Exploring the Impact of Green Logistics Strategies on Supply Chain Efficiency and Sustainability: A Case Study of Posti Company

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Abstract

The objective of this study was to study how Posti Group, a top postal and logistics company in Finland, benefited from implementing green logistics. Because of increased attention to the environment, Posti started using sustainable logistics methods to save the ecosystem. The task was to see the types of green initiatives Posti uses, measure their impact on supply chain efficiency and consider what problems were found during their use. The study applied both surveys and interviews with staff from Posti, as well as material from reports, publications and other literature. It was seen that the use of electric and biogas vehicles, route planning with digital tools and setting up energy-saving technologies helped to cut emissions and improve the operations. According to the results, using green logistics supports both the environment and the overall performance of the supply chain and other logistics enterprises can benefit from these findings.

Keywords/tags (subjects)

Green Organizational Development, Sustainable Transformation, Environmental Efficiency, Organizational Change, Sustainability Practices.

Contents

1 Introduction

Green logistics has become a topic of discussion in recent years since there has been an increase in the need to enhance logistics operations with less negative impact on the environment. Sustainable logistics is the implementation of green practices within the logistics practices. This entails strategies that are focused on decreasing the emission of carbon, increasing energy efficiency, and adopting environmentally friendly technologies and processes. In recent years, the management of organisations has shifted its concern towards sustainability since the global community demands responsible operation in business ventures.

Among those that have adopted green logistics is Posti; a postal service provider in Finland. In the current world that is experiencing a rise in climate change effects, Posti has embraced environmental conservation practices by adopting green logistics. Therefore, as part of its sustainability strategy, Posti has been working on emission reduction and route optimization, firstly, on vehicles, and secondly, on energy-efficient technologies. These strategies seek to ensure that Posti cuts on the use of fossil fuels, has a low carbon footprint and encourages the shift towards the use of clean energy.

The implementation of green logistics into Posti's supply chain is not only timely in a world that is looking toward more sustainability but also progressive as it adds to the firm's competitive edge in the logistics industry. Since there are rising customer and legal demands for a company to prove its environmental responsibility, the green logistics that Posti has adopted gives it a competitive advantage in a market that is moving towards green solutions. This research has also noted that through green logistics, not only will Posti be supporting the conservation of the environment but it will also be increasing its operational efficiency and decreasing operation costs in the future.

The management of green logistics faces a number of challenges, which has led to the implementation of the strategies. Challenges that Posti encountered include expensive investment in sustainable technologies, human resources for managing such systems, and resistance to change existing business structures. Moreover, it is difficult to standardize the regulation and coordination of activities related to green logistics across the global supply chain since it is a cross-functional area. In the context of Posti, the problem of implementing green logistics practices and managing their interaction with the company's infrastructure and supply chain management has emerged.

The purpose of the present research is to analyse the effects of green logistics strategies on supply chain performance improvement and development in a logistics company called Posti. The nature of the research is to investigate the particular green logistics measures that are implemented in Posti, measure the impact of these measures on supply chain performance, and assess the significance of these measures in the organisation's environmental management. The study will also analyse the experience of Posti in implementing green logistics practices and the strategies to be followed or avoided by other organisations.

Indeed, green logistics is playing a more important role in this globalization world as a new trend. This leads to the idea that the incorporation of green logistics in a firm's supply chain strategies enables the firm to better cope with the challenges associated with managing the flow of goods in the current society while contributing to the attainment of environmental objectives. This research will be beneficial in unveiling how green logistics can be incorporated into supply chain management systems and provide relevant recommendations to firms that want to increase green supply chain management.

2 Research purposes and missions

2.1 Research Purpose

The rationale for this research is to understand the effect of green logistics towards supply chain performance with reference to the Posti Company. In the recent past, there has been growing pressure on business organizations to embrace environmental sustainability in their operations and this has impacted the role of logistics operations in the achievement of sustainability in business organizations. This study seeks to evaluate the extent to which green logistics strategies have impacted on the basically supply chain of Posti Company in terms of operation and environmental outcomes.

The study will also look at the benefits that Posti has realised from implementing green logistics strategies such as reinforced image, legal requirements, and customer goodwill. Based on the analyses of Posti's case, this study provides recommendations: for other organisation that would like to follow the same, to advance the level of green logistics concepts worldwide, promoting the sustainable supply chain.

Besides, the study will also outline the challenges for the adoption of GLP and the ways to address them in terms of financial, operational and organizational factors limitations. In the end, the objective of this study is to offer recommendations to Posti and possibly other logistic companies to enhance their performance environmentally and at the same time enhance the supply chain performance.

2.2 Research Mission

The objectives of this research are to establish the various green logistics strategies used in Posti Company as well as the strategies practiced by this company in the supply chain management. In this regard, the employed research strategies will shed light on the extent to which the identified company is willing to make logistics environment-friendly.

1. To examine the green logistics strategies that have been implemented in the Posti organization.
2. To evaluate the outcomes of these strategies on supply chain effectiveness.
3. To assess the role of green logistics in the sustainability agenda.
4. To reveal difficulties encountered on the way to the adoption of green practices and offer practical advice.

The second research question of this study is thus to assess the efficiency resulting from Posti's green logistics on its supply chain performances. This also incorporates changes in productivity, elimination of cost and overdose, and the impact of the new organizational performance and environmental effects. To this end, the

research will aim at establishing how the above strategies have impacted on the improvement of supply chain sustainability and performance.

The study will identify the factors that may hinder Posti in the implementation of green logistics including financial constraints, resistance to change or inadequate infrastructure. The findings of the study will point out the best strategies of overcoming the challenges and improving the green logistics management.

3 Research Questions

Posti uses sustainable transportation, optimizes its routes and uses energy from renewable sources. These plans increase sustainability, though they still encounter expenses and infrastructure problems. The researcher is looking for the answers to these questions in this research:

1. Which green logistics strategies have been adopted in the Posti Company?
2. How have green logistics strategies affected supply chain operations of Posti?
3. What is the purpose that green logistics holds in the sustainable development of Posti Company?
4. What kind of obstacles and pressures has Posti experienced when implementing the green logistics practices?
5. What specific recommendations can be given to other organisation seeking to implement green logistics strategies?

3.1 Research subjects

The main aim of this research is to find out the main factors that affect the adoption and deployment of green logistics concepts in the supply chain of Posti Company. This work will determine the crucial factors that impact the manageability and the running of logistic activities. Therefore, by focusing on the discussed challenges and prospects of green logistics implementation at Posti, the research provides practical recommendations on the subject and indicates that the study grants value to the company and academic community. The understanding that will be obtained from this will help other firms that intend to adopt green logistics.

Thus, in discovering critical factors, the given research will also assess the impacts of green logistics strategies on the effectiveness of a supply chain. Overall, the study aims at identifying the role of green logistics practices including low emission and improved resource use and the ways Posti's logistics contributes to cost and operations savings and support for its sustainable goals. The evaluation will also assess the effects of these green practices on the performance of the supply chain of Posti in both financial and environmental aspects.

The practicality of applying green logistics strategies in the supply chain of Posti Company as well as other similar organizations shall be discussed with regard to its governance impact. This will involve another segment of the research that aims at identifying how levels of governance shape the implementation of green logistics. It will also give recommendations of how the supply chain governing structure can be improved to facilitate better execution of sustainable supply chain best practices in the supply chain.

3.2 Research scope

The purpose of this study is to investigate the effectiveness and sustainability of green logistics practices in the supply chain of Posti Company. The objectives of the study are: This research seeks to identify the green logistics practices adopted by Posti, analyse their performance and ascertain the level of contribution towards the organisation's operational performance and sustainability goals.

There are two main data collection methods for this research: surveys to the supply chain employees of Posti that are aware of or involved in sustainability matters. These interviews will ascertain the company's supply chain action plans, implementation, the difficulties faced when rolling-out sustainable measures, and noticed enhancements in supply chain competence and earth friendly performances. Secondary data will involve sourcing information from personal communication from managers and technicians via questionnaires, logistic journals, books and existing literature reviews. It will also be effective in establishing Posti's position in relation to other trends in the industry. Thus, utilizing both primary and secondary data, the study is going to make a contribution to the knowledge about the application of green logistics practices for enhancing the results of the supply chain and making recommendations for further developments at Posti and other companies operating in the field of logistics.

4 Research methodology

4.1 Qualitative research methods

In this study, qualitative research methods are used to identify and analyze the effects of the implementation of green logistics on the Posti Company's supply chain performance and sustainability. The research of the study focuses on determining the effects of sustainable logistics on Posti's operation and its supply chain. It is for this reason that qualitative research methods are appropriate for this study as they allow one to get to understand the nature of phenomena, the patterns of activities and perceptions of the study subject and key actors in green logistics at Posti (Naz et al., 2024).

The data collection comprises of interviews, participant observation, and contextual interpretation. Namely, practical interviews will be conducted with employees of the Posti company describing the process of applying green logistics in their work. Through the evaluation, the common threads and trends will be discovered and thus better probability of compliance and regulation of sustainable logistics practices will be understood. In turn, this qualitative approach helps the research to answer the ''why'' questions that relate to the green logistics implementation and enabler, as well as the results in Posti's setting. In the long run, the research aims to help the establishment of a sustainable supply chain and create a basis for further quantitative investigations on logistics.

