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Strategic Business Responses to Shifts in Promoting Sustainable Supply Chain Management (SSCM) in Business Practices

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ABSTRACT:

This thesis examines the strategic collaborative response of businesses to the changing requirements of SSCM, or that combination of environmental, social, and economic aspects within the SCO context. With stakeholders focusing on sustainability as the global attention grows, industries are using SSCM to not only regulate their operations but also establish a competitive edge, improve the resiliency of their operations, and satisfy stakeholder demands and concerns. The research takes a qualitative, exploratory, and deductive approach that analyzes secondary data primarily drawn from corporate sustainability reports, literature, and regulatory documents. The study is based on CTCA, which shows the development of SSCM strategies from the 1990s to 2025, with the significant changes shifting to regulatory compliance, digital transformation, circular economy models, and AI-driven optimization. Five theoretical lenses are used to interpret the findings; they include RBV, TBL, DCT, ST, and IT, to inform the way businesses utilize internal capabilities, react to external factors, and align the company to stakeholder requirements. The paper concludes that SSCM has today emerged as a strategic necessity, which has both operational and reputational benefits. It offers a valuable perspective to managers about how sustainability can be embedded in core business processes, and it is also theoretically relevant as it synthesizes various frameworks of sustainability. Crucial gaps when it comes to SME inclusion, digital equity, and harmonization of regulations also imply the future research areas highlighted in the thesis. Finally, it puts SSCM frames as an evolving, comprehensive system, critical to successful business resilience and world sustainability.

KEYWORDS: Supply Chain Management, Sustainable Supply Chain Management, Circular Economy, Corporate Social Responsibility and Sustainable Development

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Abbreviations

AI: Artificial Intelligence

CBAM: Carbon Border Adjustment Mechanism

CDP: Carbon Disclosure Project

CE: Circular Economy

CSR: Corporate Social Responsibility

CSRD: Corporate Sustainability Reporting Directive

CSS: Corporate Sustainability Strategy

DJSI: Dow Jones Sustainability Indices

DSDG: Division for Sustainable Development Goals

ESG: Environmental, Social, and Governance

EU: European Union

GCSA: Global Corporate Sustainability Assessment

GRI: Global Reporting Initiative

GSC: Global Supply Chains

GSDR: Global Sustainable Development Report

HP: Hewlett-Packard

IoT: Internet of Things

ISO: International Organization for Standardization

LEED: Leadership in Energy and Environmental Design certification.

MDGs: Millennium Development Goals

ML: Machine Learning

NGOs: Non-Governmental Organizations

PUE: Power Usage Effectiveness

SASB: Sustainability Accounting Standards Board

SCA: Supply Chain Activities

SCA: Sustainable Competitive Advantage

SCC: Supplier Code of Conduct

SCM: Supply Chain Management

SCO: Supply Chain Operations

SD: Sustainable Development

SDGs: Sustainable Development Goals

SEC: Securities and Exchange Commission

SIDS: Small Island Developing States

SMEs: Small and Medium-sized Enterprises

SSC: Sustainable Supply Chain

SSCM: Sustainable Supply Chain Management

SSR: Supplier Sustainability Report

TBL: Triple Bottom Line TBL

TCFD: Task Force on Climate-related Financial Disclosures

TSC: Traditional Supply Chains

UL: Underwriters Laboratories

UN: United Nations

UNDESA: United Nations Department of Economic and Social Affairs

UNGC: United Nations Global Compact

WBCSD: World Business Council for Sustainable Development

1 Introduction

1.1 Background and Context

The development of SCM was primarily aimed at making organizations more effective, cutting costs, and simplifying their operations. At this point, CSR emerged, enabling businesses to recognize how good behavior in their operations could positively impact matters related to society and the environment. Currently, as more attention is paid to environmental concerns and labor ethics, companies and organizations are prioritizing sustainability. Because of this, global attention on responsible choices has led companies and organizations to be more mindful about the environment and the society they serve (Lee & Billington, 1995; Habib, 2011; Carter & Easton, 2011). Numerous organizations are moving toward SSCM primarily because it supports responsible actions for the environment and communities. To achieve profit, care for the environment, and support communities, organizations now rely on SSCM. Also, sustainability plays a key role in SCM, and more organizations are starting to factor it into all their decision-making (Esfahbodi et al., 2016; Haghighi et al., 2016). Ahi and Searcy (2013) pointed out that SSCM relies on bringing in sustainable development efforts with SCM for the ongoing and future development of organizations. SSCM means joining together systems thinking, strategy, and action in SCM, focused on financial, ecological, and social results. Carter and Rogers (2008) explain that SSCM refers to making a strategic and confident effort to achieve social, environmental, and economic goals by coordinating key business activities across organizations, thereby enabling a company and its SCA to function effectively in the long term. In addition, rapidly changing customer demands, intensified competition, and pressures from regulators and other stakeholders have motivated most companies to prioritize sustainability in their supply chains. In addition, it is now important for companies to learn how they can interact with major groups within their SCM to prioritize sustainability (Gopal & Thakkar, 2015; Kashmanian, 2015). The process of SSCM covers everything from getting resources to processing them and moving the finished products to buyers. To ensure an SSCM, businesses must pay attention to these key

elements to meet all their goals. Achieving these goals supports making the main parts of an SSC more effective and more ethical (Fritz, 2019; Cetinkaya et al., 2011).

1.2 Research Problem Statement

SSCM is now an effective strategy plan used by organizations to attain profitability and contribute positively to the environment and society. Nevertheless, SSCM is among the largest plans of any company, yet it comes along with numerous issues and challenges in each organization that should be considered (Seuring & Müller, 2007). The authors concur that all issues of SSCM can primarily be related to the application of sustainable development, changing the behaviors of stakeholders, managing uncertainties, tradeoffs, and increasing the complexity of addressing problems. The fact is that it is all about costs and revenues that are seen as the primary focus of the SCA, and the majority of studies indicate that it is relevant that the SCA should honor sustainability even today (Kuo et al., 2017). When the firms in the chain collaborate in sustainability, they will be able to carry out waste reduction practices at lower costs, locate environmentally friendly solutions to their production and service issues, and generate environmentally sustainable innovations. The environmental regulations give enterprises within an SCA the capacity to realize the impact of their actions (Seuring, 2012). Complying with these requirements compels the members of the supply chain to implement reforms that incur costs and may decrease their competitiveness and profits, along with altering their production or service delivery processes to consumers (Pavan et al., 2022). Therefore, the strategy of a firm related to paying fines and penalties can be made according to the attitude towards the pressures established by the regulators. When we consider issues as opportunities, we can concentrate on sustainable stability and maintain good relations. The potential benefits can be shared and addressed by actors in a supply chain through contracts, market processes, and cooperation agreements, which would improve the performance of both parties (Govindasamy, 2010). The supply chain partners cooperate in the long term when the industry is mature and strives to satisfy everybody; therefore, it is win-win. In this way, sustainable goals influence the effectiveness of actors throughout the chain of supply, and they indirectly enhance such

effectiveness by promoting more trust and collaboration (Wongsunopparat, 2023). One of the most significant issues to be reckoned with is persuading companies to implement sustainability in their decision-making. It requires a radical change in thinking, practices, and procedures in the company. Aligning the plans of a company with sustainability goals is a significant endeavor in itself, and companies need to do so to unlock the full potential of SSCM. In addition, SSCM encourages companies to invest in sustainable enhancements initially, as they may need to incur additional costs in the short term (Nazam et al., 2019).

1.3 Research Objectives

The main research objective of this thesis is provided below:

- To identify how corporate strategies take place towards the promotion of SSCM in response to the theoretical evolution between the years 1990 and 2025.

Likewise, based on the research, some of the sub-research objectives of this thesis are presented below:

- To explore the extent to which the significant theories of sustainability (e.g., TBL, RBV, DCT, ST, IT) have been applied in practice to develop SSCM strategies over time.
- To identify and analyze the internal and external drivers, challenges, and opportunities that have promoted the SSCM over time.
- To identify how strategic patterns and shifts in SSCM have changed throughout the historical periods.

1.4 Research Questions

The main research question of this thesis is provided below:

- What do the corporations use the SSCM strategies to adapt strategic responses to theoretical and institutional change between 1990 and 2025?

Likewise, based on the research, some of the sub-research questions of this thesis are presented below:

- What theoretical frameworks, strategic responses, and conceptual patterns have taken place in SSCM across these different historical periods?

- What kind of internal and external drivers, challenges, and opportunities have influenced the strategic directions of SSCM over time?

1.5 Research Gaps

Even though SSCM has gained subsequent interest as a research agenda, little is known about how an organization can strategically adopt sustainability in its supply chain. Even though stringent documentation has been made regarding the evolution of SSCM through adaptation of earlier supply chain models into sustainable models which focus on a greater extent in the environmental, social and economic sectors (Seuring & MULLER, 2008) not much has been done in the research world regarding asking how such theoretical frameworks can be exhausted to various organizational settings. Within the current body of literature, much attention is now given to large multinational organisations, and there is a knowledge gap in whether SMEs have their problems and possibilities in performing the SSCM practices (Amofa et al., 2023). Besides, despite the possible positive impact of emerging technologies such as AI and blockchain as SSCM enablers being frequently brought to the table (Hazen et al., 2020), there is very little to no actual documentation of any positive impact that the technologies may have on the outcomes of sustainability performance. There is a further lack of easily accessible road maps provided by literature on the ways to scale up pilot projects to more comprehensive SSCM strategies, particularly in the climate of scarce resources. Another central area of no understanding of the process through which corroborating international megatrends, e.g., post-pandemic recovery plans, anti-deglobalization pressure, and evolving regulatory environments, are rearranging SSCM priorities and practice modalities (Liu et al., 2022). Although one can mention such issues as supplier resistance and cost barriers, being well-explained (Walker & Touboulic, 2015), the

number of corresponding solutions provided to isolated problems available in the literature is limited, factoring in organization size/industry-specific constraints, and geographic differences. The study attempts to fill these gaps by bridging the gap between the theory and the practice of SSCM through the detailed case studies of various organizations of varying physical size, as well as sectors. It will provide empirical evidence on how technology can enhance the performance of sustainability, and it will aim to develop practical applications, considering the limitations in real life. The product of theoretical precision and applied common sense, the study will equip organizations of any size with the tools that may aid them to sift their sustainability wishes and the practicalities of their business within the framework of a globally complex corporate environment.

1.6 Significance of the Study

In today's world, sustainability plays an important role for any business. Similarly, the significance of SSCM plays a role in steering businesses to act more sustainably and ethically, which supports their competitive edge and long-term growth (Svensson, 2007). Organizations that develop an awareness of drivers, key practices, and the effect of SSCM can incorporate sustainability in a much better manner within their supply chain, which benefits the organization's reputation to the extent of improving operations, economizing money, and boosting the image of the organization (Zailani et al., 2012). In the same way, the significance of this thesis for SSCM is important in three fields: academic, practical, and societal.

Firstly, in the field of academics, this thesis is integrated with the Dynamic Capabilities Theory, which explains how organizations are adapting in these changing environments through their resources and capabilities towards the SSCM. (Brooks, 2021) Through analyzing the gaps in existing literature reviews, this thesis also highlights how organizations are participating in SSCM through adopted and implemented strategies that balance or impact the performance of the organizations. These findings encourage

a better and more diverse approach to sustainable business practices, forming the foundation for more cross-business studies (Signori et al., 2015).

Secondly, in terms of practical implications, this thesis has provided important aspects for both organizations and policymakers in the field of sustainability. In the field of business and organizations, this thesis examines the business strategies that allow organizations to achieve their sustainability goals and practices (Beske & Seuring, 2014). The adopted and implemented strategies include such as energy efficiency, transformation towards renewable sources of energy, adoption of green technologies, formation of sustainable partnerships, ethical sourcing of resources, sustainable procurements, community engagement and feedback, employee engagement and feedback, sustainability standards, sustainable organization cultures, and implementing circular economy models which allow organizations to achieve their sustainability goals and practices (Lüdeke-Freund et al., 2017). Moreover, this thesis will lead policymakers in sustainability by incorporating sustainability strategies in all spheres, providing incentives in the form of green taxes and subsidies, and enhancing sustainability policies and regulations. Strategic decisions of sustainability assist the study that, as far as businesses as well as policymakers are concerned, sustainability cannot be an option on the shelf; rather, it is to be integrated into the economic models (Pagell & Shevchenko, 2013).

Third, within the domain of social dimensions, this thesis corresponds with the numerous objectives of the UN SDGs. Significant goals of the UN SDGs incorporated in this thesis are SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation and Infrastructure) SDG 11 (Sustainable Cities and Communities) SDG 12 (Responsible Consumption and Production) SDG 13 (Climate Action) and SDG 17 (Partnerships for Goals) (Pradhan et al., 2017). These are the objectives, all of them in line with UN SDG, to help business grow responsibly, treat workers fairly, can use sustainable factory technology and cleaner power, develop cities where people can live healthily and produce less waste, and to develop a responsible business climate where being

sustainable in business should be a norm (Pradhan et al., 2017). Finally, this thesis shows that the synthesis of theory and practice will reveal that sustainability is a feasible and workable practice that businesses can adopt.

1.7 Scope of the Study

This research aims to examine and discuss the reaction of enterprises participating in the manufacturing, retail, and technological areas to innovations in SSCM. These industries have been analyzed closely since they affect people due to the magnitude of their activities. We live in a global environment, and it was necessary to analyze these industries since they have diverse SSCM systems (Ortas et al., 2014).

The manufacturing sector research investigates the way companies are managing the issues, which include increasing measures to reduce carbon emissions, enhancing the utilization of energy, reducing waste, and adopting concepts of a CE (Gupta et al., 2018). In the analysis of the retail industry, focus is paid to sustainable purchasing practices, green packaging, ecological transportation, and eco-friendly customer programs. The research is focused on the urgent topics of responsible mining activities, recycling electronic waste, prolonging product life, and the impact of data center and cloud systems on nature (Niskanen, 2023).

The companies surveyed in the study are located in developed and growing regions, as well as underdeveloped and developing regions, including very fast-growing regions such as India and Southeast Asia. The combination will enable one to have a closer examination of the influence that the rules of various countries, market conditions, economic conditions, and cultural backgrounds have on SSCM. The research can involve case studies on other regions of the world if they reveal new and useful concepts about sustainability, although these regions constitute the bulk of our research (Erol & VeliOğlu, 2019; Amann et al., 2014).

1.8 Structure of the Thesis

This thesis consists of five chapters. The first section is an Introduction part that comprises the background and context of SSCM, the definition of research problems, objectives, and questions, the significance and scope of the study, and the organization of the study. This is followed by the Literature Review, which provides a more specific discussion of the development of SSCM, its major definitions, theoretical underpinnings, which are RBV, TBL, DCT, ST, and IT, and the core elements of SSCM, its global drivers, new strategies, and its implementation issues. An SSCM conceptual model is presented to present the strategic dynamics of SSCM. The Research Methodology chapter describes the qualitative, exploratory, and deductive definitions used by the research to guide the study, with attention given to secondary data and CTCA in the interpretation of the findings. The findings chapter represents a chronological exploration of strategic business reaction towards SSCM from the 1990s to 2025. It defines the most prominent patterns in these trends and matches them with the theoretical framework. The discussion will continue with a synthesis of findings, a conclusion, and a discussion of theoretical and managerial implications, limitations, and future research suggestions.

2 Literature Review

2.1 Introduction to SSCM

2.1.1 Historical Context of SSCM

With this growing concern about the environment and fair labor practices, industries are focusing on sustainability in every aspect. The globally emerging trend of ecological and social responsibility has not only modified consumer requirements. However, it has also changed the regulation, urging businesses to be more conscious of their impact on the environment, society, and the world (Carter & Easton, 2011). It is in this backdrop that SSCM, as one of the greatest approaches to strategy, has emerged as a whole-way forward in which organizations are ready to be profitable due to the approach of being environmentally and socially responsible (Carter et al., 2019).

