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Sustainability in supply chain management

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Abstract

There are prominent concerns arising from the impact business practices are posing to the environment, particularly due to climate change, scarcity of resources, and social responsibility. The main objective of the research was to assess the strategies firms can use to incorporate sustainability in their supply chain practices while maintaining their financial viability. The study applied a qualitative approach to find out the sustainability practices companies apply in their supply chain process. The data collection techniques applied included semi-structured interviews with 20 participants from diverse organizations. The study also used focus groups comprising of 5 participants for dynamic discussions and peer-to-peer learning. Themes were developed from the group interviews and focus groups that helped to draw conclusions from the study. The key findings from the research are as follows: First, regulatory restrictions are the major driving force towards sustainability. Secondly, consumers show high affinity towards products offered by sustainable organizations. Third, lack of awareness is the main reason why some organizations have not incorporated sustainability into their supply chain. The fourth finding is that the circular economy leads to significant reduction in wastes, hence supply chain sustainability. Incidentally, the study finds out that supply chain sustainability cuts costs for organizations. The research findings validate the importance of supply chain sustainability in enhancing financial performance of companies, boosting brand reputation, and increasing consumer loyalty and retention.

Keywords: Sustainable Practices; Sustainability; Circular Economy; Financial Performance; Supply chain management

1. Introduction

1.1. Background and significance of IPO in the UK market

Sustainability in supply chain management has emerged as a significant factor for organizations in today's global economy. The increased acknowledgement of environmental and social obligations, together with the growing demand from consumers and stakeholders for more sustainable practices, has led to a paradigm shift in how firms handle their supply chains. The old perspective of supply chain management primarily centered on improving costs, efficiency, and speed. However, the emergence of environmental issues such as climate change, resource depletion, and concerns about social responsibility have prompted corporations to reassess their supply chain tactics.

Incorporating sustainability principles into the supply chain requires reducing the negative impact on the environment and society while maintaining the continuity of business operations. This shift towards sustainability is driven by a range of factors, including legal demands, customer preferences, and the awareness that long-term profitability and environmental stewardship can go hand in hand. By implementing sustainable practices, businesses can lower their carbon footprint, minimize waste, and promote the well-being of the communities in which they operate. These adjustments not only contribute to a greener planet but also create a competitive advantage in an increasingly eco-conscious market. In this context, this dissertation attempts to study the varied character of sustainability in supply

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chain management and provide insights into how firms can successfully implement sustainable practices while retaining profitability.

1.2. Research Rationale

The motivation for conducting this research arises from the imperative to address the increasingly prominent environmental and social concerns within the contemporary business environment. The conventional methodology employed in supply chain management frequently resulted in adverse outcomes, including but not limited to excessive utilization of resources, heightened emissions of greenhouse gases, and the perpetuation of inequitable labor practices. In light of these concerns, a multitude of stakeholders, encompassing consumers, investors, and regulatory entities, are advocating for transformative measures.

The objective of this study was to establish a connection between sustainability and profitability within the context of supply chain management. The objective is to illustrate the capacity of firms to successfully mitigate their environmental footprint and enhance their commitment to social responsibility, all while maintaining economic viability. Gaining insight into the tactics and optimal methodologies for attaining this equilibrium is imperative for the sustained prosperity and adaptability of enterprises amidst a swiftly evolving commercial landscape.

This dissertation sought to offer significant insights that can serve as guidance for firms, policymakers, and other stakeholders in their pursuit of more sustainable and responsible practices by analyzing the many aspects of sustainability in supply chain management. The anticipation is that this research will not alone add to the scholarly dialogue, but also provide viable resolutions to the obstacles encountered by firms striving to align sustainability with profitability in their supply chains.

1.3. Purpose and Objective of the Dissertation

The primary objective of this research is to examine the incorporation of sustainability practices within the domain of supply chain management, and to assess the strategies that organizations can employ to mitigate their environmental footprint without compromising their financial viability. Through an analysis of the intricate dynamics between sustainability and supply chain management, the objective of this study is to offer a thorough comprehension of the obstacles, prospects, and approaches that enterprises can employ to establish a supply chain that is more sustainable, socially responsible, and capable of withstanding disruptions.

