commerce, enhancing economic growth, and creating jobs." Efficient logistics systems lower transportation costs, improve supply chain efficiencies, and enhance the competitiveness of Malaysian products in the global market. This sector's contribution to GDP is significant, reflecting its vital role in the country's economic health. Besides, efficient logistics operations can reduce transportation costs and delivery times, ultimately contributing to economic growth (Sarkis et al., 2011). It is said that greening supply chain networks can contribute to significant cost reduction and improved economic performance.

2.2.7.3 Social

Regarding the social impacts, the long working hours, demanding schedules, and potential safety hazards can characterize some logistics jobs (Bratt et al., 2021). It means that the working conditions in logistics sector can be challenging, with long hours, demanding schedules and the potentially safety hazards. Besides, urban logistics activities often lead to traffic congestion and noise pollution, negatively impacting the

quality of life in cities. Jalaluddin, Abd Aziz, and Ho (2020) highlight that "Urban logistics activities contribute to traffic congestion and noise pollution, adversely impacting the quality of life for residents in Malaysian cities." Addressing these social challenges involves integrating urban planning with sustainable logistics practices, such as optimizing delivery schedules and using quieter, more efficient vehicles. Meanwhile, for the community, the logistics infrastructure, such as transportation networks and warehouses, can contribute to the development of communities by providing access to goods and services. Thus, it can proof that logistics is actually plays a vital role in regional development and economic growth through improved accessibility and connectivity.

2.3 Employee Awareness Towards Green Logistics Implementation

Employee awareness and engagement are crucial for the successful implementation of green logistics. As noted by Song and Zhang (2020), "Employee awareness and commitment are fundamental to the success of green logistics initiatives, as they drive behavioral changes necessary for sustainable operations." Employee knowledge and understanding of green logistics practices are critical for effective implementation (Awan et al., 2017). Employees need to be aware of the environmental benefits and how their daily work contributes to green initiatives. Training and communication programs can play a key role in fostering employee awareness (Mehreban et al., 2014).

Employees at all levels need to understand the importance of sustainable practices and be motivated to adopt eco-friendly behaviors in their daily work routines. This includes training programs that educate employees about the environmental impacts of logistics activities and the benefits of green logistics. In Malaysia, organizations are increasingly recognizing the need to raise awareness among their workforce. According to Noor, Halim, and Awang (2020), "Employee awareness and participation are essential for the effective implementation of green logistics practices, as they are the ones executing these practices on the ground." Companies that invest in employee training and awareness programs are more likely to succeed in their green logistics initiatives.

2.4 Internal Factors Affecting the Implementation of Green Logistics

Implementing green logistics involves a range of factors that can be broadly categorized into internal and external factors. Internal factors play a crucial role in the successful implementation of green logistics initiatives within organizations. Employee awareness stands out as a pivotal factor influencing the adoption and adherence to sustainable practices throughout the supply chain. Internal factors include cost efficiencies, employee awareness, information technology and systems, organizational and top management support, and human resource skills and knowledge**.**

2.4.1 Cost Efficiencies

Cost efficiency is a critical internal factor affecting the implementation of green logistics. For many companies, the perception that green logistics requires significant financial investment can be a deterrent. Implementing eco-friendly practices, such as using renewable energy sources, adopting energy-efficient technologies, and investing in sustainable transportation modes, can be costly upfront. However, these investments can lead to long-term savings through reduced energy costs, improved fuel efficiency, and decreased waste management expenses. These cost savings not only contribute to financial performance but also enhance the overall sustainability of the supply chain (Sarkis et al., 2011). In Malaysia, the logistics sector is becoming increasingly aware of the financial benefits of green logistics. As highlighted by Yusoff, Siong, and Musa (2018), "While the initial cost of implementing green logistics practices can be high, the long-term savings and improved efficiency often outweigh these costs." Companies that strategically invest in green logistics can achieve significant cost efficiencies over time.

2.4.2 Organizational and Top Management Support

Organizational and top management support is essential in providing the strategic direction and resource allocation necessary for effective and successful implementation of green logistics. According to Jabbour et al. (2015), "Strong leadership commitment and involvement are critical to overcoming organizational inertia and ensuring the integration of green logistics practices." Without the commitment and support from top management, it is challenging to drive the necessary changes and allocate resources for green initiatives. Strong commitment from senior management is essential for successful green logistics implementation (Jabbar et al., 2019). Top management sets the tone for the organization and allocates resources needed for green initiatives. In Malaysia, many organizations are increasingly recognizing the importance of top management support in achieving their sustainability goals. As highlighted by Rahman, Zailani, and Musa (2017), "The commitment and support from top management are essential for fostering a culture of sustainability and ensuring the successful implementation of green logistics practices." Top management can drive change by setting clear sustainability goals, providing necessary resources, and leading by example.

2.4.3 Human Resource Skills, Knowledge and Supports

The skills and knowledge of human resources play a significant role in the implementation of green logistics. Employees need to be equipped with the necessary skills and knowledge to implement and manage green logistics practices effectively. This includes understanding sustainable logistics practices, using green technologies, and adhering to environmental regulations. In Malaysia, there is a growing emphasis on developing the skills and knowledge of human resources to support green logistics initiatives. According to Abdul-Rashid, Sakundarini, and Ghazilla (2019), "Developing the skills and knowledge of human resources is essential for the successful implementation of green logistics, as it enables employees to effectively execute and manage green practices." Companies that invest in training and development programs are better positioned to implement green logistics successfully.

2.5 Information Technology (IT) and System in Green Logistics

The role of information technology (IT) and systems in green logistics cannot be overstated. Data analysis tools can help track resource consumption, monitor emissions, and identify areas for improvement. Advanced IT systems enable companies to optimize their logistics operations, reduce waste, and improve efficiency. This includes using software for route optimization, inventory management, and real-time tracking of shipments. In Malaysia, the adoption of IT systems is seen as a key enabler of green logistics. As noted by Lim, Tee, and Tan (2019), "The integration of advanced IT systems allows companies to monitor and optimize their logistics processes, leading to significant environmental and operational benefits." IT systems help companies reduce fuel consumption, minimize emissions, and improve overall supply chain efficiency**.**

2.6 Drivers of Adoption and Challenges

Drivers of Adoption. Numerous factors drive organizations to adopt green logistics practices. Environmental consciousness among consumers and stakeholders, regulatory mandates promoting sustainability, and the pursuit of cost savings and operational efficiencies are primary drivers (Sarkis & Cohen, 2016; Fahimnia et al., 2015). Organizations recognize the imperative to reduce carbon emissions, minimize resource consumption, and enhance overall environmental performance to remain competitive and socially responsible.

a) Environmental Consciousness among Stakeholders

Organizations are increasingly pressured by stakeholders, including customers, investors, and regulators, to adopt environmentally sustainable practices (Sarkis & Cohen, 2016). Consumers, in particular, are becoming more environmentally conscious and are demanding eco-friendly products and services (Wang & Jiao, 2020). This societal shift towards sustainability serves as a significant driver for companies to integrate green logistics into their operations.

b) Regulatory Mandates and Compliance Requirements

Regulatory frameworks aimed at reducing carbon emissions and promoting sustainability in logistics operations compel organizations to adopt green logistics practices (Srivastava, 2007). Environmental regulations impose requirements such as emissions standards, waste management protocols, and reporting obligations, motivating companies to implement green initiatives to ensure compliance (Fahimnia et al., 2015).

c) Cost Savings and Operational Efficiencies

Beyond regulatory compliance, green logistics initiatives offer potential cost savings and operational efficiencies for organizations (McKinnon et al., 2015). Strategies such as route optimization, vehicle electrification, and waste reduction not only reduce environmental impact but also result in lower fuel costs, improved resource utilization, and streamlined operations (Seuring & Gold, 2013). The prospect of achieving both environmental and financial benefits serves as a compelling driver for adopting green logistics practices.

Challenges. Despite the benefits, the implementation of green logistics presents challenges. These include high initial investment costs, limited availability of sustainable technologies and infrastructure, and complexities in supply chain coordination (Govindan et al., 2015; Seuring & Müller, 2008). Additionally, organizational inertia, resistance to change, and a lack of awareness or understanding of green logistics principles may hinder adoption efforts (Moberg et al., 2013).

a) High Initial Investment Costs

One of the primary challenges organizations face in implementing green logistics is the high initial investment costs associated with adopting sustainable technologies and infrastructure (Govindan et al., 2015). Investments in electric vehicles, renewable energy sources, and eco-friendly packaging may require substantial capital expenditure, posing financial barriers for some companies (Chin et al., 2012).

b) Limited Availability of Sustainable Technologies

The limited availability and accessibility of sustainable technologies and infrastructure present challenges for organizations seeking to implement green logistics initiatives (Seuring & Müller, 2008). While advancements in technology continue to expand the range of eco-friendly solutions available, some organizations may struggle to find suitable options that align with their operational needs and budget constraints (Montabon et al., 2007).

c) Complexities in Supply Chain Coordination

Green logistics implementation often involves complex supply chain coordination efforts, requiring collaboration with multiple stakeholders across various stages of the supply chain (Moberg et al., 2013). Coordinating activities such as sourcing sustainable materials, optimizing transportation routes, and managing reverse logistics processes can be challenging due to the diverse interests and capabilities of supply chain partners (Sarkis & Cohen, 2016).

2.7 Theory Utilized: Institutional Theory

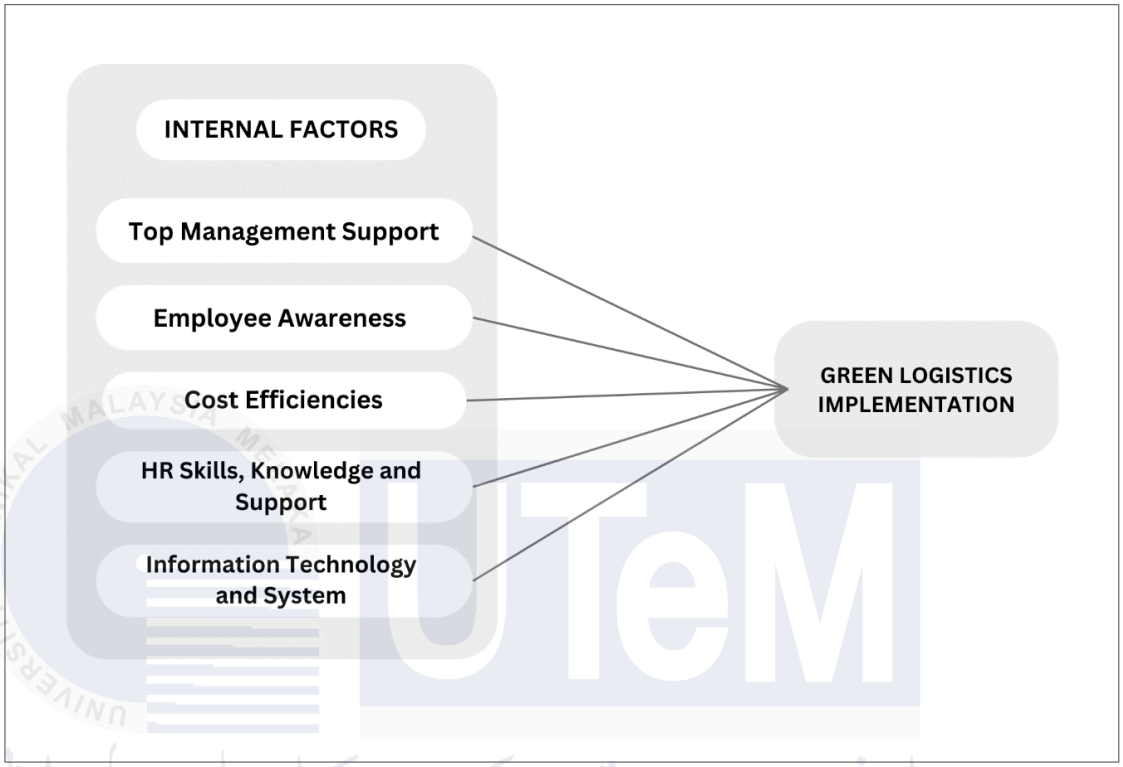
Institutional theory provides a valuable lens for understanding the implementation of green logistics within organizations. This theory emphasizes the influence of institutional pressures, including societal norms, regulations, and cultural expectations, on organizational behavior and decision-making processes (DiMaggio & Powell, 1983). In the context of green logistics implementation, institutional theory helps elucidate the external and internal factors that shape organizations' adoption of sustainable practices. **First, coercive pressures**. Coercive pressures refer to the influence exerted by external regulatory bodies, governments, and industry standards on organizational behavior (DiMaggio & Powell, 1983). Organizations face pressure to comply with environmental

regulations and standards governing logistics operations, such as emissions limits, waste management requirements, and sustainable sourcing practices (Srivastava, 2007). Compliance with these coercive pressures drives organizations to implement green logistics initiatives to avoid penalties, maintain legitimacy, and mitigate reputational risks (Fahimnia et al., 2015). **Secondly, the normative pressures.** Normative pressures stem from social norms, values, and expectations within the broader institutional environment (DiMaggio & Powell, 1983). As societal awareness of environmental issues grows, there is increasing pressure on organizations to adopt environmentally responsible practices, including green logistics (Wang & Jiao, 2020). Consumers, investors, and other stakeholders expect companies to demonstrate environmental stewardship and sustainability, driving normative pressures for green logistics adoption (Sarkis & Cohen, 2016). **Thirdly, mimetic pressures**. Mimetic pressures arise from organizations' tendency to imitate or emulate the practices of others perceived as successful or legitimate (DiMaggio & Powell, 1983). In the context of green logistics, organizations may adopt sustainable practices in response to industry norms, benchmarks, or best practices (McKinnon et al., 2015). Industry leaders and competitors that have successfully implemented green logistics initiatives serve as models for emulation, prompting other organizations to follow suit to maintain competitiveness and legitimacy.

2.8 Research Framework

This case study explores the various internal factors influencing the adoption and implementation of green logistics initiatives within organizations. Thus, this research framework will list the dependent and independent variables related with the implementation of green logistics. The independent variables consist of internal factors while the dependent variable is the implementation of green logistics. Below is the details of the variables and their relation.

Figure 2.6: Research Framework



2.9 Scientific Literature Review

Table 2.9: Scientific Literature Review

No.	Authors and (Year)	Country	Title	Influential Factors	Theory/Model	Research Method	Findings
1.	Rodríguez, M., & Vargas, G. (2021)	Spain	Green Logistics in the Spanish Automotive Industry: Influencing Factors	Regulatory compliance, market competition, sustainability awareness	Stakeholder Theory	Quantitative	Regulatory compliance and market competition are critical drivers, while sustainability awareness is growing among automotive companies.
2.	Tan, C.L., & Zailani, S. (2021)	Malaysia	Influences of Green Logistics Management on Environmental Performance	Top management commitment, government policies, technological capability	Resource-Based View	Quantitative	Top management commitment and government policies significantly impact the adoption of green logistics practices.
3.	Rahim, R., & Abdul Aziz, A. (2022)	Malaysia	Green Logistics Practices in Malaysian SMEs: A Review	Environmental regulations, cost savings, customer pressure	Institutional Theory	Qualitative	Environmental regulations and cost savings are significant motivators for green logistics adoption among Malaysian SMEs.
4.	Hassan, H., & Awang, Z. (2020)	Malaysia	Barriers and Drivers of Green Logistics Practices: Insights from Malaysian SMEs	Cost, lack of knowledge, regulatory pressures, competitive advantage	Diffusion of Innovation	Qualitative	Cost and lack of knowledge are major barriers, while regulatory pressures and competitive advantage drive adoption.
5.	Ahmad, S., & Kamarud din, M. (2019)	Malaysia	Sustainable Supply Chain and Green Logistics in Malaysia	Supplier collaboration, government support, environmental awareness	Stakeholder Theory	Quantitative	Supplier collaboration and government support are critical for effective green logistics implementation.
6.	Alshaali et al. (2020)	United Arab Emirates	Green logistics practices in the construction supply chain: A literature review and a proposed framework	Government regulations, economic factors (costs, investments), technological advancements, stakeholder pressure	Institutional Theory, Stakeholder Theory	Literature review	A framework is proposed for integrating green practices within the construction supply chain, emphasizing stakeholder pressure.