4.2 Research methodology selection

This type of research is qualitative in nature, and as a result, it has been adopted in this research for the following reasons. Quantitative research involves direct participation and interaction to recover quantitative data having concern with quantitative estimation and exact measurement, on the other hand, Qualitative research is fundamental for gaining underpinning concepts and essence of the research problem or a particular study. Here, the study seeks to determine the effect of green logistics strategies on the supply chain performance and the factors that influence the extent of such effects, which calls for a better understanding of the processes, practices, and issues within mostly the Posti company (Garg & Vemaraju, 2024).The researcher opted for a qualitative study because there is no hypo research to be tested and because the study seeks to examine how Posti is implementing green logistics.

5 Literature Review

Green logistics helps lower environmental impact in logistics by choosing eco-friendly transport, improving energy use, reducing waste and using sustainable packaging.

5.1 Evolution and Definition of Green Logistics

Sustainable green logistics has therefore emerged as one of the vital strategies developed in the recent past in the quest to make supply chains green around the world. It developed in the late industrial age in the early half of the twentieth century due to the rising consciousness about the surroundings and climate course in addition to the advancing rules bestowed on transport and distribution segments. Originally, logistics was mainly focused on the economy and elimination of waste (Kamewor, Kwateng, & Mensah, 2024). However, with increasing carbon emissions and environmental deterioration, the concerns of their actions went beyond the life impact. Green logistics involves applying environmental conservation tools to logistical activities that include transport, storage, packaging and order fulfilment, among others. It enhances the practical application of clean energy, efficient routing, recyclable materials, and environmental technologies.

The concept of green logistics has evolved beyond merely minimizing the harm it causes to the environment and embracing proactive measures aimed at making the entire supply chain sustainable. In the same tone, Chatzoudes et al., (2017) defined green logistics as all efforts made to quantify and reduce the environmental cost of logistics operations. These extend from fuel and energy conservation measures like proper management of fleet, less use of packaging material and material return policy to efficiency in the use of energy in the warehouses. The focus is made on two objectives at the same time, which are the economic and ecological objectives, with equal importance given to matters such as service quality and dependability.

Environmental sustainability in the supply chain has now become an effective way of improving an organization’s performance, establishing a good reputation, and satisfying customers. It proves to be consistent with the concept of CSR and sustainable development. In sectors where environmental responsibilities are high, for instance in transportation and post-services industries, green logistics has evolved into a strategic management process. As the process of making organization operations green, it has become necessary for organizations to embrace green logistics. Green logistics are adopted as a means to perform organizational obligation, while at the same time enhancing organizational performance and future-proofing organisational operations (Rane, Choudhary, & Rane, 2024).

5.2 Core Components of Green Logistics Strategies

Environmental-friendly logistics strategies refer to measures that aim at environmental conservation as well as fitting a company's strategy forward when it comes to executing its business goals and objectives. The last element is 'green transportation and circulation' which entails the use of energy-efficient means of transport, proper routing of the delivery and conforming to the use of environmentally friendly energy sources such as electric, bio-diesel or hydrogen. They also spend money on the procurement of vehicles and the use of smart technologies that would help them monitor emissions and the schedule of transport fleets. Compared to conventional transportation or the practice of transporting goods, eco-friendliness contributes to sustainability efforts, plus it is cost-efficient (Roy & Mohanty, 2024).

Another factor is the environmental one of packing, focusing on recyclability, biodegradability, or reusability of the materials used. Minimal packets also mean that more use can be made of visualization, which is also good since it means that the amount of packaging material absorbs and used and its impacts on the environment regarding usage and disposal is also reduced. In the same regard, reverse logistics is very essential in green logistics since it involves the management of returns, reuse as well as recycling of products and materials. This process ensures that they are properly processed for disposal while the components are returned to the supply chain to be recycled reducing the demand for raw materials and finally cutting on the dumping of the end-of-life products (Esan, Ajayi, & Olawale, 2024).

Some of the other core strategies to be implemented include reduction of carbon footprint and minimizing waste in all logistics operations. This is by assessing the environmental impact of emissions right from sourcing to the consumer end and applying strategies like energy consumption efficient ways of storing goods, efficiently thinking digitally, or efficient ways of handling inventories among others. Waste reduction involves reducing the number of inventories, limiting transportation, and eliminating forms of supply that lead to the wastage of resources. Each of these elements ensures that a firm's logistics processes are brought in context with the sustainable goals but also helps to build a good reputation, attract conscious buyers, and increase levelled profitability (Nikseresht, Golmohammadi, & Zandieh, 2024). It is possible for these strategies to greatly improve the company supply chain by making it both environmentally conscious and efficient.

5.3 Industry Adoption and Best Practices

Internationally, organizations' implementation of sustainable logistics solutions is now a strategic business imperative; especially for industries that are known to be environmentally sensitive such as the postal and logistics industries. It has now become evident that while being environmentally irresponsible is inadvisable

due to its negative impacts, business tactics that are sympathetic to the environment tend to be cherished due to their efficiency and the enhanced satisfaction that is ultimately satisfied by consumers. For instance, the German-headquartered Deutsche Post DHL Group has set a target of being completely carbon neutral by 2050 and has come up with programs such as using green delivery vehicles, energy generated from roofs of solar panels in selected warehouses, and sustainable packaging. These are some of the ways in which colossal logistics players contribute toward mainstreaming sustainability within their value chain besides not jeopardizing service delivery (Muchenje, 2024).

Most service industries including the postal have demonstrated a positive advancement in the incorporation of green logistics. Norway Post is an excellent example of an organization that introduced electric vehicles in its delivery services, which produced many emission cuts coupled with minimized fuel expenses. In addition, Japan Post has enhanced its operations through better ways of logistics planning with the help of sophisticated analysis of data and has come up with phenomenal recycling strategies in its outlets. These cases discuss the trends of the integration between the national postal services and environment sustainability agendas, as well as, the symbiosis between efficiency and sustainability as advanced by innovation and leadership (Al Masri & Wimanda, 2024).

Other industries provide a clear example of the effective implementation of methods for green logistics. IKEA, for instance, and UPS have devised end-to-end closed-loop solutions concerning returns operations and implemented real-time tracking as a means of cutting trips and emissions. These organizations can therefore be used to emulate and other institutions that wish to make their supply chains sustainable. From such best practices, these company should be able to set goals by using reference tools, compare with its performance, and implement successful best practices that fit the organisation’s operations. Another significant aspect of logistics that has emerged is the increasing emphasis on the green sphere – this evolution not only proves the relevance and effectiveness of such approaches but also provides guidelines for companies of logistics that want to achieve sustainable and efficient goals for a long time (Ahuchogu, Sanyaolu, & Adeleke, 2024).

5.4 Evaluating the Impact of Green Logistics on Supply Chain Effectiveness

Green logistics makes operations run smoothly, lowers expenses and improves the quality of services. It offers a better experience to customers, helps brands build a positive reputation and fosters loyalty because of environmentally friendly methods, meeting deadlines and supporting sustainability. Green logistics makes operations run smoothly, lowers expenses and improves the quality of services. It offers a better experience to customers, helps brands build a positive reputation and fosters loyalty because of environmentally friendly methods, meeting deadlines and supporting sustainability.

5.5 Operational Efficiency and Cost Reduction

Environmental management and improved efficiency and effectiveness have emerged as two key promotional goals that can be achieved through green logistics strategies. Possible effective approaches that can ensure that there is a reduction in fuel consumption and transportation cost include the following: Route optimization, Eco-driving training that focuses on the efficiency of transport vehicles and acquisition of fuel-efficient or electrical transporting vehicles. McKinnon (2010) noted that the use of green technologies in logistics results in low operating costs as the company incurs low energy and maintenance costs (Kamewor, Kwateng, & Mensah, 2024).

Moreover, sustainable practices in the form of efficient lighting, renewable energy, inventories and others, are always cost-saving measures in the warehousing process. All these not only decrease the overhead but have positive impacts towards shortening the time required to process the messages and efficient and reliable delivery performance. Another element of green logistics is reverse logistics which enables a firm to manage returned resources in order to recover their value to a certain extent thus there are also opinions that suggest that green logistics results in favourable enhancement of supply chain profitability (Garg & Vemaraju, 2024).

European postal services also provide several case studies that show that sustained investment impacts the long-term reduced costs and increased accuracy of logistics. These findings indicate that green logistics while being a capital-intensive undertaking in the short run, offers the supply chain numerous benefits in terms of cutting costs, and costs and increasing its returns in the long run, where competition is stiff.

5.6 Service Quality and Customer Satisfaction

Appropriate sustainability implementations in logistics and postal services impact the organizational customers' experience, reliability, and satisfaction rates. Many consumers today choose firms that are friendly to the natural environment and thus have pressed the need to work on the issue of green logistics to improve the quality of services provided. As Jayarathna, Agdas, & Dawes (2024) stated sustainability in service delivery is no longer a luxury but a strategic imperative which enhances customers' commitment and confidence.

The literature also shows that consumers are willing to buy from companies that embrace their values such as environmentally friendly policies. This is even considered in the context of logistics services, meaning an increase in service reliability, timely delivery, and sustainability disclosure. Research conducted indicated that as a result of environmental applications, consumer satisfaction increased owing to the extra value added by the incorporation of eco-friendly efforts as well as efficiency (Kavota, Cassivi, & Léger, 2024).

Furthermore, it brings improvements to the reliability of operations since people tend to demand environmentally friendly solutions and services from companies. This also leads to the improvement of the brand's reputation hence enhancing strong customer relationships. As consumers embrace sustainable practices, adopting environmentally friendly practices in the delivery of logistics services allows the firms delivering these services to meet the customer demand and experience a competitive edge.