The main objectives of this dissertation are as follows:

- To evaluate the present condition of sustainability in supply chain management, specifically within the framework of global corporate operations.
- To ascertain and examine the primary factors that facilitate or impede the implementation of environmentally responsible practices within supply chains.
- To examine optimal approaches and tactics that enterprises can utilize in order to incorporate sustainability principles into their supply chain management processes.
- To assess the influence of sustainability initiatives on financial performance, customer satisfaction, and stakeholder involvement, it is necessary to conduct an evaluation.

1.4. Research Question

1. How can businesses effectively incorporate sustainability principles into their supply chain management processes?

- What are the key drivers and barriers that influence the adoption of sustainability practices in supply chain management?
- What are the most effective strategies and best practices for reducing environmental impact while maintaining profitability in the supply chain?
- To what extent do sustainability initiatives impact financial performance, customer satisfaction, and stakeholder engagement in supply chain management?
- How can businesses strike a balance between sustainability and profitability in their supply chain management, considering the unique challenges of their industry and operational context?

1.5. Chapter Summary

The present chapter functions as an introductory section that addresses the broad issue of sustainability within the context of supply chain management. The provided statement delineates the core principles and concerns that establish the foundation of the research, so preparing the groundwork for the ensuing chapters. The background and significance of the study are crucial aspects that need to be addressed. This paper provides a comprehensive examination of the growing significance of sustainability within the realm of supply chain management, specifically emphasizing the environmental and social obligations that businesses must undertake. This statement underscores the shift in paradigms towards sustainability and the increasing significance of this dimension within the contemporary business environment.

The purpose of this study is to provide a justification for conducting research. This research aims to explore the underlying factors that necessitate its undertaking, with a particular focus on the imperative nature of addressing environmental and social issues within the supply chain. The aforementioned statement underscores the increasing demands placed by consumers, investors, and regulatory entities for the adoption of sustainable practices and the demonstration of responsible conduct.

2. Literature review

2.1. Conceptual Review

2.1.1. *The Concept of Sustainability in Supply Chain Management*

The notion of sustainability in supply chain management encompasses various dimensions, including economic, environmental, and social aspects. From an economic perspective, sustainability refers to the process of guaranteeing the enduring financial feasibility of a corporation by means of implementing supply chain procedures (Sanchez-Flores et al., 2020). From an environmental standpoint, the concept entails the reduction of resource use, the minimization of waste generation, and the mitigation of emissions. The social component includes concerns pertaining to equitable working methods, ethical sourcing, and active involvement within the community.

The significance of sustainability is underscored by statistical data. As per a survey conducted by CDP, it was found that the proportion of companies within the S&P 500 index that released sustainability reports witnessed a significant increase from a mere 20% in 2011 to an impressive 89% in 2019 (Governance and Accountability Institute, 2021). This exemplifies the extensive acknowledgment of sustainability as an essential element of corporate strategy.

Historical Development

The progression of sustainability in supply chain management is characterized by significant milestones. During the 1980s, corporations began to acknowledge the ecological consequences of their activities, resulting in the birth of environmental management systems. During the 1990s, there was an increasing emphasis on social and ethical concerns, including the promotion of fair labor practices and the adoption of ethical sourcing strategies (Lambrechts, 2021). Nonetheless, it was not until the onset of the early 21st century that the concept of sustainability within supply chains garnered significant recognition.

The historical progression is demonstrated by the expansion of sustainability criteria. The establishment of ISO 14001 (Environmental Management) in 1996 and ISO 26000 (Social Responsibility) in 2010 played a significant role in influencing sustainable practices throughout supply chains (Chakroun et al., 2019). These standards have emerged as influential frameworks for multinational corporations, facilitating their compliance with environmental and social best practices.

The concept of the Triple Bottom Line

The "triple bottom line" framework, commonly known as the "people, planet, profit" paradigm, has emerged as a fundamental concept in comprehending the sustainability aspects of supply chains. This statement underscores the importance for businesses to take into account not only their financial success, but also the welfare of society and the environment.

