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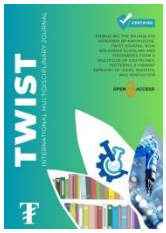

Sustainable Supply Chain Management: Theory and Practice

Combining Communication and Efficiency for Long-Term Success

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Abstract
This study aims to present a sustainable supply chain management with insight from both theory and practice by combining communication and efficiency for long-term success. The study presents a comprehensive, systematic review of the literature on Sustainable Supply Chain Management (SSCM) as published in leading logistics and supply chain management journals over the past two decades. A systematic literature review approach was employed to minimize researcher bias and ensure the reliability and replicability of findings. The study further enhances its empirical robustness through strong inter-coder reliability across thematic coding categories. The evolution of SSCM research has progressed from isolated studies focusing on social or environmental dimensions, to a corporate social responsibility framework, and more recently toward an integrated sustainability approach based on the triple bottom line. SSCM is emerging as a distinct theoretical construct, with the research field becoming more conceptually grounded and methodologically robust. Nonetheless, there remain significant opportunities to deepen theoretical development, refine methodologies, and enhance managerial relevance. By identifying key trends and research gaps, this review contributes a well-structured roadmap for future research directions in SSCM. Contemporary SSCM insights offer valuable guidance for practitioners, helping them allocate limited resources toward initiatives that simultaneously address environmental, social, and economic objectives. This paper offers a rigorous, methodologically sound review that traces the development and maturation of empirical SSCM research over a 20-year span, offering critical insights for both academia and practice.

Keywords
sustainable supply chain management, sustainable development goals, economic sustainability, social responsibility, environmental management

INTRODUCTION

Sustainability has emerged as a central theme in modern business and society at large. It's now common to encounter news stories or magazine covers highlighting topics such as renewable energy, climate change, or striking imagery like a polar bear stranded on melting ice. This heightened attention is driven by several factors such as shifting patterns in energy supply and demand, a deeper scientific awareness of climate change, and growing public scrutiny of how organizations impact both the environment and society. Stakeholders are placing growing pressure on organizations to take responsibility for and effectively manage the environmental and social impacts of their operations. Supply chain managers hold a strategic role in influencing these outcomes either beneficially or detrimentally through key decisions such as selecting and developing suppliers, choosing transportation modes and carriers, planning vehicle routes, determining facility locations, and making packaging choices.

The modern supply chain is now closely linked with ecological responsibility and sustainable development. This connection arises from the growing demands of today's world, where sustainable supply chain management is driven by the need to use resources efficiently while minimizing environmental impact. Embracing sustainability in supply chains

not only enhances a company's public image but also leads to reduced waste, fosters innovation, boosts profitability, and strengthens competitive advantage. Supporting this perspective is suggesting that integrating sustainable practices into logistics processes can benefit both the environment and a company's financial performance. Similarly, García-Arca et al. (2017), emphasize that the globalization of operations and rising raw material costs make the adoption of sustainable solutions in supply chains imperative. They note that this necessity is recognized not just by businesses themselves, but also by external stakeholders across the entire supply chain.

Sustainable Supply Chain Management (SSCM) has emerged as a critical area of interest in both academic research and business practice, driven by the growing recognition of environmental degradation, social inequality, and economic volatility across global markets. In an era characterized by climate change, resource scarcity, and rising stakeholder awareness, organizations are under increasing pressure to ensure that their supply chain operations are not only economically viable but also environmentally sound and socially responsible (Hussain & Malik, 2020). The concept of sustainability in the supply chain context extends beyond simple environmental compliance; it encapsulates the integration of the three pillars of sustainability economic, environmental, and social into supply chain processes and decision-making (Sajjad et al., 2020). As such, SSCM involves aligning operational efficiency with ethical responsibility to ensure long-term value creation for all stakeholders, including suppliers, customers, regulators, and communities (Moktadir et al., 2021).

Effective communication and operational efficiency have proven to be key enablers in achieving sustainable outcomes. Communication facilitates transparency, trust, and stakeholder engagement elements that are vital for identifying sustainability risks, managing supplier relationships, and promoting collaborative innovations (Mardani et al., 2020). Efficient processes, on the other hand, reduce waste, optimize resource utilization, and lower costs, thereby supporting both environmental goals and business performance (Bui et al., 2021). The synergy between communication and efficiency is therefore essential for developing supply chains that are not only resilient but also adaptive to the dynamic demands of sustainability.