To determine the development of SSCM and its importance, it is necessary to trace its history. The development of the concept of sustainability in the supply chains has been on a slow but persistent progression, and there were turning points in the process that turned the development (Ghadimi et al., 2018). The big issue in the past related to the SCM, which was concerned with efficiency, cost saving, and optimization in the operations. Nevertheless, as the consequences of the business operations on the environment and the socio-economic spheres reappear, the possibility of providing some form of responsible SCM has also emerged (Rajeev et al., 2017). At the beginning of the 21st century, a significant shift in business practices took place; environmental responsibility, as well as the humanistic attitude to labor, came to be valued by companies. Environmental regulations or labor regulations are some of the new rules that have been incorporated to ensure sustainability in the supply chains (Tundys, 2020). Thus, SSCM began to emerge on the scene as a means of regulating business actions and such changes in sustainability requirements. Business organizations started viewing sustainability not only as a matter of compliance but also as a strategic pursuit (Tundys, 2020).

2.1.2 Author Definitions

The science of SSCM came into existence to oversee the movement of information, goods, and services to an assortment of consumers, businesses, and supply chain associates. Over the past three decades, the notion of SSCM has been discussed by different researchers and practitioners. The scope and definition of SSCM have been in continuous transition. It is constantly expanding and shaping its definition. The list of definitions of SSCM is given below.

Authors	Definitions
Carter and Rogers (2008)	The visible, tactical synthesis and achievement of the ESG of an organization into the methodical synthesis of essential inter-organizational business processes in the support of the improved, longer-term economic profitability within the specific company and its supply channels.
Seuring and Müller (2008)	Management of the flow of material, information, and capital, and collaboration between the companies of the supply chain consider the respective goals of all three dimensions of SD, which are ESG.
Ahi and Searcy (2013)	The formation of integrated supply chains with voluntary integration of ESG concerns involves the chief business systems of an inter-organizational character in the field of management of the material, informational, and capital flows within the frames of production, purchasing, and distribution of goods or services.
Gunasekaran et al. (2013)	SSCM is a good performance of an SCA on both conventional measures of profit and loss and a broadened set of measures identified as environmental and social.

Giunipero et al. (2012)	SSCM is a degree to which management of supply considers environmental, social, and economic value when selecting, assessing, and managing its supply base.
Ageron et al. (2011)	Highlight on SSCM as a strategic tool for incorporating sustainability into the supply chain practice to achieve superior competitiveness and stakeholder satisfaction.
Silvestre (2016)	SSCM is a dynamic competency that allows companies to respond to environmental and social pressure they still ensuring economic performance.
Sánchez-Flores et al. (2020)	SSCM is a concept of incorporating sustainability in the operation of the supply chain, which is relevant in emerging economies, and the relevance of context strategy is necessary.
Fritz (2019)	SSCM refers to the management of supply chains as a process that involves the incorporation of sustainability goals, economic, social, environmental, and ethical considerations for every stakeholder.

Table 1. Authors' Definitions of SSCM

The topic of SSCM has changed a great deal, as depicted in the definitions used by different scholars. There is a general agreement on the mention of economic, environmental, and social objectives integration in most definitions, which makes SSCM consistent with the triple bottom line. Steps toward constructing a solid basis took place with the concept of strategic coordination and material flows (Carter & Rogers, 2008; Seuring & Müller, 2008).

The strategic character of SSCM is one of its significant themes that are noted by Ageron et al. (2012) and Silvestre (2016), where the latter considers sustainability as a competitive boost rather than a routine of compliance. It is also a trend toward contextual and adaptive proficiency, especially in the emerging economies (Sanchez-

Flores et al., 2020). Nonetheless, this convergence is also accompanied by ambiguity as far as operationalization is concerned: there are several high-level definitions and no clarity on measures, responsibility, and enforceability.

This signifies the advantages and disadvantages of SSCM: on the one hand, it is due to the flexibility of its implementation: it is possible to implement it industry-specifically; on the other hand, it is characterized by the absence of standardization, which may undermine its efficiency. The next step in the process is the coordination between theoretical principles and quantifiable, enforceable activity among supply networks.

2.1.3 SSCM Components

The primary process of achieving sustainability is accomplished through a closed-loop system, which involves reuse and recycling steps. These steps will ensure a reduction of environmental impact from the production process to the final use of products by the consumer (Esfahbodi, Zhang, & Watson, 2016). Following Esfahbodi, Zhang, and Watson (2016), SSCM consists of the core components shown in Figure 1:

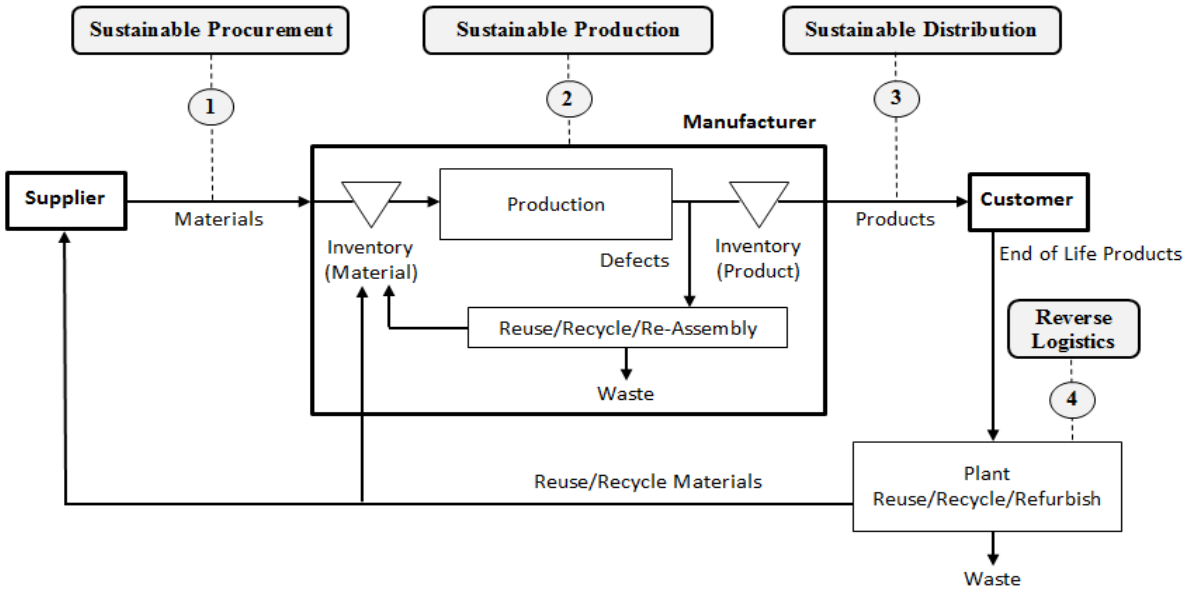

Figure 1. Core Components in SSCM (Adapted from Esfahbodi, Zhang, Watson, et al., 2016)

1. **Sustainable Procurement:**

Sustainable procurement is known as the achievement of sustainable objectives through the purchasing and supply of goods in line with desirable ecological attributes, such as reusability, recyclability, and nontoxic materials. Sustainable procurement means organizations provide what they need in goods, services, works, and utilities through processes that ensure lasting value for all of them (Walker et al., 2012). Good sustainability is promoted by putting into practice green procurement, good governance, and a stable, healthy society (Walker & Brammer, 2009). Likewise, sustainable procurement requires working closely with suppliers to produce sustainable products and services for consumers. Involvement of suppliers in sustainable procurement is significant for improving environmental performance. Also, most of the vast multinational manufacturing companies collaborate with suppliers for the procurement of goods and services, which improves the environmental performance (Vachon & Klassen, 2006; Hsu et al., 2013). For example, the Dutch Chemical Company has collaborated with its suppliers for the production of a sustainable palm oil supply chain system, which also diminishes deforestation and increases the livelihood of the suppliers as well as small farmers (Stawan & Kamani, 2023).

2. **Sustainable Production:**

Sustainable production is also known as sustainable manufacturing, which is the process of manufacturing products and services with a low environmental impact or zero waste. Sustainable production is also considered a holistic approach that requires the entire production process or lifecycle of the products and services, which aims for sustainable practices (Moldavska & Welo, 2017; Alayón et al., 2016). In addition, eco-design products, eco-friendly products, and sustainably designed products help make production efficient and boost the company's reputation. Besides, organizations are making efforts to produce goods and services that last, are energy-friendly, and produce less or no waste. In this way, companies improve their work with customers, shareholders, and their image in the online market. (Singh & Sarkar, 2019; Romli et al., 2014). Sustainable design

is focused on reducing the negative environmental impact that products have during their entire life cycle. For any environmental design to succeed, both cooperation among the firm's groups and cooperation with external organizations are necessary (Seuring & Muller, 2007). For example, in terms of sustainability, Unilever looks after its products, supply chain, partners, and global administration, and, since worldwide consumers use the company's hundreds of brands regularly, what such corporations do matters greatly. Unilever aims to achieve zero emissions in its operations by 2030 and net zero emissions throughout its entire supply chain by 2039, in addition to using new low-carbon ingredients, widening its plant-based offerings, and making low-carbon cleaning and laundry products (King, 2023).

3. Sustainable Distribution:

The concept of sustainable distribution is related to sustainable logistics, including fair labor practices, sustainable transport, packaging, warehouse management, as well as control and facility layouts (O'Connor & Martinez-Alier, 1998). An effective logistics structure is crucial when practicing SSCM, and it offers choices between direct shipments, hub-and-spoke methods, warehouses located centrally or in various places, using more than one kind of transport, and using third-party logistics or the firm's fleet (Lakshmimeera & Palanisamy, 2013). The main goal of sustainable distribution is to achieve a sustainable distribution process by minimizing its environmental footprint. Likewise, sustainable packaging plays a significant role in sustainable distribution. Sustainable packaging consists of characteristics such as size, shape, and materials. Similarly, companies benefit more through the help of packaging styles because it reduces the materials usage, space in the warehouse, and other costs (Seuring & Muller, 2008).

4. **Reverse Logistics:**

The term reverse logistics can be defined as the movement of goods and services back to companies and organizations by the end users for reuse, recycling, repair, and remanufacturing. Warranty and maintenance services are also resolved in reverse logistics (Agrawal et al., 2015). However, reverse logistics is not the exact opposite of managing a supply chain. Since reverse logistics focuses on different elements, the routing or means of transportation is generally not the same as for the company's forward (outbound) logistics. Developed reverse logistics process allows businesses to control returns effectively, explain sustainability, and support the needs of their customers more successfully (Rubio et al., 2006). For example, FedEx and UPS take back the product without the box or repackaging, which minimizes the environmental waste and optimizes the return process as well (Ashcroft, 2023).

2.2 Theoretical Foundations

2.2.1 Sustainability and Strategic Management Theories

1. **Triple Bottom Line (TBL)**

The concept of the TBL was first introduced by John Elkington in 1994, in which he expressed hopes to change the system of financial accounting-driven business model into a more holistic model of measuring impact and success (Amarah & Langston, 2017). The theory of TBL augments the traditional measures of business success to encompass the contributions of an organization to social well-being, environmental well-being, and a fair economy. These bottom-line categories are the three "P's" of People, Planet, and Prosperity. The three Ps can all be related through the systems theory lens. Since the backbone of sustainability is systems thinking, one initiative, whether under People, Planet, or Prosperity, will affect the other two as well (Isil & Hernke, 2017; Henriques & Richardson, 2013).

This theory implicitly addresses the investigation of this thesis research question because it also provides a prism through which the organizations promoting SSCM would be examined. As an example, a company can use the SSCM strategy to reduce expenditures (economic), carbon footprints (environmental), or ethically treat workers (social), all of which can fit within TBL principles (Ribeiro et al., 2022). TBL assists in the determination of internal and external drivers of SSCM. At the internal level, a sustainable practice can be driven by the values of a company, the leadership's commitment, and innovation capabilities. Externally, the regulatory demands, consumer expectations, and stakeholder pressures tend to portray one or more TBL dimensions (Ribeiro et al., 2022). In addition, the problems and prospects that companies encounter are inevitably related to the TBL structure: the right of priorities between profitability and environmental regulations, seeking the goodwill of suppliers etc. Using TBL as part of SSCM strategies helps business companies to generate long-term value even as they tackle the issues of global sustainability (Elkington, 1997; Carter & Rogers, 2008).

2. Resource-Based View Theory (RBV)

This theory, developed by Birger Wernerfelt in 1984, suggests that the company's resources and capabilities are the key factors that drive the company's competitive advantage. RBV assumes that competitive advantage is based on using unique resources of the firm, which are valuable, non-fragmented, and unique, irreplaceable, and substitutable (Taher, 2011). Peteraf (2018) introduced resource-based theories as theories concerning the nature, behavior, and/or performance of firms, with a resource or capability that a firm possesses, controls, or has preferential access to being the unit of analysis. Likewise, in SSCM, this theory focuses on the external factors of the organizations, such as market conditions, shifts in technological aspects, and government regulations, as well as internal capabilities, including logistics, integrations, and innovations. The ability of these factors is highly effective in the SSCM due to the utilization of these internal resources, which implies that there is a profound interdependence between the resource pool of a firm and its supply chain performance (Hunt & Davis, 2008; Dubey et al., 2017).

On the point of relevance to the research questions of this thesis, this theory explains why businesses should strategically incorporate internal capabilities to incorporate sustainability in their supply chains. Alternatively, the companies that already have well-developed environmental management systems or stakeholder interaction performance can better realize the SSCM strategies, making sustainability and differentiation into value creation a long-term feature (Shibin et al., 2017). Moreover, the internal factors that hold the RBV versions (leadership commitment and innovation capacities) are also considered, and external factors, i.e., regulations or market requirements, can also affect the mobilization and development of the internal resources in the firms. Therefore, besides making it evident why firms may seek to adopt SSCM, RBV further shows how they could align inwardly established strengths to sustainability changes in supply chain operations (Shibin et al., 2017).

3. Dynamic Capabilities Theory (DCT)

Devised by David Teece, Gary Pisano, and Amy Shuen in 1997, this theory explains that organizations could adapt themselves and sustain the changing environment by formulating, combining, and reorganizing their resources and capabilities to achieve or maintain a competitive advantage. It is oriented towards the capability of responding to the change instead of the mere continuation of current operations (Teece, 2018; Ringov, 2017). Eisenhardt and Martin (2000) defined DCT as the use of resources to create new resources that can bring change in the market. In terms of sustainability, DCT explains it as an adaptation, innovation, and also concerning the integration of sustainability in the strategy processes of companies (Cezarino et al., 2018). The companies should constantly monitor the trends in sustainability, the expectations of different stakeholders, and changes related to regulations, so that they can also take any future business opportunities (Wu et al., 2013; Beske, 2012).

DCT also affirms the research questions of this thesis, considering that the DCT reveals the mode of formation and realization of DCT by firms, i.e., innovation, learning, and strategic flexibility, to execute SSCM practices. These functions allow the business to

develop foresight in responding to any sustainability issues or opportunities that may arise, like changing consumer demands or the emergence of new environmental policies (Beske, 2012). Coupled with that, DCT assists in determining internal motivating factors, such as organizational learning and leadership agility, and the external factors, such as technological change or the influence of stakeholders. It also tells us how companies can conquer obstacles (e.g., lack of resources or change resistance) as well as seize opportunities (e.g., green innovation or circular models) and reorganize their supply chain operations and relationships (Addo & Ackah, 2025). Finally, the DCT offers a model to describe the way business organizations not only respond to but also influence sustainability trends in the supply chain, which makes it an effective supplement to such theories as the RBVT and TBL (El Gizawi & University of Twente, 2014).