Aspect	Impact of Green Logistics
Customer Perception	Positive association with eco-friendly practices, boosting loyalty.
Service Reliability	Improved on-time delivery and operational transparency.
Customer Satisfaction	Higher satisfaction due to the blend of environmental responsibility and efficiency.
Brand Reputation	Enhanced reputation, fostering long-term customer relationships.

Table 1: Impact of Green Logistics on Service Quality and Customer Satisfaction (Kavota, Cassivi, & Léger, 2024).

As shown in Table 1, using green logistics can improve both the quality of services and customer satisfaction. When customers notice eco-friendly ideas, they often choose to stay loyal and prefer sustainable brands. Better reliability of services—as a result of timely and clear handling of things—earns customer trust. Being environmentally responsible and offering efficient services causes an increase in customer satisfaction. Prioritizing green logistics helps companies improve their brand image which encourages customers to stay loyal in the long run. All in all, green logistics helps protect the environment and also gives companies a boost over their competitors by following the trend of customers opting for sustainable and trustworthy options.

5.7 The Role of Green Logistics in the Sustainability Agenda

Environmental sustainability benefits from green logistics as it decreases emissions, waste and energy wastage. It fits with a corporation's ESG efforts by using responsible methods, being open and honest, gaining stakeholder trust and enhancing the organization's competitiveness in long-term supply chains.

5.8 Contribution of Green Logistics to Environmental Sustainability

The essence of green logistics practice is very crucial in that it aims at decreasing the effects of logistics activities on the environment. Of all the ways that the identified strategies point out to help reduce sustainability impact on the environment, carbon emission reduction is one of the most apparent. This is especially because eco-friendly transport methods, routing optimization and incorporating electric or hybrid vehicles are some of the factored approaches that logistic companies can implement to minimize these emissions (Jayarathna, Agdas, & Dawes, 2024). Furthermore, the utilization of other fuel sources and energy resources lessens greenhouse gas emissions and also smaller carbon footprint assists the international campaign against global warming as argued by Kamewor, Kwateng, & Mensah (2024).

Greening of logistics also entails reducing waste as a way of conserving resources and optimizing efficiency. Various measures including recycling, reuse of materials and minimizing the packaging materials have been implemented in an organization and have had the added advantage of cutting down on the wastage that is channelled to the landfills as well as the exploitation of resources (Nicoletti & Appolloni, 2024). Green logistics helps in tackling the packaging material issue in which firms will be motivated to switch to biodegradable and recyclable packaging materials to reduce the impacts of the already overwhelming packaging waste (Nikseresht, Golmohammadi, & Zandieh, 2024).

Moreover, this research also classified green logistics strategies as effective in improving energy efficiency through the effective utilization of resources in the transport and storage of goods. These are through short-haul and long-haul fuel conservation through proper planning of routes and conducting a study on the ways of constructing energy-efficient warehouses, and the adoption of smart energy management systems respectively (Prataviera, Creazza, & Perotti, 2024). Altogether, the above strategies assist in ensuring that there is sustainability in the supply chain and logistics, in that their activities are in tandem with the set sustainability goals around the world, and at the same time, assisting companies to enhance positive environmental impacts.

5.9 Integration of Green Logistics in Corporate Sustainability Goals

Companies are realizing the necessity and importance of green logistics as a strategic part of the corporate sustainability agenda of environment, social, and governance (ESG). Green logistics is an effective tool in ensuring sustainable development in various organizations and corporations by ensuring the accomplishment of ecological and social objectives as well as boosting corporate image. It promotes the environmental aspect of ESG through reduction of emission, efficient utilization of natural resources and effective management of wastes, towards supply chain operations (Nguyen & Zuidwijk, 2025). Also, it

promotes social sustainability, particularly in a manner that supports community gain concerning consumerism (Sibt e Ali, Faridi, Javed, & Javaid, 2024).

Implementing green logistics practices also enhances governance by promoting accountability of procedures which are being carried out. From this perspective, Sikder et al. (2024) noted that through green logistics, Companies can engage in ways of responsible business practices hence improving ways of gaining loyalty from stakeholders such as customers, investors and regulatory agencies. Thus, measuring and reporting on environmental performance have social benefits since enhancing an organization's credibility and responding to consumers and regulatory bodies' ever-growing interest in corporate sustainability (Mahmood et al., 2024).

At a pragmatic level sustainability practices can be conveyed in the supply chain management of businesses by involving green log strategies like no carbon neutral in delivery, eco-friendly packing and energy-efficient warehouses. These endeavors are also beneficial in sustaining the environment and improving the sustainability and future; viability and competitiveness of the organization.

ESG Pillar	Green Logistics Contributions
Environmental	Reduction in carbon emissions, energy efficiency, waste reduction
Social	Community benefits, promoting sustainable consumption
Governance	Enhanced transparency, stakeholder engagement, sustainability reporting

Table 2: Integration of Green Logistics in Corporate Sustainability Goals (Mahmood et al., 2024).

As shown in Table 2, green logistics relates to the main areas of Environmental, Social and Governance (ESG) sustainability. When it comes to the environment, green logistics helps cut carbon emissions, use less energy and keep wastage down. When a business cares about sustainability, communities are helped and the business shows greater social responsibility. When it comes to governance, green logistics makes operations more open, helps stakeholders participate and promotes complete sustainability reports. Such contributions prove that logistics practices can be combined with ESG to help a company become more sustainable and maintain its obligations to society for years to come.

5.10 Challenges in Adopting Green Logistics Practices

Green logistics is limited by costs, a lack of understanding among people and people who resist changes. Handling these issues slowly, with excellent leadership, employee educations, teamwork and introducing modern logistics technology are effective ways (Mahmood et al., 2024).

5.11 Barriers to Implementation in the Logistics Industry

The application of green logistics practices becomes a challenge in the management of logistics. First of all, including a fixation on new high-quality sustainable technologies and infrastructures in the field of cars, packaging, and warehouses also requires high initial investments. The reasons for failing to implement these practices in logistics companies, especially SMEs, are as follows; these companies do not have adequate financial capital to finance such strategies, since the returns can sometimes take time to come in, because the long-term benefits are not necessarily clear. Furthermore, there may be a knowledge gap of what is happening to the environment by those involved in the logistics operations especially the employees and the managers of logistics organization this can hamper the development of green principles (Mahmood et al., 2024).

One of them is the reluctance of some stakeholders to embrace change from the traditional logistics models that do not consider sustainability's impact on cost. This resistance is evident in the stinginess to change set practices or adopt new technology that most likely would threaten the status quo strategy (Kamewor, Kwateng, & Mensah, 2024). Moreover, the choices made for and the integration of sustainable measures with other supply chains that operate under various regulations and in different cultures are still another level of challenge (Judijanto, Utami, & Harsono, 2024). All these challenges must be fixed in order to allow for increased uptake of green undertakings in the logistics domain.

5.12 Overcoming Challenges: Practical Recommendations for Successful Adoption

Due to the complexity of the green logistics processes, its adoption involves planning, investment, and cooperation. Specific recommendations include the implementation of green practices gradually and incrementally in existing logistics approaches: The micro-level interventions entail simple and inexpensive strategies like using energy efficiency on lighting, redesigning the delivery routes, and decreasing packaging waste (Nwankwo et al., 2024). These modifications can show the value and potential of sustainability without necessarily asking for major adjustments at an organization's onset.

The other market strategy is the issue of a clear vision on sustainability from senior management. It is crucial that strong leadership is used to properly facilitate the company through such a change and ensure that it has all the needed tools to take up green logistics. It is also important that the employees at the delivery and other associated logistics operations should be trained on issues to do with the environment so that sustainable measures can be put in place (Ali, Hossain, Islam, & Alam, 2024). Overall, appropriate relations with the externals, including the suppliers, transportation service providers and local governmental authorities may help establish the green supply chains. Finally, use of advanced technology for instance route optimization software and green vehicles in logistics companies' operations can greatly address the issue of environmental degradation as efficiency is at the same time achieved.

Topics	Description
Incremental Integration	Start with small, cost-effective changes to demonstrate feasibility.
Strong Leadership and Commitment	Top management must provide clear direction and allocate resources.
Employee Training	Educate employees on sustainable practices and their role in logistics.
External Collaboration	Partner with suppliers and transportation providers to create green supply chains.
Technological Advancements	Use technologies like route optimization and green vehicles to reduce impact.

Table 3: Overcoming Green Logistics Challenges (Gupta, Shreshth, Kharub, & Kumar, 2024).

Table 3 describes some methods companies can use to overcome the problems of adopting green logistics. Starting with affordable and step-by-step steps encourages colleagues to boost progress and confirm results. Senior leaders must be committed and make sure resources are available to support any necessary changes. Ensuring employees are trained in sustainability means they contribute to the Green practices of the company. Working together with outside groups such as suppliers and transport companies helps create environmentally friendly logistics systems. 10. Finally, using tools that help plan more efficient routes and using eco-friendly vehicles can greatly lower the impact on the environment while keeping logistics operations efficient.

6 Data Collections and Results

This chapter explores the ways Posti handles logistics, workers' points of view, environmental efforts, supply chain operations and ways to cut costs.

6.1 Primary Data Collection

People working for Posti say there is now less subcontracting, bigger route networks and better efficiency in delivery. Despite drops in journalism as a business, the company stays up-to-date by enhancing how things are done, being more responsible and creating services.