In the realm of supply chain management, the social aspect of the triple bottom line assumes significance as it underscores the significance of equitable labor practices, ethical sourcing, and active involvement with the community (Hammer, 2016). For example, companies that allocate resources towards the welfare of their employees and local

communities frequently observe a decrease in employee attrition rates and an enhancement in their public perception (Aruisamy et al., 2023).

The planetary context requires a decrease in carbon emissions, waste generation, and resource utilization. Companies that place a high priority on implementing environmentally sustainable practices frequently experience a decrease in operational expenses and achieve compliance with regulatory standards (Roffe & Gonzalez, 2023). The findings of a study conducted by the Carbon Disclosure Project indicate that companies that place a high emphasis on sustainability within their supply chains experience an average reduction of 5.6% in carbon emissions (CDP, 2021).

The concept of "profit" may initially seem contradictory to the principles of sustainability, but it serves to emphasize the financial feasibility of businesses. The management of sustainable supply chains encompasses not only ethical decision-making but also considerations of cost-effectiveness and risk reduction. Many companies that embrace sustainability practices frequently experience significant cost reductions. A research conducted by MIT Sloan Management Review revealed that 36% of companies that integrated sustainability practices into their supply chains reported experiencing cost savings, whereas 35% observed an increase in revenue (Baskin, 2023).

The triple bottom line framework offers a comprehensive perspective on sustainability within supply chains. The adoption of ethical and regulatory practices is not solely a requirement, but rather a strategic approach that has the potential to augment profitability, mitigate risks, and establish companies as responsible and forward-thinking entities within the global market (Esan et al., 2024).

2.2. Drivers and Barriers to Sustainability in Supply Chains

2.2.1. Drivers

The implementation of regulatory requirements has played a crucial role in promoting sustainability throughout supply chains. According to a poll performed by DHL and the Global Reporting Initiative (GRI), a significant majority of organizations, specifically 63%, indicated that legal mandates and regulations serve as a principal motivator for the adoption of sustainability measures (DHL, 2020). This encompasses legislation pertaining to pollution, waste management, and labor practices. The adoption of environmentally sustainable supply chain techniques by numerous organizations can be attributed to the high emissions objectives set by the European Union, as a means to ensure compliance.

Consumer demand has a significant role in shaping the sustainability of supply chains as it strongly influences consumer choices. Based on a study conducted by Nielsen, it was shown that a significant majority of customers, specifically 66%, exhibit a willingness to incur additional costs in exchange for items originating from businesses that demonstrate a strong dedication to social and environmental responsibility (Bhaduri, 2023). The expectations of consumers have compelled corporations to modify their supply networks in order to meet these demands.

One of the key factors that drives organizations is the need to remain competitive in a market that is constantly changing and evolving. According to a poll conducted by McKinsey & Company, a significant majority of respondents, specifically 75%, expressed a high level of importance regarding the role of supply chain sustainability in enhancing competitiveness (Bove & Swartz, 2016). There is a growing trend among companies to adopt sustainable practices as a means of distinguishing themselves from competitors and capturing a larger portion of the market.

Economic advantages can be derived from the implementation of sustainable supply chain techniques, as they frequently lead to reductions in costs. According to a report published by the Carbon Disclosure Project (CDP), organizations who have adopted sustainable supply chain strategies were able to achieve cost savings amounting to \$19.3 billion in the year 2019 (CDP, 2021). The considerable savings are attributed to the reduction in waste, energy consumption, and other inefficiencies in resource utilization.

2.2.2. Barriers

Cost Considerations: An often mentioned obstacle to achieving sustainability in supply chains is the anticipated financial implications associated with the adoption of environmentally friendly methods. According to a survey conducted by Capgemini, a significant proportion of organizations, specifically 42%, have identified cost as a prominent obstacle (Capgemini, 2024). This phenomenon is particularly conspicuous in sectors characterized by narrow profit margins, which renders the initial investment in sustainability endeavors appear onerous.

One challenge faced by certain firms is a deficiency of knowledge and proficiency pertaining to sustainable supply chain operations. The International Journal of Production Economics conducted a study which revealed that 28% of the organizations polled saw a deficiency in knowledge and skills as a significant obstacle in the implementation of sustainability initiatives. This emphasizes the necessity of acquiring knowledge and training within the respective sector.