4. Stakeholder Theory (ST)

This approach to business, ST (Freeman, 1984), makes it clear that the business should not only consider the interests of shareholders but also of all other stakeholders, the customers, suppliers, employees, governments, and non-governmental organizations, etc. (Siems et al., 2022). In SSCM, this theory depicts the nature in which environmentally and socially responsible behaviors are embraced by firms due to the expectations of a firm's stakeholders. Therefore, ST is a valuable tool to study strategic responses to the sustainability challenges in the supply chains (Siems et al., 2022). In the same way, on the research questions, ST offers an analysis perspective on how businesses develop business strategies that resonate with the hopes of stakeholders about their businesses being sustainable. It endorses the proposed view that firms implement SSCM affected by more than cost-saving factors or obligation to compliance, namely, sustaining legitimacy, reputation, and long-term relations with stakeholders (Wittke, 2014). Also, ST can be used to determine the drivers (e.g., regulatory pressure, consumer demand, investor expectations) and the barriers (e.g., conflicting stakeholder interests, resource constraints) affecting the SSCM adoption. It also describes the possibilities and difficulties (e.g., stakeholder collaboration, innovation, stakeholder conflicts, complexity)

of implementing SSCM strategies in businesses. This thesis shall use ST to explain the effects of stakeholder salience (power, legitimacy, urgency) in shaping strategic decisions in SSCM, and the way businesses make tradeoffs when trying to satisfy competing stakeholders in sustainability (Wittke, 2014).

5. Institutional Theory (IT)

This theory shows how organizations adapt to the rules, norms, and expectations within their environment to become legitimate and survive. DiMaggio and Powell (1983) explain that coercive (regulatory) or legal, normative (professional, societal expectation), and mimetic (modeling of successful peers) institutional pressures can be distinguished. In SSCM, IT aids in explaining why companies adopt sustainability practices not only as a way of achieving efficiency but also to conform to institutional expectations and avoid erosion of institutional legitimacy. The research questions are also supported through this theory, which elaborates on how external pressures influence businesses in adopting strategies of promoting SSCM. In answering the core question, namely, how the business responds to SSCM, this theory assists in studying the influence of coercive (regulatory), normative (industry norm), and mimetic (peer influence) pressures over the strategic decision-making process (Amenta & Ramsey, 2009). Moreover, on external drivers, explaining the institutional environments that act as a driver that pushes the firm to pursue a perspective of sustainability. Also, it is valuable in illustrating the challenges businesses face, including the complex regulations and the ability to attain legitimacy via sustainability certification. In this way, this theory offers an institutional view on strategic SSCM reactions (Putnam & Mumby, 2013). In this thesis, this theory will be used to understand how the external institutional environments influence the strategic decisions made in SSCM. It supports the analytical outlook by providing a structural perspective of organizational behavior, and this aspect aids in illustrating the convergence in sustainability practices across industries and territories (Willmott, 2014).

To sum up, this thesis offers a few theoretical frameworks to provide an efficient analytical lens. At the core of this argument is the TBL that will see the incorporation of ESG aspects in the SSCM strategies (Elkington, 1997). TBL is a strategy that directly aligns with business strategies that foster sustainability by providing a composite measure against which the business strategies can be rated. The theory of the RBV helps to analyze the internal forces according to how the companies exploit their distinctive resources and capabilities, green technologies, or human capital orientation in sustainability aspects as one of their objectives to acquire a competitive edge (Barney, 1991). This theory can explain why companies are more active in SSCM practices compared to others. Considering RBV, DCT provides an understanding of how companies adapt, integrate, and rearrange internal and external capabilities in response to changes in the environment (Teece, Pisano, & Shuen, 1997). This is especially applicable in the study that was done regarding the strategies employed by businesses in response to the changing needs and challenges of sustainability. The ST is a theory that highlights the need to focus on the demands of the different stakeholders, including customers, suppliers, regulators, and communities, in defining the SSCM strategies (Freeman, 1984). This theory is used to align with studying the external and stakeholder forces behind the use of SSCM. Finally, the IT can also give the idea of how the pressure of regulations, norms, and cultures governs organizational behavior (DiMaggio & Powell, 1983). Likewise, all these together form an interrelated system of theories: TBL gives explanations about evaluative criteria, RBV and DCT articulate matters of internal strategic capabilities, whereas ST and IT shed light on the exterior forces and the struggles of impactful stakeholders. TBL and DCT are of particular interest to your analysis since they help to connect strategic intent to long-term sustainable results.

2.2.2 Supply Chain Management Theories

1. Supply Chain Integration (SCI)

SCI is the practice of operating a supply chain as an integrated chain, considering customer service level demands, inventory placement, and the formation of policies and

procedures. Its objective is to reduce resources and deliver acceptable customer service levels (Hendijani & Saei, 2020). In general, SCI comprises the external and internal integration. Internal integration sets internal operations, processes, and plans to meet the needs of its customers in the manufacturing industry. It involves cross-functional relationships since it shares information to gain a better understanding of the needs of the customer. Similarly, external integration concerns working and relating with the external members exposed to the firm, who are related to the supply chain (Barratt & Barratt, 2010). SCI may influence the performance of firms both directly and indirectly. Directly, the positive cooperation of the organizations in the supply chain leads to better performance of the company. SCI can also indirectly assist firms to determine and remove non-value-adding activities from the entire supply chain, which enhances and improves product quality as well as reduces production costs, which leads to the improvement of value and customer satisfaction (Kim, 2009).

2. Lean and Agile Supply Chains

Lean and agile are two strategies that have matured at the intra-organizational level to the SC level and are being adopted by the SC level to cope with the changing environment, including the issue of increasing competitiveness and dynamic customer preferences, by coming up with the development of LSC and ASC strategies (Christopher & Towill, 2001). The LSC strategy is designed to establish a cluster of organizations that collaborate to achieve cost reduction, inventory reduction, and lead time reduction by utilizing a more efficient pull system. An LSC strategy aims at developing a cost-effective SC by removing the non-value-added factors, linking resources to develop well-coordinated inter-firm processes within the SC, and imbuing a concept of continuous improvement within the SC (Christopher et al., 2016). The strategy of ASC entails the capability of responding to uncertainty and environmental volatility through addressing volatile demand through the utilization of market knowledge to reduce lead time and utilize the opportunities in addressing the volatile demand (Qrunfleh & Tarafdar, 2013; De Oliveira-Dias et al., 2022). Researchers argue whether, in the case where SC needs to be upstream cost-effective and to be downstream responsive to the fluctuating

marketplace, the SC should lean in before the decoupling point, before shifting towards being agile downstream of the decoupling point (Ciccullo et al., 2017).

2.3 Drivers of SSCM

Every organization is affected by both internal and external factors. These factors could include governments, communities, investors, stakeholders, consumers, employees, and suppliers. According to Saeed & Kersten (2019), SSCM drivers are elements that sway or motivate organizations to pursue sustainability actions across their supply chains. Tuomi (2021) defines SSCM drivers as stakeholder pressures, regulatory pressures, and corporate strategies that pressure companies to become sustainable. Sánchez-Flores et al. (2020) identify SSCM drivers as factors that are considered to influence the performance of supply chains, especially those of emerging economies. Likewise, the major drivers of SSCM are provided below:

1. **Corporate Strategy:** The appropriate corporate strategy of the company in the creation of SSCM practice is that it adds responsibility to the environment and society to the business objectives. The other practices that sustainable corporations might venture into their corporate strategy are green procurement, carbon emissions reductions, and fair labor practices (Hofmann, 2010). The studies reveal that the firms that excelled in the sustainability strategy are more likely to attain profitability and competitive advantage in the long term (Saeed & Kersten, 2019). Also, SSCM as a part of corporate strategy could contribute to making sure that the business fulfills the regulatory requirements, creates brand awareness, and provokes trust among stakeholders (Koksal et al., 2018). When businesses consider sustainability as one of their core business objectives, they raise the bar of efficiency of carrying out business, minimize the degree of adverse effects to the environment, and establish long-term values that will be shared benefits to all the stakeholders (Hofmann, 2010).

   Nevertheless, there is a disagreement on how much strategy is proactive rather than reactive. As examples, Hofmann (2010) focuses on proactive integration of

sustainability in core business models. However, Koksal et al. (2018) point out that, in many cases, strategy may happen to be a reaction to the external factors (e.g., regulation, consumer demands). This implies a conflict between strategic voluntarism and strategic compliance, a theme that has received little empirical research attention. In addition, although Saeed & Kersten (2019) contend that the adoption of strategies that focus on sustainability contributes to long-term profitability, the assertion does not hold across the board. In some studies (e.g., Tuomi, 2021), it is cautioned that sustainability investments usually pay off in the context of particular cases, such as in emerging markets where institutional support might be poor.

2. **Organizational Resources:** The adoption of SSCM practices also relies on the resources of a company, either in the form of financial capital, technological capital, or human capital. When businesses have sufficient financial resources, they will be able to invest in renewable energy, sustainable packaging, and ethical sourcing (Hofmann, 2010). Talent and management support for innovation in the sphere of green logistics, waste disposal, and energy savings is another way to reach sustainability (Tuomi, 2021). Businesses that have an elaborate digital foundation can deploy data analytics and AI-based solutions to make their supply chains efficient and environmentally friendly. Researchers have confirmed that resource presence is crucial in the context of a company's ability to adopt SSCM (Caniato et al., 2012). Therefore, investments in the latest technologies and education and training of the employees that would be tailored towards sustainability are the most significant ones that would guarantee a successful implementation of SSCM in the business (Hofmann, 2010).

   However, a debate on whether resource constraints are a barrier or a catalyst to innovation. As an illustration, according to Tuomi (2021), restrictions on resources can lead both to frugal innovation and creative problem making, more so in SMEs. On the contrary, Hofmann (2010) and Sanchez-Flores et al. (2020) believe that SSCM

is still a dream without a significant assessment. The other growing theme is digital infrastructure. Although not such a prevailing emphasis in previous sources, the recent research (e.g., Margaret et al., 2023) reveals the transformational role of AI and data analytics in streamlining environmental supply chain optimization, which has yet to become an interesting subject of empirical research.

3. **Market Pressures:** The market pressure consists of the consumer demand, industry trends, and competitive forces that drive companies to this practice of SSCM. Customers are demanding environmentally friendly products as sustainability awareness rises, hence compelling companies to inculcate environmentally friendly sourcing, production processes, and packaging systems (Hofmann, 2010). The competitive pressure is also a significant factor where companies want to gain a competitive advantage over their competitors by becoming sustainable certified, e.g., LEED, Fair Trade, and ISO 14001 (Koksal et al., 2018). It has been pinpointed that the companies that operate in highly competitive business environments are more likely to adopt the SSCM practices to ensure that they retain their competitive advantage and build on the brand perception (Saeed & Kersten, 2019). Market sustainability is commonly accepted, and the researchers can rank its representatives in terms of their effectiveness and authenticity. Hofmann (2010) and Koksal et al. (2018) regard shaping consumer demand and competition dynamics as a strong drive towards SSCM.

   Nevertheless, Saeed & Kersten (2019) warn that pressure in the market may result in greenwashing when companies resort to shallow sustainability behaviors to shut down their stakeholders without having any real change. There are no strong guidelines on how to differentiate between a symbolic and substantive SSCM practice, as in an industry in which a green certification can be so easily faked.

4. **Regulatory Pressures:** The regulatory pressure, which consists of government policies, environmental laws, and international agreements, takes a toll on the SSCM adoption. Carbon emissions caps, waste disposal rules, and sustainability reporting being introduced by governments the world over are driving firms towards more environmentally friendly supply chain operations (Tuomi, 2021). These regulations have witnessed Apple being one of the many multinational organizations that have devoted to being carbon-neutral. Those companies that do not adapt to the provisions of the sustainability laws are liable to legal penalties and fines, besides losing reputation (Sanchez-Flores et al., 2020). Such has been contributed by the findings of research, which shows that companies that are in a more rigid environment are forced to accommodate sustainability in their supply chains to a greater extent (Caniato et al., 2012).

   Nonetheless, regulation is only effective in dimensions across regions. As an example, despite the EU Green Deal prompting significant changes in corporate behavior, Caniato et al. (2012) observe that in loosely-regulated surroundings, firms do not usually feel motivated to obey or even possibly able to do so. One of the issues on this is whether the regulation will be more corrective or more incentive-based. Others believe that more enforcement is needed (e.g., carbon tax), whereas others believe that market-based incentives would be needed (e.g., green innovation subsidies). This is indicative of a larger conflict of coercive and normative institutional influences in SSCM shaping.

2.4 Global Trends Driving SSCM

The SSCM industry is ever-changing following the changes in technology, consumer expectations, and global shocks. Firms that keep up with the latest trends and changes likely to face SCM in the future must be at the forefront and offer flexibility, since this market can be very volatile by nature (Tsai et al., 2021). In the last couple of decades, SSCM has become the foundation upon which the integrated interrelationship between customers and suppliers has been established in a significant number of industries. The

environment has turned competitive because of the continuous growth in the last year in SSCM (Saeed & Kersten, 2019). Therefore, any company that wants to meet the demands of competition must familiarize itself with the new SCM aimed at addressing competition.

1. **Climate Change and Environmental Pressures:** Climate change has been a significant disruption to the GSC, making its way to the world in terms of extreme weather, sea level rise, and a shortage of available resources. These interruptions touch on logistics, production, and sourcing, and companies are reconsidering their supply chain strategies (Ghadge et al., 2019). Gartner classifies the three kinds of risks introduced by climate change: physical (e.g., floods, wildfires), transition (e.g., carbon pricing, regulatory shifts), and opportunity risks (e.g., the tendency of consumers to shift to the production of green products) (Mayakova, 2021). Sarkis (2020) also claims that climate-linked risks are now as relevant to supply chain strategy as it has ever been, and firms are turning to mitigation and adaptation solutions. There is a widespread agreement that the effects of climate change reshape sourcing and logistics strategies, and that physical, transition, and opportunity risks are the biggest disruptors in GSC.

   There is, however, some disagreement about the degree to which the firms are adapting as compared to responding to regulatory or reputational risks. Though Sarkis (2020) and Ghadge et al. (2019) claim that the topic of climate adaptation becomes a strategic imperative, other sources suggest that many firms continue to perceive adaptability to climate change as an issue of compliance without long-term perspectives. Furthermore, it is assumed by some authors that the majority of financing on climate resilience is focused on major multinationals to the detriment of SMEs and suppliers in the Global South. This brings into question the equity and inclusivity of the global SSCM strategies (Gupte et al., 2025).

2. **Investor Pressure and ESG Integration:** The most recent trend that motivates the implementation of a SSCM practice is investor pressure. The ESG criteria have become the key factor in the investment process, and institutional investors seek more transparency and responsibility (Tarczynska-Luniewska et al., 2024). In one of the studies carried out by Thomson Reuters, it was revealed that 28 percent of the companies collect ESG information on suppliers in response to investor demands, but 80 percent of those that do it mention regulatory compliance as a motivating factor (Greggwirth, 2024). In a study conducted by Bisetti et al. (2023), when firms are exposed to tremendous pressure from ESG investors, there is more reallocation of suppliers and increased environmental and social performance. Such changes are not just cosmetic; they affect the ability to receive capital, premiums paid on insurance, and brand valuation. Businesses can fall to ESG expectations, taking the form of divestment as well as reputation damage (Wongsunopparat, 2023).

   Although Bisetti et al. (2023) demonstrate that the use of ESG pressure can enhance the performance of suppliers, some have warned that greenwashing and selective disclosure are widely used. Another conflict is short-term financial payback and long-term sustainability objectives. Companies might only place ESG compliance on their agenda, in proportion to their shareholders, when it becomes profitable at the expense of the potential push towards change induced by the latter (Gupte et al., 2025).

3. **Regulatory Shifts and Compliance Requirements:** The necessity to report sustainability and perform due diligence becomes obligatory because of the regulatory changes accelerating the adoption of SSCM practice (Hameri & Hintsa, 2009). As an illustration, the EU provides the CSRD, according to which big companies are required to report the Scope 3 emissions and the effects of the supply chain (Forrest, 2025). On the same scale, the U.S. SEC has proposed climate disclosure regulations that require companies to make disclosures through financial threats of climate change. The regulations are transitioning sustainability from a compulsory

regime to a voluntary one (HeinOnline, 2025). Seuring and Müller (2008) observe that the regulatory pressure is one of the notable external SSCM drivers. Through these laws, the firms are forced to audit their suppliers, implement risk management systems, and offer transparency. The regulatory changes are not always compliance-driven; they can bring innovation and participation in stakeholder engagement.