7.	Chen, H., & Zhang, F. (2020)	China	Drivers and Barriers of Green Logistics in China	Economic incentives, regulatory frameworks, technological advancement	Technology-Organization-Environment (TOE) Framework	Quantitative	Economic incentives and regulatory frameworks are key drivers, while technological advancements facilitate green logistics implementation.
8.	Jabbar et al. (2019)	Malaysia	A conceptual framework for the drivers and barriers of green logistics practices: A review of the literature	Government regulations, economic factors (costs, investments), technological advancements, stakeholder pressure	Institutional Theory, Stakeholder Theory	Literature review	A framework is proposed for understanding drivers and barriers across contexts, highlighting the impact of regulations and stakeholder pressure.
9.	Ibrahim et al. (2019)	Malaysia	The Determinant Factors of Green Practices Adoption For Logistics Companies in Malaysia. A Case Study of PKT Logistics Group Sdn. Bhd	Government regulations, economic considerations (cost-benefit analysis), environmental awareness, competitive advantage	N/A	Case study	The case study highlights the importance of government regulations, economic viability, and environmental awareness for green logistics adoption.
10.	Ayvaz et al. (2018)	Turkey	Green logistics practices and performance: A literature review and future research directions	Environmental regulations, economic factors (costs, investments), technological advancements, information technology	Natural-Resource-Based View	Literature review	Balancing environmental and economic performance is a key challenge. Technological advancements offer opportunities.
11.	Awasthi et al. (2018)	India	Green logistics practices and barriers in the Indian context: A review and path forward	Environmental regulations, economic viability, lack of infrastructure, internal resistance to change	Institutional Theory, Technological Determinism Theory	Literature review	Infrastructure development and overcoming internal resistance are crucial for green logistics adoption in India.
12.	Lee, K.T., & Goh, C.F. (2018)	Malaysia	Determinants of Green Logistics Adoption in the Manufacturing Sector	Environmental concerns, cost reduction, customer demand	Contingency Theory	Quantitative	Environmental concerns and cost reduction are primary drivers of green logistics adoption in the manufacturing sector.

13.	Song et al. (2017)	China	Green logistics research in China: A critical review	Government policies, economic factors (costs, ROI), technological innovation, stakeholder pressure	Institutional Theory, Stakeholder Theory	Literature review	Government support, economic viability, and stakeholder pressure influence green logistics adoption in China.
14.	Zhu et al. (2013)	China	Green logistics innovation capability and performance: A review of the literature	Top management commitment, government regulations, technological capabilities, information sharing	Dynamic Capability Theory	Literature review	Green logistics innovation capability positively impacts environmental and economic performance. Top management commitment is essential.
15.	Geng et al. (2013)	China	Driving Forces and Barriers for Green Logistics Development in China	Government regulations, economic performance, technological advancements	N/A	Literature review	-
16.	Seznec et al. (2012)	France	Logistics and Sustainable Development	Environmental regulations, economic performance, social responsibility	N/A	Literature review	-
17.	Sarkis et al. (2011)	United States	Greening Supply Chain Networks	Environmental regulations, stakeholder pressure, economic considerations	N/A	Literature review	-
18.	Setola (2011)	Finland	Drivers of green logistics practices in Finnish SMEs	Environmental regulations, customer pressure, cost reduction potential, lack of knowledge/ awareness	Institutional Theory, Technological Determinism Theory	Case studies	Balancing environmental and economic goals is challenging for SMEs due to limited resources. Knowledge sharing is crucial.

Table 2.10: My Research Scientific Review

Authors and (Year)	Country	Title	Influential Factors	Theory/ Model	Research Method	Findings
Fatin Najihah Binti Fauzi (2025)	Malaysia	Application and Implementation of Green Logistics: An Exploratory Study on the Implementation of Green Logistics at Suzuki Malaysia Sdn. Bhd.	Cost efficiencies, Employee Awareness, IT and System, Organizational and Top Management Support, HR Skills, Knowledge and Supports, Government Regulations, Competitions, Customer and Public Pressure		Qualitative	Employee Awareness, Top Management Support, Organizational Roles, and Global Role such as IT Systems will give impacts to the green logistics implementation

2.10 Summary

The literature review on the implementation of green logistics reveals a multifaceted landscape shaped by internal and external factors, each influencing the adoption and success of sustainable practices within organizations. Internally, top management commitment, employee awareness, existing infrastructure and technology, and organizational culture emerge as pivotal drivers. Top management commitment sets the tone for prioritizing sustainability, while a well-trained workforce and robust infrastructure facilitate the integration of green practices. Externally, government regulations, customer pressure, fuel prices, and technological advancements create a dynamic environment, further motivating organizations to embrace sustainability. The dependent variable, green logistics performance, encompasses environmental, economic, and operational dimensions, highlighting the holistic impact of sustainable practices. Through a comprehensive understanding of these factors, organizations can navigate the complexities of green logistics implementation and strive towards a more sustainable future.

CHAPTER 3

RESEARCH METHODOLOGY

3.0 Introduction

In this chapter, the researcher will discuss about the research methodology that will used to accomplish the research objectives of this research. The researcher will explain on the theoretical framework, hypothesis testing, research design, research approach that utilized in this research. Besides, researcher will also discuss on the questionnaire development with variables. Furthermore, the researcher discusses on the data collection, sampling frame and some data analysis tools that will used to analyse the gathered data. This chapter provides a comprehensive overview of the methodology employed in this explorative study on the implementation of green logistics. The primary objective of the methodology is to systematically investigate the practices, challenges, benefits, and perceptions associated with green logistics within organizations. Recognizing the exploratory nature of the study, some approach is predominantly used to gain in-depth insights, supplemented by quantitative data to offer a broader perspective and validate findings. In an era when environmental concerns and sustainability are becoming more and more of a focus, it is essential for all industries, including logistics, to implement environmentally friendly practices. Developing green logistics becomes essential as companies work to adapt their operations to environmental responsibility principles. Green logistics, characterized by activities and strategies aimed at mitigating the environmental impact of logistics operations, holds promise for fostering sustainable supply chains and reducing carbon footprints. Fundamentally, this study's methodology

aims to go beyond theoretical abstraction and provide useful information and practical suggestions for businesses that want to implement green logistics. With a strong basis in empirical research and guidance from influential scholarly contributions, the study seeks to revolutionise logistics and promote a change in perspective towards the principles of sustainability and the preservation of the environment.

3.1 Research Design

This study adopts an exploratory research design to investigate the implementation of green logistics practices within organizations. Given the nature of the research, a qualitative approach will be primarily utilized to gain in-depth insights. This approach is suitable for exploring the internal factors influencing the implementation of green logistics at Suzuki Malaysia Sdn. Bhd., as it allows for a nuanced understanding of motivations, challenges, and strategies related to sustainable logistics practices within the organization (Creswell & Creswell, 2018). The research design could provide researcher an overview of this study for better understanding. According to Saunders et al. (2016), research design can be considered as a fundamental aspect of understanding the overall strategy of the researcher in conducting research where it will be indicated how the researcher answering research questions in order to achieve research objectives. Research design is important where researcher able to decides the sources used to collect data and how to gather data from target respondents then analyse it. It will allow a greater value of information needed as well as help researcher to make decision in the entire study of project. The research approach involves conducting semi-structured interviews with key stakeholders at Suzuki Malaysia, including senior management, logistics managers, and employees involved in green logistics initiatives. These interviews will be guided by a set of open-ended questions designed to elicit insights into the internal factors driving or hindering the implementation of green logistics. These interviews will be complemented by document analysis of internal reports, policies, and sustainability documents to provide a comprehensive understanding of the organizational context, contextual information and practices related to green logistics.

The research design emphasizes understanding the perspectives and experiences of individuals within Suzuki Malaysia regarding green logistics implementation. According to Charmaz (2014), qualitative research is particularly effective for exploring complex phenomena within their natural settings, allowing researchers to uncover nuanced insights that quantitative methods may overlook. By focusing on internal factors such as management support, employee engagement, HR capabilities, cost considerations, and IT infrastructure, this study aims to identify critical success factors and potential barriers to the adoption of green logistics practices. Furthermore, this research design incorporates a thematic analysis approach to analyze the qualitative data gathered from interviews and document reviews. Thematic analysis allows for the identification and interpretation of patterns, themes, and relationships within the data, thereby facilitating the exploration of how internal factors interact to influence green logistics implementation (Braun & Clarke, 2006). The findings from this analysis will contribute to understanding the specific drivers and challenges faced by Suzuki Malaysia in their journey towards sustainable logistics practices.

In summary, this qualitative research design aims to provide a detailed exploration of the internal factors shaping the implementation of green logistics at Suzuki Malaysia Sdn. Bhd. By employing interviews and document analysis, the study seeks to uncover insights that can inform organizational strategies and contribute to the broader understanding of sustainable supply chain management.

3.1.1 Research Approach

The research approach adopted for this study is exploratory, aimed at generating insights and hypotheses concerning the internal factors influencing the implementation of green logistics at Suzuki Malaysia Sdn. Bhd. Exploratory research is chosen due to its capacity to explore complex phenomena within their natural context and uncover new perspectives (Creswell & Creswell, 2018). This approach allows for a flexible and iterative exploration of relatively unexplored areas, emphasizing the generation of hypotheses rather than their testing. By engaging with key stakeholders from top management to operational staff involved in green initiatives, the study seeks to

understand their motivations, challenges, and perceptions regarding the adoption of green logistics practices.

The methodology involves conducting in-depth semi-structured interviews and analyzing internal documents to capture diverse viewpoints and contextual factors influencing green logistics implementation. These qualitative methods are crucial for capturing nuanced, contextual data that may be overlooked by quantitative approaches, thereby exploring the subjective experiences and organizational realities shaping decision-making in sustainability efforts (Braun & Clarke, 2006). Furthermore, this exploratory research approach is well-suited to the dynamic nature of sustainability practices within organizational settings. It acknowledges the interplay between internal factors such as top management support, employee awareness, technological infrastructure, and cost efficiencies. By embracing this approach, the study aims not only to contribute to academic understanding but also to offer practical insights that can inform future research and guide organizational strategies toward sustainable supply chain management.

3.1.2 Pilot Study

A pilot study serves as a preliminary investigation to refine the research design, methods, and instruments before conducting the main study. It helps in identifying potential challenges, assessing the feasibility of the research process, and ensuring the reliability and validity of the study. For this research on the internal factors influencing the implementation of green logistics at Suzuki Malaysia Sdn. Bhd., a pilot study using qualitative methods is essential. The pilot study aims to:

1. Test the feasibility and appropriateness of the semi-structured interview guide.
2. Identify any potential issues in the data collection process.
3. Ensure that the questions are clear and elicit relevant and rich data.
4. Refine the research design and methodology based on the feedback and findings.

3.1.2.1 Methodology

Sampling

A purposive sampling method will be employed to select a small, representative sample of participants for the pilot study. This sample will include key stakeholders involved in the implementation of green logistics at Suzuki Malaysia Sdn. Bhd., such as managers, employees from different departments, and IT personnel. A total of 2-5 participants will be selected to ensure a diverse range of perspectives.

Data Collection

Semi-structured interviews will be the primary data collection method. An interview guide will be developed, focusing on the following key areas:

A. Employee awareness and understanding of green logistics.
B. Perceptions of cost efficiencies related to green logistics.
C. The role of top management in supporting green logistics initiatives.
D. implementation.
E. The impact of IT systems on green logistics practices.

The influence of HR skills, knowledge, and support on green logistics

Procedure

Each interview will last approximately 45-60 minutes and will be audio-recorded with the participants' consent. The interview guide will include open-ended questions to encourage detailed responses and allow for the exploration of unexpected themes.

Data Analysis

The data from the pilot study will be analyzed using thematic analysis. This involves identifying, analyzing, and reporting patterns (themes) within the data. According to Braun and Clarke (2006), thematic analysis is a flexible and useful method for qualitative research that can provide rich and detailed accounts of data. The initial coding and theme development will help in refining the interview guide and methodology for the main study.

Findings and Adjustments

The pilot study will provide insights into the effectiveness of the interview guide and the overall research process. Any issues identified, such as unclear questions or logistical challenges, will be addressed. Feedback from the participants will be used to refine the questions to ensure they are understandable and relevant. For instance, if participants find certain questions ambiguous or difficult to answer, those questions will be rephrased for clarity. Similarly, if new themes emerge that were not initially considered, the interview guide will be updated to include these areas.

Importance of Pilot Study

Conducting a pilot study is crucial for enhancing the quality and rigor of qualitative research. It allows researchers to identify and mitigate potential issues before the main study, thereby improving the reliability and validity of the research findings (Creswell & Poth, 2018). Moreover, it provides an opportunity to refine the data collection instruments and methods, ensuring they are well-suited to the research objectives.

3.2 Research Theoretical Framework

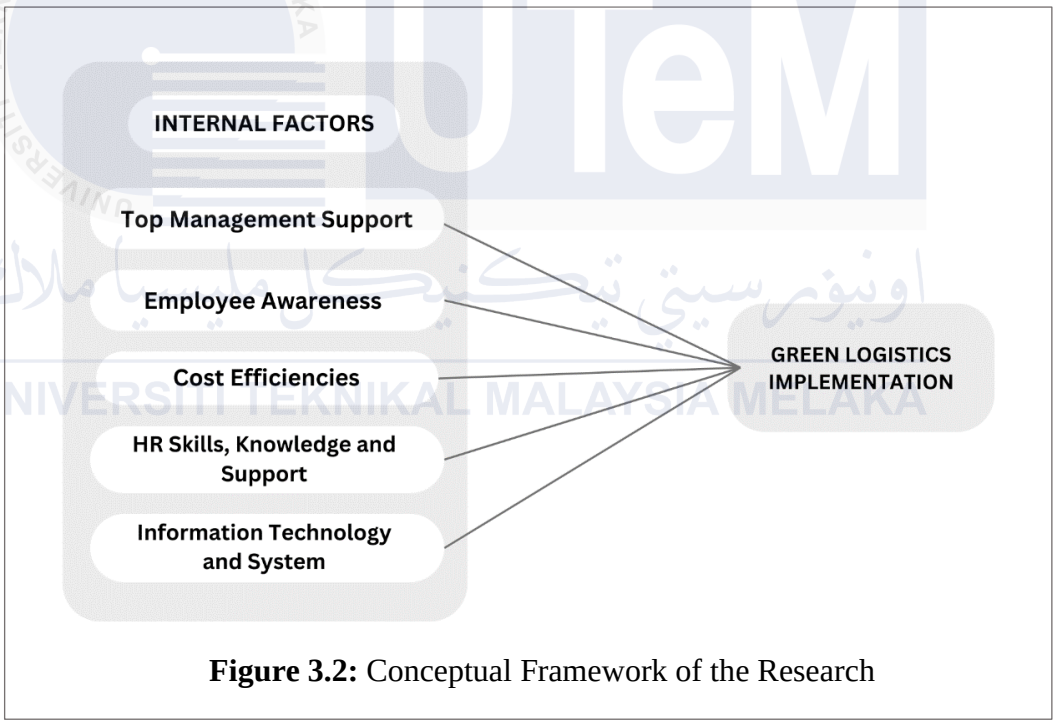


Figure 3.2: Conceptual Framework of the Research

This research framework that explores factors affecting the implementation of green logistics practices. Understanding the factors that influence the implementation of green logistics practices is crucial for organizations seeking to reduce their environmental impact and operate more sustainably. This research framework explores internal factors that can drive or hinder green logistics adoption. The internal factors are already discussed at the previous chapter.