Resistance to change is a common phenomenon when it comes to the implementation of sustainable measures, as it typically requires substantial modifications in procedures, culture, and behavior. Resistance to change within organizations can provide a significant impediment. According to a poll conducted by Accenture and the UN Global Compact, a significant proportion of respondents (38%) identified internal resistance as a hindrance to the effective implementation of sustainable supply chain management (Accenture, 2021).

Supplier engagement presents a considerable difficulty in maintaining sustainability across the entirety of the supply chain. The process of engaging with suppliers can be intricate, and certain suppliers may exhibit unwillingness or lack the capacity to embrace sustainable practices. According to a research conducted by the Sustainable Supply Chain Foundation, a notable proportion of organizations, namely 33%, identified challenges in effectively involving suppliers as a substantial obstacle.

Understanding these drivers and barriers is essential for organizations seeking to navigate the complex landscape of supply chain sustainability. Overcoming the barriers and leveraging the drivers can lead to enhanced environmental, social, and economic outcomes, creating a more sustainable and responsible supply chain.

2.3. Theoretical Review

2.3.1. Best Practices and Strategies for Sustainable Supply Chain Management

Sustainable sourcing constitutes a vital element of supply chain sustainability. According to research conducted by the World Economic Forum, it has been determined that around 70% of the environmental effect attributed to a corporation is concentrated within its supply chain (World Economic Forum, 2020). Sustainable sourcing encompasses the implementation of conscientious procurement strategies, meticulous supplier evaluation, and meticulous tracking of product origins. Organizations that adopt sustainable sourcing practices strive to minimize their ecological impact and uphold principles of ethical labor.

According to a study done by McKinsey & Company, organizations that engage in sustainable sourcing practices are able to attain cost savings of up to 20% through the reduction of waste and enhancement of resource efficiency (Bové & Swartz, 2016). Moreover, according to a survey by Nielsen, a significant proportion of global customers, specifically 66%, exhibit a willingness to allocate additional financial resources towards sustainable businesses (Bhaduri, 2023). This inclination towards responsible sourcing might be perceived as a distinct competitive edge in the market.

The concept of green logistics comprises a variety of strategies and initiatives that are designed to mitigate the negative environmental effects associated with transportation and warehousing activities within the supply chain. The optimization of shipping routes, enhancement of warehouse efficiency, and implementation of reverse logistics are fundamental components. The implementation of environmentally-friendly logistics procedures leads to a decrease in emissions and cost savings in operations.

The environmental advantages of green logistics are exemplified by the potential reduction of carbon dioxide (CO₂) emissions by up to 30% through the optimization of transportation routes, as stated in a report published by the European Environment Agency (Delft, 2024; European Environmental Agency, 2024). Furthermore, according to the Council of Supply Chain Management Professionals, organizations who adopt green logistics techniques observe a mean decrease in costs of 9% and a 21% enhancement in the total efficiency of their supply chains (CSCMP, 2024).

The notion of the circular economy has garnered significant attention in the field of supply chain sustainability due to its novel nature. The focal point lies in the promotion of waste reduction, enhancement of resource efficiency, and the exploitation of materials in a sustainable manner. Organizations that embrace circular economy ideas strive to limit the development of trash and prolong the lifecycle of products.

The potential benefits of adopting a circular economy approach, as shown by research conducted by the Ellen MacArthur Foundation, indicate that economic opportunities worth \$1 trillion can be unlocked specifically within the consumer goods sector. Moreover, a study conducted by the World Business Council for Sustainable Development reveals that the

adoption of a circular economy model has the potential to yield a substantial reduction in material costs, estimated at \$1.8 trillion (WBCSD, 2024).

Collaborative initiatives refer to cooperative efforts undertaken by multiple individuals or organizations with the aim of achieving a common goal or objective. These

The establishment of collaborative projects that involve relationships with suppliers, customers, and stakeholders is vital in order to facilitate the advancement of sustainability within supply chains. Participating in these projects frequently results in the exchange of knowledge, sharing of resources, and a more extensive dedication to the implementation of sustainable practices.