However, some believe that excessive regulation may hinder creativity, particularly in marginally profitable or in the case of developing economies (Gonçalves et al., 2025). Harmonization is also questioned: as the EU and U.S. are finalizing powerful regulations (e.g., CSRD, SEC climate regulations) by promoting fragmentation in standards, international companies will have to comply with new rules. There are those scholars who support global regulation convergence, and others caution that the universality of regulation might not be appropriate across the various economic situations (Gupte et al., 2025).

4. **Technological Advancements and Digital Transformation:** SSCM is transforming the supply chain to be more sustainable and with the potential to measure in real-time, use predictive analytics, and provide more transparency. Among the technologies that help the company make its operations efficient are examples of AI, blockchain, and IoT, which help minimize waste and make ethical purchasing decisions (Agafonova et al., 2020). Blockchain technology, such as the one implemented by IBM Food Trust, enables companies such as Walmart to expect food products on the shelf, all the way through the farm, in a matter of seconds, meaning better food safety and visibility of the supply chain (Martínez-Castañeda & Feijoo, 2023). The study by Dubey et al. (2020) notes that digital technologies promote supply chain visibility and agility as they are pivotal to sustainability. Such tools can also help with ESG reporting, as they allow measuring emissions, labor practices, and consumption of resources in real-time. As the level of supply chain complexity increases, the digital transformation is obligatory in order to address the risks, stakeholder expectations, and sustainability goals (Dubey et al., 2020). It is also generally accepted that

technology is a game-changer in SSCM, making it possible to conduct real-time monitoring, have predictive analytics, and exhibit transparency.

However, there has been a debate on whether these technologies can be easily accessed and scaled. Although big companies, such as Ericsson and Walmart, leverage AI and blockchain, smaller companies lack the time and skills to use these tools (Baig et al., 2020). In addition, researchers warn against naive hopes that digitalization will be sustainable. With no ethical designs and inclusive governance, technologies may either exacerbate the already present imbalance or may result in data misuse and misappropriation issues (Gupte et al., 2025).

2.5 Emerging Strategies of SSCM

Over the past several years, the desire to deal with climate change, resource shortage, and ethical supply has animated organizations to revert to more innovative and comprehensive SSCM practices (Saeed & Kersten, 2019). The new trends, including digital twin technology, traceability by using blockchain technology, elastic logistics, and green data infrastructure, find themselves redefining sustainability management by firms within the manufacturing sector, the service industry, and information technology (Ahmed et al., 2024; Hannila, 2023). Such strategies are distinguished by the application of high technologies, cross-functional teamwork, and real-time data that would help reduce environmental impact, increase transparency, and respond to the needs of rapidly changing stakeholders.

1. **Digital Twins Technology:** Digital twins are revolutionizing SSCM since manufacturers are now able to model a real-time virtual copy of tangible assets, processes, or systems. Lu et al. (2020) hold that digital twins lessen energy usage, enhance resource distribution, and facilitate forethought maintenance. The technology is also helpful in the process of scenario planning as it enables the firms to experiment with sustainability strategies that do not necessarily affect real operations (Hyrkäs & Myllykangas, 2024). Digital twins, when coupled with IoT and

AI, can give real-time information, enabling companies to achieve a reduction in carbon footprint, as well as supply chain agility (Radanliev et al., 2021). With the increasing complexity and data-centrism of manufacturing and its optimization, digital twins present a proactive and holistic systems approach to SSCM that balances operational efficiency and environmental agenda (Zhen & Yao, 2024). The literature on digital twins in SSCM is unified around the transformative potential of digital twins. However, instead of exploring the limits and implications of digital twins, it overwhelmingly overlooks the cross-sectoral domain of applicability. Lu et al. (2020) and Zhen & Yao (2024) focus on the importance of digital twins in reducing energy consumption and improving operational efficiency.

In contrast, Hyrkas & Myllykangas (2024) discuss the importance of digital twins in scenario planning. Such views are complementary, implying both short-term and long-term advantages. There are, however, few studies that question the challenges of data integration, cybersecurity, or the cost of implementation. The discussion is further developed by Radanliev et al. (2021), who also associate digital twins with IoT and AI, where the literature is still techno-centric, and an emphasis is placed on human and organizational contribution. One of the gaps includes the assessment of long-term sustainability results and scalability of digital twin systems in SMEs.

2. **Collaborative Supplier Platforms:** Supplier collaborative platforms allow manufacturers to involve suppliers in everyday sustainability activities, exchange real-time data, and jointly design environmental and social performance targets (Lindquist et al., 2008). The World Economic Forum describes a broad range of such collaboration as being beneficial to improve the visibility, resilience, and resource efficiency of supply chains at least in the context of managing Scope 3 emissions, which make up to 90 percent of a given company's carbon footprint (Kenari et al., 2024). Using this platform, Ford Motor Company has utilized its Aligned Business Framework to collaborate with key suppliers in co-creating sustainability measurement, thereby encouraging sustainability accountability and transparency

(Dewa, 2023). Such platforms can heavily rely on the use of digital means such as blockchain and cloud-based dashboards to track conformance, emission, and reporting systems (Dewa, 2023). According to the SPARQ360, collaborative supply chains can benefit not only the manufacturers in terms of ESG achievements but also decrease costs and enhance operational effectiveness (Van Andel, 2024). Coordination through shared supplier platforms and trust helps to shift sustainability to the shared value issue, i.e., a shared value proposition rather than compliance obligation, and, therefore, a prime element of contemporary SSCM in the manufacturing industry (Van Andel, 2024). The use of collaborative supplier platforms has been widely considered as a means of promoting transparency and common sustainability objectives.

However, the literature tends to address it as a nearly perfect solution with little acknowledgement of implementation challenges. Both Lindquist et al. (2008) and Kenari et al. (2024) agree on their ability to control Scope 3 emissions and create visibility in the supply chain. Dewa (2023) and Van Andel (2024) also claim that the platforms lead to increased trust and shared value, placing sustainability on a new path of co-creation instead of compliance. However, those sources seldom touch upon the obstacles to cooperation, e.g., the power imbalance, data confidentiality considerations, and differences in technology between suppliers. Though the creation of blockchain and cloud dashboards has been suggested as an enabler, accessibility and interoperability have not been investigated. Nevertheless, an important gap remains in the relationship between digital and human collaboration. Research directions of future studies are the models of governance, mechanisms of trust-building, and the role of SMEs in collaborative ecosystems to achieve inclusive and prosperous SSCM.

3. **Elastic Logistics:** Elastic logistics describes the capacity of firms in the service sector to flexibly deploy or deactivate the scales of the logistics activity according to their demand, which may vary at any given moment, based on real-time data and

automation (Castillo et al., 2018). Choi (2020) proves that elastic logistics results in the increased resilience of the supply chain as it helps to eliminate wasted capacity and save fuel, leading to customer satisfaction. Elastic logistics is based on omnichannel fulfillment and lean inventory models; thus, it becomes one of the tenets of sustainable service supply chains (GEP, 2023). The literature presents elastic logistics as a dynamic, responsive measure to the changing demand and the pressures of sustainability, especially in the in-service sectors. Castillo et al. (2018) and Choi (2020) mention its contribution to minimizing losses and maximizing customer satisfaction by being live and responsive to their requests. The GEP (2023) outlook places it as a foundation of sustainable services supply chains.

However, it does not review its environmental trade-offs, including increased packaging and the effects of the gig economy. The way elastic logistics can intermingle with the pairing of collaborative platforms or green outsourcing is also not discussed at length. One of the most significant lapses is in the determination of the long-term viability of elastic models in situations outside a crisis. They would improve the literature by more profoundly examining ethical, environmental, and economic strains of the hyper-flexible logistics systems.

4. **Green Outsourcing and Localized Services:** Green outsourcing is considered where green-certified third-party providers are chosen as well, and localized services are provided with a closer location to end users, which will minimize emissions. This two-fold approach allows service companies to reduce their carbon footprints and assist local economies (Bhamra, 2012). As underlined by Liu et al. (2019), behavior changes, including giving a priority to local vendors and eco-certified partners, increase the sustainability of service SSCM. It is also an adequate method of enhancing the supply chain flexibility and lessening the risk of international disturbances. Liu et al. (2017) further provide that green outsourcing is aligned with the TBL, whereby it balances three factors: environmental liability, cost efficiency, and social impact. SSCM, with its environmental perspective, is represented by green outsourcing, localized, and

brings the socio-environmental dimension that is not represented in other innovations that are primarily digitally based.

According to Bhamra (2012) and Liu et al. (2019), sourcing eco-certified suppliers and local suppliers has both environmental and social values which align with the TBL. Liu et al. (2017) posit its compatibility with flexibility and risk mitigation, but little research exists on how it is combined with digital platforms and cooperation with suppliers. The risk of greenwashing or the unfair distribution of certified providers is also practically not criticised. The literature adheres to the importance of green outsourcing without a detailed perception of the systematic consequences thereof. Future examinations should examine how localized strategies can be scaled, validated, and even incorporated into more comprehensive SSCM structures.

5. **Blockchain for Ethical Sourcing:** The trend being swept by blockchain technology is the revolution of sourcing practices through the improvement of transparency, traceability, and accountability of sourcing practices in SSCM in the IT sector. It allows traceable records of transactions, unlike in the case of rare earth minerals, where companies can confirm the ethical source of the material (Kshetri, 2022). Hannila (2023) discovered that blockchain enhances trust between the members of the supply chain and facilitates real-time audit. Checks of compliance are automated using smart contracts, paving the way to the reduction of administrative costs and fraud. Paliwal et al. (2020) observed that another benefit of blockchain as it relates to sustainable procurement is that it provides visibility over the entire journey of the products across the multi-level supply chain. It is imperative in the case of the IT sphere, where the practices of suppliers are hidden because of complex networks across the world (Tang et al., 2019).

   In the body of literature on blockchain in ethical sourcing, there are some surfaces of the transformative presence of blockchain in promoting transparency and accountability, especially in multilayered global supply chains. As noted by Kshetri

(2022) and Paliwal et al. (2020), the blockchain can stop international sourcing of materials that require conflict-free and environmentally sound sources, a process made possible by the assurance of tracing the value chain of materials, including rare earth minerals. Such opinions are supported by Hannila (2023), who mentions that blockchain generates trust and enables real-time audits due to smart contracts, thus decreasing fraud and administrative costs. Nevertheless, it has been well-recognized that the positive effects far outweigh the negative aspects. However, the literature also did not consider the technological and regulatory implementations, such as its easy adoption in developing parts. As indicated by Tang et al. (2019), there is a lack of transparency in the IT supply chain, and little research is done to see how adoption of blockchain may be dissuaded by the parties whose interests are served by this lack of transparency.

2.6 Challenges in SSCM Implementation

SSCM has emerged as a business strategy that organizations use to maintain balance on economic performance, environmental, and social obligations. Nevertheless, the application of SSCM is surrounded by complicated issues in the financial, regulatory, operational, technological, and cultural realms (Shebeshe & Sharma, 2024). Recent literatures indicate that these issues are compounded by global crises like pandemics, geopolitical affairs, and climate change that reveal weaknesses in the supply networks (Narimissa et al., 2019). As an example, Kareem et al. (2024) single out crucial conflicting demands between sustainability and efficiency and unexpected effects of technological innovation that are potentially pushing resource-constrained stakeholders to the periphery.

1. **Financial and Economic Constraints:** Sometimes, when SSCM practices are implemented, there is a substantial proportion of upfront investment, which may act as a significant hindrance to most organizations, especially SME. Such expenses involve green technology adoption, the use of environmentally friendly materials, and infrastructure upgrades to comply with the environment (Xing et al., 2019).

Sharma et al. (2024) list financial constraints as one of the top ten obstacles to sustainable SSCM, at least in the developing economies. In addition, there is also the inability to access green financing and government incentives, which exacerbates the problem. Organizations typically find it hard to meet short-term profit restrictions and long-term sustainable objectives (Alora & Barua, 2019). It is proposed that some form of public-private partnership, green bonds, or sustainability-linked loans can fill this financial gap (literature). However, such solutions are not generally available and in use. Financial and economic limitations are consequently one of the vital issues in the general use of SSCM (Garg & Kashav, 2021).

All the literature identifies financial barriers as a significant challenge to SSCM, especially with SMEs and companies in developing economies. The expensive nature of green technologies and infrastructure modernization is highlighted by Xing et al. (2019) due to the lack of monetary benefits in many cases. Alora & Barua (2019) also note that a trade-off between profitability in the short-term and sustainability over the long-term is complex to strike. On the one hand, there are proposals (e.g., green bonds and sustainability-linked loans). In contrast, Garg & Kashav (2021) state that even these financial arrangements are unevenly distributed and accessible. The perception of the necessity of working together with the private sector is agreed upon in the literature. However, a critical analysis of the success or expandability of these partnerships is missing.

2. **Regulatory and Compliance Challenges:** The complicated and changing nature of environmental regulations can be seen as a considerable challenge that firms with the ambition of adopting a sustainable chain of supply face. The laws that govern are not similar in any way; hence, it becomes very challenging, especially for international companies operating in different countries, to abide by them (Boström et al., 2014). Sharma et al. (2024) even claimed that regulatory compliance is not only expensive but also takes time and requires a legal and environmental labor force. There is the irregularity and uncertainty of regulations, which implies that companies

would find no incentive to invest in long-term sustainability efforts. In addition, small companies are usually ill-equipped to track and comply with such types of regulations. The literature talks about the importance of having consistent standards throughout the world as well as better regulatory guidelines to support SSCM (Awuah-Gyawu et al., 2024).

Another primary concern in SSCM is regulation, particularly for companies that conduct business in more than one country with environmental rules that are varied and volatile. As stated by Boström et al. (2014) and Sharma et al. (2024), there is also a compliance cost, which entails trained legal needs, time, and financial requirements. Although Awuah-Gyawu et al. (2024) argue in favor of harmonized international guidelines, the scholarly debate on the question of political and institutional barriers to international standards harmonization is scarce. More than that, small firms' impact is disproportionate, and these firms lack the resources to perform observations and adapt to new norms. The literature tends to interpret compliance as solely a technical issue and lacks a strategic interpretation of it (e.g., uncertainty of compliance is a pullback factor towards investing in long-term sustainability). Even though it is unanimously accepted that a more transparent and logical regulation is necessary, there is a deficit in the literature covering not only the empirical analysis of how firms are coping with this complexity, but also how they can contribute to policymaking.

3. **Supply Chain Disruptions and Operational Challenges:** SSCs tend to be more prone to upheaval because of their dependence on a particular supplier, materials, or geographic areas that are environmentally and ethically compliant (Azadegan et al., 2020). As an example, because of lockdowns and workforce shortages observed during the COVID-19 pandemic, Unilever experienced substantial gaps in accessing certified sustainable palm oil in the Southeast Asia region. Such disturbances pressured the company to revert to less sustainable alternatives, which shows how weak GSCs are in the long term (Kareem et al., 2024). Kareem et al.'s (2024) review

finds that some of the central tensions in SSC are trade-offs between sustainability and operational efficiency, as well as between global operation objectives and local sustainability objectives. The paper highlights that though sustainability increases long-term resilience, it also presents short-term vulnerabilities. To contain these threats, it is recommended that companies multiply their supplier base, invest in digitalization in the supply chain, and comply with the principles of the circular economy (Azadegan et al., 2019). Nevertheless, such strategies become quite costly and thoroughly coordinated, and not every company can undertake them.