6.2 Daily Responsibilities and Work Routine at Posti

During delivery, drivers track each one and make a note of problems with deliveries, unable to deliver, or wrong address, etc. Regarding delivery problems like wrong address or delivery to inaccessible drop-off point, the drivers have to address the problems and may involve rerouting the package, returning it to the sender, or contacting the supervisor. Besides deliveries, drivers sometimes take care of documents that are usually parceled and delivered in the course of the day, thus, perform a two-in-on. Such additional responsibilities have made working conditions gradually more challenging, but employees stay committed to timely and accurate delivery services with the increased number of delivery routes.

6.3 Tenure and Observed Changes

Five early morning shift employees from the Posti Group in Helsinki's Konala service point were picked from a group of 16 people and chosen for the interview. We picked these based on being easy to find and have gather enough information. All involved completed 16 specific questions, giving information about what has changed recently inside the organization. Posti's operations, mainly with regard to deliveries, showed many improvements, according to most employees. Many people have pointed out that the expanded routes save on delivery time and allow all resources to be efficiently put to use. In addition, offering other daytime services during night delivery hours helps Posti work more efficiently. A major change in this industry is that companies used to rely on many subcontractors but now prefer to hire employees to work as delivery staff. It is claimed that this action has made the organization more responsible and improved how groups within it operate. Employees also noted that fewer people were paying for newspapers and they said this was because

many now get their news online. Because of this, Posti has adjusted its methods by enhancing the efficiency of its deliveries and goods. They are made to stay relevant as people's methods of consuming media quickly evolve. Overall, the interview information demonstrates that Posti is making efforts to raise the quality of its services, hold people accountable and satisfy customers by improving business and operational strategies in response to shifts in the business environment and technology. It is clear that the company is growing alongside its employees and customers.

6.4 Green Logistics Practices

Green logistics are supported by eco-friendly driving, electric vehicles, bicycles and green packaging at Posti. Warehouses can also keep emissions down further by using recycling and energy savings which helps the environment and makes operations sustainable.

6.5 Impact of Sustainable Strategies on Work Practices

This company has assured the protection of the environment by investing in green logistics where it has incorporated sustainable strategies in the delivery services. The above strategies have an impact on operations daily. This means that drivers are now expected to drive in an environmentally friendly manner by accelerating gently, unnecessarily stalling and stopping their vehicles gently as well. Low-emission and electric vehicles have been incorporated into the fleet over the recent past, which has made the working environment quieter and less polluting as the days progresses.

Both scooters and bicycles are used on certain trails and it is the responsibility of the driver to ensure that the vehicle is charged and maintained. This has entailed industrious learning and sensitisation processes but has otherwise impacted positively on the delivery process as it is more sustainable and in tandem with contemporary practices. Moreover, another practice adopted at Posti is recycling since employees are expected to separate the packaging materials for recycling. Newsresearch bundles are packed with research and the packs are pasted with plastic straps which are also disposed of after the bundle has been sold, all this helping in Environmental conservation.

6.6 Vehicle Utilization and Eco-Friendly Equipment

Although to some extent today's drivers mainly rely on fuel-efficient car models, some of them have been lucky to use electric cars. These new car models can be used for travelling especially during the winter season since they enable smooth riding on the roads. The advantages consist of no noise pollution, no pollutive emissions, and that drivers do not have to attend to their vehicles as they may with gasoline-powered ones. However, the cost of charging and sometimes they are mechanical problems especially when the vehicle is not charged fully or when it has mechanical problems.

Posti has also tried the use of electric-assist bicycles, especially owing to the high delivery density in certain geographical locations. These bicycles are environmentally friendly in that they produce fewer emissions while also allowing one to navigate narrow lanes and other difficult to reach areas.

6.7 Packaging, Recycling, and Energy Conservation

As for the packaging, Posti has come up with various strategies of using environmentally friendly packaging materials. Many drivers and customer service agents continuously persuade their customers to use generally recyclable packaging materials. Within the delivery hubs or warehouses, there is an opportunity for the most energy-saving activities to be saved. These include the fact that employees ordered to turn off kitchen and non-essential area lights when not required, while delivery doors are left closed to prolong heat especially during winter.

To conserve more energy, batteries for electric bicycles are stored apart and managed in a very optimal manner. Altogether, these activities enable Posti to pursue its goal of reducing emissions and having a better environmental impact in all aspects of the deliveries.

6.8 Supply Chain Efficiency

Improved logistics by Posti have made it possible to use route-optimized vehicles as well as electric scooters and bikes which supports faster and more efficient ways to transport goods that are also more economical in fuel. Using digital tools makes route delivery more precise, tracks where goods are along the way and makes it easier to communicate, making everything more productive.

6.9 Enhancements in Speed and Productivity

Combination of the green logistics strategies show positive impact on still delivery time and general operation. The current vehicles facilitate quick and secure deliveries even in poor weather condition associated with climatic changes. Again, the use of electric scooters or bicycles is flexible on the type of route used hence cutting on the use of fuel-powered vans in routes that are short or in heavily congested areas.

This means that Posti's logistics systems have been developed to take the matter of route planning within the housing areas and deliveries into consideration. This helps in the reduction of fuel consumption as well as the time taken on the road due to direct shortest paths being taken. Schedules of delivery are well set in such a way that the workload will not be much and the project will be delivered on time.

6.10 Role of Digital Tools

Technology or mobile applications are crucial to delivery drivers in their working environments. Such apps also offer the information of the route and tracks, packages and addresses of customers. Consequently, drivers can pay more attention to delivering commodities in the right places without having to look for directions or consulting the dispatcher. It minimizes the possibility of human interfering, increases the efficiency in scheduling the performances, and develops a better communication system between multiple groups.

However, like any other technical venture, technical challenges are always present although minimal. Sometimes, in cars breakdown or are replaced with old models as can be seen; this leads to relative low standard hence slight congestion –especially during the winter period where standards of vehicles has a big bearing on safety and speed.

6.11 Customer and Stakeholder Perception

People who use Posti often approve of its commitment to nature through electric vehicles and ecologically friendly packing which helps to build the firm's reputation as eco-friendly. Employees think that rewarding greener actions, getting more electric vans and discounting bicycles are good solutions. Some customers think environmental campaigns are promoted more than necessary.

6.12 Public Response to Sustainability Efforts

In general, the customers of Posti have been accepting of its environmental efforts. Customers approve the usage of electric vehicles and the efforts that are being made by companies towards environmentally friendly packaging. Such campaigns in support of these endeavours have gone a long way in enhancing the Posti brand image of the firm as environmentally conscious.

Additionally, training employees to properly operate new eco-friendly vehicles and equipment requires ongoing effort and resources. The cost of transitioning to a fully green fleet can also be a hurdle for future upgrades.

6.13 Recommendations and Employee Suggestions

Employees believe that rewarding eco-friendly behavior at work—such as efficient driving and proper waste sorting—could serve as a motivational tool. There is also strong support for the introduction of fully electric vans across the delivery fleet. This would further reduce emissions and align with Posti's long-term sustainability goals (Zhang, 2024).

Another proposed initiative includes providing employees with subsidized bicycles for commuting, which could reduce reliance on personal vehicles and support broader environmental objectives. Routine maintenance checks on delivery vehicles and the early detection of technical issues would also enhance safety and efficiency.

These results show that customers have fewer complains and the general public is becoming more conscious about Posti's role as a green company. Actually, both businesses and individuals seem to support these actions, and many of them perceive Posti as their logistics provider because of its concern for the environment.

However, some customers stated that they are tired of such initiatives being advertised to them all the time. As concerning the cause, the residents support it but do not approve of such an intense way of expressing it

6.14 Secondary Data Collection

Posti has cut down on transportation expenses by 5% in each logistics center thanks to RouteSmart which also helps to travel shorter routes and use less fuel. During that period, Posti aimed to achieve cost savings of between EUR 150 and EUR 200 million by using more vehicles and getting better collective agreements with staff. Sustainability is important to the company as well, as they want to have fossil-free transport by

2030, aim for a 30% cut in CO_2 emissions by 2020 and work toward having carbon neutral operations (Sikder et al., 2024).

Transportation Cost Savings

In its endeavour to rationalize assets and enhance efficiency in the supply chain, Posti Group has made a lot of efforts to cut down the transportation costs. Here, one of the chief instruments that have been employed in this process is the RouteSmart – a route automation tool which intends to minimize the distances that need to be traveled, enhance the delivery rate, and increase the usage of vehicles to the maximum. Thanks to the introduction of RouteSmart the right number of routes was taken from delivery volumes what led to a decrease of transportation costs (Sauvola et al., 2025).

Route Optimization Impact

The implementation of RouteSmart has therefore helped realize the optimization of delivery routes in what Posti planned to achieve a specific 5% reduction in the delivery cost per center. This has been done through better routing, where travel time was decreased and hence fuel costs as a form of operational expenses were also reduced. After having adopted the improved standards of logistics, Posti was able to enhance the usage of vehicles in handling relatively high volume of parcels but group without causing additional expenses (Poutanen et al., 2024).

Strategy	Impact/Results
Route Smart Implementation	5% reduction in delivery costs per center.
Cost Savings Target (2019-2021)	EUR 150-200 million savings targeted.
Emission Reduction Goals	Fossil-free transport by 2030.