The Sustainable Supply Chain Foundation presents a case study that exemplifies the substantial waste reduction achieved via collaborative efforts throughout supply chains. Through collaborative efforts with suppliers, the company successfully optimized operational procedures and mitigated inefficiencies, resulting in a noteworthy 20% decrease in waste generation and a commendable 10% reduction in costs.

2.4. Measuring and Assessing Sustainability Performance

Certifications and Standards: Sustainability certifications and standards, such as ISO 14001, ISO 26000, and Fair Trade certifications, play a pivotal role in verifying sustainable practices in supply chains. These certifications offer a recognizable benchmark for responsible business conduct. A case study on Fair Trade certified supply chains published in the *Journal of Business Ethics* revealed that businesses adopting Fair Trade principles not only improved the livelihoods of producers but also saw increased sales of Fair Trade products, demonstrating the value of these certifications in driving sustainability and consumer trust. By integrating these best practices, strategies, and measurement methodologies, supply chain managers can enhance their sustainability performance and, in the process, realize tangible environmental and economic benefits while adhering to established certifications and standards.

2.5. Measuring and Assessing Sustainability Performance

To evaluate sustainability performance in supply chains, organizations rely on a range of Key Performance Indicators (KPIs) and metrics that capture the economic, environmental, and social dimensions of sustainability. These KPIs are crucial for monitoring and improving performance. Measuring greenhouse gas emissions (GHGs) is a fundamental KPI for assessing environmental sustainability. According to a report by CDP, 61% of companies in their 2020 global supply chain sample tracked and reported their carbon emissions (CDP, 2021). This KPI helps in identifying opportunities to reduce emissions and contribute to climate change mitigation. Tracking water consumption is becoming increasingly important as water scarcity becomes a global concern. According to the Carbon Disclosure Project (CDP), 59% of companies in their 2020 supply chain sample reported water data. By measuring water usage, companies can identify areas for reduction and more responsible water management. KPIs in the social dimension include measures related to fair labor practices, community engagement, and supplier diversity. For instance, the Ethical Trading Initiative (ETI) reports that 82% of companies with ETI membership measure their social impact, demonstrating a commitment to ethical labor practices (ETI, 2022).

Monitoring and reducing waste is essential for environmental sustainability. A case study by the Green Supply Chain cites a company that achieved a 40% reduction in waste by implementing waste reduction KPIs (Trowbridge, 2006). Sustainability certifications and standards play a significant role in verifying sustainable practices in supply chains, offering a recognizable benchmark for responsible business conduct: ISO 14001 is an international standard for environmental management systems. According to ISO, more than 360,000 organizations worldwide have adopted ISO 14001, demonstrating the global recognition of this standard as a cornerstone of environmental sustainability. ISO 26000 is a guidance standard for social responsibility. It provides a framework for organizations to integrate social responsibility into their operations. The International Organization for Standardization (ISO) reports that ISO 26000 is used by organizations of all types and sizes in over 100 countries (ISO, 2024). Fair Trade certifications ensure that producers in developing countries receive fair compensation and adhere to ethical labor practices. According to Fair Trade International, sales of Fair Trade products have continued to grow, reaching €11 billion globally in 2019 (Fairtrade, 2021). This observation signifies the level of consumer demand and confidence in products that have been verified by Fair Trade.

2.6. The Impact of Sustainability on Financial and Non-Financial Performance

Integrating sustainable practices in supply chains significantly impacts financial performance. Sustainability improves firms financially, according to several studies and industry reports:

- **Cost Savings:** Sustainable supply chain methods can reduce costs. Companies who adopted such procedures saved \$19.3 billion in 2019, according to the CDP. Operational expenses drop significantly when organizations reduce waste, optimize resource use, and boost efficiency.
- **Income Generation:** Sustainability can boost income. Nielsen found that 66% of worldwide consumers will pay more for socially and environmentally responsible brands. Sustainable products are becoming more popular, which could boost sales and market share.
- **Risk Mitigation:** Sustainability strategies reduce financial performance risks. Responsible supply networks are less susceptible to adverse weather, labor disputes, and resource constraint. Companies that actively managed and mitigated environmental and social risks outperformed others, according to Harvard Business Review.

Long-term success in supply chains requires sustainability, which not only improves financial metrics but also provides several non-financial benefits.