Therefore, the challenge in the supply chain and operational obstacles persist as an impediment to the deployment of SSC (Craighead et al., 2007). As Azadegan et al. (2020) and Kareem et al. (2024) reveal, over-dependence on certified suppliers or specific regions, which is usually needed to achieve ethical sourcing, can be a disaster in times of crisis, as experienced by Unilever in the pandemic regarding its palm oil crisis. Such disturbances create trade-offs between sustainability and continuity, which do not always agree with the presupposed inherent resilience of green supply chains. Although the solutions suggested are digitalization and the principles of the circular economy (Azadegan et al., 2019), the literature underrepresents the cost and coordination of the implementation. According to Craighead et al. (2007), even the most thought-out plans may pose some novel complexity, e.g., suppliers may demonstrate resistance or the problem may be data overload. The literature concurs that diversification and digital tools are ways of mitigating risks, but it does not provide any cross-sectoral comparison of the most effective strategies. One of the gaps is that we, arguably, do not understand how companies are exploring the right undertakings that provide global efficiency and local sustainability, especially when they are under duress.

4. **Stakeholder Resistance and Cultural Barriers:** Stakeholder opposition, which includes internal staff and suppliers as well as customers, may play a significant role in the failure of the practices of SSC. This opposition is usually caused by ignorance,

fear of change, or a clash of priorities (Luthra et al., 2021). Sharma et al. (2024) argue that resistance among stakeholders represents one of the most significant obstacles that should be counteracted using effective communications, education, and incentive mechanisms. According to the literature, in the case of sustainability, companies should involve stakeholders early enough in the sustainability process through participatory methods to create trust and alignment. Resistance to change can be solved with change management strategies, including the ideas to introduce change through training programs and sustainability champions (Bansal & Jha, 2025). In addition, the transition can be made more attractive by aligning the sustainability objectives with business returns, particularly the cost savings that are associated with energy efficiency.

Nevertheless, despite these efforts, cultural and behavioral constraints, as deep-seated problems, continue to pose complex issues in combating them in SSCM (Panigrahi & Rao, 2018). According to Luthra et al. (2021) and Sharma et al. (2024), internal resistance (by employees and suppliers) stands out as one of the key resistances especially in connection to that which can be experienced in While, Bansal & Jha (2025) argue and recommend participatory approaches and training programs, the emotional and psychological aspects of resistance are not captured to a greater extent in the literature. According to Panigrahi & Rao (2018), even when the incentives are present, changing cultural norms and behavioral habits is hard. The literature on the significance of initial connection and communication agrees, but not on elaborate plans for aligning stakeholders. In addition to that, there is a limited amount of research on the interaction between resistance and other impediments, like financial barriers or regulatory overload. A significant gap exists in how to change management strategies according to cultural and organizational situations.

5. **Technological and Data Integration Challenges:** Although digital technologies, including blockchain, IoT, and AI, have a tremendous potential to enhance transparency, traceability, and efficiency, these technologies are usually high-effort and require significant resources (Kache & Seuring, 2017). Most firms, particularly in developing countries, do not have either the technical know-how, infrastructure, or finances to make use of these technologies effectively. As an example, blockchain may be used to increase the traceability of food supply chains, making them ethical and minimizing wastage. Small farmers and suppliers in other countries (India or Kenya) are, however, not as digitally literate or connected to the internet to be included in these systems (Karumanchi et al., 2022). Kareem et al. (2024) argue that technological innovation might put stakeholders with few resources at a disadvantage inadvertently and even establish what they refer to as a digital divide within the supply chain. Furthermore, another significant challenge is incorporating the sustainability data of the various levels of suppliers. This is frustrated by shallow data format, poor standardization, and issues of data ownership (Awad & Nassar, 2010). The literature notes that to eliminate these obstacles, collaborative platforms, capacity-building programs, and uniform reporting infrastructure should be used. Unless these challenges on technologies and data integration are dealt with to overcome them, the full potential of SSCM will not be achieved (Mehrotra, 2010).

   Karumanchi et al. (2022) emphasize that small-scale suppliers in such regions as India or Kenya cannot access such systems because they do not have digital literacy or the necessary infrastructure, which involves a digital divide and defeats inclusivity. According to Kareem et al. (2024), such a technological divide, in turn, may unintentionally sideline the low-resource stakeholders, which, in terms of SSCM ethical objectives, is contrary to the objectives. In addition, data inconsistency in the format used, data standardization, and data ownership are some of the elements that limit the integration of sustainability data in multi-tiered supply chains (Awad & Nassar, 2010). Such challenges not only limit the reliability of data but also padlock real-time decision-making. Mehrotra (2010) and others suggest collaborative

platforms and generic reporting modules as possible ways out; however, there is no empirical evidence in the literature on their efficiency. There is still a fundamental knowledge gap in scaling digital tools effectively and increasing the capacity of underrepresented actors. The potential of digital SSCM has not been achieved unless these integration challenges are dealt with.

2.7 Conceptual Model: Strategic Dynamics of SSCM

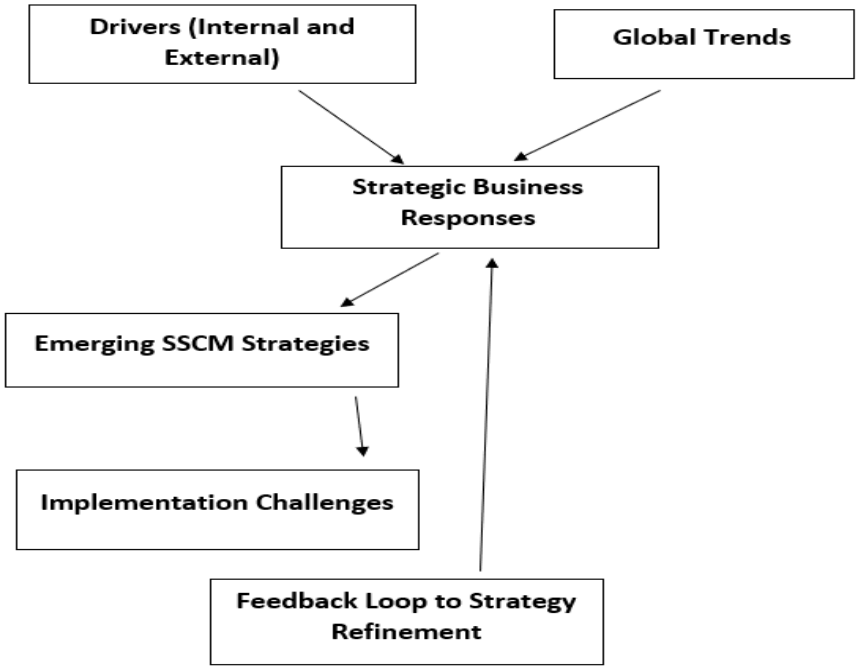

Figure 2. Conceptual Model: Strategic Dynamics of SSCM

SSCM is essentially premised on the relationship between internal and external forces, global trends, strategic adjustment, and implementation issues. The first ingredients of the model are the internal and external drivers, as they are initiators of the necessity of having sustainability in supply chains. These are corporate strategies that incorporate sustainability into business targets (Hofmann, 2010), including the organization's resources, such as financial and technological capacities (Tuomi, 2021). In these market forces, they are driven by the consumers and companies (Saeed & Kersten, 2019) and regulatory forces where they are pressured by governments and international

organizations (Caniato et al., 2012). The global trends, in turn, contribute to these drivers and amplify them to the point where they become one of the forces that shape the strategic direction. The major ones are increased climate change, pressure on investors regarding ESG transparency, changes in regulatory frameworks, including the EU CSRD, and the lightning-fast evolution of technology, including AI, blockchain, and the IoT (Ghadge et al., 2019; Bisetti et al., 2023; Forrest, 2025; Dubey et al., 2020).

Given these pressures, businesses have developed a strategic response, which has become an emerging SSCM strategy. Such solutions involve implementing the digital twin technologies in real-time monitoring and scenario planning (Lu et al., 2020), utilizing collaborative supplier platforms to optim approaching Scope 3 emissions and opportunities to increase transparency (Kenari et al., 2024), the implementation of elastic logistics to operate demand-responsibly (Choi, 2020), green outsourcing, and localized services to minimize carbon footprints (Liu et al., 2019), and blockchain to support ethical sourcing and traceability (Kshetri, 20) Nevertheless, these strategies have challenges during their implementation. A critical moderating layer in the model is implementation challenges, which include financial and economic constraints, particularly when applied to SMEs (Xing et al., 2019), the complexity and variety of regulations that have to be encountered in different jurisdictions (Boström et al., 2014), operational shocks such as those that occurred in the context of the COVID-19 pandemic (Kareem et al., 2024), resistance of the stakeholders due to cultural and behavioral inertness (Luthra et al., 2021), and technological aspects (Karumanchi et al., 2022).

It is crucial to note that the model includes a feedback loop, according to which the results and obstacles observed during implementation would be used to improve the strategies. The cyclic pattern makes SSCM dynamic and proactive to changing sustainability requirements. Conceptual model, in turn, gives us the whole picture of how businesses can follow the intricate world of SSCM, balancing strategic intent and external facts, with internal capabilities, and learning through the experience of implementation.

3 Research Methodology

3.1 Research Design

The research design of the study is set up as qualitative, exploratory, and analytical research and is managed with the help of a deductive process of reasoning. It is a complex design that has been chosen because it will be used to explore in depth how businesses are strategic and adapt to the changing demands of SSCM. Each aspect of the design plays its part in making the process of carrying out the research and ensuring that the research is not only theoretically informative but also empirically informative. Likewise, the findings will be aligned with broad theories, usually developed around the TBL (Elkington, 1997), RBV (Birger Wernerfelt, 1984), the ST (Freeman, 2010), and IT (DiMaggio & Powell, 1983), and apply them to the analysis of actual corporate practice.

The reason why the qualitative research design is best suited for this study is that it enables exploration of complex, context-specific phenomena that are non-quantifiable. The qualitative methods are a perfect fit in observing the vivid and in-depth aspects of the organizational culture, relations with stakeholders, and institutional set-ups that are heavily involved in SSCM approaches (Collins et al., 2024). Creswell (2019) underlines that the qualitative research approach is most suitable to use when the objective is to find out how individuals or organizations perceive and make meaning of a specific matter in question, here is sustainability in supply chains.

Presentation of the research in the form of exploratory research is an indication of the necessity to explore the identified area in the phase of its development, either in a theoretical or practical sense (Stebbins, 2001). SSCM is a relatively new area of concern in strategic management, and although an extended literature foundation exists, numerous areas, including the way firms respond to the changing regulatory, environmental, and stakeholder demands, are underdeveloped (Ketchen & Giunipero, 2003). Exploratory research applies when a researcher is interested in making patterns, creating insights, and laying the base for future research (Stebbins, 2001). One can take,

as an illustration, an investigation of the reporting of companies of various industries on Scope 3 or supplier engagement practices to find new directions of the trends and their strategic priorities.

Also, the study is analytical, which implies that it not only describes the given information, but also tries to interpret and explain the hidden strategic reasoning of corporate behaviour. Analytical research aims at unraveling the data patterns, relationships, and meanings (Anderson et al., 2007). This paper uses thematic content analysis and extracts common themes that include risk mitigation, innovation, preserving compliance, and aligning with stakeholders. These themes are then interpreted considering the theoretical frameworks in order to come to terms with how and why firms implement particular SSCM strategies (Anderson et al., 2007).

The research design would serve as a strong tool to explore strategic business response to SSCM because it has combined the aforementioned elements, namely qualitative inquiry, exploratory scope, and analytical depth. Through such a holistic methodology, the study will not only record what companies are up to but, much more importantly, the strategic reasoning behind their action, and this should be of value to both theoretical research and practical business management (Godwill, 2015).

3.2 Data Collection Methods

This research uses a secondary data collection approach, which entails the use of existing data initially collected to serve a different research objective other than the one at hand. The secondary data is also particularly applicable to the qualitative research that aims at studying the strategic trends, institutional reactions, and stories of sustenance in varied organizations (Vartanian, 2011). It promises an efficient strategy, both in terms of finances and time investment, and a resource-saving one for acquiring rich and context-informed data on a large variety of sources (Vartanian, 2011).

Some of the key resources of secondary data used in this research are company sustainability reports, corporate social responsibility disclosures, annual reports, business strategies, third-party ESG ratings (including those of CDP, DJSI, and MSCI), and industry white papers. Such documents are public and give us extensive knowledge on the way those companies define their supply chain strategies about sustainability, announcing the performance results, and reacting to stakeholder demands (Simnett et al., 2009). As an example, the sustainability report of a company could describe the programs in which the supplier is engaged, carbon reduction programs, and ethical sourcing policies, which are crucial for understanding the company's approach towards SSCM (Simnett et al., 2009).

Besides the corporate documents, academic resources, government publications, and industry analysis are also consulted to provide theoretical and contextual explanations. This consists of peer-reviewed studies (journal papers), study policies, and benchmarking research papers of organizations like the WBCSD and GRI. These sources contribute to triangulating findings and ensuring that these findings are driven by both the practice and theory (Grayson, 2017).

In general, once secondary data is used, the researcher will have a wide and varied scope of information to access and will therefore be in a position to study all aspects of the issue of strategic business response to SSCM. It is also beneficial to conduct comparative analysis across companies and industries, which helps identify common themes and the most efficient procedures in sustainable supply chain management (Vartanian, 2011).

3.3 Data Analysis Methods

This paper will base its data analysis on qualitative methodology, and it will use a Chronological Thematic Content Analysis (CTCA) and framework-directed interpretation to analyze secondary sources using sustainability reports, CSR disclosures, and strategic documents. The thematic analysis is considered the primary analytical method, as it allows identifying the repetitive patterns and themes in qualitative data and interpreting

them (Braun & Clarke, 2006). The first step is to familiarize oneself with the data, where the researcher undertakes frequent reading of the collected documents to gain a proper understanding of the content. It is followed by initial coding in which the main concepts within the SSCM are found and marked, i.e., supplier engagement, circular economy, reduction of emissions, and ethical sourcing. Such frameworks are then classified in the larger strategic themes such as risk mitigation, innovation, compliance, and responsiveness to stakeholders. The last step entails an interpretation of these themes to discover strategic trends as well as to gain an understanding of how firms manage their supply chain practices by responding to the sustainability pressures (Svensson, 2007).

To achieve a higher level of analysis, the research has a strong analytical framework, which assumes multiple theories that have been approved. The ST (Freeman, 1984) is employed in the measurement of how companies react to the impacts of expectations by various stakeholders, such as investors, customers, regulators, and civil society. The concept of IT (DiMaggio & Powell, 1983) allows for the examination of the effect of regulatory, normative, and mimetic pressure on corporate sustainability behavior. The RBV is used to analyse internal capabilities and resources: green technologies, supply chain transparency, and sustainability expertise by the firms as a vehicle of strategic advantage (Barney, 1991). Moreover, it also uses the DCT (Teece, Pisano, & Shuen, 1997) to determine how companies adapt, integrate, and adjust their resources dynamically to evolving conditions in the environment as well as in the market, especially within SSCM.

Content analysis is also used in the study to conduct a systematic assessment of the structure, frequency, and focus of disclosure sustainability related to various industries. This also entails the comparative analysis of sustainability and CSR reports published by companies in leading sectors, i.e., manufacturing, retail, and logistics, which makes it possible to identify industry-specific trends and best practices (Krippendorff, 2018). Content analysis can complement the use of the thematic approach as it quantifies the frequency of specific themes or keywords' presence, thus backing the qualitative insights

with systematic facts (Krippendorff, 2018). As an illustration, the number of references to such terms as carbon neutrality, supplier audits, or circular economy may reflect the interests of companies in a particular industry.

Collectively, content and thematic analysis offer a reasonable and methodical solution to qualitative secondary data. The combination of the methods described with the solid theoretical framework provides the study with the ability to gain results that are both empirically and conceptually sound. The method will do more than it is already doing by letting us know what companies are doing regarding SSCM and how they make decisions to do so, thus providing a unique insight into academic research and also managerial practice (Neuendorf, 2018).