The increasing deployment of digital technologies such as big data analytics, the Internet of Things (IoT), and blockchain has also contributed to the advancement of SSCM by enhancing real-time visibility, traceability, and predictive capabilities within supply chains (Romagnoli et al., 2023). These technologies not only streamline supply chain functions but also enable companies to monitor and report on sustainability metrics more accurately, aligning with global sustainability frameworks such as the United Nations Sustainable Development Goals (SDGs) (Srivastava et al., 2022).

In the evolving global economy, sustainability is no longer a peripheral concern but a central issue in supply chain management. Organizations are increasingly expected to align their operations with sustainable development principles reducing environmental harm, promoting social equity, and maintaining economic viability. However, despite the proliferation of research and corporate declarations around Sustainable Supply Chain Management (SSCM), there remains a significant gap between theoretical propositions and real-world implementation (Zimon et al., 2020). Many companies continue to struggle with integrating sustainability objectives into their operational frameworks in a manner that balances communication, efficiency, and long-term competitiveness.

One major challenge is the lack of cohesive models that simultaneously emphasize effective communication and operational efficiency in driving sustainability. Communication both internal and external is essential for transparency, stakeholder engagement, and regulatory compliance (Villena & Gioia, 2020). Yet, organizations often face information silos, limited supplier collaboration, and inadequate reporting systems, which hinder the flow of relevant sustainability data across the supply chain. Simultaneously, efforts to boost supply chain efficiency through lean management, cost-cutting, and digital innovation can sometimes conflict with sustainability goals, particularly when efficiency is pursued at the expense of environmental or social performance (Alzoubi & Ahmed, 2020). Moreover, the integration of emerging digital technologies such as big data analytics, blockchain, and the Internet of Things (IoT) offers the promise of enhanced sustainability monitoring and decision-making. However, the adoption of these technologies is uneven and often hindered by financial constraints, skill shortages, cybersecurity risks, and unclear return on investment particularly in developing regions and small-to-medium-sized enterprises (Khan et al., 2022). This inconsistency in technology adoption further widens the gap between theoretical SSCM models and practical outcomes.

Another critical issue lies in the absence of a unified framework that identifies the conditions under which communication and efficiency strategies can be co-optimized for sustainable outcomes. The literature tends to treat these dimensions in isolation, thereby limiting our understanding of how they interact in real-world supply chain environments (Sánchez-Flores et al., 2020). Without a clear roadmap for aligning communication structures and efficiency goals with sustainability metrics, organizations risk implementing fragmented strategies that yield suboptimal or even counterproductive results. Despite the growing body of literature, there remain gaps in bridging the theoretical foundations of SSCM with its practical applications, especially concerning how communication strategies and operational efficiencies can be co-optimized for sustainable outcomes. Moreover, while many organizations acknowledge the importance of sustainability, they struggle with implementation due to challenges such as supplier resistance, lack of data integration, high initial costs, and regulatory complexities (Fritz & Ruel, 2024).

The problem this study seeks to address is the persistent disconnect between the theoretical models of SSCM and their practical implementation, particularly in the areas of communication and efficiency. There is a pressing need for an integrated framework that helps organizations understand how to effectively combine communication strategies and operational efficiency mechanisms to achieve long-term sustainability success in their supply chains. Therefore, this study

seeks to explore how theory and practice can be aligned to foster more sustainable supply chain operations, with a particular focus on the combined role of communication and operational efficiency. It aims to provide a comprehensive understanding of how businesses can integrate sustainability into their core supply chain strategies to achieve long-term success while addressing environmental and social responsibilities.

LITERATURE REVIEW

Over the past two decades, Sustainable Supply Chain Management (SSCM) has emerged as a critical area of focus in logistics and supply chain research, driven by growing environmental concerns, social accountability, and the pursuit of long-term economic performance. The concept has evolved from isolated discussions of environmental and social practices to a more integrated view aligned with the triple bottom line encompassing economic, social, and environmental sustainability. As global supply chains become increasingly complex and exposed to sustainability-related risks, both scholars and practitioners have recognized the need for structured, theory-driven approaches to managing sustainability across the supply chain. This literature review explores the evolution of SSCM, mapping key trends, theoretical developments, methodological advancements, and gaps that offer direction for future research.