Table 4: Posti Transportation Cost Savings Strategies (Posti, 2024).

Table 4 describes the strategies Posti has put in place to cut down on transportation expenses and become more sustainable. Posti managed to save 5% in costs in each logistics center by using RouteSmart for more effective routing and lowering how much fuel their vehicles use. Over the years 2019 through 2021, the business worked on EUR 150–200 million in savings by boosting its fleet productivity and bargaining with labor contracts. They also contributed to the bigger goal of reaching fossil-free transportation by the year 2030. That Posti can now practice sustainable logistics while keeping costs down demonstrates its true commitment to the environment.

Broader Cost-Saving Strategies

Apart from routing optimization, cost reductions measure being used at Posti encompass general cost reduction in the range of EUR 150 to 200 million during 2019-2021. These savings are part of the numerous changes that the management of Posti has formulated in an effort to strengthen the company and combat increased competition from both local and overseas players. Additionally, to reach a competitive cost-level with other competitors, Posti is in the process of negotiating collective agreements similar to those of delivery companies since the cost level in the postal services industry remains higher than in many other industries (Roy & Mohanty, 2024).

Emission and Sustainability Goals

Another aspect that contributes to Posti's saving on its transportation is sustainability. The company has the vision towards achieving fossil-free transport by 2030 which will enable the company to realise drastic and sustainable costs reduction in the future due to the integration of environmentally friendly and innovative means of transport.

Fuel Consumption Reduction at Posti

Although the implementation of green logistics has considerably minimised fuel usage and the effects on the environment, Posti, a Finland-based postal and logistics operator has successfully achieved all those goals. This is because the company has made it its goal to increase the efficiency of its operations by incorporating other fuel types and also seeking to give optimal productivity. They are in line with the company's environmental management plan of lowering the dioxide emission by 30 percent in 2020 in comparison to the year 2007 and the company strives to attain carbon neutrality in every value by 2030 (Sikder et al., 2024).

6.15 Key Fuel Consumption Reduction Strategies

Posti's fleet now includes 10 biogas trucks which has decreased its CO_2 emissions by 1,620 tonnes. Moving goods using High Capacity Transport trucks leads to a 30% increase in what can be carried which reduces fuel consumption and emissions. Watching driving style helps save fuel by 10-15% and using renewable diesel decreases the amount of greenhouse gas emissions. They contribute to Posti being carbon neutral by 2030, making Posti more environmentally friendly and better for business.

Low-Carbon and Gas-Powered Fleet Expansion

Of all the strategic activities that have been initiated by Posti, one of the most significant was the diversification of low-carbon gas-powered delivery vehicles. This year Finnish postal and logistics provider Posti's fleet was expanded by 10 new biogas-powered trucks making it the leader in sustainable freight

services in the country. Liquefied biogas (LBG) results in at least a 90% reduction in GHG emissions during production and usage. These trucks have been inserted into Posti's logistics fleet; they have decreased carbon dioxide emissions to the extent of 1,620 tonnes which is as good as a distance equivalent to 8.6 million km distance covered by a passenger car. That way, gas-powered fleets such as Liquefied Natural Gas (LNG) vehicles reduce emissions and fuel consumption on the road for Posti (Zhang, 2024).

High Capacity Transport (HCT) Technology

Another aspect of fuel saving implemented is; the organization's use of High Capacity Transport (HCT) trucks which are trucks that carry some accessories that enhance volume carrying capacity. HCT vehicles are found to have a transport capacity of 30% more than ordinary trucks, which helps Posti transport the same load with fewer numbers of vehicles. These same outcomes included a reduction in the amount of fuel required to transport goods on the road and therefore less emissions. Thus, they also help to improve vehicle capacity and decrease the level of CO_2 emissions in Posti's freight management (Zhang, 2024).

Driving Style Monitoring

Posti's Freight Services in its endeavour to systematically curb fuel consumption through a more efficient driving style has adopted a driving style monitoring program. Posti has installed specific gadgets that are used in vehicles to detect fuel usage and emission control due to driving style in all its vehicles. By ensuring proper driving habits amongst its drivers, Posti has been able to cut its fuel usage by a range of 10-15%. The feedback may be used to change the driver's behaviour thus improving fuel efficiency and operational cost (Nguyen & Zuidwijk, 2025).

Investments in Renewable Fuels

In addition to other fuel technologies, Posti also includes renewable diesel as part of its sustainability strategy. For instance, Posti has incorporated Neste Renewable Diesel in its usage, which has the effect of reducing greenhouse gas emissions by minimising the carbon content in its carrier fuels. It can be noted that the utilization of the renewable diesel intervention fits well with the vision of making Posti's logistics carbon-neutral by 2030.

Results and Impact

They have led to significant cuts in fuel use and emissions, confirming Posti's dedication to sustainable logistics. It has the additional benefits of enabling better control of the organisation's environmental footprint and cost-saving in the long run. With biogas, LNG which will remain as specifications for its operations and transport, and renewable diesel there is fuel consumption is expected to be cut down towards the company's aim of achieving carbon neutrality by 2030.

6.16 Delivery Times of Posti

Posti is a Finnish postal and logistics company that provides its customers in Finland and in the global market with several possible delivery times and delivery services for parcels, mail, and small packages. The postal service also offers different options to deliver parcels and mail swiftly to the intended recipients for convenience and flexibility.

Parcels Delivery Times

Posti aims to make delivery easier for customers as they enable customers to decide when exactly they would like to receive their packages. It is also important to note that delivery time can be selected as parcel delivery is usually done on weekdays from 9 am to 9 pm at around a 4-hour interval. A particular time slot of their convenience can be selected so as to ensure that a particular customer is at home to receive the parcel. It is also worth mentioning that Saturday deliveries are possible in some cases, which adds to the recipients' convenience if they cannot receive packages during the weekdays (Kim et al., 2024).

In addition to ensuring that customers are given the tracking of their parcel status, Posti informs customers when their parcel is due for delivery. These are conveyed through an email or through a telephone call in order to make a customer prepare for the delivery. The "Home Parcel" service extends this even further by providing the recipients with a phone call in most cases the day after the order is placed to arrange for delivery time.

Mail Delivery Times

The delivery of mail by Posti occurs on Monday, Wednesday, and Friday within the week thus providing adequate delivery services for customers all over the country. Newsresearchs and various other types of mail deliveries are made early in the morning and thus the recipient can be assured to receive his or her mail in the morning. If required, Posti can also deliver on any other day, so that it can be convenient for every customer who may be unavailable on any particular day of delivery.

Small Parcel to Door

To the small parcel, Posti has a simple service that ensures that the parcel gets to the intended place within five business days. They are left at the mailbox, letterbox, or at the door step of the recipient together with other mails in small packages. This service is convenient for recipients who do not need large deliveries, but do not want to bother with organizing the deliveries themselves (Posti, 2024).

International Deliveries

Posti also offers services that include international deliveries they have different delivery time for the delivery services. Like, parcels that are to be delivered to the Baltic countries take reaching upto 1-2 working days

while those to other Nordic countries take upto 2-5 working days. It is a bearer product and they take up to 3-7 working days in Europe and 6-14 days internationally depending on place of delivery.

Service Type	Delivery Time	Additional Information
Parcels (Weekdays)	9 a.m. to 9 p.m. (4-hour time slots)	Customers can choose a specific time window.
Saturday Deliveries	Available in some areas	Home deliveries available on Saturdays in select areas.
Notifications for Parcels	Email/phone notifications when the delivery time approaches	Helps customers prepare for the arrival of their parcel.
Home Parcel Service	Usually contact the recipient the next weekday	To agree on a delivery time.
Mail Delivery	Mondays, Wednesdays, Fridays	Regular delivery days; early-morning deliveries in many areas.
Alternate Mail Delivery Days	As needed	Flexibility for customers who may not be available on regular days.
Small Parcel to Door	Delivered within 5 business days	Delivered to mailbox, mail slot, or behind the door.
International Deliveries	- Baltic countries: 1-2 working days	- Nordic countries: 2-5 working days
	- Europe: 3-7 working days	- Rest of the world: 6-14 working days
Express Delivery (EU)	1-3 working days	Faster delivery within the European Union.
Express Delivery (Global)	2-8 working days	Faster delivery to international destinations.

Table 5: Posti Transportation Cost Savings Strategies (Posti, 2025).

Table 5 explains the variety of parcels and packages that can be delivered and the related timings by Posti for the convenience of customers. You can get parcel delivery Monday through Friday from 9 a.m. to 9 p.m., in 4-hour time slots and sometimes on Saturday, too, depending on where you live. Emails or calls to the phone keep customers updated on their parcels delivered through Home Parcel Service. The standard delivery days are Mondays, Wednesdays and Fridays, although mail can also be delivered on other days if that's helpful for you. Parcels under 0.5 kg are given to you at your doorstep after five business days. Delivery outside your own country takes different times based on regions, while express services are faster for EU and world orders.

6.17 CO_2 Emissions Reduction at Posti: Green Logistics Strategies

The decrease in emissions will be a result of implementing and executing different green logistic strategies such as implementing green logistics in Posti that is the premier postal and logistics service provider in Finland. This includes, for example, renewing the fleet of vehicles, implementing efficient delivery routes, and reducing the emissions of CO_2 At the same time, the company aims at reducing the amount of emissions to 25% by 2030 and achieving zero emissions by 2050 (McKinnon, Browne, Whiteing, & Piecyk, 2015).