4 Findings

In this chapter, the results of the research are presented in the form of CTCA, which expresses the historical development of SSCM from the 1990s to 2025. The analysis is made based on the conceptual model created in the Chapter 2 that includes important combination of five following theories: TBL- being in balance between environmental, social and economic goals, RBV- use of internal capabilities as a prescribed implement of SSCM, DCT- adapting and recombining resources through using change, ST- reacting to demands of stake holders, and IT- acting following the regulatory and normative demands. The results of this research also fall in line with the goals and questions that were developed in Chapter 1 and with the approach that was to be used in Chapter 3, which is the qualitative approach.

4.1 CTCA of Strategic Business Responses to SSCM Shifts

1. 1990s: Early Awareness & Voluntary Initiatives

The establishment of SSCM arose in the 1990s, and this decade can be defined as the foundational decade for voluntary corporate clubs and the formulation of environmental awareness in business worldwide. This was the time that formed the basis of what was to come in the then more organized and institutionalized strategies on sustainability. The decade was defined by increasing interest in environmental degradation among the public, the role of World Summits, and the early years of the CSR ideology. These evolutions were not, at that time, driven by regulatory requirements, but by internal leadership values, stakeholder expectations, and a growing awareness of the interrelatedness between business and the environment (Delmas & Young, 2009).

Among the most significant conceptualizations of this period was the TBL way of thinking that was developed by John Elkington in his bestselling book Cannibals with Forks: The TBL of 21st Century Business (1997). Elkington alleged that companies must not pay attention solely to financial performance (profit), but also to their environmental (planet)

and social (people) effects. The structure would form a pillar of measuring corporate sustainability and would form the intellectual basis of SSCM and companies to take moral responsibility into their supply chains (Elkington, 1997).

Another landmark occurred in 1992 in Rio, when the idea of sustainable development was presented to the world policy agenda. The summit also highlighted the fact that corporations should take initiative in the protection of the environment and social justice. The results were non-binding primarily, but they triggered a movement of voluntary corporate efforts aimed at aligning business activities with the new standards of sustainability (United Nations, 2025).

At this time, companies such as Patagonia and Interface Inc. became innovators in the concept of SSC practices. Patagonia, like the example, introduced the use of recycled polyester in its outdoor clothes as early as 1993, and this marked the beginning of green sourcing. The company also introduced a transparent model of supply chain where the information concerning its suppliers and environmental impact was revealed openly. The strategy was indicative of a strong correlation with the inner corporate values and devotion to stakeholder interaction, especially with the green-friendly consumers. The strategy adopted by Patagonia is an excellent example of the RBV approach, according to which companies can gain a competitive advantage through the use of unique internal capabilities in the form of brand integrity, innovation, and ethical leadership (Patagonia, 2025; Hartman & Haas, 1995; Leonas, 2016).

In another example, Interface Inc., a US company that makes carpets, started an ambitious program called the Mission Zero in 1994, which was to end any negative contribution to the environment by 2020. Closed-loop manufacturing systems made out of sustainable materials and renewable energy were two examples of initiatives the company invested in long before such practices were mainstream. Interface not only made a sustainable decision but also made a financially feasible one, as the environmentally progressive strategy turned out to show that sustainability could be

developed as a core business activity without negatively affecting profitability (Johansen, 1998; Fishman, 1988; Lampikoski, 2012).

This is consistent with the DCT, which focuses on changes in firms regarding adaptability, innovation, and the reconfiguration of resources in the event of fluctuating environmental conditions. According to the ST perspective, these early adopters were responding to an increasing stratum of consumers, NGOs, and employees who desired increased corporate accountability. Even though formal stakeholder engagement processes remained at an early stage, companies such as Patagonia and Interface were interested in the strategic opportunities of ensuring their firms worked to the expectations of the stakeholders. This was proactive, which assisted in creating brand loyalty, talent attraction, and reducing reputational risks. The importance of IT in this era was not as apparent as it was implicit. Although there were no powerful coercive laws to dictate the need to be sustainable, normative pressures and imitations began to emerge. The industry association, environmental non-governmental organizations, and early adopters developed a form of soft institutional pressure, which stimulated other companies to put it into practice.

Likewise, the introduction of the ISO 14001 environmental management standard in 1996 offered companies a voluntary guideline for giving form to their environmental procedures (Darnall, 2006). There was no obligation to follow it, but the standard had been adopted as an indicator of environmental social responsibility, particularly by multinational corporations interested in maximizing their legitimacy within international markets (Delmas & Montes-Sancho, 2011). Furthermore, strategic responses in the 1990s were highly internal and were part of the value-based approach towards sustainability. The adoption of SSCM by companies at this time was associated with an ethos of visionary leadership at the helm and the need to excel among other competitors in the market. It is one of the core beliefs of the RBV, as it considers organizational culture, leadership, and innovation as intangible assets that can bring long-term competitive advantage (Giunipero et al., 2008). The voluntary aspect of these initiatives, however,

also meant that there was uneven adoption and, in many cases, only those companies capable of investing in sustainability and those with leadership will and discretion to invest did so. Even SMEs had problems like the absence of funds, experience, and pressure exerted by the stakeholders. This brings out a premature problem in SSCM, the scalability and inclusiveness of sustainability in various organizational settings (Giunipero et al., 2008).

In methodological terms, the results in this section rest upon the analysis of secondary data, corporate sustainability reports, scholarly sources, and historical policy documents, as is described in Chapter 3. Thematic coding was applied to identify common recurrences regarding strategic responses, drivers, and theoretical alignment. It was found that the 1990s did not have formal regulatory mechanisms but an abundance of innovation, experimentation, and thought leadership, which would define the direction of SSCM in the decades henceforth.

The 1990s can be described as the infancy period of SSCM, characterized by voluntary proposals and internal leadership, and the beginning of stakeholder involvement. The cases of strategic reactions of the companies, such as Patagonia and Interface, demonstrate how the early adopters successfully integrated the internal forces and stakeholder group alignment to be the producers of sustainable business practices. These attempts were supported by theoretical frameworks like TBL, RBV, DCT, ST, and IT, which are competent today in the examination of SSCM. Though the decade represented the adoption of SSCM by very few players, it marked the regulatory, technological, and collaborative changes that would characterize the upcoming stages of SSCM development.

2. 2000–2010: Regulatory Push & Stakeholder Pressure

The early years of the 21st century witnessed a radical shift in the development of SSCM, transitioning to a more formal policy of compliance efforts. This was a time when global regulatory systems emerged, accompanied by increased analysis from stakeholders, and sustainability reporting became more formal (Fritz, 2019). In the 1990s, when institutional leadership and ethical norms set the agenda, external influences crept in during the 2000s, and these were regulatory as well as normative, which forced companies to be more transparent and accountable to their SCA (Perez-Batres et al., 2012; Gallego-Alvarez et al., 2017).

One of the main events of this time was the opening of the UNGC in 2000. This voluntary initiative led to promoting change in many businesses worldwide, causing them to focus on their industries to comply with a set of ten universal standards in the fields of human rights, labor, environment, and anti-corruption. Even though the UNGC was not binding, it provided a platform with a global perspective on corporate accountability and sustainability indicators within the supply chain. The outside firms that became part of the group were to provide annual feedback on their improvement, which, in a roundabout way, institutionalized sustainability reporting and stakeholder relations (Serrat, 2020; Sisco et al., 2010). At the same time, the EU passed a REACH Regulation (Registration, Evaluation, Authorisation and Restriction of Chemicals) in 2006 that established a legally binding system in which companies have to reveal the chemical composition of their products and maintain safe handling throughout the supply chain. The implication of this regulation was beyond the reach of most manufacturers and suppliers, especially those in the chemical, electronic, and textile businesses. It caused companies to design their supply chains more thoroughly, to interact with upstream suppliers, and to invest in compliance mechanisms. The IT is especially applicable to the current context, as REACH itself is an instance of coercive institutional pressure: a legal regulatory framework to remake industries and influence how companies behave in general (Williams et al., 2009; Petry et al., 2005).

In ST terms, activism by NGOs, labor unions, and consumer citizens was also boosted in this decade. These stakeholders required multinational corporations to be more transparent, ethically sourced, and accountable. The advent of digital media increased the influence of such voices, enabling more people to expose unethical acts more easily and see the mobilization of the population. Firms could no longer afford to overlook the interests of the stakeholders without facing reputational losses (Fritz, 2019). Likewise, one of the most publicized cases of change due to stakeholders is the reform of Nike after the sweatshop scandals that hit the company in the late 90s. Following the criticism and boycott by consumers in 2005, Nike released its first Supplier Sustainability Report, which made it one of the first brands to reveal details of the locations and names of its suppliers. The company has implemented a detailed auditing system that it uses to follow up on labor and environmental compliance of its GSC. The current strategic change process demonstrates how the normative pressure (IT) and mimetic pressure (IT), along with stakeholder salience (ST), can be used to motivate firms to engage in more transparent and ethical supply chain behavior (NIKE, Inc., 2025; Doorey, 2011).

Another example is HP, which came up with an SCC and started to use environmental scorecards in order to check supplier performance. The strategy employed by HP was a cross between compliance and capacity building, wherein HP provides training and support to suppliers to achieve the sustainability standards. This represents the DCT because HP has been able to adjust its SCO to changes in stakeholder requirements as well as regulations (Kumar et al., 2013). It was also during this time that the scholarly strength that is SSCM was established. Seuring and Müller (2008) defined a holistic conceptual framework of SSCM in their influential paper, which is the result of a systematic literature review. They defined SSCM as: the management of material, information, and capital flows and coordination between companies in the supply chain and the integration of the objectives of the three-fold problems of sustainable development, i.e., economic, environmental, and social. They emphasized the necessity of upstream and downstream cooperation, stakeholders' involvement, and performance

evaluation, a concept that would take center stage in SSCM practice over the following years.

Another trend that gained popularity in this decade was the TBL framework, with businesses noting that they need to ensure that the economic performance of their enterprises is not prioritized at the expense of environmental stewardship and social responsibility. Nevertheless, the 2000s went against the 1990s, the era that was more aspirational and did not put much emphasis on metrics, auditing, and reporting standards. Sustainability is not only a branding tool, but now it is an aspect of business performance that could be measured and reported (Fritz, 2019). According to RBV, those that had already invested in internal sustainability capabilities (i.e., environmental management systems, ethical sourcing protocols, and stakeholder engagement mechanisms) were better able to respond to the new regulatory and normative environment. The capabilities acquired the status of strategic capabilities, enabling firms to achieve compliance with regulations, meet the demands of stakeholders, and differentiate themselves (Fritz, 2019). Likewise, the 1920s were not a period lacking adversity, despite these improvements. Compliance imposed a heavy burden on many companies in terms of both cost and complexity, especially in situations where multiple GSCs are involved. Smaller suppliers did not usually have the resources or expertise to comply with new norms, causing bottlenecks and hazards to lead firms. Moreover, there was often a question regarding the integrity of self-report data, resulting in the demand for unbiased verification and standardized systems of reporting (Fritz, 2019).

Methodologically, the results within this section are related to the secondary data analysis of sustainability reports published by corporations, regulatory reports, and scientific literature, as described in Chapter 3. The processes of triggering patterns regarding strategic responses, external drivers, and theoretical alignment were identified using thematic coding. The review provided a noticeable change in voluntary compliance-based SSCM and exerted pressure on corporations.

Overall, the 2000-2010 era can be summed up as a turning point in terms of SSCM, as regulatory bodies and stakeholders were on the verge of institutionalizing sustainability efforts throughout industries. The response by the companies was in the form of supplier audits, issuance of sustainability reports, and greater degrees of involvement with stakeholders. Whereas these responses were strategic, a mix of IT (coercive and normative pressures), ST (salience and legitimacy), DCT (adaptation and reconfiguration), and RBV (leveraging internal capabilities) defined them. The TBL guided these efforts as a framework for evaluation. This decade was the basis of upcoming, more technologically developed and cooperative strategies of SSCM, which would appear within subsequent years.

3. 2010–2015: Technology-Enabled Transparency

Between 2010 and 2015, a critical change occurred in SSCM due to the rapid advancement of digital technologies and the growing trend towards greater transparency in GSC. During this time, advancing technology led to real-time data integration, traceability, and carbon accounting, which have altogether changed the way companies practice sustainability. Compared to the past decade, in which compliance and stakeholder pressure used to prevail, the period involved in this phase consisted of strategic digital innovation and the absorption of sustainability into mainstream business strategies (Thöni & Tjoa, 2015). Among the most remarkable trends that were witnessed during this time was the growing emphasis on Scope 3 emissions, which are the indirect emissions that are brought about in the value chain of a specific company, both upstream and downstream. The Greenhouse Gas Protocol provided a standardized framework for measuring and controlling these emissions, and as a result, companies invested in acquiring digital tools capable of tracking the environmental impacts of their suppliers on various levels. This change needed not just the technological infrastructure but also a cultural change in the way companies and their suppliers interacted (WRI & Safaei, 2024).

Likewise, one of the all-time success stories in this transformation relates to the Sustainability Index initiated by Walmart in 2010. The index, which was developed with the help of The Sustainability Consortium, assessed the suppliers on their levels of environmental and social performance using a standardized questionnaire and scoring system. The program spread to more than 100 product categories and thousands of suppliers, thus becoming one of the most far-reaching sustainability assessment tools in the retail sector. This strategy of Walmart is in line with RBV because the firm utilizes its scale, data, and relationships with suppliers to create competitive advantages that would boost sustainability performance (Walmart, 2025; Negi, 2014). Also, the collaboration between Unilever and the Rainforest Alliance is another good example, as it started implementing blockchain technology into its tea supply chains back in 2012. Use of blockchain permits end-to-end traceability such that consumers can see the origin and the sustainability credentials of what they are buying. Besides providing a high level of transparency, this innovation, among others, created faith among the stakeholders, who include environmentally friendly consumers. The strategy of Unilever in terms of ST perspective depicts how companies can react to the emergence of changing stakeholder expectations by embracing advancements in technology that enhance transparency and responsibility (Braga et al., 2010; Sarbazvatan, 2022).

Similarly, this period in history was intellectually based on that of Carter and Rogers (2015), who highlighted the importance of the strategic value of SSCM in the attainment of competitive advantage. They have stated in their article Towards a Theory of the Supply Chain that sustainability is not an appendage or a factor. However, rather, it is a component of supply chain strategy. They suggested that companies that implement environmental and social issues in their supply chains will be able to gain long-term strategic advantages, such as risk elimination, innovation, and brand differentiation. This is also in much agreement with the DCT that emphasizes sensing, grasping, and changing capabilities as a response to environmental changes. The strategies adopted at this time, based on the TBL point of view, illustrated a more level approach towards sustainability. It was no longer about companies being highly compliant or cost reduction; companies

were out there trying to find a way to produce shared value economically, environmentally, and socially. As an example, the use of digital traceability tools not only decreased the risk to the environment but also led to increased operational efficiency and a better brand reputation, creating value in all three TBL pillars (Kitsis & Chen, 2019). Also, at this moment, there was a shift in the place of IT. The coercive pressures had not been rendered obsolete, particularly in the regulated industries, but the state of mimetic pressures assumed a dominant path. This experience of the implementation of better sustainability technologies in the work of such leaders as Walmart and Unilever pushed competitors into adopting similar practices to maintain their positions and images. On top of these mimetic forces, industry standards, sustainability ratings, and investor rankings would be established, and would encourage these dynamics atop a self-reinforcing loop of innovation-adoption (Soares et al., 2020).

On the other hand, one of the most significant issues was the digital divide between the large multinational corporations and the SMEs. The majority of the SMEs lacked the technical knowledge and financial capability to subscribe to blockchain, AI, and IoT platforms, as the major companies had already reached a point where they could offer these services. This threatened isolationism and segregation in the GSC to scuttle the objective of holistic sustainability (Estrada et al., 2018). The other task was data reliability and standardization. There were various platforms, measures, and reporting systems applied, which made it difficult to maintain consistency and comparability across the supply chains. This gave rise to the demands of a greater harmonization of the sustainability frameworks and the establishment of interoperable digital systems (Garcia-Torres et al., 2019).