- **Enhanced Brand Reputation:** Sustainable companies frequently have a great reputation. A Journal of Business Ethics study indicated that companies with strong corporate social responsibility (CSR) efforts have stronger brand recognition and are more favoured by consumers and stakeholders.
- **Sustainability measures can boost client loyalty.** Sustainable companies are more likely to retain clients, according to the World Economic Forum. Repeat business, positive word-of-mouth marketing, and solid customers often result from loyalty.
- **Stakeholder Engagement:** Supply chain sustainability may engage employees, investors, and the community. Investors who emphasize long-term sustainability prefer sustainable enterprises, according to Harvard Business Review. Engaged workers boost productivity and innovation.

Supply chain sustainability improves financial and non-financial performance. These techniques boost financial performance by lowering expenses, increasing revenue, and reducing risks. They boost brand reputation, customer loyalty, and stakeholder engagement, boosting the company's resilience.

2.7. Striking a Balance Between Sustainability and Profitability

Supply networks must balance sustainability and profitability, which is difficult and involves trade-offs:

- **Cost Considerations:** Cost is a major barrier. Technology, training, and process improvements are needed to implement sustainability practices. Companies may need to mitigate these expenditures without hurting profits.
- **Resource constraints:** Energy-efficient equipment and sustainable materials may be needed for sustainability. Organizations must efficiently deploy resources without affecting profitability.
- **Longer ROI Horizon:** Sustainability initiatives like renewable energy installations or sustainable sourcing may have longer ROI timescales. This can be difficult for short-term profit-driven companies.
- **Consumer Demand vs. Cost:** Companies have a conundrum when consumers want sustainability but are unwilling to pay more. Businesses must find ways to satisfy customers without sacrificing costs.

Many firms have integrated sustainability into their supply chain management while being profitable:

Unilever: A consumer products firm has implemented a Sustainable Living Plan. By 2017, they cut CO₂ emissions by 22% and water use by 17% per ton. Their sustainable sourcing has increased consumer trust and revenue. These instances demonstrate that sustainability may be ethical and profitable, despite hurdles.

2.8. Research Gap Identification

This evaluation also suggests areas where existing material may leave opportunity for further exploration. Research gaps include the need for a greater understanding of the specific obstacles faced by different sectors in incorporating sustainability and the creation of methods to overcome these industry-specific challenges.

3. Methodology

3.1. Introduction

This chapter explores the research methodology for integrating sustainability practices into supply chains to reduce environmental impact and maintain profitability. This dissertation explores how businesses can integrate sustainability

practices into their supply chains, thereby reducing environmental impact while maintaining profitability, using a structured research methodology. It outlines the research design, methods, and techniques to provide a systematic approach to answering research questions, shedding light on challenges and strategies for sustainability without compromising profitability. This chapter outlines the research methodology, focusing on research questions, data collection, analysis techniques, and existing frameworks and models, laying the groundwork for empirical investigation.

3.2. Research Design and Approach

This dissertation used a qualitative research design to explore sustainability practices in supply chain management. The research involved semi-structured interviews and focus groups, allowing for in-depth discussions and understanding of the multifaceted nature of sustainability. This approach allows for a holistic and context-specific understanding of the experiences, challenges, and strategies of businesses in implementing sustainability practices.

3.3. Data Collection Method

The study used semi-structured interviews with 20 participants from diverse organizations to explore sustainability practices in supply chain management. These interviews were recorded and transcribed for accuracy. Focus groups, consisting of 5 participants each were conducted to encourage dynamic discussions and peer-to-peer learning. Both methods were conducted openly, allowing participants to share experiences, challenges, and strategies related to sustainability in supply chains. The data collected will be used to triangulate and complement the insights gained from individual interviews.

3.4. Sampling technique and Sample size

The study used a purposeful sampling technique to select participants with relevant insights on sustainability in supply chain management. A sample size of 20 participants was chosen from various industries, ensuring a diverse and representative sample. This qualitative research aimed to explore sustainability in supply chain management.