Fleet Modernization: Alternative Fuel Vehicles As one of the ways through which Posti is seeking to minimize its carbon footprint, the company has adopted the strategy of modernizing its fleet. To decrease their independence on traditional gasoline and diesel vehicles the company has been purchasing AFVs including EVs, hybrids. This transition to a more sustainable fleet decreases Green House Gas Emission, decrease fuel consumption and in variety the company also decreases its dependency with fossil fuels. Currently, Posti targets to achieve, to have not less than 50 % AFV in its fleet necessary for the green future.

Route Optimization: Another policy that Posti has adopted in an attempt to minimize CO_2 emissions is what can be referred to as route optimization. Since route planning involves the use of technology, it enables the company to cover less distance with the vehicles, less fuel consumption hence less emission. This optimization strategy in addition to the carbon emission reduction contributes in cutting on expenses hence shortening the delivery time. Route planning makes it possible for Posti to attend to its customer's needs while at the same time conforming to the standards that will help in the conservation of our environment (Borsenberger & Joram, 2022).

Energy Efficiency & Waste Reduction: In addition to fleet modernisation and route optimisation, which involves a rational approach to the organisation of transportation, Posti is implementing other energy efficiency measures within its properties. With the help of adaptation of more energy-efficient technologies, including light-emitting diode lighting, smart heating, and cooling systems, the company is capable of

attaining decrease the energy ratio and the resultant consequent emission level (Mampuru Jamgade, et al., 2024).

Thus, Posti needs to measure the emissions and use the identified carbon offsetting programs to balance the remaining emissions. This is done through purchasing and funding for projects that offset or mitigate emissions of CO_2 for instance through afforestation and provision of renewable energy sources. Carbon offsetting helps Posti to neutralize its environmental footprint as the it works towards restructuring the company to become environmentally friendly.

Emission Reduction Targets Posti has committed to the goal which has been set by the International Post Corporation (IPC) that seeks to limit the emission of carbon dioxide by 50% by 2030 while making a comparison with 2019 levels. This fits with the company's overall plans of achieving a net zero emissions by the year 2050 which makes it an important player in the transformation of Finland into a low-carbon economy. In the case of Posti, they are using different measures such as refinancing of fleets, redesigning of the route, and embracing of eco-friendly measures to show the importance of green logistics in improving the supply chain.

Green Logistics Strategy	Details
Fleet Modernization: Alternative Fuel Vehicles	Posti is transitioning to electric and hybrid vehicles, aiming for 50% of fleet to be alternative fuel vehicles by 2030.
Route Optimization: Efficient Delivery	Advanced technology is used to optimize delivery routes, reducing fuel consumption and CO_2 emissions.
Sustainable Practices: Energy Efficiency	Posti uses energy-efficient technologies like smart heating, LED lighting, and sustainable building practices to reduce emissions.
Waste Reduction & Recycling	The company reduces waste and increases recycling efforts to lower its carbon footprint and promote sustainability.
Carbon Offsetting	Posti invests in carbon offsetting programs such as reforestation and renewable energy projects to neutralize emissions.
Emission Reduction Targets	Posti aims to cut CO_2 emissions by 50% by 2030 compared to 2019 levels, with a long-term goal of achieving net-zero emissions by 2050.

Table 6:Posti's Green Logistics Strategies and CO_2 Emission Reduction Efforts (Posti, 2025).

Table 6 shows the green logistics plans that Posti employs to cut down CO2 emissions. Actions include updating the vehicle fleet so that more than half of the cars run on alternative fuel by 2030 and improving delivery planning with advanced tools to lessen fuel use and emissions. They have transmitted heat through water pipes in the buildings and have installed LED lights in many of them as well. To help the environment, the company decreases waste, encourages recycling and participates in activities like tree planting or building energy from non-fossil fuels. Such projects help Posti work toward its goal of cutting emissions by 50% by 2030 (from 2019 levels) and reaching zero emissions by 2050, like many organizations around the globe aim to do.

6.18 Theory for Analysis: Triple Bottom Line (TBL) Theory

The Triple Bottom Line Theory stands as one of the most accepted methods to assess sustainable business and wider operational impact. The theory which John Elkington developed during the 1990s pushes organizations to use environmental and social impact metrics along with financial results for performance analysis. TBL approach stands on three core pillars named People, Planet and Profit which teach organizations to regard sustainable business methods holistically (Żak, 2015).

People (Social Sustainability)

The TBL theory's “People” pillar describes how businesses affect their complete internal and external stakeholder groups including personnel at all levels and their clients as well as their respective communities and public society. Posti Company uses this aspect to study the beneficial impact of their green logistics strategies on social wellness.

Posti's investments in sustainable delivery technologies decrease both loud noise and airborne pollutants found in residential zones which creates better communities. The company conducts employee awareness programs and training which promote environmental commitment and work safety among staff. Posti supports social well-being through two initiatives which both improve staff environmental behavior and generate employment within the green economy (Żak, 2015).

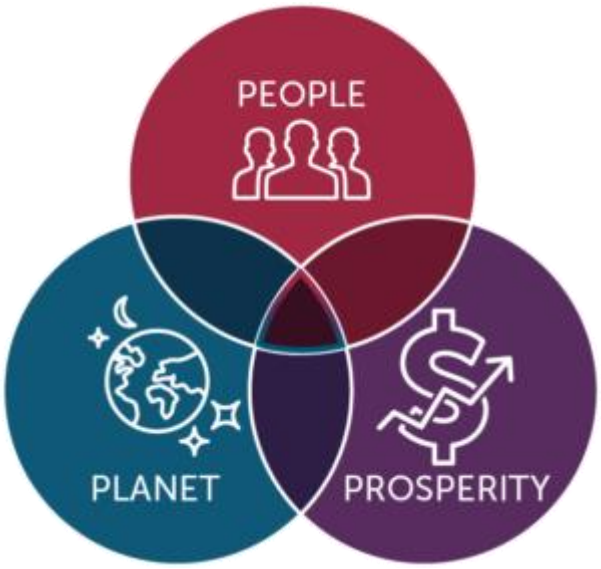

Figure 1: Triple Bottom Line (TBL) Theory (Tseng, Chang, Lin, Wu, Chen, Xia, & Xue, 2020).

Planet (Environmental Sustainability)

The "Planet" element deals with timely social responsibility and the company's use of resources. In the case of Posti, green logistics initiatives aim at cutting the company's emission of carbon and avoiding wastage and use of energy. Such initiatives include the purchase of electric and hybrid cars, constant changing of routes to reduce travelling distance and fuel usage, and sustainable practices of use of energy and water in the company's facilities.

To an extent, Posti has managed to make considerable progress in the emission reduction plans. The company is a member of the International Post Corporation (IPC) and together it works to cut down the CO_2 emissions by almost 40% since 2008 and the goal of 50 % by 2030. These action results from the company's approach of transforming its business to make it sustainable so that future generations will also be able to have an equal chance of enjoying a better life by having a clean environment, thus appearing under the environmental responsibility of TBL theory (Pereira & Martins, 2021).

Profit (Economic Sustainability)

The "Profit" feature cannot, therefore, be understood as a mere financial return but also as sustainability and rationality in terms of business functionality. This cancels out with the aspect ofgreen logistics that is a win-win strategy for the business, in this case Posti since it enhances cost-cutting as well as boosts performance. In terms of operation cost, it is helpful to know that route optimization of delivery at Posti will also minimize the use of fuel and shorten the time spent on

delivery. For instance, low-energy buildings cut down on the costs of utilities whereas environment conservation enhances a firm's image and endorsements leading to financial sustainability (Żak, 2015).

On the same note, by operating in the line of climate, Posti enhances its legal compliances as well as secures its strategic outlook in the competitive market. Sustainability efforts can also create new revenue streams, for instance, additional paid services on making deliveries more environmentally friendly or advice on climate-neutral delivery.

Through the analysis of the three dimensions of the Triple Bottom Line theory, it is possible to assess the green logistics activities carried out by Posti Company. These three Ps signify that Posti has managed to show other logistics organizations how operating efficiently and sustainably is possible in the current world. It also does well to measure current performance and provides guidance in formulating strategies for the future that create more environmental and societal value apart from generating better returns in the long run (Ali et al., 2024).

6.19 Factors Affecting Green Logistics Implementation

Organizing green supply chain management is a significant way of achieving the sustainability goal needed in the implementation of green logistics to enhance the delivery of products, as is the case with Posti Company. However, eco-friendly transition in logistics depends on many factors, both internal and external to a firm. The following are the factors that define a green logistics initiative's success, speed, and scale and are critical in any plan.

Technological Readiness

In the current world, the use of technology is integral towards supporting sustainable and environmentally friendly logistics. The cost of electric vehicles and routing software, sorting machines, and tracking systems affect the implementation process of the supply chain. Electric Posti delivery vehicles' deployment is strongly connected with the possibility of accessing high-quality EVs which can perform in different states of weather and road conditions. Also, the software system that is required for effective and real-time tracking of vehicles and the optimization of the delivery routes will go a long way in reducing fuel usage while at the same time increasing the overall speed of the delivery. Many institutions lack proper technological systems and development hence green initiatives may be slowed down or halted in the process (Seroka-Stolka, 2014).