At the methodological level, the results presented in this section will rely on secondary data analysis of corporate sustainability reports, industry case studies, and academic literature, as explained in Chapter 3. Thematic coding was undertaken to identify recurring patterns about digital innovation, stakeholder engagement, and strategic

alignment. The actual analysis indicated that technology was not the tool of compliance, but a stratagem of SSCM transformation.

To conclude, the years between 2010 and 2015 are a technological inflection in the practice of SSCM. Firms started using digital tools to increase transparency, traceability, and stakeholder trust. A mixture of RBV (internal digital capabilities), DCT (adaptation and innovation), ST (demand for visibility), and IT (mimetic pressures) developed these strategies. The TBL was used as a summary to measure and report these strategies. It was a period that gave birth to the digital beginnings of even more complicated SSCM systems that appeared in the next decade, driven by AI.

4. 2015–2020: Circular Economy & Collaborative Models

It was one of the key changes in SSCM, which was witnessed in the period between 2015 and 2020, when companies began to emerge out of non-regenerative, extractive forms of organization and into more regenerative, collaborative forms. This was due to the growing fears of climate change, shortages of resources, and the desires of consumers for ecologically mediated and humane products. The concern towards the concept of the CE, which is striving to eliminate waste and keep materials in play, has turned into one of the key levels of the CSS. It was in this era that a collaborative model emerged where companies interacted with their suppliers, NGOs, and even with their rivals to co-create sustainable value (Gardetti, 2018; Circular Economy Introduction, 2025). Ellen MacArthur's Foundation played a significant role in this period in popularizing the CE model framework. A report, A New Textiles Economy, released in 2017, demonstrated how fast fashion causes these kinds of pressures on the environment, and how reusing, recycling, and regenerative materials of products could be some of the potential circular solutions. The implication of the foundation in the industries influenced the companies to rethink the product design, the supply chain flow, and the strategies to be adopted at the end of its life (Kouhihabibi, 2022).

Likewise, IKEA proved to be among the most well-known examples of circular innovation in the corporate sphere. In 2018, IKEA introduced a pilot furniture program in some of its markets, enabling customers to rent out furniture rather than buy. This was part of the company's goal of becoming a fully circular business by 2030. In 2020, IKEA had already resold, refurbished, and recycled more than 47 million items. The company has also redesigned most of its products to make them modular and easy to disassemble, enabling repair and reuse. Such undertakings indicated the presence of the TBL framework since IKEA attempted to find a compromise between the ecological advantage (reduction of wastes), social, and economic prosperity (new designs of revenue implementation, affordable furniture) (IKEA Global, 2025; Kral, 2023). The company proved to be able to feel the changes in the environment and the market and use them to its advantage to innovate and convert its supply chain to facilitate circularity. It needed to restructure the logistics systems, retrain the workforce, and involve the suppliers differently. It is also an example of the RBV, since IKEA used its capabilities, e.g., design skills, the worldwide logistics network, and the well-recognized brand, to establish circular activities that their rivals could not imitate (IKEA Global, 2025; Kral, 2023). Similarly, the following major case was Dell Technologies, which increased its closed-loop recycling program at the time. Dell was the first Information Technology company to incorporate closed-loop recycled plastics, which received the UL certification in its products. By 2020, the company will have introduced the materials in more than 45 product lines, comprising monitors and laptops. The circular concept of Dell presupposed recycling of utilized electronics, recovery of valuable resources, and the introduction of them into the manufacturing of new ones. The closed-loop mechanism not only minimizes the effect on the environment but also decreases the costs of materials and improves the brand reputation. Both RBV and DCT characterize Dell's strategy, but the company used its internal innovation and modified its supply chain based on sustainability objectives (Atkinson, 2025; Dell USA, 2025).

The ST ensured its applicability, too, at this time. NGOs, consumers, and investors began demanding that companies be held accountable for their environmental and social

impacts. Firms reacted to this by inviting the stakeholders to co-create. As an example, Dell worked together with NGOs and recycling partners in order to enhance the collection and processing of e-waste. IKEA collaborated with suppliers to redesign products as circular, along with customers, to encourage take-back programs. These partnership opportunities increased trust, economic reputation risk, business practice, and stakeholder values (Dell USA, 2025; IKEA Global, 2025). The IT offers us more information about the catalysts of change at this time. Although the regulatory pressure was not yet as intense as it would be in the 2020s, normative and mimetic pressure had a significant impact. Companies such as IKEA and Dell have become the leaders in sustainability practices and influence their competitors to follow the trend to remain legitimate. Companies ranked, certified, and voluntary efforts (e.g., Fashion Pact) provided a level of soft regulations that altered corporate actions (Dell USA, 2025; IKEA Global, 2025).

In the same way, the Fashion Pact created during the G7 summit in 2019 is an example of the teamwork of the time. It allowed more than 60 international fashion companies, among them H&M, Adidas, and Chanel, to pledge towards common environmental targets, namely, to cut greenhouse gas emissions and safeguard biodiversity, and stop the use of single-use plastics. The pact was voluntary, but this was an indication of shared responsibility and an industrial change. It also illustrated the conjunction between ST and IT, since its stakeholder expectations and institutional norms collided to impose systemic change (Pérez-Bou & Cantista, 2022). Although such developments took place, the process of converting into circular and collaborative models did not go unassisted. The investment in circularity was significant, with the redesign of products, reverse logistics, and the training of suppliers. The fear of inclusivity and scalability was partly because numerous SMEs lacked the resources and expertise to participate fully. Further, quantifying circularity and its influence on sustainability performance was still complicated because the measurement did not use a standard set of metrics, and data gaps were present (Rizos et al., 2016; Dey et al., 2022). The other issue was the requirement of cultural fare in organizations. Changing the linear state of thinking to a

circular one was accomplished by busting silos and encouraging cross-functional teamwork, and reinventing what it meant to be successful. Companies were forced to move towards maximizing short-term sales, towards optimizing long-term value creation, which came in the form of trade-offs and experimentation (Rizos et al., 2016; Dey et al., 2022).

Methodologically, all the results in this section are drawn from secondary data analysis of the corporate sustainability reports, publications in the industry, and scholarly articles. Recurrent themes presented in thematic coding included circular design, cooperation with stakeholders, and flexibility. These trends were later applied to the conceptual framework built in Chapter 2, establishing the applicability of TBL, RBV, DCT, ST, and IT in defining how a company can respond to the challenge of sustainability.

Altogether, the upcoming 2015-2020 is a revolutionary era in SSCM when the principles of CE and collaborative models will be adopted. Other examples of companies, such as IKEA and Dell, also managed to innovate by redesigning products, relying on logistics, and involving stakeholders to interact differently. The internal capabilities (RBV), adaptive innovation (DCT), stakeholder engagement (ST), and institutional norms (IT) came together. They were driven through the TBL based on internal capabilities (RBV), adaptive innovation (DCT), stakeholder engagement (ST), and institutional norms (IT). Although this period still had numerous obstacles, it set the stage for the digital and policy-based evolution of SSCM that was to help determine its future.

5. 2020–2025: AI-Driven Optimization & ESG Mandates

The period from 2020 to 2025 can be considered a turning point in SSCM development as it will see multiple advances that include digitalization, AI, and ESG requirements overlap. It is during this period that the concept of sustainability became a business board-level priority, driven by data, and firms are entrenching SSCM in the digitalization of the enterprise. The COVID-19 pandemic increased the demand for more resilient,

visible, and adaptive supply chains, further confirming the value of digital tools and ESG frameworks (Noble, 2025; Domingo, 2025). The introduction of AI and ML in SCO is among the most life-changing trends in the industry during this period. AI allowed companies to streamline their operational logistics, predict demands, monitor emissions, and determine the risk of suppliers in real time. These were consistent with the DCT, where a company should be sensitive enough to realize opportunities and transform itself in response to environmental changes. AI-enabled companies are poised to experience the impact of disruptions, as well as opportunities to achieve efficiency and transform conventional supply chain models into innovative and dynamic systems (Noble, 2025; Domingo, 2025).

Likewise, one of these leaders is Maersk, the world leader in shipping and logistics. In 2023, Maersk was using AI-enabled systems to streamline shipping routes and reduce fuel consumption to make deliveries more efficient. These systems relied upon real-time information of weather, port congestion, and vessel performance and altered routes dynamically, leading to a 12 percent decrease in emissions. This plan is representative of both DCT and the RBV, as Maersk has used its digital plumbing and analytics to achieve a competitive advantage to achieve sustainable objectives (Majeed, 2025). Also, Apple has made a daring pledge to incorporate 100-percent recycled cobalt in all Apple-designed batteries by 2025, as part of its wider target to make all its products carbon neutral by 2030. The action was seen to handle issues of environmental responsibility as well as human rights issues in the process of obtaining minerals, such that they were consistent with the TBL and ST. IT is also evident in the strategy of Apple since it reacted (responded) to coercive powers of regulators, normative expectancies of consumers, and also mimetic pressures of market rivals (Rema, 2024; Wilson & Post, 2011).

Besides this, the regulatory environment at the time also changed tremendously. In 2021, the EU adopted the CSRD, which required large corporations doing business in the EU to provide a set of detailed ESG disclosures. Such disclosures were Scope 3 emissions, human rights due diligence, and climate risk assessments. The CSRD also signaled the

transition to mandatory reporting rather than voluntary accountability, and further confirmed the role of IT in determining the behaviour of corporations. Organizations were now under the law to implement sustainability in their governance, risk management, and supply chain processes (Hummel & Jobst, 2024). To an ST, ESG integration was a broader change in corporate responsibility. The civil society organizations, employees, consumers, and investors clamored against a lack of transparency, ethical practices, and initiatives on climate. In response, companies integrated the ESG indicators into procurement policies, supplier audits, and executive performance. As an example, companies such as Microsoft and Unilever started to tie executive bonuses to their ESG performance, indicating a profound institutionalization of sustainability (Greggwirth, 2024). The TBL model served as the main context for measuring SSCM strategies. AI and ESG technologies helped companies navigate among environmental, social, and economic objectives simultaneously (e.g., matching emissions reduction, labor rights, cost savings, and risk reduction). An example would be that predictive analytics enabled companies to minimize inventory wastage, whereas traceability systems based on blockchain guaranteed ethical processes in the sourcing of raw materials (Rane et al., 2024).

However, with the arrival of digitalization of SSCM, other problems also emerged, such as the protection and security of data on the internet, and through the buying and selling of supply chain data, companies would be at risk of data leakage and non-compliance. The governance of safe and moral use of information made control one of the up-to-date credos of SSCM (Kumar, 2019). The second was the cyberspace distance between giant corporations and SME. Although large businesses in the form of multinational enterprises might adopt the AI and ESG platforms, most of the SMEs were unable to explore how they could exploit the same because of the lack of viable technical expertise and financial capabilities. This threatened the fragmentation and exclusion in supply chains at the international level, and this was a blow to the attainment of comprehensive sustainability. There was a need to fill this gap through capacity-building projects, inclusive procurement interventions, and public-private projects (Ferraro et al., 2025).

Another significant threat proved to be greenwashing. Once the discussion of ESG was placed in the mainstream and companies could achieve reputation gains, they overshot the mark, at least partially overstating their sustainability performance. This eliminated the trust of the stakeholders and revealed the necessity of the activities being harmonized, checked by a third party, and monitored. Examples of organizations helping to promote transparency and accountability included the SASB and the GRI (Esposito & Niemotko, 2024; University of Wollongong, 2025).

In methodological terms, the results presented in this part were carried out through secondary data analysis of corporate sustainability reports, regulations, and scholarly material. Thematic coding demonstrated that several trends associated with digital innovation, ESG integration, and stakeholder engagement occurred fundamentally. These trends were projected to the conceptual system of Chapter 2, in which the relevance of TBL, RBV, DCT, ST, and IT to explain the strategic response to sustainability difficulties was ascertained.

To conclude, the 2020-2025 timeframe is a digital inflection point in SSCM. Business entities started using AI and ESG systems to streamline operations, become more open, and satisfy stakeholder aspirations. The influence of a blend of the internal capabilities (RBV), adaptive innovation (DCT), stakeholder engagement (ST), and institutional pressures (IT) factors that were considered within the concept of the TBL shaped these strategies. Such challenges as data governance, digital inequality, and greenwashing remained persistent, but this period provided an opportunity for systemic change in SSCM in the future years.

6. Future Outlook (2025+): Systemic Transformation

Considering the changes even after 2025, we can expect SSCM to be transformed into a system, and its system integration will result in a sustainable globalization governance model. The changing world is merely the result of convergent forces: global policy

systems, net-zero pledges, ethical incorporation of technology, and a unified supply chain. Besides corporate innovation, SSCM will also be influenced by the law and stakeholder activism, as well as geopolitical factors (Gupte et al., 2025). One of the biggest drivers of this change is the envisaged UN Global Plastics Treaty, which is about to be completed in 2025. The objective of this treaty is to institute measures to control the production, use, and plastic waste throughout the whole life cycle and institute compulsory responsibilities on governments and companies globally. It is a manifestation of higher coercive institutional pressure, enhancing the role of IT in the formation of SSCM. To be compatible with the provisions of the treaty, the companies will need to adjust the packaging, invest in new materials, and switch to circular systems. This international accord will influence how suppliers make their supply chains sustainable (i.e., make sustainability lawful), so that the issue of how suppliers consider the environment will be a matter of law as opposed to a whim (BSR, 2025; De Sousa, 2024).

Similarly, the German Supply Chain Due Diligence Act (Lieferkettengesetz) is a pioneer in changes in corporate responsibility. The law, which will take effect in 2023 and increase in scope in 2025, will ask companies to identify and prevent human rights and environmental risks throughout their value chains, and to mitigate those risks. Companies are required to do due diligence on their suppliers, develop complaint systems, and publish their results. This act is representative of IT, as it introduces legal requirements that reformulate corporate conduct. It is also an element of ST because it reacts to demands within the civil society to act ethically in sourcing and be transparent (Linn & Olsson, 2025; Samal & Jena, 2024). Corporate innovators are already adjusting to this novel environment. An example is that Apple is set to achieve its goal of utilizing 100 percent recycled cobalt in batteries and recycled rare earths in magnets in 2025. This action plan represents a TBL concept that is environmentally focused (resource circularity), socially oriented (ethical sourcing), and environmentally oriented (supply security). It also shows RBV in the case of Apple, as Apple uses its internal resources

(traceability of supply chain, innovation in materials, and brand power) in achieving high sustainability goals (Cullen & De Angelis, 2020).

Also, social sustainability in the future will occur alongside ethical AI. With AI increasingly becoming the key part of decision-making regarding the supply chain, such as the optimization of logistics processes and predicting potential threats, firms will have to ensure that algorithms are transparent, equitable, and aimed at achieving sustainability aims. This brings new horizons to DCT, featuring ethical governance and stakeholder trust. To be responsible in the use of technologies, companies will be required to invest in the systems of AI ethics, bias mitigation, and stakeholder engagement to ensure the responsible use of technology (Attard-Frost & Widder, 2025; Naidu et al., 2024). Another fledgling priority is geopolitical resilience. The last few years have seen the impacts of disruptions such as the COVID-19 pandemic and the war in Ukraine, which have highlighted the vulnerability of GSC. The key strategies of SSCM in the future will be localization, redundancy, and scenario planning to mitigate geopolitical challenges. The companies will also utilize digital twins, simulation models, and decentralized networks to develop dynamic, resilient supply chains. These capacities are attributed to RBV and DCT because businesses develop knowledge-oriented and flexible frameworks that can react to shocks and uncertainties (I et al., 2025; Srivastava et al., 2022). Another characteristic of systematic SSCM will be inclusivity. The new policies should be able to support SMEs, Aboriginal people, and other disadvantaged labourers by enhancing their financial and technological capabilities and providing them with fair contracts. This is a representation of the ST principle of fair interaction and the TBL objective of social sustainability. The inclusive SSCM will need capacity-building plans, inclusive procurement procedures, and common platforms that help diverse actors be a part of sustainable value generation (Nazarian & Khan, 2024).