3.2.1 Research Questions Development

In qualitative research, the testing method is approached differently compared to quantitative studies. Instead of testing specific hypotheses with statistical methods, qualitative research aims to explore, understand, and generate theories or explanations from the data collected. Therefore, testing method in qualitative research are often framed as research questions or propositions that guide the inquiry rather than being tested for statistical significance. For this study, the research questions serve as guiding reason to be explored qualitatively through thematic analysis and interpretation of participant responses. These questions are designed to uncover insights into the internal factors influencing the adoption and implementation of green logistics practices within the organization. The qualitative approach adopted for this study posits several research questions aimed at understanding the internal factors that drive or hinder green logistics implementation at Suzuki Malaysia Sdn. Bhd. These questions may sound like this:

1. How does top management support influence the integration of green logistics practices?
2. What are the perceptions and attitudes of employees towards green logistics initiatives?
3. How do HR policies and capabilities contribute to the successful implementation of sustainable logistics practices?
4. What role does IT infrastructure play in supporting green logistics operations?
5. What are the perceived cost efficiencies and financial implications associated with green logistics adoption?

3.3 Primary and Secondary Data

Both primary and secondary data play crucial roles in gaining comprehensive insights into the topic. According to Sekaran and Bougie (2016), primary data refers to information collected firsthand by the researcher directly from the source. In the context of this study, primary data collection methods such as semi-structured interviews with key stakeholders at Suzuki Malaysia Sdn. Bhd. will be employed. These interviews will allow the researcher to gather in-depth qualitative data regarding internal factors influencing green logistics implementation, including insights into management support, employee perspectives, HR capabilities, IT infrastructure, and cost efficiencies (Sekaran & Bougie, 2016).

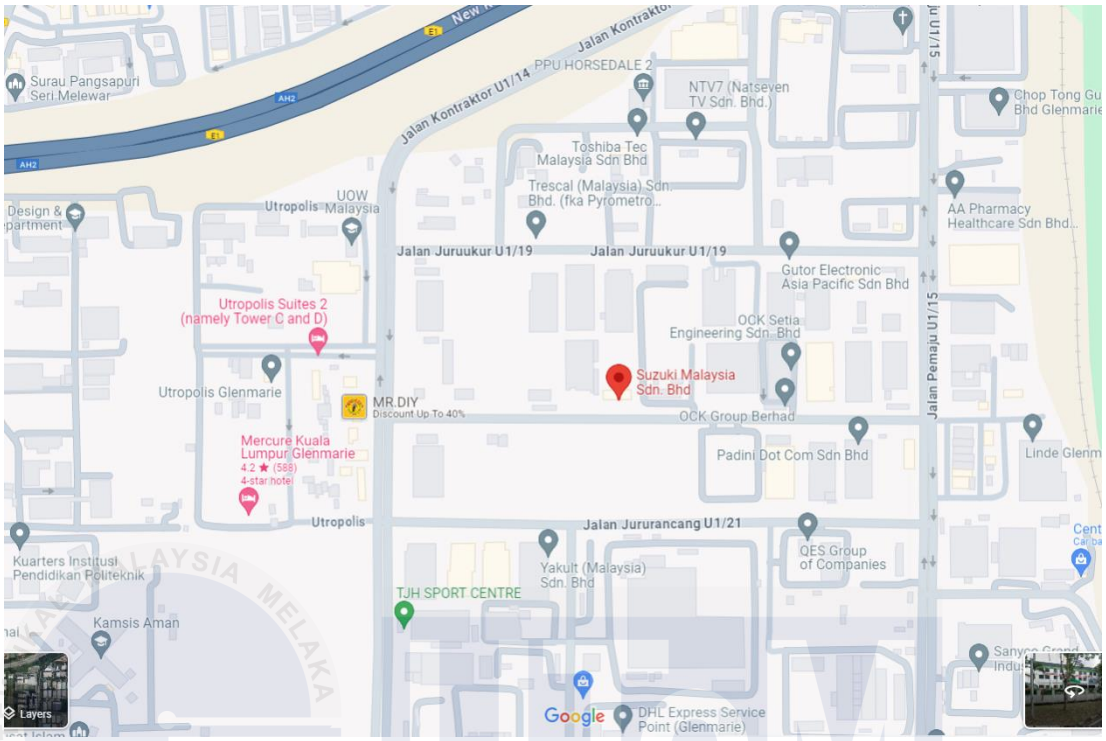
On the other hand, secondary data, as defined by Saunders et al. (2019), consists of information that was initially collected for a different purpose but is subsequently analyzed to provide additional insights, knowledge, or explanations. In the context of this study, secondary data sources may include existing literature, reports, and organizational documents related to green logistics practices, sustainability initiatives, and supply chain management. Secondary data will be valuable for contextualizing findings from primary data collection, validating emerging themes, and providing a broader understanding of industry trends and best practices in sustainable logistics (Saunders et al., 2019).

Moreover, Kvale and Brinkmann (2015) emphasize the importance of using multiple data sources, both primary and secondary, in qualitative research to enhance the richness and credibility of findings. By triangulating data from interviews with stakeholders and insights from literature and organizational documents, this study aims to offer a comprehensive exploration of internal factors influencing green logistics implementation at Suzuki Malaysia Sdn. Bhd. This approach not only enriches theoretical understanding but also provides practical implications for enhancing sustainable supply chain management practices in the organization.

3.4 Research Location

The research will primarily focus on Suzuki Malaysia Sdn. Bhd., a prominent subsidiary of Suzuki Motor Corporation based in Malaysia. Suzuki Malaysia operates within the automotive industry, specializing in the distribution and servicing of Suzuki vehicles across the Malaysian market. The company's headquarters and operational facilities will serve as the primary research location for this study. Suzuki Malaysia Sdn. Bhd. is chosen as the research location due to its strategic importance within the regional automotive sector and its ongoing commitment to sustainability initiatives, including the implementation of green logistics practices. Suzuki Malaysia Sdn. Bhd. is strategically situated within the Hicom Glenmarie Industrial Park, located in Shah Alam, Selangor Darul Ehsan, Malaysia. This industrial park is renowned for its concentration of automotive industry players and its strategic positioning within the Kuala Lumpur metropolitan area.

Hicom Glenmarie Industrial Park is home to a cluster of automotive manufacturers, suppliers, and service providers. This clustering effect fosters synergies, collaboration, and knowledge-sharing within the automotive industry, enhancing Suzuki Malaysia's competitive edge through access to a skilled workforce, specialized suppliers, and technological advancements. The park's strategic location facilitates efficient logistical operations for Suzuki Malaysia. Close proximity to major highways and transportation arteries ensures swift connectivity to ports, airports, and regional markets within Malaysia and across ASEAN countries. This logistical advantage enables Suzuki Malaysia to optimize supply chain management, reduce lead times, and meet customer demands effectively.



No. 12 & 14, Jalan Jurunilai U1/20, Seksyen U1,
Hicom Glenmarie Industrial Park, 40150
Shah Alam, Selangor Darul Ehsan

Figure 3.4: Research Location

3.5 Research Strategy

A research strategy is an action plan outlining how a researcher will answer their research questions (Saunders et al., 2019). For this study on exploring internal factors of green logistics implementation at Suzuki Malaysia Sdn. Bhd., a case study methodology is chosen. This approach allows an in-depth examination of complex phenomena within their real-life contexts (Baxter & Jack, 2015). The case study approach is well-suited for this research as it provides a detailed understanding of Suzuki Malaysia's internal dynamics and practices related to green logistics. Case studies are particularly effective for exploring specific objects, events, or activities within their natural context, offering a

comprehensive view of the factors influencing green logistics implementation (Ridder, 2017).

Data will be collected through semi-structured interviews, which offer flexibility while ensuring all relevant topics are covered (Qu & Dumay, 2019). Semi-structured interviews are advantageous in exploratory research as they allow for deep probing and rich, qualitative data collection. Each interview will last approximately 60 minutes and will be audio-recorded with participants' consent to ensure accurate data capture and subsequent analysis. **The interview protocol** will be developed based on the framework suggested by Rubin and Rubin (2012), focusing on key themes such as management support, employee awareness, HR capabilities, IT infrastructure, and cost efficiencies. This structured approach helps capture comprehensive insights into participants' experiences and perceptions regarding green logistics at Suzuki Malaysia. Key stakeholders, including top management, logistics personnel, and employees involved in green initiatives, will be interviewed to gather diverse perspectives. The rationale for choosing a case study strategy stems from its ability to provide a deep understanding of the internal factors influencing green logistics implementation. According to Yin (2018), case studies are particularly effective when the boundaries between the phenomenon and context are not clearly evident. This is relevant for green logistics, where internal organizational factors such as management support, employee awareness, HR capabilities, IT infrastructure, and cost efficiencies play a crucial role.

3.6 Data Analysis

The data analysis for this study on the internal factors influencing the implementation of green logistics at Suzuki Malaysia Sdn. Bhd. It will employ a qualitative approach, specifically thematic analysis. Thematic analysis is a method for identifying, analyzing, and reporting patterns (themes) within data. This approach allows for a detailed and nuanced understanding of the data, which is essential for exploring complex phenomena like green logistics implementation (Braun & Clarke, 2006).

Thematic analysis involves several steps to ensure a systematic and thorough examination of the qualitative data collected from semi-structured interviews and internal documents. These steps include familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the final report (Braun & Clarke, 2006). **First, familiarization with the data involves** transcribing the audio-recorded interviews and reading through the transcripts multiple times to become deeply familiar with the content. This step also includes noting any initial observations or potential patterns (Nowell et al., 2017). Second, generating initial codes involves systematically coding the data to identify significant features. Coding involves tagging segments of the data that appear relevant to the research questions. This process helps in organizing the data into meaningful groups (Maguire & Delahunt, 2017). Next, **searching for themes involves collating codes into potential themes.** Themes are broader patterns that capture significant aspects of the data in relation to the research questions. At this stage, different codes are combined to form overarching themes (Clarke & Braun, 2018). Reviewing themes involves checking the identified themes against the coded data and the entire data set to confirm their validity and coherence (Nowell et al., 2017). Defining and naming themes involves further refining and naming the themes. This step involves defining the essence of each theme and determining how it relates to the research questions. Each theme is given a descriptive name that captures its core meaning (Clarke & Braun, 2018). Finally, producing the final report involves writing up the analysis, which includes a detailed account of the themes and their relevance to the research questions. This report will provide a rich and insightful understanding of the internal factors influencing green logistics implementation at Suzuki Malaysia (Braun & Clarke, 2006).

In the context of this study, thematic analysis will be used to explore internal factors such as management support, employee awareness, HR capabilities, IT infrastructure, and cost efficiencies. By systematically analyzing the qualitative data, the study aims to uncover the motivations, challenges, and success factors associated with green logistics at Suzuki Malaysia. This detailed analysis will provide practical insights and contribute to the broader understanding of sustainable logistics practices in the automotive industry.

3.6.1 Trustworthiness Strategies

This qualitative study on green logistics implementation followed rigorous trustworthiness strategies to ensure the validity and reliability of findings. Trustworthiness was established by adhering to the criteria of credibility, confirmability, dependability, and transferability (Lincoln and Guba, 1985).

Credibility

To enhance the credibility of the qualitative findings, multiple strategies were employed. Triangulation was utilized during the data coding and analysis phase, combining insights from interviews, observations, and document analysis. According to Patton (1999), triangulation strengthens the study by ensuring that findings are not limited by a single source of data or method. Peer examination was conducted throughout the analysis phase to validate interpretations and challenge potential biases, aligning with Shenton's (2004) emphasis on involving colleagues to enhance trustworthiness. Furthermore, member checks were incorporated during all phases of the study—data collection, analysis, and presentation. Member checking allowed participants to review the accuracy of transcriptions and interpretations, ensuring their perspectives were authentically represented (Lincoln & Guba, 1985).

Confirmability

To address potential researcher biases, reflexivity was a core component of the study. Reflexivity, achieved through a bracketing strategy, required the researcher to critically examine their positionality and assumptions throughout the research process. As Gearing (2004) notes, bracketing helps to mitigate personal biases and allows the data to speak for itself. A reflective journal was maintained to document ongoing reflections and decisions during data collection and analysis.

Dependability

The dependability of the study was ensured by implementing a standardized protocol for data collection, which provided a consistent structure for interviews and observations. An audit trail was also established, meticulously documenting methodological decisions, coding processes, and data interpretations. Lincoln and Guba (1985) emphasize that an audit trail allows external reviewers to assess the research process for consistency and dependability.

Transferability

To promote transferability, varied sampling was utilized to capture diverse perspectives on green logistics implementation. This approach ensured the inclusion of participants with different roles and experiences in logistics. Additionally, findings were presented with rich and thick descriptions to provide detailed contextual information, allowing readers to assess the applicability of the findings to their own contexts. As Shenton (2004) states, such detailed descriptions enable other researchers to make informed judgments about the transferability of results.

3.7 Ethical Considerations

The study adheres to ethical research guidelines by obtaining informed consent from all participants, ensuring the confidentiality of their responses, and securing necessary institutional approvals. This ensures the ethical integrity of the research process (Bryman, 2016).

Informed Consent

All participants will be required to provide informed consent before participating in the study. They will be informed about the purpose of the study, their rights as participants, and how their data will be used. This study will adhere to ethical guidelines

to ensure the confidentiality, voluntary participation, and informed consent of all participants. Ethical approval will be obtained from the relevant institutional review board (IRB) prior to data collection (American Psychological Association, 2017).

Confidentiality and Anonymity

Confidentiality. Participant data will be kept confidential and used solely for the purposes of this research. Personal identifiers will be removed from the data to ensure anonymity. The data will be stored securely and only accessible to the research team. Saunders, Lewis, and Thornhill (2013) emphasize the importance of confidentiality in maintaining the trust and integrity of the research process. **Anonymity**. Where possible, data will be collected anonymously. When anonymity is not feasible, pseudonyms will be used to protect the identities of the participants and the organization involved. This approach aligns with the principles outlined by Creswell and Creswell (2018), who highlight the significance of anonymity in protecting participants' identities.

3.8 Timeline

- Month 1-2: Conduct literature review and develop data collection instruments.
- Month 3: Pilot test and refine data collection instruments.
- Month 4-5: Collect data through interviews, questionnaires and observations.
- Month 6: Analyze data using thematic and statistical methods.
- Month 7: Write and finalize the methodology chapter.