Government Regulations

From experience, it can be argued that regulatory factors play a very significant role in achieving green logistics strategies. These are the policies in the form of environmental laws, restrictions on carbon emissions, high taxes on fuel, and incentives within the government to adopt environmentally friendly practices among others. For instance, relief on taxes, incentives and ways to encourage buyers to opt for EVs or government incentives for developing greener outlets can speed up Posti's transition to a greener environment. At the same time, non-compliance with new changes in the regulations may lead to the freezing of the project or loss of reputation in a market, for that reason, proper compliance is necessary and unavoidable (Khayyat, Balfaqih, Balfaqih, & Ismail, 2024).

Infrastructure Support

The key factors which underline the green success of logistics is the support infrastructure available in the operating regions. For EV fleets, having a station to charge the vehicles is very important, especially in rural or remote areas. The use of modern technology such as intelligent systems, energy efficient systems, solar panels and automated systems for waste sorting makes logistics sustainable (Li, Chen, & Wang, 2020).

Customer Demand

Consumers of products in the contemporary world are enlightened and have concerns towards the environment and want organizations to show a similar concern. The need to meet the increasing consumer expectations and expectations in meeting their environmental impacts like carbon-neutral shipping or recyclable packaging drives companies like Posti towards sustainability. Customer preferences could also be the cause of the competitiveness of certain markets. Businesses that do not meet these expectations are deemed to be dismissed by the customers and hence lose their share in the market.

Financial Resources

An approach to green logistics entails risks that may require Initial capital investment, which is usually high. The acquisition of EVs, modifying warehouses, raising employee awareness, and introducing new technologies all cost money. As for the long-term cost-saving by the ways of least fuel consumption and their longer-time energy efficiency, the poor financial capacity constraints the green change. Regarding the factors that make Posti pursue green innovations, the respondent highlighted the importance of having proper financial management and external funding/incentives (Jefimovaitė & Vienažindienė, 2022).

Employee Engagement

For green logistics strategies to be effectively implemented by employees and lead to enhanced performance, there are certain strategies that need to be put into consideration. All employees, starting from the vehicle operators, and the warehouse workers, among others, need to appreciate their roles in

sustainability goals. Training programs, workshops, and internal campaigns are some of the ways that warrant implementation so as to increase the adoption of sustainability. This research therefore postulates that intensified motivated and informed employees embrace green practices to foster organisational sustainability (Juvonen-Posti & Vuorento, 2025).

The forces driving green logistics are technological advancements, legal, infrastructural, economic, customer-oriented, and changes in human attitude. These are fundamental points that Posti and like-minded organisations have to consider so that it can effectively grow and ensure that it fulfils its environmental obligations. This research considers that a better-orchestrated approach to all these influences can result in a better, stronger, efficient and sustainable supply chain.

6.20 Future Plans of Posti

The concept of Sustainable Development has become a vital objective for companies all over the globe, and hence, Posti, a postal service and logistics firm in Finland has commenced marks to curb its environmental effects and boost efficiency. The company's medium- and long-term strategies include further decrease in carbon dioxide emissions, implementation of smart logistics, and application of circular economy principles. These are crucial for Posti's focus on sustainable logistics while at the same time being able to remain a competitive player within the market.

Net-Zero Emissions Target by 2040–2050

A major strategic development plan of Posti is the target to become carbon-neutral by 2040–2050. This entails a strategic approach where all the greenhouse gases emitted by the company are eradicated or compensated. In this respect, the key activity that has been identified for Posti is the change to renewable energy sources, use of low-emission vehicles and carbon offset programme. There is a need to consult with a stakeholder who promotes environmental issues and the relevant authorities so as to accomplish environmental legal obligations. This will not only help minimise the effects of the firm on the environment but also place it in a better place to be the leading company in matters concerning sustainability among logistics providers (Posti, Häkkinen, & Tapaninen, 2011).

50% Alternative Fuel Fleet by 2030

Posti also decided to make its corporate carbon dioxide emissions peak by 2030 and use fifty per cent of the green vehicles by the same year. This entails embracing plug-in electric, and hybrid, along with other low-emitting vehicles. It has already started especially in the cities where electrified delivery vans and Cargo bicycles are on the rise for the final consumer deliveries. This will cut down CO_2 emissions, air pollution and noise to ultimately meet their objectives on the environment as it also enhances most of Posti's customer's

experiences with minimal noise and pollutant deliveries. They are important also in terms of analysing how Posti could reduce its emissions in the future years (Posti, Bhamoriya, Kumar, & Khare, 2024)

Smart Logistics Solutions

Posti is also focusing on smart logistics solutions that bring more efficient operations and less impact towards the environment. Some of the core objectives include pursuing digitization, artificial intelligence, predictive analytics, and automation technologies in the company. Adopting AI in a planning and scheduling process will ensure that Posti finds effective routes that will minimize fuel consumption and time taken in order to transport the parcels. Furthermore, there will be an automated sorting and warehouse system making it easier to operate hence cutting costs on energy. In expanding these smart technologies, Posti will be in a position to enhance supply chain performance and practice sustainable supply chain management by providing efficient and environmentally friendly services (Siqueira Pinto et al., 2023).

Sustainable Packaging and Warehousing

The development strategies of Posti also focus on the sustainable packaging and warehousing of products in the near future. They are still welcome to utilize, where possible, recyclable, recyclable, reusable materials, especially in the e-commerce logistics' packaging. This is a noble venture which is seeking to address issues to do with packaging waste and coming up with a good supply chain. Besides, it also focuses on energy-efficient infrastructure changes by replacing a warehouse's lamps with LED lamps, installing solar panels, and installing smart systems for HVAC control. These changes will contribute to the general electricity usage diminution in the firm and minimize the adverse impact of the organization to the environment.

Enhanced Circular Economy Initiatives

As part of creating efficiency, Posti currently seeks to enhance the circular economy to cut down on its wastage. It also entails improving returns management, product reuse and recycling services. Through the purchase of recycled research and the prolongation of research products usage cycle, it is also affecting the creation of a circular economy, where the amount of waste is reduced, as well as the reuse of resources. These activities will alleviate Posti's environmental effects while also opening up new business areas in waste management and product lifecycle services.

7 Discussion and Analysis of Data Collection: Posti Group's Transportation and Sustainability Strategies

Data analysis and decision making have extremely influential roles in identifying the various working parameters that help in logistically efficient, cost-effective and environmental friendly supply chain systems. The essential strategy of transport management with some Finnish company and best-known postal and logistics company, such as Posti Group, has pursued various approaches of data collection and analytical techniques for controlling the transport cost, fuel consumption, delivery time, and carbon emission. By embracing leading technologies and enviable practices, Posti has effectively coped with economic and environmental aspects of the company and its industries. This discussion and analysis shall look into some of the evaluation criteria for Posti which include; assessing the various data collection strategies used by Posti, the effectiveness of a particular strategy in benefiting the company and other sustainability measures about the firm (Tamulis, Guzavičius, & Žalgirytė, 2012).

7.1 Data Collection for Transportation Cost Savings

An example of how Posti accomplishes this is by relying on RouteSmart, a route optimization system that is aimed at decreasing transportation expenses miscellaneous information. RouteSmart.com organizes delivery routes depending on the delivery volumes and geographic information. Traffic conditions, parcels' tendencies, and delivery destinations become a basis for the formation of an efficient timetable of deliveries. this has the effect of shortening the distance and time traveled and improving on the overall use of the vehicles hence conserving fuel.

In Posti's case, it shows that RouteSmart has been effective in terms of reducing the overall costs. Thus, due to the introduction of this system, the delivery costs have been cut by 5% per center. This was achieved following the proper documentation of the amount of delivery, effective route, and usage of vehicles that were used to derive efficient routes. Posti has planned to cut down its delivery costs to the extent of EUR 150-200 million from 2019 to 2021, which is another notable example of data application for achieving strategic objectives. In other words, Posti has established itself as an organization that not only offers its services at reasonable prices but also complies with the requirements of its clients while gaining competitive advantages and improving its operational benchmarks (Lule et al., 2024).

Nevertheless, certain general issues should be taken into consideration in relation to the collection of data. As effective coping strategies highly depend on internal information, such as traffic flow, delivery loads, and vehicles' performance, the need for real-time data collection increases due to some unexpected factors that

may delay transportation, for instance, adverse weather conditions or traffic accidents. Real-time data analysis can be integrated to enhance decision making and routing also, to be able to cope up with the existing conditions of the environment, depending on the situation.

7.2 Focus on fuel consumption reduction

After the elimination of strikers, the reduction of fuel consumption and carbon footprint can be regarded as another successful example of the use of data initiatives that address both efficiency and environmental concerns at Posti. To mitigate the effects on the natural environment, the company has used various data collection methods of the fuel, emissions, and driving habits, thus lowering the firm's impact.

A major data collection can be done through driving style programs that help track fuel consumptions. Posti collects data through smart devices on the parameters of fuel consumption and driving behaviour which include speed, brake as well as acceleration. Such real-time data capture also helps make suggestions for better fuel consumption by the drivers to Posti. The initial analysis of the data harvested by such devices has shown that gradual changes in the driving style have led to a decrease of fuel consumption by 10-15%. These lead not only to lower working costs, but also to Posti's broader environmental objectives, which include carbon neutraality by 2030.

In another note, it has also diversify its vehicle means to those that offer low-carbon and gas emissions. Thus, by implementing biogas-powered trucks and LNG vehicles into operation, Posti gathers own data on experience in benchmarks of utilization of other fuel types and, therefore, defines efficiency of own experimental investments. This has been made possible by the application of big data in the firm and has seen the firm cut its carbon dioxide emissions by 1,620 tonnes in a year with single biogas-fueled lorry emitting equivalent to approximately 8.6 million km of a passenger vehicle (Posti, 2024).