3.5. Data analysis technique

Data analysis utilized a theme analysis technique. Thematic analysis is a widely recognized method for detecting, interpreting, and reporting patterns (themes) within qualitative data. The analytical process involves the following steps:

- **Data Familiarization:** The transcripts from interviews and focus groups were read and familiarized to acquire an overall grasp of the material.
- **Initial Coding:** Codes were produced from the data. This entailed identifying significant phrases, sentences, or paragraphs that relate to the research questions and objectives.
- **Theme Development:** Codes were arranged into basic themes, which were evaluated and revised iteratively to ensure that they accurately capture the material.
- **Theme Review and Refinement:** Themes were examined and refined to ensure their relevance and consistency. This procedure involved comparing and contrasting topics and their links.
- **Report Writing:** The findings were summarized and presented in a systematic manner, connecting them with the research questions. Direct quotations from participants were utilized to illustrate crucial points.

Thematic analysis provides for a systematic and thorough assessment of the qualitative data, helping the identification of patterns, insights, and key discoveries connected to the integration of sustainability practices in supply chain management.

4. Data analysis, presentation and interpretation

4.1. Preparation of Data

Interview and focus group data underwent several critical preparation processes before analysis:

- **Data Transcription:** Interview and focus group recordings were transcribed verbatim for easy analysis.
- **Data Organization:** Transcriptions were labeled by participant identification, interview/focus group session, and date.
- **Cleaning:** Data was checked for transcription errors and inconsistencies to ensure correctness and reliability.

- **Data Coding:** The approach was followed for data coding. Text linked to important topics and research questions was coded.

The coded data was cross-verified to guarantee consistency and accuracy throughout all interviews and focus groups.

4.1.1. Descriptive data

Table 1 Participant Demographics

Participants	Age	Gender	Industry	Role
Participant 1	42	M	Retail	Supply Chain Manager
Participant 2	35	F	Technology	Procurement Manager
Participant 3	39	M	Healthcare	Environmental Analyst
Participant 4	33	F	Food and Beverage	Sustainability Officer
Participant 5	47	M	Manufacturing	Logistics Manager

This table provides an overview of the demographic characteristics of the participants involved in the study.

Table 2 Integration of Sustainability Practices

Themes	Times Themes were mentioned
Sourcing Sustainably	15
Circular Economy	8
Green Logistics	12
Collaborative Initiatives	10

Table 3 Key Drivers and Barriers

Key Drivers	Times Mentioned	Key Barriers	No. of Mentions
Consumer Demand	17	Lack of Awareness	10
Regulatory Requirement	14	Resistance to change	12
Competitive Pressures	13	Cost Concerns	18
Economic Benefits	15	Supplier Engagement	11

4.1.2. Thematic analysis procedure

Thematic analysis is a systematic method for identifying, analyzing, and reporting patterns within qualitative data. It involves several steps, including data familiarization, initial coding, code development, theme generation, review and refinement, data extraction, data organization, interpretation, data reporting, and validation. The process begins with data familiarization, followed by initial coding, code development, and theme generation. Themes are broader patterns that provide insight into the research questions. The process involves continuous review and refinement, data extraction, data organization, interpretation, data reporting, and validation. The process is flexible and iterative, allowing for a deep exploration of the data, enabling the drawing of meaningful conclusions and insights from the qualitative information gathered during interviews and focus group

5. Conclusion

This study sheds light on supply chain sustainability integration. Through qualitative interviews and focus groups, we learned how firms combine environmental, social, and economic sustainability in their supply chains. The following conclusions apply:

- Organizations use a multi-dimensional strategy to integrate sustainability practices into their supply chains. Sustainable sourcing, green logistics, circular economy concepts, and collaboration are popular integration methods.
- Drivers and Barriers: Organizations prioritize sustainability due to regulatory, consumer, and competitive constraints. Cost issues, lack of awareness, and change resistance hinder sustainability integration.
- Sustainable supply chain management best practices include sustainable sourcing, green logistics, circular economy principles, and collaborative projects. The strategies meet financial and non-financial performance goals.
- Performance Impact: Sustainability practices lead to cost savings, revenue growth, enhanced brand reputation, and higher consumer loyalty. These benefits boost supply chain financial and non-financial performance.
- Balancing sustainability and profitability is tough but achievable. To strike this balance, organisations can link sustainability to fundamental business goals, create explicit goals, and promote sustainability.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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