3.9 Summary

This chapter outlines the research methodology employed to explore the internal factors influencing the implementation of green logistics at Suzuki Malaysia Sdn. Bhd. It begins by defining the research design, emphasizing an exploratory approach suitable for uncovering new insights and understanding complex phenomena within their natural context. The research approach is elaborated upon, highlighting the use of qualitative methods to gain in-depth insights into the motivations, challenges, and success factors related to green logistics. The chapter details the data collection process, emphasizing the use of primary and secondary data sources. Primary data is gathered through semi-structured interviews with key stakeholders, providing rich, firsthand insights, while secondary data is sourced from existing documents and records, offering a broader context. The methodology ensures the collection of comprehensive and relevant data to address the research objectives. **A significant focus is given to the data analysis process**, which employs thematic analysis to systematically identify, analyze, and report patterns within the qualitative data. The steps of thematic analysis, from familiarization with the data to producing the final report, are meticulously described to ensure a robust and thorough examination of the data. Overall, this chapter provides a detailed and structured explanation of the research methodology, ensuring transparency and rigor in the exploration of internal factors affecting green logistics implementation at Suzuki Malaysia. It sets the foundation for the subsequent chapters, which will present and discuss the findings derived from this methodological approach.

CHAPTER 4

RESEARCH FINDINGS AND DISCUSSION

4.0 Introduction

In this chapter, the findings of the analysis regarding the factors that drive Suzuki Malaysia to implement green logistics are discussed in greater detail. It begins with individual factors, such as employee awareness, followed by organizational factors, including top management support, and global factors like Information Systems (IT). The research questions and objectives stated in Chapter 1 are also discussed based on the chosen data analysis methodology. This includes interviews conducted with supervisors at Suzuki, which were carried via online meeting, allowing flexibility and accommodating diverse respondent preferences. The thematic analysis approach was used to identify recurring patterns and themes in the responses, ensuring a robust understanding of the factors influencing green logistics.

4.1 Description of The Research Findings

Chapter 4 of this study examines the factors that contribute to the successful implementation of green logistics within organizations, specifically focusing on Suzuki Malaysia's transition to more sustainable logistics practices. It explores how employee

awareness, organizational culture, and leadership support play key roles in driving the adoption of green logistics. The study highlights three main factors influencing Suzuki's initiative: individual, organizational, and global. Data was collected through a mixed-methods approach, combining interviews with supervisors and analysis of Suzuki's operational practices, providing a well-rounded perspective on the motivations behind the company's shift towards environmentally friendly logistics solutions.

4.1.1 Study Participants

Participants in this study consist of supervisors from the logistics department at Suzuki Malaysia where both of them have a great and outstanding experience in this field. One of them have been with this department for more than six months while the other one have been with the department for over one year and half. While for the research method, qualitative case study (QCS) research method have been chosen in order to collect data from the study participants. Semi-structured interview was chosen in order to gain the understanding and experience of the study participants regarding the green logistics implementation at Suzuki Malaysia Bhd. The data the was transcribed, analyzed and examined in order to find the emerging themes. For validity, data were triangulated using secondary method of data collection such members checking. Besides, to preserve anonymity of the respondents, they were assigned pseudonyms.

4.2 Green Logistics From Their Perspective

So, upon interviewing both participants, they openly shared about green logistics from their perspectives. Green logistics, generally in normal people understanding is regarding the process or habit or adaptation in maintaining the world sustainability, or any practices that could lead to lower the harm to the planet and people. But, below are the definition and green logistics definition from their point of view.

"Green logistics refers to efforts to reduce the negative impact of logistics on the environment. It involves the use of eco-friendly technologies and practices such as reducing carbon emissions, minimizing fuel consumption, optimizing the supply chain, and managing waste more efficiently."

(Madam Rose, Logistics Supervisor at Suzuki)

Madam Rose emphasize that green logistics are actually some great initiatives that aimed to minimize the environmental impact of logistics activities. It focuses on adopting sustainable practices and technologies to reduce harmful effects towards our environment. This includes efforts to lower the carbon emissions, cutting down the fuel usage, while streamlining supply chains for efficiency, and to manage waste in a more environmentally responsible way. Overall, the goal of green logistics is to make logistics operations more eco-friendly while maintaining efficiency and effectiveness in the supply chain.

"In the context of Suzuki Malaysia, green logistics can involve steps such as reducing fuel consumption in vehicle transportation, minimizing raw material waste, and using green technology in the distribution of vehicles and spare parts. This aligns with the commitment to sustainability and environmental responsibility"

(Madam Rose, Logistics Supervisor at Suzuki).

Madam Rose also emphasized regarding the green logistics in the Suzuki Malaysia perspectives. She said, at Suzuki, green logistics practices can make its transportation process more eco-friendly. This include using less fuel when moving the transportation, cutting down the waste from raw materials, and using green technology when delivering cars and spare parts. These efforts help in supporting the company's commitment to being environmentally responsible and sustainable. Furthermore, the other respondent, Miss Jane, shared that green logistics from her point of view as below:

"Green logistics refers to environmentally friendly supply chain management, aiming to reduce negative impacts on the environment, such as minimizing carbon emissions, resource waste, and the use of renewable energy."

(Miss Jane, Logistics Supervisor at Suzuki)

4.3 Research Question 1: Level Of Employee Awareness in Green Logistics

RQ 1: What is the level of awareness among employees regarding green logistics implementation in the organization?

Under this theme, we will discussed about the level of awareness among employees regarding green logistics implementation in the organization. Employees' understanding and awareness of sustainability play a crucial role in the success of green logistics implementation. According to the interviews conducted, several employees expressed a sense of personal responsibility toward reducing environmental impact. This aligns with the notion that "Employee awareness and education are the cornerstones of successful green initiatives, fostering accountability and innovation at all levels of the organization" (Smith & Johnson, 2021). Additionally, under this theme, several subtopics have emerged, including:

(a) Information About Green Logistics Practices

(b) Employee Encouragement Methods

(c) Successful Approaches Implemented

4.3.1 Information About Green Logistics Practices

Information about green logistics practices must be effectively communicated within the company through various channel and strategies in order to make sure that the employee is timely aware about it. For green logistics to be successfully integrated into an organization, it is essential that employees have a strong understanding of its principles and practices. If employees have limited knowledge about green logistics, ensuring the successful implementation of green logistics within the organization becomes quite difficult, and may even be impossible. A lack of understanding or awareness among employees can severely hinder the effectiveness and success of adopting green logistics practices in the organization. Without proper awareness and training too, employees may struggle to adopt eco-friendly practices, leading to resistance, inefficiencies, and even failure in achieving environmental goals.

> *"Information about green logistics practices is effectively communicated through training and workshops to educate staff. This is supported by clear company policies on green guidelines. Internal communication tools like emails, bulletin boards, and company portals are used to disseminate information. Additionally, company reports and performance monitoring help to track the achievements of green initiatives. Awareness campaigns are also conducted to encourage employee participation in eco-friendly practices" (Madam Rose).*

Madam Rose pointed out that employee education workshops and training sessions are the key to effectively conveying green logistics practices. Clear company policies on environmental guidelines also support this effort. Information is shared using internal communication tools such as emails, bulletin boards, and company portals. Additionally, company reports and performance tracking are used to monitor the progress of green initiatives. Campaigns to raise awareness are held to motivate staff members to actively engage in environmentally friendly activities. Besides, Miss Jane also highlighted the same thing about how the information about green logistics is shared.

"Usually through emails and bulletins or webinars, for example, distributing periodic emails and bulletins about the latest green campaign practices and updates on the company's green initiatives."

(Miss Jane)

4.3.2 Employees Encouragement Methods

Encouraging employees to adopt and practice green logistics both within the organization and in their daily lives is crucial. Effective encouragement methods can significantly contribute to the successful implementation of green logistics practices. By providing proper motivation and support, employees are more likely to apply these practices within the workplace and carry them over into their personal routines. This encouragement ensures that green logistics initiatives are not only embraced in the organization but also integrated into employees' everyday actions, which ultimately leads to more sustainable practices and a greater impact on the environment.

Under this subtopic, we will thoroughly explore the encouragement methods used to ensure that employees are motivated and actively practice green initiatives in their daily routines. These methods are designed to inspire employees to incorporate sustainable practices not only in the workplace but also in their personal lives, supporting the overall goals of green logistics within the organization.

"Employees are incentivized with recognition and rewards for innovative eco-friendly ideas. They are also encouraged to participate in energy-efficient practices and recycling programs" (Madam Rose).

From the interview session, Madam Rose mentioned that employees are motivated through recognition and rewards for contributing innovative eco-friendly ideas. They are also encouraged to take part in energy-saving practices and recycling programs to support sustainability within the organization.

> *"Initiatives such as rewards and recognition, for example, offering bonuses or acknowledgment to employees using eco-friendly delivery methods like electric vehicles, which could earn praise or monthly awards" (Miss Jane).*

Miss Jane also added that initiatives like rewards and recognition, such as offering bonuses or acknowledgment, are used to motivate employees who adopt eco-friendly delivery methods. For example, employees using electric vehicles for deliveries may earn praise or even monthly awards for their sustainable efforts.

4.3.3 Successful Approaches Implemented

Under this subtopic, we will discuss the successful strategies and approaches that have been implemented, which have raised awareness among employees and encouraged them to adopt green practices. These efforts have contributed to the success of green logistics initiatives within the organization.

> *"Continuous education campaigns, clear goals, and engaging tools like videos and mobile apps help raise awareness and motivation."*
>
> *(Madam Rose)*

Madam Rose mentioned that ongoing educational campaigns, clear goals, and engaging tools such as videos and mobile apps play a key role in raising awareness and

motivating the employees. These efforts help keep employees informed and encouraged to participate in green initiatives.

> *"Using digital tools or applications that track and report employees' eco-green achievements, like reducing paper usage or lowering carbon footprints in logistics operations" (Miss Jane).*

While Miss Jane added that the use of digital tools or applications to monitor and report employees' eco-friendly accomplishments, such as reducing paper consumption or minimizing carbon footprints in logistics, enhances motivation and helps track the success of sustainability efforts.

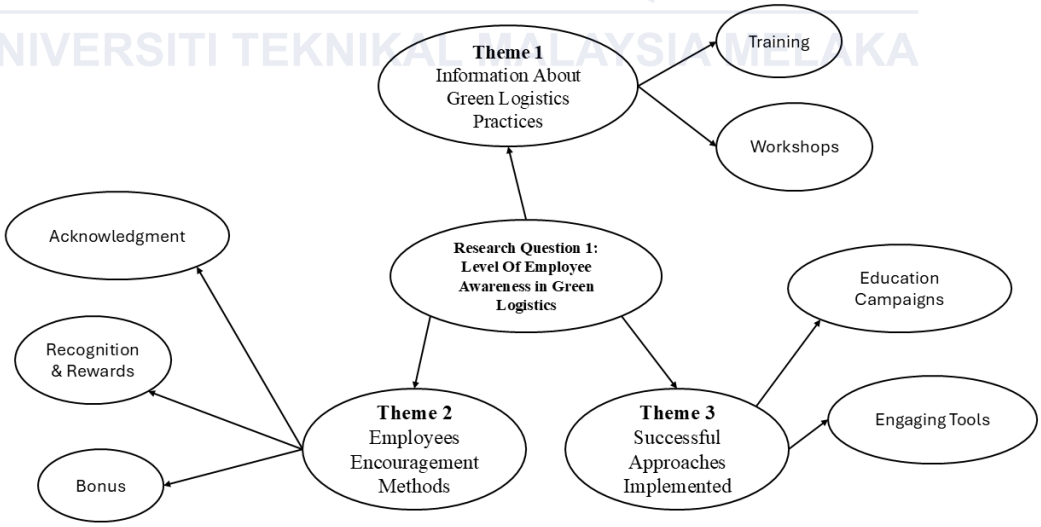


Figure 4.13: Themes and Categories for Research Question 1

4.3.4 RQ1 Discussion

RQ 1: What is the level of awareness among employees regarding green logistics implementation in the organization?

Employee awareness plays a critical role in the successful implementation of green logistics. At Suzuki Malaysia, creating awareness among employees about sustainable practices is crucial for fostering a culture of environmental responsibility. Training programs and internal campaigns are often used to educate staff on the benefits of green logistics, such as reduced carbon emissions, cost savings, and compliance with environmental regulations. According to Khan et al. (2020), employee education enhances their ability to adopt and sustain green initiatives, which ultimately contributes to the organization's long-term goals.

4.4 Research Question 2: The Role of Organizational Culture and Leadership Towards Green Logistics Adoption

RQ 2: How do organizational culture and leadership contribute to the adoption of green logistics?

Support from Suzuki Malaysia’s leadership emerged as a significant driver. The study found that proactive engagement from top management not only provided the necessary resources but also set the tone for a culture of sustainability. This finding aligns with the resource-based view (RBV) theory, which emphasizes the importance of organizational capabilities and leadership commitment in achieving competitive advantages through sustainability initiatives (Barney, 1991).We will go thoroughly on how organizational culture and leadership contribute to the adoption of green logistics. Under this theme, we will explore the role of organizational culture and leadership in

promoting the integration of green logistics practices. Several subtopics have emerged, including:

(a) Cost Efficiencies

(b) Top Management Support

(c) HR's Role

Organizational culture and leadership are crucial in shaping how green logistics practices are adopted within an organization. A supportive culture encourages employees to align with sustainability goals, while strong leadership ensures that these goals are prioritized and effectively implemented. Leadership, particularly from top management, plays a key role in providing direction, resources, and motivation for green initiatives. Additionally, human resources (HR) can support the adoption of green logistics by integrating sustainability into employee training, performance evaluations, and rewards systems. Together, these elements create a framework that fosters the successful adoption of green logistics across the organization.

4.4.1 Cost Efficiencies

Cost efficiencies play a significant role in the adoption of green logistics by helping organizations balance sustainability goals with financial performance. When organizations implement green logistics practices, such as optimizing transportation routes, reducing energy consumption, or using eco-friendly packaging, they can reduce operational costs in the long run.

> *"Green logistics reduces operational costs by optimizing fuel usage, minimizing waste, and using energy-efficient technologies"*
>
> *(Madam Rose)*

Impact on Costs. The adoption of green logistics can have a positive impact on costs by reducing waste, improving efficiency, and lowering resource consumption. For example, energy-efficient vehicles or automated systems can significantly lower fuel and maintenance costs, while waste reduction practices can reduce disposal expenses. Green logistics also optimizes fuel usage, minimizes waste, and incorporates energy-efficient technologies, as highlighted by Madam Rose. These practices help to lower expenses related to fuel consumption, waste disposal, and energy usage. Miss Jane also mentioned that optimizing the travel routes lead to lower fuel consumption and vehicle maintenance costs as the unnecessary travel distances can be reduced.

> *"By optimizing routes, the company can reduce unnecessary travel distances, lowering fuel consumption and vehicle maintenance costs"* ***(Miss Jane).***

> *"Packaging materials can also reduce costs; for instance, using recyclable or eco-friendly packaging materials helps save on purchasing costs and reduces waste disposal needs" (Miss Jane).*

Miss Jane also added that packaging materials can play a role in reducing costs. For example, using recyclable or eco-friendly packaging helps lower the costs of purchasing materials and reduces the need for waste disposal. By switching to sustainable packaging, organizations can further cut operational expenses while supporting their green logistics efforts. Besides, Madam Rose also stated that using alternative fuel vehicles and recycled packaging materials has led to substantial cost savings, while also helping the organization meet environmental compliance requirements. These initiatives are not only lower operational costs but also support the organization's commitment to sustainability and regulatory standards.

"Alternative fuel vehicles and recycled packaging materials have significantly saved costs while improving environmental compliance" (Madam Rose).