Altogether, Posti's commitment to use data to approach the issue of fuel consumption is quite appropriate; however, there are shortcomings. For instance, surveillance of driving behaviors entails regular undertakings, which may be time-consuming given that they need to track all the vehicles in the fleet. Also, Posti has adopted the use of other fuels in an effort to minimize on emission, should face challenges in relation to the supply, cost, and technology relating to the use of green vehicles.

7.3 Delivery Time Optimization and Customer Satisfaction

The collected data at Posti is not limited to the organization's environmental and operating occurrences but it also captures customer service and their satisfaction. The company has incorporated the following

approaches to meet its objectives of delivering its services in a timely and flexible manner either locally or internationally.

For example, through the understanding of current client options, historical delivery data, and localized analytics, Posti is apt at making special deliveries and deliveries in general where clients are allowed to choose delivery time of their parcels. Through this project, specific information on delivery options for the customers and trends in the regions of operation could be gathered to enable Posti to serve the clients with additional services that would improve customer satisfaction. Another advantage of this system is that it will be notifying the customers immediately a parcel is getting close to the delivery time, in order to enable the recipients prepare for the delivery. This type of services helps in improving customer satisfaction through delivery of packages at the times when the recipients are around.

This has also been an avenue of investment by Posti to ensure that it comes up with the best delivery route depending on the volumes of parceled or the places where they are to be delivered. This data can be incorporated into the company's route optimization system, has enabled Posti to enhance on the time it takes and efficiency. It is in line with the customer's demand while at the same time helps the company toward their bigger idea of cutting costs of transportation and pollution (Posti, Häkkinen, & Tapaninen, 2011).

Still, it remains a task for institutions to find the means to satisfy customers and at the same time balance the efficient and effective flow of operations. For instance, although customer control relating to delivery times is a positive attribute it also provides high levels of operational costs when not well dealt with.

7.4 Sustainability and Carbon Emission Reduction

The major purpose of the approach to collecting data in the company refers to the minimization of Carbon emissions that ensures sustainability. This has a vision of becoming a net-zero company by 2050, with targets that halfway to achieving 50% Carbon reduction by 2030. Measurement captures these objectives because the firm can use it in observing the company's emissions, determining the viability of the green technologies applied in the business, and making adjustments these concerns based on tangible data.

Besides, the company currently investigates opportunities for the coverage of the remaining emissions through carbon offsetting initiatives. Thus, with the help of some quantitative parameters, Posti estimates the effectiveness of these programs and decides which ones, for example, reforestation, or support of renewable energy sources, will be the most efficient to compensate its emissions. In this way, Posti will be able to collect information on the possible carbon reduction, and thereby make accurate decisions on where to invest in order for the greatest impact to be made.

Despite the progress Posti has made in its sustainability journey, efforts for the company to get to net-zero will have to be incremental and evolutionary. Information on emissions and sustainability activities will remain for important in guaranteeing that the effectiveness of the strategies towards its achievement is determined, and the company's long-term goals are met efficiently.

The strategies applied by Posti Group in data collection show how integrated technological solutions and analytical tools contribute to operational optimization, cost savings, and sustainability. The outcome of developing a successful strategy of using route optimization, the monitoring of fuel consumption, and green logistics has not only enhanced the efficiency of the operations of Posti but also the firm had made progress toward realizing most of its strategic goals in sustainability (Siqueira Pinto et al., 2023). These strategic initiatives ensure the company has effectively managed to promote efficient transport cost reduction while enhancing the environment impacts. However, these changes bring problems in data collection strategy across operation level, such as the collection of real time data, how green technologies are well scaled, and the best balance between customers and effectiveness of operations for Posti.

8 Work Reliability

The validity of the study is guaranteed by the obvious consistency of the purpose, methods, and the actual case of the Posti Company, which is the major logistics operator in Finland and is characterized by environmental activities. The attention given to the green logistics approaches, which include energy-efficient transportation, route planning, and renewable energy, shows that the research is pegged on realistic and quantifiable practices. The research will have the advantage of a sufficiently documented topic with readily available information, which enhances the validity and consistency of the results by choosing Posti Company.

To achieve reliability, the research will be qualitative with a secondary research design where the author used sustainability reports, scholarly articles, and industry reports. These are credible peer-reviewed publicly available data sources, which decrease the possibility of bias and increase transparency. Furthermore, the case study approach enables a detailed analysis of the green logistics activities of Posti in the context of a real supply chain, which can provide stable and repeatable results in the framework of similar investigations.

The thematic analysis employed also contributes to the reliability of the work, patterns, and themes are extracted and observed to be common in various data sources. This approach mitigates the subjectivity and allows to ground the conclusions on exhaustive and coherent evidence. The ethical norms are observed in the process of the research through the correct situational quote, admiration of intellectual property, and objectivity of the analysis.

Also, the cross-sectional nature allows for capturing the picture of the current practices in question without relying on any future assumptions, which increases the temporal reliability. Through the combination of practical and academic knowledge, the research will offer a reliable source of information on the role of green logistics in the efficiency of the supply chain and its environmental friendliness. Altogether, the similarity in the collection and analysis of data and the emphasis on the case study contributes to the high reliability and credibility of the research results.

9 Ethiclal Considerations

As a researcher, I am aware of the necessity to maintain high ethical standards in the whole process of the research. When carrying out this research on the effects of green logistics practices on the efficiency and sustainability of supply chains by taking the Posti Company as a case study, I was keen to make sure that every part of my work complies with set ethics.

As I used secondary data, I was especially careful to utilize only trustworthy open sources like official sustainability reports published by Posti, academic journals, and proven industry publications. I also ensured that I acknowledged all the authors and sources by providing the right citations and references. In this way, I did not violate the intellectual property rights of other people and I observed academic integrity.

I as well was objective in my analysis and the interpretation of the data was not affected by my personal views. I was neutral towards the research and strived to provide an objective and well-balanced assessment of the logistics strategies used by Posti and their consequences. Whenever an opinion or an interpretation was provided, I made a clear distinction with factual findings.

The issue of privacy and confidentiality did not play a significant role in this research study because there was no gathering of personal or sensitive information. Nevertheless, I did not overlook any information and treated it with respect and care, particularly when speaking about the practices or performance of the company.

Moreover, I made sure that the process of research poses no harm- not to the people, and not to organizations. I intended to make a positive contribution to academic knowledge and offer insights that could be used to enable more sustainable practices in the logistics industry.

In general, I was also determined to be honest, transparent, and responsible during the research. These ethical reflections not only enhance the validity of my work but also together with values of sustainable development and social responsibility which are the core of my research topic.

10 Conclusion

The analysis of Posti Group's green logistics initiative draws attention to the ability of sustainability efforts to revolutionize logistics both internally and in terms of environmental impact. Innovative solutions in this case include utilization of biogas fuelled vehicle and efficient route planning system to minimize transportation costs, fuel usage and reduction of carbon footprints, benefits that have been realized at Posti. The company's environmental management and goals, such as the commitment to the production that has no net emissions by 2050, are proof that environment management and goals can create a positive synergy with the business objectives to increase overall effectiveness.

The use of data such as fuel consumption and vehicle performance has greatly helped Posti Company in efficient organization of delivery routes and customer satisfaction. In addition, recycling helps to minimize the company's share of negative impacts on the environment and become profitable in the long term, as the use of green technologies is often considered profitable for logistics companies.

However, several issues are observed which include: There is need for uniformity in data gathering technique, growth of green technologies, and optimization of operational cost while satisfying the customers. This pressure and the potential example of Posti's successful implementation and positioning of green logistics as a competitive advantage in the practice show that green logistics can be both good for the environment and for business. it will be imperative to acknowledge that the green logistics notion of Posti is useful for other firms in the logistics and the supply chain industry. The strategy applied by the company offers a blueprint of how sustainability may be achieved in the logistic chain without compromising the functionality of the company. Thus, outlining methods used by Posti in employing the green logistics strategies can help other organizations in the industry to learn how they can perform sustainably while implementing the strategies.

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Appendix – 1: Questionnaires

- Can you describe your daily responsibilities as a delivery driver at Posti?
- How long have you been working with Posti, and what changes have you noticed over the years?
- Posti has implemented several green logistics strategies—how have these changes affected your daily work?
- Do you use electric or low-emission vehicles for deliveries? If so, what are the benefits and challenges?
- Has Posti introduced any eco-friendly packaging or recycling initiatives? How do they impact deliveries?
- How does Posti manage route optimization to reduce fuel consumption and carbon emissions?
- What measures are taken to reduce energy consumption at delivery hubs or warehouses?
- Have the new green logistics strategies improved the speed or efficiency of deliveries?
- Do digital tools, such as route planning apps or real-time tracking, help reduce delays and optimize delivery schedules?
- Have there been any issues or delays due to sustainability initiatives (e.g., charging electric vehicles, using bicycles in certain areas)?
- How do customers react to Posti's sustainability efforts, such as electric deliveries or eco-friendly packaging?
- Do you receive any feedback from customers regarding Posti's environmental initiatives?
- Are businesses more likely to partner with Posti due to its sustainability practices?
- What are the biggest challenges of implementing green logistics in last-mile delivery?
- Do you think Posti could improve its green logistics strategies? If so, how?
- Are there any sustainability initiatives that you would personally like to see implemented?