Supply chain management process

Supply Chain Management (SCM) refers to the coordinated management of the flow of goods, services, information, and finances as they move from suppliers to manufacturers to wholesalers to retailers and finally to consumers. It integrates supply and demand management within and across companies to optimize efficiency, reduce costs, and improve customer satisfaction (Hazen et al., 2021). The supply chain management (SCM) process is a comprehensive and strategic approach to overseeing the flow of goods, services, information, and finances from the point of origin to the end consumer. It encompasses the coordination and integration of various activities across suppliers, manufacturers, distributors, retailers, and customers to ensure that products are delivered efficiently, cost-effectively, and in alignment with customer expectations (Ivanov et al., 2021).

The SCM process begins with planning**,** which serves as the foundation for aligning supply chain activities with business goals. This phase involves demand forecasting, capacity planning, and determining resource requirements to ensure a balance between supply and demand. Planning also incorporates risk assessment and mitigation strategies to address potential disruptions. Pasupuleti et al. (2024), highlight that effective planning ensures organizations can anticipate market changes and respond proactively, thereby maintaining service levels and minimizing costs.

Once planning is in place, the next step is sourcing**,** where organizations identify, evaluate, and engage suppliers capable of delivering the required materials or services. This stage includes negotiating contracts, establishing terms of delivery, and managing relationships to ensure supplier reliability and performance. Sustainable sourcing practices, such as evaluating suppliers based on environmental and social criteria, are increasingly important in modern SCM. According to Ghizlane (2022), strategic sourcing not only reduces costs but also creates long-term value and resilience in the supply chain. The third stage in the process is manufacturing or production**,** where raw materials are transformed into finished goods. This phase includes activities such as scheduling, quality control, packaging, and assembly. Efficiency, consistency, and adherence to quality standards are critical to avoid defects, minimize waste, and meet customer expectations. Ghelani (2021), notes that lean manufacturing principles and the use of automation technologies can greatly enhance productivity and reduce production cycle times. Following manufacturing is the delivery and logistics phase this involves the storage, transportation, and distribution of products to the end consumer. Efficient logistics ensure timely delivery, minimize handling costs, and optimize transportation routes. Companies often utilize logistics service providers and advanced technologies such as GPS tracking, warehouse management systems, and real-time data analytics to enhance visibility and responsiveness. Burity (2021), emphasizes that effective logistics operations are vital for creating customer satisfaction and competitive advantage in a globalized market.

Another important component is returns management, also known as reverse logistics this aspect of the SCM process deals with the return of defective, unwanted, or recyclable products. Managing returns efficiently involves authorization, transportation, inspection, and restocking or disposal. Reverse logistics plays a key role in achieving sustainability and cost recovery. Grover et al (2024) argue that well-managed return processes improve customer service, support circular economy initiatives, and reduce environmental impact. Throughout the supply chain, integration and coordination among partners are essential for smooth operations. Information sharing, real-time communication, and collaboration technologies such as enterprise resource planning (ERP) and supply chain management software help unify the different links in the chain. Tarigan et al. (2021) point out that seamless integration enhances agility, reduces lead times, and facilitates innovation across the supply network. Performance measurement and continuous improvement are central to the SCM process. Organizations use key performance indicators (KPIs) such as order accuracy, delivery speed, inventory turnover, and cost efficiency to evaluate and improve supply chain activities. Benchmarking, feedback loops, and data-driven decision-making support ongoing enhancements, enabling firms to remain competitive in dynamic markets (Kalf et al., 2023). Supply chain management is a dynamic and complex process that spans planning, sourcing, production, logistics, returns, and performance evaluation. It requires a strategic approach, cross-functional collaboration, and the use of technology to optimize efficiency, quality, and customer satisfaction while also addressing sustainability and resilience (Kazancoglu et al., 2021).

Fig. 1 Supply chain management process.

Sustainable Supply Chain Management (SSCM) Implementation Framework

A sustainable supply chain management (SSCM) implementation framework provides a structured approach to embedding sustainability principles across all levels of the supply chain. This framework ensures that environmental, social, and economic considerations are systematically integrated into the supply chain, enabling companies to create long-term value, reduce risks, and contribute to global sustainability goals such as the United Nations Sustainable Development Goals (UN SDGs) (Bratt et al., 2021).