Cost Savings with Green Logistics. By embracing sustainable approaches, organizations can improve their overall cost-efficiency while contributing to environmental conservation. This potential for cost savings makes green logistics an attractive option for businesses aiming to enhance both their financial performance and sustainability efforts. Through the study, Miss Jane said that the company carefully manages cost savings and investments in green logistics by conducting cost-benefit analyses and implementing changes gradually. They also take advantage of government programs and incentives to support their efforts.

"The company balances cost savings and investments in green logistics through cost-benefit analysis and phased implementation while leveraging government initiatives" (Miss Jane).

"The company balances cost savings with investments in green logistics through long-term planning and cost-benefit analysis. Although initial investments in green technology or eco-friendly infrastructure may be high, the company evaluates the return on investment (ROI) through future operational cost reductions, improved efficiency, and compliance with environmental laws that avoid penalties. They may also seek support such as government incentives or strategic partnerships to reduce the burden of initial investments" (Madam Rose).

"Suzuki invests in technologies that reduce long-term operational costs, such as automation and energy management" (Miss Jane).

The company balances cost savings and investments in green logistics by focusing on long-term planning and analyzing costs versus benefits. Although the upfront cost of green technologies or eco-friendly infrastructure can be high, the company assesses its return on investment (ROI) through potential savings in operational costs, improved efficiency, and compliance with environmental regulations to avoid fines. They also explore government incentives and partnerships to ease the financial burden of these investments. Suzuki focuses on technologies that help reduce long-term operational costs, such as automation systems and energy management solutions.

4.4.2 Top Management Support

Support from top management is essential for the successful adoption of green logistics. Their involvement ensures that sustainability goals are aligned with the company's overall strategy. By providing clear direction, allocating necessary resources, and fostering a culture of environmental responsibility, top management drives the success of green logistics initiatives. Their dedication encourages partnerships, trust among stakeholders, and employee engagement - all of which are critical for successfully implementing environmentally friendly logistics practices.

(I) Level of Support

According to Madam Rose, there are strong backing from top management due to the long-term cost savings and enhanced company reputation. She also said that they recognize the potential for long-term cost savings, improved company reputation, and compliance with environmental regulations. Management actively provides resources and sets performance targets to ensure the success of sustainability programs. While the other respondents, Miss Jane emphasizes that the supportive management invests in green technologies, ensures employees receive training, and promotes involvement, making sustainability a key KPI for the company. She also pressed on the commitment of the top management. Committed top management ensures that green practices are transparently implemented and ingrained into the organizational culture, securing widespread support and involvement from all levels within the company.

"The level of support from top management for green logistics initiatives is generally high. They recognize the potential for long-term cost savings, improved company reputation, and compliance with environmental regulations. Management actively provides resources and sets performance targets to ensure the success of sustainability programs"

(Madam Rose).

"The level of support is evident in their commitment to setting strategic visions, allocating financial resources, and leading by example. Supportive management invests in green technologies, ensures employees receive training, and promotes involvement, making sustainability a key KPI for the company" *(Miss Jane).*

(II) Actions or Policies Implemented

"Supportive management implements actions such as investing in green technologies like automation systems to reduce carbon emissions and introducing recycling and waste reduction policies in warehouse operations."

Miss Jane emphasised that the implementation of successful green logistics initiatives depends heavily on supportive management. She explained that top management engages in actions such as investing in green technologies, including automation systems, to minimize carbon emissions. Additionally, they introduce recycling and waste reduction policies within warehouse operations. Not only that, they also set environmental standards, adopt renewable energy sources for operational centres and production stages, while providing the employees training on green logistics practices to ensure alignment with sustainability goals.

> *"Top management typically implements specific actions or policies, such as introducing low-carbon vehicle policies, optimizing the supply chain to reduce carbon emissions, and promoting recycling and waste reduction in company operations. They also set clear green goals, allocate specific budgets for eco-friendly technologies, and provide incentives and training to employees to comprehensively support green practices" (Madam Rose).*

Besides, Madam Rose emphasized the importance of top management in advancing green logistics initiatives through targeted actions and policies. These include implementing policies for low-carbon vehicles, streamlining the supply chain to reduce carbon emissions, and promoting recycling and waste reduction throughout the organisation. Furthermore, they establish specific green objectives, allocate dedicated budgets for sustainable technologies, and provide both incentives and employee training to ensure widespread support for environmentally friendly practices.

(III) Positive Influenced on Green Logistics Practices

Madam Rose (2024) stated that Suzuki Malaysia's top management has a positive impact on green logistics practices by implementing policies such as using energy-efficient or low-carbon vehicles for delivery and distribution. Budgets are also set aside by management for the optimisation of delivery routes and investments in green technologies. These efforts not only reduce costs, fuel consumption, and carbon emissions, but also help Suzuki Malaysia build a reputation as a sustainability leader. Such initiatives reduce operational costs while also making it easier for the company to meet environmental standards.

> *"At Suzuki Malaysia, top management has shown significant support for green logistics initiatives through comprehensive environmental plans and actions" (Miss Jane).*

> *"Additionally, the company has introduced support tools and worked to improve fuel efficiency in transportation vehicles" (Miss Jane).*

Besides, through extensive environmental plans and initiatives, Suzuki Malaysia's top management has shown a strong commitment to green logistics, Miss Jane underlined. For example, by implementing energy-efficient transportation strategies, such as switching from truck-based to rail and ship transportation, the company has committed to lowering CO2 emissions in its logistics operations. Suzuki has also demonstrated its commitment to sustainability and innovation by putting support tools into place and taking action to increase the fuel efficiency of its transportation vehicles.

4.4.3 HR's Role

HR plays a significant role in ensuring the successful implementation of green logistics. The support from HR, along with any roles and responsibilities assigned by both HR and management, will drive the success of green logistics initiatives. This collaborative effort helps ensure sustainability and contributes to creating a better environment for the world.

HR's Support. At Suzuki Malaysia, the Human Resources (HR) department plays a significant role in supporting green logistics practices by fostering a sustainability-focused culture within the organization. According to Miss Jane, HR contributes by offering specific training programs for employees, running internal awareness campaigns on eco-friendly practices, and implementing reward and recognition programs for staff who successfully reduce carbon emissions. These initiatives aim to enhance employees' skills and knowledge about green logistics while encouraging active participation in sustainability efforts.

> *"The HR department actively supports the implementation of green logistics practices by integrating sustainability training and awareness into employee development programs. They offer courses that provide knowledge about green practices and encourage staff involvement through awareness campaigns" (Madam Rose).*

Madam Rose further emphasized HR's role in integrating sustainability training into employee development programs. The department designs courses to educate employees about green logistics practices and motivates participation through awareness campaigns. Additionally, HR creates incentive policies to drive engagement in green initiatives and evaluates employee performance, recognizing those who significantly contribute to the company's sustainability goals. These efforts help embed sustainability as a core organizational value and promote a collaborative approach to achieving green objectives.

Development Programs. At Suzuki Malaysia, training and development programs play a crucial role in enhancing employees' skills and knowledge about green logistics. Madam Rose (2024) emphasized that these programs include courses on sustainability principles, waste management techniques, and supply chain optimization. Employees also participate in practical workshops focused on using green technologies and evaluating environmental impacts. Additionally, awareness campaigns and employee involvement in green projects ensure that employees understand their contributions to the company's sustainability goals.

> *"To enhance employees' skills and knowledge of green logistics, the company offers various programs, training, and development opportunities, including practical training that allows employees to learn through hands-on experience, such as simulations and on-the-job training."* *(Miss Jane)*

Miss Jane added that the company provides hands-on training opportunities, including simulations and on-the-job training, to reinforce practical learning. Continuous learning initiatives, such as workshops, webinars, and online courses, ensure that employees stay updated with the latest trends and innovations in green logistics. Moreover, Suzuki Malaysia encourages employees to pursue professional certification courses related to supply chain and logistics management, which further enhance their expertise and ability to contribute to green logistics practices effectively.

> *"Professional certification courses related to supply chain and logistics management also enhance employee expertise."*
>
> *(Miss Jane)*

Effectiveness of These Programs. Miss Jane said that the training and development programs offered by the company appear to be highly effective in improving green logistics practices. By providing hands-on experiences like simulations and on-the-job training, employees gain practical skills where it can be directly applied to their daily tasks. Continuous learning opportunities, such as workshops, webinars, and online courses, ensure that employees stay informed about the latest trends and innovations in green logistics, which helps them adopt modern and efficient practices.

While Madam Rose said that the effectiveness of these training programs can be seen through increased employee understanding and involvement in green initiatives. These programs help employees adopt eco-friendly practices in daily operations, which subsequently reduces waste and operational costs. By measuring performance and gathering employee feedback, the company can evaluate the positive impact of these programs on operational efficiency and sustainability, ensuring that green initiatives align with the company's strategic goals.

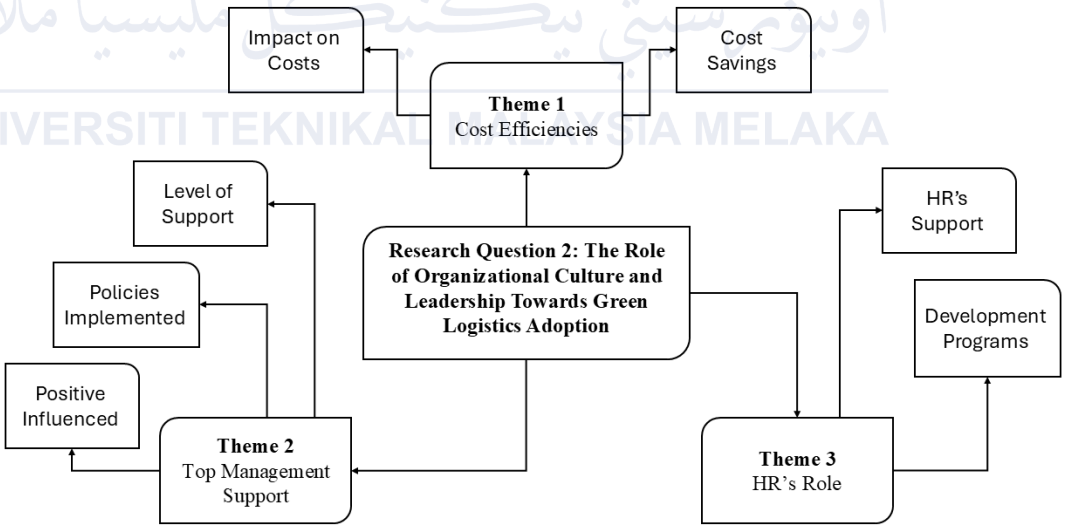


Figure 4.14: Themes and Categories for Research Question 2

4.4.4 RQ2 Discussion

RQ 2: How do organizational culture and leadership contribute to the adoption of green logistics?

A strong organizational culture and visionary leadership are essential for adopting green logistics at Suzuki Malaysia. Leaders play a pivotal role in shaping the values and attitudes of employees toward sustainability. For instance, the leadership team at Suzuki Malaysia prioritizes environmental goals alongside operational efficiency, demonstrating their commitment to green logistics. As highlighted by Smith and Jones (2019), a supportive organizational culture encourages innovation and collaboration, enabling employees to contribute actively to sustainability efforts.

Cost Efficiencies. Green logistics at Suzuki Malaysia focuses on achieving cost efficiencies while minimizing environmental impact. Initial investments in eco-friendly technologies, such as energy-efficient vehicles and automation, may seem costly but are justified by their long-term benefits. For example, Suzuki's adoption of energy management systems has significantly reduced operational expenses. As noted by Rose (2022), “although initial investments in green technology or eco-friendly infrastructure may be high, the return on investment is realized through future operational cost reductions.”

Top Management Support. This proactive approach by management demonstrates the value of leadership in advancing green initiatives. According to Zhu, et al. (2018), "Top management commitment is a critical enabler of green supply chain practices, providing necessary resources, policy frameworks, and employee motivation to achieve sustainability objectives." Furthermore, training employees on eco-friendly logistics practices improves operational efficiency and fosters an environmentally responsible culture. Kumar et al. (2020) find that "employee education and leadership support foster an organizational environment conducive to sustainability and continuous improvement in green logistics."

This multifaceted approach reflects the importance of leadership in creating a sustainable culture within the organisation. As Carter and Rogers (2008) point out: "Effective leadership in sustainability involves setting clear goals, ensuring resources are available, and empowering employees to contribute to environmental initiatives." Such initiatives will not only improve operational efficiency, but they also help the company's reputation as an environmentally responsible organisation.

Positive Influenced on Green Logistics Practices. So Suzuki Malaysia demonstrate a strategic approach to environmental impact reduction by focussing on energy efficiency, route optimisation, and transitioning to environmentally friendly transportation modes. As Carter and Rogers (2008) write, "Sustainability in logistics requires the integration of environmental objectives into core business strategies, driven by leadership commitment and resource allocation." Moreover, investing in green technologies and infrastructure not only reduces environmental risks but also provides long-term savings. According to Sarkis et al. (2012), "Green logistics practices create competitive advantages by improving operational efficiency, reducing costs, and enhancing stakeholder trust." Suzuki Malaysia demonstrates how leadership can drive meaningful environmental change in logistics operations by taking these steps.

HR's Roles and Support. The HR department's role in advancing green logistics initiatives is crucial for aligning organizational practices with sustainability goals. By integrating sustainability into training programs, HR supplies employees with the knowledge and skills required to adopt eco-friendly practices. According to Renwick et al. (2013), "HR departments act as key enablers of sustainability by embedding green principles into recruitment, training, and employee engagement processes." Moreover, reward and recognition programs help to increase motivation and reinforce a culture of environmental responsibility, ensuring that employees remain committed to achieving sustainability targets. Besides, according to Green et al. (2021), "HR acts as a bridge between management and employees, facilitating communication and collaboration for green initiatives." By embedding sustainability into recruitment, training, and performance evaluation processes, HR ensures that green logistics is a shared responsibility across the organization. Internal awareness campaigns are another important strategy used by HR to promote green practices. These campaigns not only raise awareness, but also encourage employees to adopt new behaviours. As noted by Jabbour and Santos (2008), "HRM policies focusing on environmental awareness and training contribute significantly to the success of green initiatives by creating a well-informed and engaged workforce."

Development Programs. Incorporating training and development into green logistics is essential to giving staff members the abilities and information required to

embrace sustainable practices. Training programs that integrate theory and real-world applications are particularly beneficial at developing a workforce that cares about the environment. As Renwick et al. (2013) points out, "Green training and development programs enable employees to acquire the necessary competencies to implement environmentally sustainable practices, bridging the gap between awareness and action." Besides, continuous learning programs and professional certifications are critical for maintaining employee engagement with emerging green technologies and global sustainability standards. According to Jabbour et al. (2010), "Ongoing education and professional development in environmental management not only improve employee skills but also strengthen the organization's competitive advantage by ensuring alignment with best practices in green logistics."

4.5 Research Question 3: Facilitating Successful Green Logistics Implementation Through Information Technology Systems in Supply Chain Operations

RQ 3: How do information technology (IT) systems facilitate the successful implementation of green logistics in supply chain operations?

The integration of advanced Information Systems (IS) has enabled Suzuki Malaysia to optimize logistics operations, minimize waste, and reduce emissions. The use of IT solutions, such as route optimization software and real-time tracking systems, underscores the role of technology as an enabler of green logistics. This finding is consistent with previous studies that argue, "Digital technologies are instrumental in achieving sustainability goals by streamlining operations and enhancing transparency" (Zhang et al., 2020).