Methodologically, the future of SSCM is going to be based on data Integration, interoperability, and standardization. Firms will have to ensure that they can standardize ESG performance across countries, integrate blockchain for traceability, and leverage AI

for predictive analysis. Regulatory bodies and industry coalitions will be important actors in the process of developing general standards and methods of verification. This will increase transparency, lessen the cost of complying, and earn the stakeholders ' trust. In addition, research conducted in academic circles will also take a new shape regarding emerging challenges and opportunities. The primary topics of study are going to be ethical AI in procurement, geopolitical risk modeling, inclusive innovation, and policy harmonization. Researchers shall establish how SSCM can be used to achieve sustainability objectives around the world, including the UN SDGs, and how companies can manage shades of grey between efficiency, equity, and resilience (Nazarian & Khan, 2024).

To conclude, the post-2025 period is a systemic change in SSCM. Businesses will no longer stay in the remote sustainability corners, but instead adopt integrated models, aligned to national policy lines, and guided by stakeholders. During this evolution, such theories as IT, DCT, RBV, ST, and TBL will continue to be central in terms of understanding and directing this evolution. SSCM, as a new direction in business and society, will be the key to corporate strategy development and global governance, as well as sustainable development.

4.2 Synthesis: Strategic Patterns and Conceptual Integration

This part compiles the findings chronologically and directly corresponds them with the conceptual framework pioneered in Chapter 2. The framework suggested that the dynamic interaction of the internal capability, external pressures, expectations of different stakeholders, and institutional pressures affects the strategy business response towards SSCM, based on the assessment through the TBL.

1. **Strategic Patterns**

Strategic Pattern	**Summary**	**Theoretical Framework/ Theories**
Voluntary to Institutionalized SSCM	SSCM originated in internal drives and moral principles. Sustainability was gradually institutionalized as more regulatory and societal pressure built up regulatory expectations and norms into formal practice and standards. RBV, ST, and IT have their impact on the shift.	RBV, ST, IT
A Compliance with Competitive Advantage	A compliance tool in the early days, SSCM evolved into a business tool. The companies started employing sustainability as a means of innovation, differentiation, and competitive advantage, which is consistent with RBV and DCT, as there is ample use of the strengths and overall dynamic capabilities that firms have.	RBV, DCT
Digitalization and the Power of Data-Driven Decision	SSCM was changed with the assistance of AI, blockchain, and carbon tools. These technologies made it possible to run in real-time, take away the blinders, and deliver foresight, enabling firms to be more agile with their strategic decision-making. This is a sign of the orientation of RBV and DCT in terms of the development of capabilities.	RBV, DCT
Stakeholder-Centric Collaboration	Companies are starting to involve stakeholders—suppliers, NGOs, and consumers—to co-create sustainable value. This team effort improved legitimacy,	ST, TBL

	innovation, and common purpose by ST and TBL.	
Circular and Net-Zero Models	The SSCM strategies were entered into circularity and net-zero ambitions. Systemic change, as fueled by the TBL sustainability lens, pressures because of IT, and the adaptive capabilities of DCT organizations, redesigns the chain of supply to conserve waste and reduce emissions.	TBL, IT, DCT

Table 2. Strategic and Historical Patterns of SSCM with Theories

2. Conceptual Framework Alignment

Theoretical Lens/ Theories	**Role in SSCM Evolution**	**Examples from Findings**
Triple Bottom Line (TBL)	Deterministic models of economic, environmental, and social balancing.	Patagonia's first CSR initiatives, IKEA's circular business model, and Maersk's AI-driven decarbonization.
Resource-Based View (RBV)	Internal capabilities (e.g., leadership, digital tools) as enablers of SSCM.	Walmart's digital index, Apple's ethical sourcing roadmap.
Dynamic Capabilities Theory (DCT)	The flexibility of firms to change, to innovate, and to re-arrange resources.	Dell's CLT; Tesla's blockchain.
Stakeholder Theory (ST)	The effect of customers, NGOs, investors, and suppliers on SSCM strategy.	Nike's response to labor activism is ESG-driven investor activism.
Institutional Theory (IT)	The sources of regulatory, normative, and mimetic	EU CSRD, UN Global Compact and GSCA.

	pressure influencing SSCM adoption.	

Table 3. Conceptual Framework Alignment of Findings with Theories

3. Link to Research Objectives and Questions

Research Objectives/ Questions	**Findings/Summary**
Identifying historical strategic responses to SSCM	The progression of strategies went forward toward AI-based integration of ESG.
Analyzing internal and external drivers	Internal: leadership, the innovation (RBV); External: regulation, environmental pressure by stakeholders (IT, ST).
Exploring challenges and opportunities	Challenges: Cost, Complexity, and Supplier Alignment. Opportunities: Innovation, Transparency, Resilience.
Recommending improvements	Bring focus on digital inclusion, policy alignment, and the ethical code of AI in SSCM.

Table 4. Link of Research Objectives and Questions with Findings

4. Summary of Evolutionary Phase

Period	**Theme**	**Strategic Focus**
1990s	Voluntary Initiatives	CSR, environmental audits
2000–2010	Compliance & Pressure	Supplier codes, transparency
2010–2015	Digital Traceability	Blockchain, carbon accounting
2015–2020	Circular Economy	Waste-to-value, collaboration
2020–2025	ESG & AI Integration	Predictive analytics, ESG mandates
2025+	Systemic Transformation	Net-zero, policy convergence

Table 5. Summary of Evolutionary Phase with Theme and Strategic Focus

5 Discussion

5.1 Conclusion

This thesis has explained the business strategy of the transforming environment of SSCM and has presented the dynamic transformation of the voluntary, ethics-based business to a structured, digitally supported, and regulated business. These findings indicate that SSCM is a core strategic action, which connects the environmental, social, and financial agendas, as compared to the TBL approach (Elkington, 1997; Carter & Rogers, 2008).

The research shows that numerous companies also utilize SSCM as one of the ways of acquiring a competitive advantage, along with meeting regulatory compliance, resilience, and the ability to please stakeholders. When combined with other theories like RBV, TBL, DCT, ST, and IT, the framework offers a strong basis of analysis to determine the influence of internal capabilities, external pressures, and institutional norms on SSCM strategies. As an example, the circular economy model of IKEA and the ethical sourcing of recycled cobalt in Apple demonstrate the capacity of companies to use their internal innovation and alignment of stakeholders to achieve sustainable growth and ensure a high level of profitability (IKEA Global, 2025; Rema, 2024). This thesis also discussed the impact of digital transformation on SSCM. Real-time tracking, forecasting, and traceability have also been achieved through real-time monitoring, predictive analytics, and traceability technologies like AI, blockchain, and digital twins that help firms to achieve optimal logistics, optimize emissions, and verify the ethical sourcing of their products (Dubey et al., 2020; Zhen & Yao, 2024). The example of Maersk route optimization achieved by AI, as well as the Walmart sustainability index companies developed to work with the suppliers, proves that digital tools are shifting the approaches to SCM (Majeed, 2025; Walmart, 2025). Nevertheless, the transition towards SSCM has also faced many challenges and difficulties. Challenges and difficulties related to financial inability, complicated work with regulations, technology gaps, and opposition to changes, especially among SMEs and suppliers in emerging economies (Karumanchi et al., 2022; Kareem et al., 2024). However, the future of SSCM shows a change in the system. The

GSC in the future is likely to be regulated by global harmonized rules and regulations, comprehensive innovation ecosystems, and ethical government in AI.

Lastly, SSCM is becoming a strategic, data-driven, and stakeholder-constructed paradigm. This thesis has added value to both academic discourse and managerial practice, as it can provide a rather detailed model of thinking about the strategic dynamics of SSCM, as well as index viable pathways toward sustainable change. Companies that take the initiative to adjust their supply chains to the imperatives of sustainability will not only be able to avoid the risks, but they will also be able to realize the long-term value and resilience in a global environment that is becoming highly complicated.

5.2 Theoretical implications

This thesis also contributed through the theoretical interpretation of SSCM, which includes TBL, RBV, DCT, ST, and IT to reveal the strategic responses of businesses and sustainability issues. The focus of each of the theories is distinct and provides a broader platform to analyze how the current practices of SSCM are developing.

Elkington (1997) continues to offer the evaluation of SSCM as the TBL framework and focuses on the balancing of the aspects of economic viability, environmental stewardship, and social responsibility. This analysis further supports the applicability of TBL as the examples are provided around the firms, such as IKEA and Apple, and how their SCCs are aligned with all three pillars using circular design, ethical sourcing, and objectives of carbon neutrality (IKEA Global, 2025; Rema, 2024). The TBL is therefore not just a reporting tool but also a strategic direction, leading to the creation of long-term value. The theory of RBV (Barney, 1991) is demonstrated by concretely presented cases when companies use distinctive internal capabilities in the form of digital infrastructure, innovation culture, and sustainability expertise, and develop a competitive edge with them. The SSI of Walmart and AI-based logistics optimization of Maersk are great examples of how internal resources can be activated to address the external demands of sustainability (Walmart, 2025; Majeed, 2025). This affirms the view that SSCM is even

more than a reactive concept, but can become a source of differentiation and strategic strength. DCT brings a dynamic aspect since it describes how organizations are flexible, rearrange, and innovate in response to changing environmental and regulatory settings. The implementation of AI, blockchain, and digital twins in SSCM enables firms to develop sensing, seizing, and transforming capabilities that would enable them to take on a resilient and prospective stance (Teece et al., 1997; Zhen & Yao, 2024). ST (Freeman, 1984) would be especially effective in resolving how companies react to an increasing upward pressure on the part of consumers, NGOs, investors, and regulators. As it is represented in the thesis, stakeholder salience, characterized by power, legitimacy, and urgency, causes firms to embrace the use of transparent, moral, and inclusive supply chain practices. Reactions to labor activism, as Nike and the traceability system at Unilever made possible by blockchain, are incidents of stakeholder-based change (Doorey, 2011; Sarbazvatan, 2022). DiMaggio and Powell (1983) allude to an intellectual structure that explains the industry value convergence in terms of practices of the SSCM. Corporate sustainability strategies are animated by coercive pressures (e.g., EU CSRD), normative expectations (e.g., ESG ratings), and mimetic behaviors (e.g., industry benchmarking). The thesis supports the notion that institutional environments are not passive or unresponsive backgrounds because they impact strategic decision-making.

Overall, this study contributes to the SSCM theory by illustrating the combination of these five frameworks to define the causes and strategy levels of the firms. It advises any future research that would investigate the hybrid generalizations of models of these theories and study their application in various fields, territories, and scales of organizations.

5.3 Managerial implications

The evidence presented in this thesis will be helpful to managers who intend to incorporate sustainability in their supply chain practices. As SSCM shifts to a more strategic imperative rather than a compliance-based initiative, managers need to shift toward a proactive systems-based approach to sustainable development, creating a

sustainable orientation that parallels the drivers of business, operational efficiency, and the expectation of stakeholders.

Firstly, managers have to understand that sustainability is no longer an option; it is an element of competition. IKEA, Maersk, and other corporations have demonstrated through their practices that the symbiosis of the principles of CE and logistics using AI can contribute to environmental protection and promote the quality of work and brand image (IKEA Global, 2025; Majeed, 2025). Managers need to invest in technologies in the form of digital twins, blockchain, and predictive analytics, which should enhance supply chain visibility, traceability, and responsiveness of the channels, enabling real-time decision-making and risk mitigation. Secondly, managers also require leadership commitment and cross-functional cooperation. The role of SSCM requires developing a culture of sustainability throughout departments such as procurement and logistics, marketing, and finance. Take the case of Unilever, which has incorporated sustainability measures into the executive pay practices, to show how sustainability-linked incentives can inspire performance (Greggwirth, 2024). In the organization, managers must incorporate sustainability KPIs into performance assessments and strategic planning. Thirdly, managers should prioritize stakeholder involvement. Managers ought to engage suppliers, customers, NGOs, and investors in the co-creation of sustainable solutions. Collaborative suppliers' programs, e.g., the Aligned Business Framework of Ford, give evidence that supplier collaboration and trustworthy communication might help to improve the performance of suppliers and minimise Scope 3 emissions (Dewa, 2023). Managers are also supposed to ensure that they promote capacity-building in their SMEs and suppliers within the emerging markets to make the supply chain inclusive and resilient. Fourthly, regulatory awareness is vital. Due to the emergence of obligatory ESG reporting, managers have to implement effective governance systems and reporting processes. These are carried out by engaging in supply chain due diligence, installing grievance mechanisms, and maintaining auditable records of environmental and social performance. Non-compliance may lead to condemnation of reputation, sanctions, and investor loss. Lastly, managers have to be cautious against greenwashing. Sustainability

can become a branding tool, and one of the possible risks is the exaggeration of the results with no meaningful action. Managers must seek third-party approvals, use standard organization systems of reporting (e.g., GRI, SASB), and also be transparent in their sustainability reports to enable credibility.

In summary, SSCM presents strategic opportunities and operational challenges. Those managers who adopt innovation, promote collaborations, and use sustainability in implementing business strategy have better chances of maneuvering regulatory complexity, addressing stakeholder demands, and developing resilient, future-ready supply chains.

5.4 Suggestions for future research

This thesis has led to a very concrete basis for understanding the strategic business responses to SSCM, but there are a few areas that still have scope for exploration. In future research, a greater geographical and sectoral scope is needed by studying SSCM in sectors such as agriculture, healthcare, and construction, which have different sustainability issues. Also, the developments regarding the adoption of SSCM at the regional level, particularly in the emerging economies, are necessary to get a clear picture of the role of cultural, regulatory, and economic environments. The role of SMEs is a more important area since they are not often represented in the SSCM literature. Researching the way SMEs operate to find alternative ways of navigating sustainability might help discover new solutions in terms of innovative, frugal, and community-based supply chain models. Likewise, there is more to find out concerning technology adoption. With the digital revolution intensifying, future research may be used to validate the implications of AI, blockchain, and IoT on SSCM in the long term, mainly focusing on ethical administration, privacy, and expandability. Furthermore, due to the increased prominence of ESG requirements, studies ought to identify the efficacy of the existing reporting models and develop strategies to identify and avert greenwashing. The aspects of stakeholder trust in the credibility of ESG and its impact on the corporate image and investment strategy are also relevant to be discussed. Lastly, another prospective area is

the circular economy; however, it does not have standardized measures for measuring the impact of sustainability. The future work should be devoted to the establishment of frameworks that allow assessing circularity, resource efficiency, and lifecycle emissions, especially in multi-level supply chains.

5.5 Limitations

Although this thesis provides a comprehensive analysis of strategic business responses towards SSCM, several limitations should be noted to explain the findings and inform future research.

Firstly, the research requires the extensive use of secondary data sources: the reports on sustainability, ESG reports, and scholarly articles. These sources can provide helpful information, but there is a lack of empirical validation due to the absence of primary data, e.g., interviews or surveys. Secondly, the level of the sector in the study is confined to manufacturing, retailing, and technology. Other industries, including agriculture and healthcare, as well as logistics, that also have distinctive sustainability issues, were not analyzed. This restricts the applicability of the results to the whole of the industry. Thirdly, the geographic scope favors the structured areas and large MNCs, and may fail on the unique needs of SMEs and companies that are operating within the emerging markets, owing to imperfect regulatory environments, resource limitations, and cultural distinctions. Fourthly, although there is a benefit of using five theoretical frameworks, including TBL, RBV, DCT, ST, and IT, to build a comprehensive analytical framework, it is important to bring in complexity. The interrelation of their concepts can cause a lack of interpretive clarity, especially when trying to differentiate between stakeholder-driven change and institutional pressure. Finally, the research covers SSCM growth till 2025, yet sustainability is a fast-changing industry. The outcomes and priorities of SSCM may soon be changed by the new trends in ethical AI, geopolitical shocks, and the rise of new global treaties, and some findings might be time-bound and lose their relevance. These restrictions demonstrate that the interpretation should be cautious, and further, context-sensitive research is important.

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