The implementation process begins with strategic alignment**,** where an organization defines its sustainability vision and ensures it is aligned with its overall business and supply chain strategies. At this stage, companies often draw on the Triple Bottom Line approach, which emphasizes the importance of achieving balance across economic performance, environmental stewardship, and social responsibility (Mastos & Gotzamani, 2022). Strategic alignment also involves assessing how supply chain activities can contribute to the UN SDGs and identifying relevant stakeholders such as customers, suppliers, investors, and communities whose interests must be considered (Al-Odeh et al., 2021).

The next phase involves a comprehensive assessment of internal and external drivers that influence sustainability in the supply chain. Internally, factors such as leadership commitment, organizational culture, and innovation capacity can significantly motivate sustainability initiatives. Externally, forces like customer demands, regulatory requirements, pressure from non-governmental organizations, and industry competition act as powerful motivators or constraints. Alzubi and Akkerman (2022), emphasize that these drivers form the foundation upon which decisions about adopting sustainability practices are made.

Following this, organizations focus on capability development**,** which is essential for the successful implementation of sustainability measures. This involves investing in technologies such as the Internet of Things (IoT), artificial intelligence, and blockchain for traceability and data accuracy (Bagherpasandi et al., 2025). Employee training and development programs are also critical to ensure that staff and supply chain partners understand and can implement sustainability strategies. Governance structures should be updated to support continuous environmental and social improvements (Siems et al., 2023).

Collaboration with suppliers and partners represents a critical element of the SSCM framework. Sustainable supply chains cannot function effectively in isolation; therefore, building long-term relationships based on shared values and goals is essential (Santiago et al., 2025). This includes performing supplier sustainability audits, establishing codes of conduct, co-investing in cleaner technologies, and creating incentive-based partnerships to reward sustainability performance. (Zhu et al., 2022) argue that upstream and downstream collaboration enhances the diffusion of green practices across the entire supply network.

Once partnerships are in place, organizations proceed to the implementation of sustainable practices throughout supply chain operations. This includes ethical sourcing, eco-design, green manufacturing, efficient transportation, and the adoption of reverse logistics strategies such as recycling, refurbishing, and waste reduction. Companies often rely on environmental management systems like ISO 14001 to guide and standardize these practices (Bugdol et al., 2021).

Another crucial component of the SSCM framework is performance measurement and continuous improvement**.** Organizations must establish key performance indicators (KPIs) to monitor environmental impact, such as carbon emissions, energy consumption, waste generation, and supplier compliance with sustainability standards. Benchmarking against industry standards and applying continuous improvement models like Plan-Do-Check-Act (PDCA) or Six Sigma further enhance performance outcomes. The use of real-time monitoring tools and data dashboards can also aid in timely decision-making and transparency (Sethupathy, 2021).

Transparency and reporting are vital for building credibility and maintaining trust with stakeholders. This involves publishing sustainability reports in alignment with global standards such as the Global Reporting Initiative (GRI) or the Sustainability Accounting Standards Board (SASB). Organizations are encouraged to disclose the environmental and social impacts of their supply chains, outline goals and progress, and engage in third-party certifications such as Fair Trade or Forest Stewardship Council (FSC). As Efunniyi et al (2024), opines that transparent reporting not only enhances accountability but also strengthens stakeholder relationships and brand reputation.

The implementation of a sustainable supply chain requires a holistic and systematic approach that integrates strategic planning, capability building, partner collaboration, and continuous improvement (Arda et al., 2023). By following this framework, organizations can move beyond compliance to create competitive advantage while fulfilling their responsibility to people and the planet.