4.5.1 Current Role of IT Systems In Supporting Suzuki Green Logistics Initiatives

> *"IT systems support green logistics initiatives at Suzuki by providing a platform to collect, analyze, and manage data related to the supply chain and energy usage. Through these systems, the company can monitor green performance, optimize delivery routes, and plan/manage inventory more efficiently, reducing waste and carbon emissions." (Madam Rose)*

Madam Rose explains that Information Technology (IT) plays a crucial role in supporting green logistics initiatives at Suzuki Malaysia by helping the company manage its supply chain and energy consumption more effectively. IT systems provide a platform that enables the collection and analysis of data related to logistics, such as supply chain performance, energy usage, and carbon emissions. By utilizing this data, Suzuki can optimize its delivery routes, manage inventory more efficiently, and reduce waste. This ultimately leads to a decrease in environmental impact, aligning the company's logistics practices with sustainability goals.

> *"IT systems support green logistics initiatives at Suzuki by optimizing delivery routes through transport management systems (TMS) and warehouse management systems (WMS), which reduce fuel consumption and carbon emissions." (Miss Jane)*

While Miss Jane explains that IT systems, particularly **Transport Management Systems (TMS)** and **Warehouse Management Systems (WMS)**, play a critical role in enhancing green logistics at Suzuki by optimizing the routes for delivery. These systems help reduce fuel consumption and lower carbon emissions by ensuring that deliveries are carried out in the most efficient manner possible, minimizing unnecessary fuel usage and travel time.

> *"IT also facilitates real-time monitoring of green logistics performance and manages inventory digitally to reduce waste and ensure more efficient resource usage." (Miss Jane)*

Miss Jane also highlights that IT systems support real-time monitoring of green logistics performance and digital inventory management. These systems enable the company to track and monitor key logistics metrics, such as resource usage, waste levels, and energy consumption, in real time. By managing inventory digitally, Suzuki can further reduce waste, ensure more efficient resource allocation, and make data-driven decisions that promote sustainability. As stated by Bai and Sarkis (2021), real-time data enables companies to track inefficiencies and implement corrective actions promptly, ensuring sustainability goals are consistently met. The digitization of inventory also reduces overstocking, minimizes product wastage, and improves supply chain responsiveness, leading to better resource management.

4.5.2 Specific IT Tools or Technologies Used

> *"Specific IT tools or technologies used to facilitate green logistics at Suzuki include supply chain management (SCM) systems and delivery route optimization software. For example, using GPS to plan more efficient delivery routes reduces fuel consumption. Data analysis software helps identify opportunities to reduce waste in operational processes."* *(Madam Rose)*

According to Madam Rose, Suzuki utilizes several IT tools and technologies to enhance its green logistics initiatives. Main technologies include Supply Chain Management (SCM) systems, which help monitor and coordinate the flow of goods across the supply chain, and delivery route optimization software. Route optimization tools, particularly GPS-based software, are used to plan more efficient delivery routes, reducing fuel consumption and lowering the overall carbon footprint. Additionally, data analytics software is employed to analyze operational processes and identify areas where waste can be minimized, helping the company make informed decisions to reduce environmental impact.

> *"IT tools used at Suzuki include transport management systems (TMS) that plan efficient delivery routes to minimize fuel consumption and*

warehouse management systems that optimize space and energy usage." (Miss Jane)

Not only that, the other respondent, Miss Jane, explains that at Suzuki, Transport Management Systems (TMS) and Warehouse Management Systems (WMS) are utilized to enhance operational efficiency and sustainability. The TMS is used to plan optimal delivery routes, reducing fuel consumption by avoiding unnecessary travel and minimizing carbon emissions. Meanwhile, the WMS ensures that warehouse space is efficiently utilized, and energy consumption is optimized by managing inventory in a way that reduces waste and unnecessary energy use.

"The Internet of Things (IoT) monitors logistics operations in real time, while data analytics help evaluate green performance. Blockchain technology ensures transparency in the supply chain, further enhancing sustainability." (Miss Jane)

Miss Jane also points out that real-time logistics operations monitoring become possible by applying Internet of Things (IoT) technology, which offers prompt feedback on important environmental metrics. Through constant monitoring of data pertaining to fuel consumption, energy consumption, and inventory levels, Suzuki is able to maximise efficiency and reduce waste. The business can make quick changes to its logistics operations and increase sustainability and efficiency by utilising real-time data streams. Furthermore, data analytics is used to evaluate the success of Suzuki's green logistics initiatives and pinpoint areas in need of improvement.

Miss Jane also mentions the use of blockchain technology to ensure transparency and accountability throughout the supply chain. This technology is vital for promoting sustainability, as it creates an unchangeable record of all supply chain activities, which helps build trust among stakeholders.

4.5.3 Future Evaluation of IT In Green Logistics

> *"In the future, IT's role in logistics will expand with technologies like artificial intelligence (AI), which will help optimize more efficient routes. Automation through robotics and blockchain will further improve efficiency in supply chain management."* *(Miss Jane)*

The Expanding Role of IT in Logistics. Miss Jane mentions that in the future, the role of Information Technology (IT) in logistics will become much more important as technologies like artificial intelligence (AI) are further integrated. AI will be essential for optimizing delivery routes, making logistics operations more efficient. Automation, through technologies such as robotics and blockchain, will also enhance supply chain management by improving accuracy, reducing human error, and increasing operational efficiency. These advancements will enable companies to make better-informed decisions, contributing to the achievement of sustainability goals by minimizing waste and optimizing resource use.

> *"The role of IT is expected to evolve to better support green logistics by introducing advanced technologies like artificial intelligence (AI) and big data analytics. These technologies will provide more accurate forecasts of demand and resource needs, enabling better planning and waste reduction. Additionally, integrating the Internet of Things (IoT) into logistics operations will allow real-time monitoring of resource usage, making operations more efficient and environmentally friendly."* *(Madam Rose)*

Future IT Evolution for Green Logistics. Madam Rose highlights that as IT continues to evolve, it will provide stronger support for green logistics. In the future, AI and big data analytics will become even more important, improving demand forecasting and resource planning. These technologies will allow companies like Suzuki to better allocate resources and reduce waste. Furthermore, the integration of the Internet of Things (IoT) into logistics operations will facilitate real-time monitoring of resource usage (e.g., fuel,

energy, etc.). This will enable businesses to make prompt adjustments to their operations, improving efficiency and reducing their environmental impact.

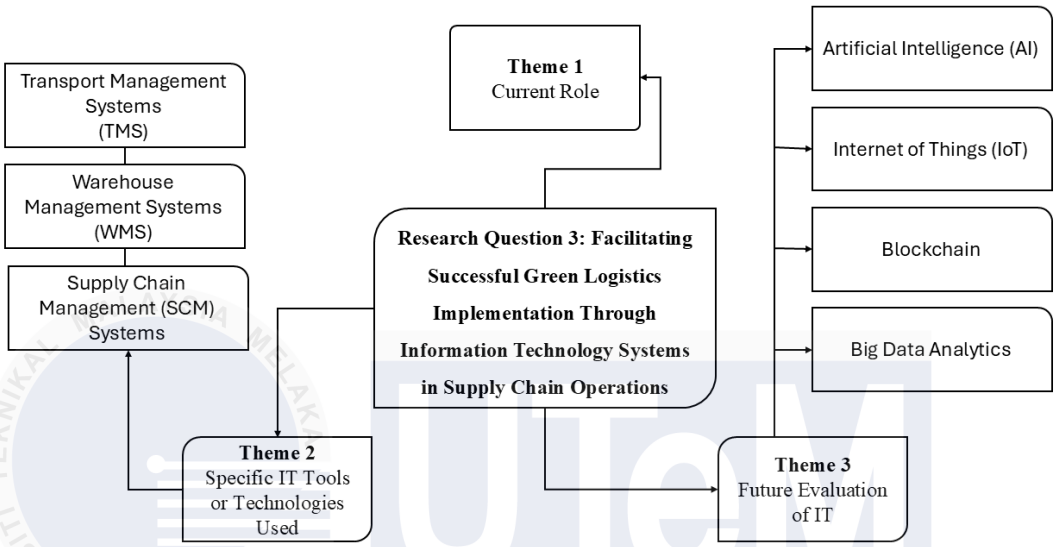


Figure 4.15: Themes and Categories for Research Question 3

4.5.4 RQ3 Discussion

RQ 3: How do information technology (IT) systems facilitate the successful implementation of green logistics in supply chain operations?

Information Technology Systems in Supply Chain Operations. According to the World Economic Forum (2020), "The integration of advanced technologies such as AI, big data, and IoT into logistics systems is key to improving sustainability. AI and machine learning enable real-time decision-making, while IoT sensors help monitor environmental variables like fuel usage and emissions, allowing for smarter, more efficient operations" (World Economic Forum, 2020, para. 5). As discussed by Chien et al. (2021), "Logistics optimization, particularly in route planning and resource allocation, can significantly reduce operational waste and carbon emissions. The use of IT systems for real-time monitoring and predictive analytics enhances the decision-making process, promoting greener logistics practices" (Chien et al., 2021, p. 45).

Current IT Role. According to a study by Papadopoulos et al. (2017), advanced IT tools like TMS allow companies to automate route planning, reducing fuel consumption and logistical inefficiencies. The use of algorithms in TMS helps companies calculate the most optimal routes, which can significantly cut down on carbon footprints and operational costs. As Cohen and Hines (2019) further explain, efficient routing also enables companies to reduce the environmental impact of their transportation activities, aligning with sustainability goals.

Specific IT Tools or Technologies Used. At Suzuki, Transport Management Systems (TMS) and Warehouse Management Systems (WMS) are utilized to enhance operational efficiency and sustainability. The TMS is used to plan optimal delivery routes, reducing fuel consumption by avoiding unnecessary travel and minimizing carbon emissions. Meanwhile, the WMS ensures that warehouse space is efficiently utilized, and energy consumption is optimized by managing inventory in a way that reduces waste and unnecessary energy use. According to Montalvo (2019), TMS tools are essential for logistics operations aiming to improve sustainability. They allow companies to calculate the most fuel-efficient routes, reducing the environmental footprint associated with transportation. The Warehouse Management System (WMS), on the other hand, optimizes space utilization, reducing the need for excessive energy usage for lighting, heating, or cooling and reducing the need for excess storage space, which ultimately saves energy and reduces waste. Another technologies applied is the Internet of Things (IoT). According to González et al. (2020), IoT enables businesses to monitor environmental factors in real time and make quick adjustments to reduce waste and energy use. In addition, Blockchain supports environmentally responsible practices by ensuring that green logistics efforts are traceable, which ultimately enhances sustainability.

Future Evaluation of IT In Green Logistics. First is about Artificial Intelligence (AI) and second is about Big Data Analytics. According to Müller et al. (2020), AI in logistics can significantly improve route planning and scheduling, reducing delays and fuel consumption. AI algorithms can analyze vast amounts of data to recommend the most efficient routes in real-time, contributing to sustainability by reducing carbon emissions and operational costs. Moreover, robotic automation can streamline warehouse operations, making them more energy-efficient and aid in reducing waste. Next, regarding the big data analytics. According to Waller & Fawcett (2019), big data analytics will be instrumental in enhancing demand forecasting and resource

optimization. By analyzing historical and real-time data, businesses can predict future needs more accurately, ensuring they allocate resources efficiently and reduce waste. The integration of IoT sensors into logistics operations will provide continuous feedback on resource consumption, helping companies make more sustainable decisions in real-time. As Jabbour et al. (2020) discuss, IoT technology allows for continuous tracking of fuel, energy, and emissions, which is critical for companies aiming to reduce their environmental footprint.

4.6 Challenges and Future Directions

The successful implementation of green logistics at Suzuki requires a comprehensive approach that integrates multiple factors, all of which are crucial for achieving sustainability and improving operational efficiency. These factors include strong leadership support, employee commitment, integrating new technologies into existing logistics infrastructure, continuous education, and the systematic measurement of performance. However, each of these elements presents its own set of challenges, which must be addressed to ensure a smooth and effective transition to sustainable logistics practices.

Strong top-level management support is essential for success. Senior Suzuki executives' dedication and active participation are essential for ensuring. that green logistics aligns with the company’s overall strategic goals. Leadership support not only provides the necessary resources but also fosters a corporate culture where sustainability is prioritized. However, convincing top management to allocate significant resources for green initiatives can be a challenge, especially in the face of competing financial priorities. Additionally, sustaining this commitment over the long term, especially in organizations with changing leadership, can create inconsistency in the implementation of green practices.

Besides, the successful implementation of green logistics is not solely the responsibility of top management; it also requires **the dedication and active involvement of employees at all levels.** Ensuring that employees understand and

embrace the company's sustainability goals fosters a sense of ownership and accountability. A significant challenge, however, is overcoming employee resistance to change, especially in established organizations where traditional logistics methods have been ingrained. Furthermore, achieving consistent engagement across all levels, from frontline workers to management, can be difficult, as not all employees may see the immediate benefits of green logistics initiatives. As McKinnon et al. (2020) note, *"Overcoming resistance to change and ensuring consistent engagement across all levels is a critical challenge in the successful implementation of green logistics*" (p. 150).

Another critical factor is **the difficulty of integrating new technologies into Suzuki's existing logistics infrastructure**. Integrating these new technologies into existing infrastructure can be complex. It requires significant effort to ensure that the new systems are compatible with current operational frameworks.

Moreover, employee training becomes essential to ensure that the workforce is fully capable of using the new technologies effectively. As highlighted by Cao et al. (2021), successful adoption of green technologies often involves overcoming significant integration challenges, as companies need to align new systems with their existing operations, train personnel, and adjust their processes to ensure seamless transition to fit within the established logistics infrastructure.

Furthermore, it is essential to **educate and raise awareness about sustainability** within the organisation. Ensuring that employees at all levels understand the environmental impact of logistics operations and the importance of sustainable practices is essential for building a green culture within Suzuki. Employees who received education on these issues are more likely to make wise decisions and take proactive steps to reduce waste and energy consumption. However, a challenge in this area is the need for ongoing, engaging training programs that keep employees up-to-date with the latest sustainability practices and technologies. Furthermore, employees might not always see the relevance of sustainability education if it is not directly tied to their day-to-day responsibilities.

Finally, **regular performance measurement and evaluation** are essential to track the progress of green logistics initiatives. These regular assessments allow Suzuki to monitor whether sustainability goals are being met, identify areas that need improvement, and make necessary adjustments. By utilizing key performance indicators (KPIs) and conducting sustainability audits, it ensure that green logistics strategies remain

effective and aligned with the company's long-term objectives. One challenge here is defining clear, measurable KPIs that reflect both business and environmental targets. Furthermore, the continuous collection and analysis of data from all logistics operations can be resource-intensive, requiring dedicated staff and advanced technology to maintain effective monitoring systems. According to González et al. (2020), measuring sustainability performance often demands a careful balance of resources, as organizations need both technological tools and skilled personnel to manage the data effectively.

4.7 Summary

In summary, Chapter 4 provides a comprehensive overview of the factors that contribute to the successful implementation of green logistics in organizations. By examining the roles of employee awareness, organizational culture, leadership, cost efficiencies, HR, IT systems, and addressing the challenges and future directions, the chapter emphasizes the interconnectedness of these elements in achieving a sustainable and efficient logistics operation. The findings suggest that with the right strategies, leadership commitment, and technological tools, organizations can successfully integrate green logistics into their operations, benefiting both the environment and the business.

CHAPTER 5

RECOMMENDATIONS AND CONCLUSION

5.0 Introduction

This chapter presents a comprehensive conclusion to the study on green logistics implementation at Suzuki Malaysia. It summarizes the key findings, evaluates the achievement of research objectives, and provides actionable recommendations. The chapter also discusses the study's limitations and proposes directions for future research, ensuring a well-rounded closure to the report.

5.1 Research Summary

The study uncovered several critical factors influencing the adoption of green logistics at Suzuki Malaysia: (1) Employee awareness, (2) Organizational Culture and Leadership, (3) Cost Efficiencies, and (4) Information Technology (IT) Role

5.1.1 Employee Awareness

While internal training and communication efforts have moderately raised employee awareness regarding the green logistics, however, challenges such as resistance to change and uneven engagement levels were identified. As Smith and Johnson (2021) note, "Employee awareness and education are the cornerstones of successful green initiatives, fostering accountability and innovation." Research at Suzuki Malaysia reveals that while efforts to educate employees on sustainable practices have been somewhat successful, the level of engagement varies significantly across departments. Some employees are highly motivated, while others remain indifferent due to lack of proper understanding or incentives. This highlights the need for more tailored and consistent awareness programs to ensure greater participation and commitment to green logistics initiatives. According to Zhang et al. (2020), effective employee education and engagement are critical factors in successfully implementing green logistics, as it drives both individual responsibility and collective environmental goals.

5.1.2 Organizational Culture and Leadership

A strong, supportive culture and committed leadership are key drivers of sustainability. Top management at Suzuki Malaysia has shown significant involvement by allocating resources, setting environmental goals, and leading by example demonstrates the importance of leadership. According to Carter and Rogers (2008), "Effective leadership in sustainability involves setting clear goals, ensuring resources are available, and empowering employees to contribute to environmental initiatives."

5.1.3 Cost Efficiencies

Initial investments in green technologies, such as eco-friendly transportation systems, have shown long-term benefits, including reduced operational costs and compliance with environmental regulations. Madam Rose emphasized, "Although initial

investments in green technology may be high, the return on investment is realized through future operational cost reductions and improved efficiency."

5.1.4 Information Technology (IT)

Advanced IT systems, such as Transport Management Systems (TMS) and Warehouse Management Systems (WMS), have optimized supply chain operations. Tools like IoT and blockchain further enhance transparency and efficiency. Zhang et al. (2020) highlighted that "IT tools enhance sustainability by streamlining operations and improving transparency in logistics."

5.2 Achievement of Research Objectives

5.2.1 Research Objective 1: To explore the awareness of employees towards green logistics implementation.

Employee awareness levels were found to be moderately high due to ongoing training and communication strategies. However, further efforts are needed to ensure consistent understanding and engagement.

5.2.2 Research Objective 2: To discover the internal factors that drive the organization to adopt green logistics within supply chain operations.

The study confirmed that Suzuki Malaysia’s leadership plays a pivotal role in driving green initiatives. A strong organizational culture that supports sustainability has been instrumental in achieving green logistics goals.

5.2.3 Research Objective 3: To identify the impact of information technology (IT) systems that lead towards successful of the green logistics implementation within the supply chain operations.

IT systems at Suzuki Malaysia significantly contribute to green logistics through route optimization, real-time monitoring, and enhanced inventory management, demonstrating their critical role in achieving sustainability.

5.3 Recommendations

To enhance the implementation and effectiveness of green logistics at Suzuki Malaysia, there are several recommendations suggested. First, **Enhance Employee Training and Engagement.** The company should expand its training programs to include practical sessions and professional certifications in green logistics. This will ensure employees acquire advanced knowledge and skills. Feedback mechanisms, such as regular surveys or focus groups, can provide insights into employee needs and encourage active participation. "Ongoing training fosters employee engagement and equips them with the tools needed to adopt sustainable practices" (Jabbour & Santos, 2008).

Second, **Strengthen Organizational Culture.** Creating a culture that values sustainability is essential. Suzuki Malaysia should introduce reward programs to recognize innovative eco-friendly contributions by employees. Establishing a sustainability committee, led by top management, can help maintain focus on green logistics objectives. According to Renwick et al. (2013), "A supportive culture, combined with clear leadership, accelerates the adoption of green practices."

Next, **Leverage Advanced Technologies.** Investing in cutting-edge technologies such as artificial intelligence (AI) and blockchain can enhance operational transparency and efficiency. AI-driven tools can optimize logistics by predicting demand and planning routes, while blockchain ensures accountability in

the supply chain. "Technology integration plays a transformative role in achieving sustainability goals" (Zhang et al., 2020).

Furthermore, is to **Adopt Cost-Benefit Strategies.** The implementation of phased plans for adopting green technologies can balance initial costs and long-term benefits. Seeking government incentives and subsidies can further offset expenses. As Kumar et al. (2020) state, "Financial incentives and careful planning are essential for overcoming the barriers to green logistics implementation."

Lastly, by **Fostering External Collaborations.** Suzuki Malaysia should collaborate with suppliers and logistics providers to align sustainability objectives across the supply chain. External partnerships can facilitate knowledge sharing and mutual growth, ensuring a cohesive approach to green logistics. "Collaborative efforts enhance the impact of green initiatives on a broader scale" (Carter & Rogers, 2008).

5.4 Limitations of the Study

This study has several limitations that should be acknowledged. First, **the small sample size of participants** may limit the generalizability of findings. While qualitative methods provided deep insights, they may not capture the full range of perspectives across the organization. Additionally, **the study's short time frame** restricts the ability to assess the long-term impacts of green logistics implementation. As McKinnon et al. (2020) observe, "Longitudinal studies are necessary to fully understand the evolving effects of sustainability initiatives."

5.5 Future Research Directions

Future studies could build on the insights provided in this research by exploring broader applications and advancing the understanding of green logistics. Three key areas are suggested:

1. Explore Industry-Wide Applications

Research on green logistics practices across various industries and geographic regions can provide comparative insights and identify universal challenges. According to Zhang et al. (2020), "Cross-industry studies enhance the scalability of sustainability solutions."

2. Conduct Longitudinal Studies

Long-term assessments are critical to understanding the sustained benefits and challenges of green logistics. This approach will help track progress and refine strategies over time. "Longitudinal research provides a deeper perspective on the effectiveness of green initiatives" (Jabbour et al., 2010).

3. Analyze Emerging Technologies

Future research should investigate the role of technologies such as IoT, big data analytics, and AI in enhancing green logistics. These tools can revolutionize operations by improving efficiency and reducing environmental impact. "Technological advancements are the backbone of modern sustainability efforts" (Bai & Sarkis, 2021).

5.6 Conclusions

Green logistics is not only a strategy for environmental sustainability but also a means of achieving operational efficiency and regulatory compliance. By leveraging leadership, advanced technologies, and a strong organizational culture, Suzuki Malaysia has made significant strides in aligning its logistics operations with sustainability goals. Addressing identified challenges and implementing proposed strategies will further reinforce the company's position as a leader in green logistics practices.

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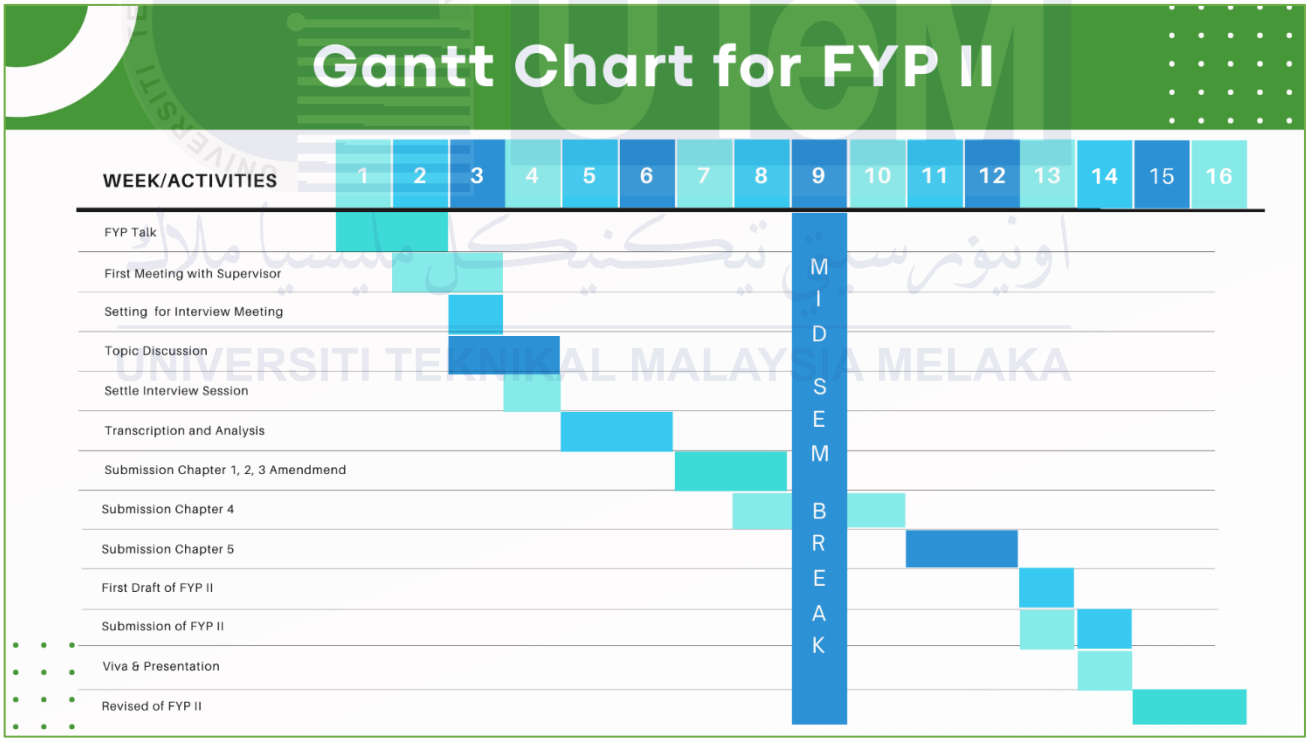
APPENDIX A

Gantt Chart of Final Year Project (FYP) 1

WEEK/ ACTIVITIES	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
FYP talk									M I D S E M E S T E R B R E A K							
Search for FYP topic																
Meeting with supervisor																
Topic discussion																
Title confirmation																
RO & RQ Construction																
Submission Chapter 1																
Submission Chapter 2																
Submission Chapter 3																
First draft of FYP 1																
Submission of FYP 1																
Presentation 1																
Revised of FYP 1																

APPENDIX B

Gantt Chart of Final Year Project (FYP) 2



APPENDIX C

Interview Protocol

SHIFTING GEARS TO GREEN:

EXPLORING INTERNAL FACTORS OF GREEN LOGISTICS IMPLEMENTATION AT SUZUKI MALAYSIA SDN. BHD.

NAME: FATIN NAJIHAH BINTI FAUZI

MATRIC NUMBER: B062110001

Semi-Structured Interview Questions

Introduction and Background

1. Can you please describe your role at Suzuki Malaysia Sdn. Bhd.?

2. How long have you been with the company?

3. Could you briefly explain what green logistics means to you and how it relates to your work?

Employee Awareness

4. In what ways is information about green logistics practices effectively communicated within the company?

5. Can you give examples of how employees are encouraged to participate in green logistics initiatives?

6. What successful strategies have you seen in increasing awareness and engagement in green logistics practices among employees?

Cost Efficiencies

7. In your opinion, How do you see green logistics practices contributing to cost efficiencies within the company?

8. Can you share any specific examples where green logistics has led to notable cost savings?

9. How does the company balance the potential cost savings with the investments required for implementing green logistics?

Top Management Support

10. How would you describe the level of support from top management for green logistics initiatives?

11. What specific actions or policies have been implemented by top management to support green logistics?

12. Can you provide examples of how top management's support has positively influenced green logistics practices within the company?

HR Skills, Knowledge, and Support

13. How does the HR department actively support the implementation of green logistics practices?

14. What kind of training or development programs are available to enhance employees' skills and knowledge about green logistics?

15. How effective do you think these programs are in improving the company's green logistics practices?

IT Systems and Infrastructure

16. How do IT systems support green logistics initiatives at Suzuki Malaysia?

17. Can you describe any specific IT tools or technologies that are effectively used to facilitate green logistics?

18. How do you see the role of IT evolving in the future to better support green logistics?

Reflection and Future Directions

19. What do you think are the most critical factors for the successful implementation of green logistics at Suzuki Malaysia?

20. How do you see the future of green logistics at Suzuki Malaysia?

21. What additional support or resources do you think are needed to enhance green logistics practices in the company?

Conclusion

22. Is there anything else you would like to share about your experiences with green logistics at Suzuki Malaysia?

23. Do you have any suggestions for further improving green logistics practices within the company?

APPENDIX D

Interview Findings

Semi-Structured Interview Questions

Respondent A: Supervisor at Suzuki Glenmarie, Shah Alam
Name: Miss Jane

Introduction and Background

1. Can you please describe your role at Suzuki Malaysia Sdn. Bhd.?

- Supervisor at Suzuki Malaysia in the Logistics department for over six months.
- Respondent's mood while explaining: Calm and Relaxed.

2. How long have you been with the company?

- Over 6 months.

3. Could you briefly explain what green logistics means to you and how it relates to your work?

- Green logistics refers to environmentally friendly supply chain management, aiming to reduce negative impacts on the environment, such as minimizing carbon emissions, resource waste, and the use of renewable energy.
- In my role, it involves optimizing routes (shorter and more time-efficient), managing deliveries, reducing fuel consumption, and recycling disposal materials to achieve sustainability.

Employee Awareness

4. In what ways is information about green logistics practices effectively communicated within the company?

- Usually through emails and bulletins or webinars, for example, distributing periodic emails and bulletins about the latest green campaign practices and updates on the company's green initiatives.
- To provide further exposure, regular departmental meetings discuss the progress of green logistics initiatives, ensuring employees from each department understand their roles in achieving green logistics goals.

5. Can you give examples of how employees are encouraged to participate in green logistics initiatives?

- Initiatives such as rewards and recognition, for example, offering bonuses or acknowledgment to employees using eco-friendly delivery methods like electric vehicles, which could earn praise or monthly awards.
- Team collaboration initiatives encourage group participation by organizing inter-departmental competitions to reduce waste or optimize logistics processes to be more environmentally friendly.

6. What successful strategies have you seen in increasing awareness and engagement in green logistics practices among employees?

- Organizing workshops where employees can participate in simulations or activities related to green logistics, such as waste management, using green technologies, or optimizing the supply chain.
- Using digital tools or applications that track and report employees' eco-green achievements, like reducing paper usage or lowering carbon footprints in logistics operations.
- Setting KPIs related to sustainability, such as fuel reduction, and measuring the performance of each department or employee in achieving these goals.

Cost Efficiencies

7. In your opinion, how do you see green logistics practices contributing to cost efficiencies within the company?

- By optimizing routes, the company can reduce unnecessary travel distances, lowering fuel consumption and vehicle maintenance costs.
- Packaging materials can also reduce costs; for instance, using recyclable or eco-friendly packaging materials helps save on purchasing costs and reduces waste disposal needs.

8. Can you share any specific examples where green logistics has led to notable cost savings?

- For example, Maersk, a global container shipping company, implemented green logistics to reduce fuel usage and emissions in their operations. They reduced their ship speeds to lower fuel consumption and invested in more energy-efficient ships using alternative fuels. Through these measures, they achieved a 7–10% reduction in fuel consumption and significantly cut carbon emissions.

9. How does the company balance the potential cost savings with the investments required for implementing green logistics?

- The company balances cost savings and investments in green logistics through cost-benefit analysis and phased implementation while leveraging government initiatives.