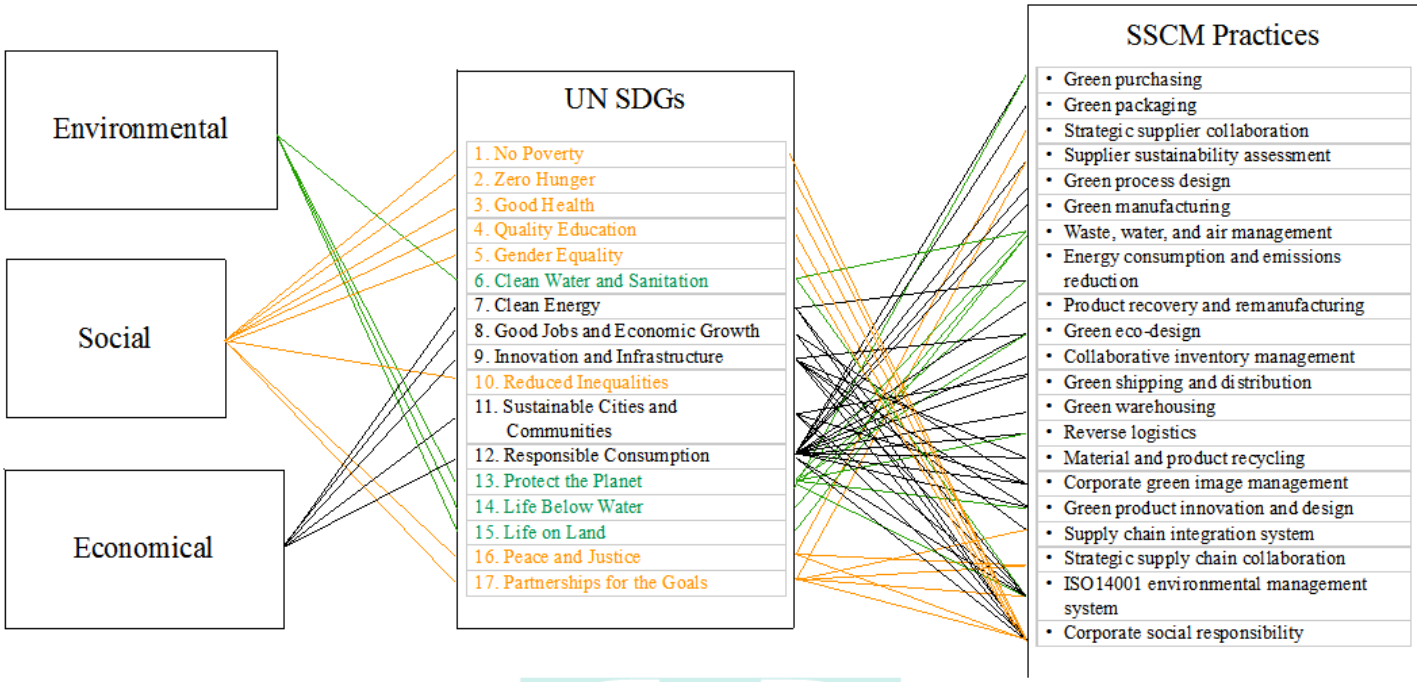

Fig. 2 SSCM practices alignment with UN SDGs (Zimon et al., 2019)

Sánchez-Flores et al (2020), opines that in recent years the interest in sustainable supply chain management has increased significantly in both business and academic areas. This is reflected in the growing number of articles, conferences, special publications and websites devoted to the subject. Nonetheless, sustainable development in emerging economies just started gaining importance. The objective of this article is to review, from a global perspective, the existing literature regarding sustainable supply chain management (SSCM) in emerging economies. For this purpose, a systematic literature review was performed, analyzing 56 articles from the year 2010 to April 2020 from a descriptive and content approach. Subsequently, the results are presented, showing the increasing interest in SSCM, however lagging behind in emerging economies' research versus developed ones. Findings indicate the context in developing countries plays an important role when conducting empirical or case study investigations. Additionally, the integration of the three dimensions of sustainability and how they impact supply chain performance becomes crucial to research from an emerging economy perspective. Consequently, limitations of this work are presented, and opportunities are identified for future lines of research, in particular in key supply chain functions. Finally, the conclusion confirms the need for further research from different supply chain viewpoints, such as collaboration, sustainable practices innovation, sourcing and supplier development from emerging countries' standpoint and background.

Shekarian et al (2022), postulates that sustainable business practices are those that allow companies to increase their profit while still considering the triple bottom line of sustainability, which involves economic, environmental, and social aspects. There are a lot of studies exploring various aspects of supply chain practices. However, there remains a gap for the proposal of a complete framework concerning various industries. This research fills this gap by studying existing empirical and review studies. Based on a content analysis of 86 studies, 789 practices are derived and categorized, leading to a comprehensive classification of sustainable practices in supply chains. Moreover, the employed methods to analyze the data are investigated. The practices are cross-checked versus the studied industries showing the current sustainable industries. The details of the studied papers are presented in a comprehensive table. The sustainable framework showing the industrial solutions toward sustainable supply chains is divided into 38 minor practices classified into 11 main categories. This paper provides a novel interpretation of the sustainable solutions addressed by different industries and presents a new and updated classification of the literature identifying future directions. This offers many advantages for practitioners and researchers to transform a supply chain into an improved version in the bigger picture.

Carter et al. (2020), updated the study of Carter and Easton (2011), by conducting a systematic review of the sustainable supply chain management (SSCM) literature in the primary logistics and supply chain management journals, during the 2010 to 2018 timeframe. The authors use a systematic literature review (SLR) methodology which follows the methodology employed by Carter and Easton (2011). An evaluation of this methodology, using the Modified AMSTAR criteria, demonstrates a high level of empirical validity. Their study reveals that field of SSCM continues to evolve with changes in substantive focus, theoretical lenses, unit of analysis, methodology and type of analysis. However, there are still abundant future research opportunities, including investigating under-researched topics such as diversity and human

rights/working conditions, employing the group as the unit of analysis and better addressing empirical validity and social desirability bias. The findings result in prescriptions and a broad agenda to guide future research in the SSCM arena.

Esmaeilian et al (2020), provided an overview of blockchain technology and Industry 4.0 for advancing supply chains towards sustainability. First, the authors extracted from the existing literature to evaluate the capabilities of Industry 4.0 for sustainability under three main topics of (1) Internet of things (IoT)-enabled energy management in smart factories; (2) smart logistics and transportation; and (3) smart business models. Their study expand beyond Industry 4.0 with unfolding the capabilities that Blockchain offers for increasing sustainability, under four main areas: (1) design of incentive mechanisms and tokenization to promote consumer green behavior; (2) enhance visibility across the entire product lifecycle; (3) increase systems efficiency while decreasing development and operational costs; and (4) foster sustainability monitoring and reporting performance across supply chain networks.

Narimissa et al (2020), opines that supply chain requires simultaneous enhancement of the economic, environmental, and social performance of the business toward sustainability. For this aim, a sustainable performance assessment system is needed to be implemented for evaluating different supply chain segments and clarify supply chains' indicators. The assessment can be performed based on three sustainability dimensions: economical, environmental, and social. The first purpose of their study is to help identify sustainability issues and highlights the gaps and inconsistencies of literature. The second purpose is to identify the most important indicators of sustainability for sustainable development supply chain of Iranian Oil Company stakeholder engagement. The indicators of the sustainable supply chain are studied and collected using metasynthesis approach, and the most important indicators of sustainability were identified for the company with Delphi technique. The proposed sustainability indicators can be useful for the researchers to develop practical and comprehensive measures in their respective industries.

Tsai et al (2021), proposes a data-driven analysis that describes the overall situation and reveals the factors hindering improvement in the sustainable supply chain management field. The literature has presented a summary of the evolution of sustainable supply chain management across attributes. Prior studies have evaluated different parts of the supply chain as independent entities. An integrated systematic assessment is absent in the extant literature and makes it necessary to identify potential opportunities for research direction. A hybrid of data-driven analysis, the fuzzy Delphi method, the entropy weight method and fuzzy decision-making trial and evaluation laboratory is adopted to address uncertainty and complexity. This study contributes to locating the boundary of fundamental knowledge to advance future research and support practical execution. Valuable direction is provided by reviewing the existing literature to identify the critical indicators that need further examination. The results show that big data, closed-loop supply chains, industry 4.0, policy, remanufacturing, and supply chain network design are the most important indicators of future trends and disputes. The challenges and gaps among different geographical regions is offered that provides both a local viewpoint and a state-of-the-art advanced sustainable supply chain management assessment.