- Suzuki invests in technologies that reduce long-term operational costs, such as automation and energy management. These savings are achieved through reduced fuel and energy consumption while avoiding environmental law penalties. Additionally, green logistics investments enhance the company's reputation, attracting sustainability-focused customers and investors, positively impacting profits and customer loyalty.

Top Management Support

10. How would you describe the level of support from top management for green logistics initiatives?

- The level of support is evident in their commitment to setting strategic visions, allocating financial resources, and leading by example. Supportive management invests in green technologies, ensures employees receive training, and promotes involvement, making sustainability a key KPI for the company.
- Committed top management ensures that green practices are transparently implemented and ingrained into the organizational culture, securing widespread support and involvement from all levels within the company.

11. What specific actions or policies have been implemented by top management to support green logistics?

- Supportive management implements actions such as investing in green technologies like automation systems to reduce carbon emissions and introducing recycling and waste reduction policies in warehouse operations.
- They also establish environmental standards, use renewable energy in operational centers or production stages, and train employees on green logistics practices.

12. Can you provide examples of how top management's support has positively influenced green logistics practices within the company?

- At Suzuki Malaysia, top management has shown significant support for green logistics initiatives through comprehensive environmental plans and actions.
- For example, Suzuki has committed to reducing CO2 emissions in its logistics operations by promoting energy-efficient transportation methods, such as shifting from trucks to rail and ship transportation. Additionally, the company has introduced support tools and worked to improve fuel efficiency in transportation vehicles.

HR Skills, Knowledge, and Support

13. How does the HR department actively support the implementation of green logistics practices?

- The HR department supports green logistics practices by providing specific training for employees on sustainability, running internal awareness campaigns about eco-friendly practices, and introducing reward and recognition programs for employees who successfully contribute to carbon reduction efforts.

- HR also helps build a green culture throughout the company, offering programs and training to enhance employees' skills and knowledge of green logistics practices.

14. What kind of training or development programs are available to enhance employees' skills and knowledge about green logistics?

- To enhance employees' skills and knowledge of green logistics, the company offers various programs, training, and development opportunities, including practical training that allows employees to learn through hands-on experience, such as simulations and on-the-job training.
- Continuous learning programs like workshops, webinars, and courses, including online courses, ensure employees stay updated with the latest trends and innovations in the field of green logistics.
- Professional certification courses related to supply chain and logistics management also enhance employee expertise.

15. How effective do you think these programs are in improving the company's green logistics practices?

- The training and development programs offered by the company appear to be highly effective in improving green logistics practices. By providing hands-on experiences like simulations and on-the-job training, employees gain practical skills where it can be directly applied to their daily tasks. Continuous learning opportunities, such as workshops, webinars, and online courses, ensure that employees stay informed about the latest trends and innovations in green logistics, which helps them adopt modern and efficient practices.

IT Systems and Infrastructure

16. How do IT systems support green logistics initiatives at Suzuki Malaysia?

- IT systems support green logistics initiatives at Suzuki by optimizing delivery routes through transport management systems (TMS) and warehouse management systems (WMS), which reduce fuel consumption and carbon emissions.
- IT also facilitates real-time monitoring of green logistics performance and manages inventory digitally to reduce waste and ensure more efficient resource usage.

17. Can you describe any specific IT tools or technologies that are effectively used to facilitate green logistics?

- IT tools used at Suzuki include transport management systems (TMS) that plan efficient delivery routes to minimize fuel consumption and warehouse management systems that optimize space and energy usage.
- The Internet of Things (IoT) monitors logistics operations in real time, while data analytics help evaluate green performance. Blockchain technology ensures transparency in the supply chain, further enhancing sustainability.

18. How do you see the role of IT evolving in the future to better support green logistics?

- In the future, IT's role in logistics will expand with technologies like artificial intelligence (AI), which will help optimize more efficient routes. Automation through robotics and blockchain will further improve efficiency in supply chain management.
- These technologies will enable the company to make more accurate decisions and achieve sustainability goals.

Reflection and Future Directions

19. What do you think are the most critical factors for the successful implementation of green logistics at Suzuki Malaysia?

Critical factors include:

1. Support from top management.
2. Utilizing IT technologies, such as the Internet of Things, for logistics efficiency.
3. Training and awareness for employees on green logistics practices.
4. Collaboration with sustainable logistics partners and continuous monitoring to evaluate and improve sustainability strategies.

20. How do you see the future of green logistics at Suzuki Malaysia?

- The future of green logistics at Suzuki Malaysia looks promising, with expectations of advancements in green technology and digitization, including AI and automation for route optimization.
- Blockchain will enhance transparency in the supply chain, ensuring all operational levels comply with green practices.
- The Internet of Things will play a larger role in real-time monitoring to reduce waste and energy consumption.
- Suzuki is expected to continue strengthening employee training and sustainability strategies. These strategies will not only support effective green operations but also ensure long-term sustainability goals are achieved at Suzuki.

21. What additional support or resources do you think are needed to enhance green logistics practices in the company?

- To improve green logistics practices, the company should invest in green technologies and provide continuous training to raise awareness among employees.
- Encouraging collaboration with green suppliers is also important.
- Additionally, using real-time data and analytics will continue to help monitor and improve the company's sustainability performance.

Conclusion

22. Is there anything else you would like to share about your experiences with green logistics at Suzuki Malaysia?

- My experience with green logistics has been both insightful and rewarding. Implementing green practices has provided valuable lessons on balancing operational efficiency with environmental sustainability. It has been inspiring to see how integrating green initiatives, such as optimizing delivery routes, adopting eco-friendly technologies, and reducing waste, can not only minimize environmental impact but also contribute to cost savings and improved resource management.
- Furthermore, witnessing the commitment of top management towards sustainability goals—through investments in green technology and supportive policies—has been encouraging. It demonstrates how leadership plays a critical role in embedding green practices into the company culture.

23. Do you have any suggestions for further improving green logistics practices within the company?

- To improve green logistics practices at Suzuki, the company could promote the use of electric vehicles to reduce carbon emissions.
- Integrating data analytics with AI in supply chain management systems could better predict supply demand and optimize inventory management.
- The company might also introduce programs to integrate green technologies.
- Implementing continuous monitoring systems to evaluate the effectiveness of green practices and make adjustments based on collected data would further strengthen the company's sustainability initiatives.
- There are potential for growth and innovation in this area. Green logistics is a constantly evolving field, and I believe Suzuki Malaysia has the opportunity to become a leader in sustainable logistics by continuing to explore advanced technologies like AI, IoT, and blockchain, as well as fostering collaboration with eco-conscious suppliers and industry partners.

Semi-Structured Interview Questions

Respondent B: Supervisor at Suzuki Glenmarie, Shah Alam
Name: Madam Rose

Introduction and Background

1. Can you please describe your role at Suzuki Malaysia Sdn. Bhd.?

- Supervisor at Suzuki Malaysia in Logistics for 1.5 years.
- Respondent's mood while explaining: Happy and Relaxed.

2. How long have you been with the company?

- One and a half years.

3. Could you briefly explain what green logistics means to you and how it relates to your work?

- Green logistics refers to efforts to reduce the negative impact of logistics on the environment. It involves using eco-friendly technologies and practices, such as reducing carbon emissions, minimizing fuel consumption, optimizing the supply chain, and managing waste more efficiently.
- In the context of Suzuki Malaysia, green logistics includes steps like reducing fuel usage in vehicle transportation, minimizing raw material waste, and incorporating green technology in vehicle and spare parts distribution. These efforts align with the company's commitment to sustainability and environmental responsibility.

Employee Awareness

4. In what ways is information about green logistics practices effectively communicated within the company?

- Information about green logistics practices is effectively communicated through training and workshops to educate staff. This is supported by clear company policies on green guidelines. Internal communication tools like emails, bulletin boards, and company portals are used to disseminate information. Additionally, company reports and performance monitoring help track the achievements of green initiatives. Awareness campaigns are also conducted to encourage employee participation in eco-friendly practices.

5. Can you give examples of how employees are encouraged to participate in green logistics initiatives?

- Employees are encouraged to join green logistics initiatives through incentives such as recognition for green performance and rewards for innovative ideas that reduce environmental impact.
- For example, they are encouraged to practice energy-efficient resource use, participate in office recycling programs, and are rewarded or acknowledged for positive outcomes.

6. What successful strategies have you seen in increasing awareness and engagement in green logistics practices among employees?

- Successful strategies include continuous educational campaigns, incentives like rewards and recognition, and involving employees in decision-making processes. The company also uses engaging communication tools such as videos and mobile apps. Setting clear targets and monitoring green performance through regular reports ensure that employees stay motivated and understand the positive impact of green practices on the company and the environment.

Cost Efficiencies

7. In your opinion, how do you see green logistics practices contributing to cost efficiencies within the company?

- Green logistics practices contribute to cost efficiency at Suzuki by reducing fuel consumption, minimizing resource waste, and optimizing the supply chain. These efforts save operational costs such as transportation, storage, and waste management. Additionally, using energy-efficient and eco-friendly materials reduces expenses in the long term while improving the company's reputation and ensuring compliance with environmental regulations, which avoids penalties.

8. Can you share any specific examples where green logistics has led to notable cost savings?

- A specific example of green logistics leading to significant cost savings is using alternative fuel or electric vehicles for delivery operations, which drastically reduces fuel costs. For instance, companies like DHL have recorded significant savings by optimizing delivery routes and adopting green technologies to reduce energy consumption. Additionally, reducing waste and reusing packaging materials helps lower the cost of purchasing new raw materials.

9. How does the company balance the potential cost savings with the investments required for implementing green logistics?

- The company balances cost savings with investments in green logistics through long-term planning and cost-benefit analysis. Although initial investments in green technology or eco-friendly infrastructure may be high, the company evaluates the return on investment (ROI) through future operational cost reductions, improved efficiency, and compliance with environmental laws that avoid penalties. They may also seek support such as government incentives or strategic partnerships to reduce the burden of initial investments.

Top Management Support

10. How would you describe the level of support from top management for green logistics initiatives?

- The level of support from top management for green logistics initiatives is generally high. They recognize the potential for long-term cost savings, improved company reputation, and compliance with environmental regulations. Management actively provides resources and sets performance targets to ensure the success of sustainability programs.

11. What specific actions or policies have been implemented by top management to support green logistics?

- Top management typically implements specific actions or policies, such as introducing low-carbon vehicle policies, optimizing the supply chain to reduce carbon emissions, and promoting recycling and waste reduction in company operations. They also set clear green goals, allocate specific budgets for eco-friendly technologies, and provide incentives and training to employees to comprehensively support green practices.

12. Can you provide examples of how top management's support has positively influenced green logistics practices within the company?

- At Suzuki Malaysia, top management's support positively influences green logistics practices by implementing policies like using more energy-efficient or low-carbon vehicles in deliveries and distribution. For example, they might allocate budgets to optimize delivery routes or invest in green technology, which helps reduce costs, fuel consumption, and carbon emissions. At the same time, it enhances the company's reputation as a sustainability leader. These efforts result in operational cost savings and easier compliance with environmental standards.

HR Skills, Knowledge, and Support

13. How does the HR department actively support the implementation of green logistics practices?

- The HR department actively supports the implementation of green logistics practices by integrating sustainability training and awareness into employee development programs. They offer courses that provide knowledge about green practices and encourage staff involvement through awareness campaigns. Additionally, HR plays a role in designing incentive policies to drive participation in green initiatives and evaluates employee performance, recognizing those who contribute to the company's sustainability goals.

14. What kind of training or development programs are available to enhance employees' skills and knowledge about green logistics?

- Training and development programs to enhance employees' skills and knowledge about green logistics include courses on sustainability principles, waste management techniques, and supply chain optimization. These programs also involve practical workshops on using green technologies and analyzing environmental impact. Furthermore, awareness campaigns and employee involvement in green projects are offered to ensure employees understand their roles in achieving the company's sustainability objectives.

15. How effective do you think these programs are in improving the company's green logistics practices?

- The effectiveness of these training programs can be seen through increased employee understanding and involvement in green initiatives. These programs help employees adopt eco-friendly practices in daily operations, which subsequently reduces waste and operational costs. By measuring performance and gathering employee feedback, the company can evaluate the positive impact of these programs on operational efficiency and sustainability, ensuring that green initiatives align with the company's strategic goals.

IT Systems and Infrastructure

16. How do IT systems support green logistics initiatives at Suzuki Malaysia?

- IT systems support green logistics initiatives at Suzuki by providing a platform to collect, analyze, and manage data related to the supply chain and energy usage. Through these systems, the company can monitor green performance, optimize delivery routes, and plan/manage inventory more efficiently, reducing waste and carbon emissions.

17. Can you describe any specific IT tools or technologies that are effectively used to facilitate green logistics?

- Specific IT tools or technologies used to facilitate green logistics at Suzuki include supply chain management (SCM) systems and delivery route optimization software. For example, using GPS to plan more efficient delivery routes reduces fuel consumption. Data analysis software helps identify opportunities to reduce waste in operational processes.

18. How do you see the role of IT evolving in the future to better support green logistics?

- The role of IT is expected to evolve to better support green logistics by introducing advanced technologies like artificial intelligence (AI) and big data analytics. These technologies will provide more accurate forecasts of demand and resource needs, enabling better planning and waste reduction. Additionally, integrating the Internet of Things (IoT) into logistics operations will allow real-time monitoring of resource usage, making operations more efficient and environmentally friendly.

Reflection and Future Directions

19. What do you think are the most critical factors for the successful implementation of green logistics at Suzuki Malaysia?

- Critical factors for the successful implementation of green logistics at Suzuki include strong support from top management, employee commitment, and investment in green technology. Additionally, awareness and education about sustainability among employees, along with integrating green practices into the company culture, are also important. Regular performance measurement and evaluation ensure that green initiatives stay on track, helping the company achieve sustainability goals and enhance operational efficiency overall.

20. How do you see the future of green logistics at Suzuki Malaysia?

- The future of green logistics at Suzuki Malaysia looks promising, with growing awareness of sustainability and climate change issues. The company is expected to continue investing in green technologies, introducing more innovative practices in supply chain management, and striving for aggressive carbon reduction. With strong management support and active employee involvement, these green initiatives can provide long-term benefits and enhance the company's reputation in the market.

21. What additional support or resources do you think are needed to enhance green logistics practices in the company?

- To enhance green logistics practices, additional support and resources are needed, including investment in the latest technologies such as IoT and advanced data management systems. Comprehensive training programs for employees on sustainability practices and collaboration with industry partners to share best practices would also be beneficial. Increasing customer awareness about the importance of green logistics can encourage demand for more eco-friendly products and services.

Conclusion

22. Is there anything else you would like to share about your experiences with green logistics at Suzuki Malaysia?

- My experience with green logistics at Suzuki Malaysia has been invaluable, especially in understanding how green initiatives can be incorporated into daily operations. Through training programs and awareness campaigns, I have observed increased employee involvement and commitment to eco-friendly practices. This shows that with collective efforts, the company can achieve its sustainability goals and make a positive impact on the environment and the community.

23. Do you have any suggestions for further improving green logistics practices within the company?

- My suggestions for improving green logistics practices include introducing periodic environmental audits to evaluate and identify areas for improvement, as well as expanding the use of cutting-edge technologies like AI for data analysis and supply chain optimization. The company could also enhance collaboration with eco-conscious suppliers and other partners to ensure green practices are implemented throughout the supply chain. Additionally, organizing awareness campaigns and green challenges among employees can further encourage participation and promote eco-friendly initiatives in daily operations.