Khan et al (2022), opines that traditional supply chain system included smart objects to enhance intelligence, automation capabilities, and intelligent decision-making. Internet of Things (IoT) technologies are providing unprecedented opportunities to enhance efficiency and reduce the cost of the existing system of the supply chain. Their study aims to examine the prevailing supply chain system and explore the benefits obtained after smart objects and embedded networks of IoT are implanted. Short-range communication technologies, radio frequency identification (RFID), middleware, and cloud computing are extensively comprehended to conceptualize the smart supply chain management system. Moreover, manufacturers are achieving maximum benefits in terms of safety, cost, intelligent management of inventory, and decision-making. The study also offers concepts of smart carriage, loading/unloading, transportation, warehousing, and packaging for the secure distribution of products. Furthermore, the tracking of customers to convince them to make more purchases and the modification of shops with the assistance of the Internet of Things are thoroughly idealized.

Khan et al (2021), stated that there is no doubt that since the last decade, as the focus towards sustainability has grown significantly in the supply chain field, many empirical and conceptual papers have been published in journals. The study aims to investigate the present and emerging trends in the field of SSCM (sustainable supply chain management), meanwhile exploring future research directions. This article conducts the meta-analysis and systematic review of 362 research papers published in the well-known peer-reviewed journals in the last sixteen years (2004–2019). Their study structured the reviewed literature with the following categories: drivers and barriers of the sustainable supply chain, adopted multi-criteria-decision-making techniques, year-wise number of research papers, names of journals and publishers, and classification of articles based on research design and method. This study draws an up-to-date picture of the recent developments, emerging trends, and gaps for future studies in the field of SSCM. The finding shows that the area has dominated by MCDM (Multiple-criteria decision making) based research methods and firms-level studies. Furthermore, researchers need to employ efficient algorithms and advanced economic modelling and conduct studies on the macro-level (country, and region-levels) to explore new linkages.

Mageto (2021), highlights that sustainable supply chain management (SSCM) has gained prominence over the past two decades largely driven by the growing challenges of climate change. On a global scale, the United Nations' Sustainable Development Goals emphasize the need for environmentally responsible practices, particularly in manufacturing supply chains, which are known to contribute harmful emissions and social issues affecting local communities and economies. Emerging information and communication technologies, especially big data analytics (BDA), offer promising solutions by identifying unsustainable practices within supply chains and enabling corrective

measures. Despite extensive research on SSCM, there is limited focus on the role of BDA within manufacturing contexts. This conceptual study utilizes Toulmin's argumentation model to analyze relevant literature, identifying key BDA components data processing, analytics, reporting, integration, security, and economic impact and linking them with SSCM factors such as transparency, sustainability culture, corporate goals, and risk management. The study concludes that BDA can significantly enhance SSCM in manufacturing supply chains, though challenges like cyber threats and skill gaps in IT remain barriers to effective implementation. It contributes conceptually and methodologically to the literature by applying an uncommon framework in management studies.

Stroumpoulis and Kopanaki (2022), states that in today's business landscape, where environmental and social demands on companies are intensifying, sustainable supply chain management (SSCM) has become critical for organizational efficiency and long-term viability. Digital transformation, through the integration of emerging technologies, plays a pivotal role in supporting sustainable strategies by enhancing supply chain processes, reducing costs, enabling real-time monitoring, and promoting environmentally responsible practices. This paper investigates the intersection of SSCM and digital transformation by focusing on the adoption of key technologies such as Blockchain, Big Data Analytics (BDA), and the Internet of Things (IoT). Its primary goal is to build theory and propose a conceptual framework that explains the conditions under which these technologies contribute to sustainable performance. Furthermore, it explores how companies can leverage these technologies to enhance competitive advantage and overall business outcomes, offering insights valuable to both scholars and industry professionals. A literature review reveals a research gap: few theoretical studies examine all three pillars of sustainability while simultaneously addressing the combined impact of BDA, IoT, and Blockchain on sustainable supply chains. To fill this gap, the paper synthesizes relevant definitions, theories, and technology-specific effects, culminating in a conceptual model that helps stakeholders assess the role of digital tools in SSCM. The study's findings affirm that digital transformation is a key enabler of sustainability, with technological synergies driving performance improvements and strategic positioning in the market.

In the study of Kshetri (2021), it was revealed that theoretical, empirical and anecdotal evidence suggests that there are more violations of sustainability principles in supply chains in developing countries than in developed countries. Recent research has demonstrated that blockchain can play an important role in promoting supply chain sustainability. In this paper we argue that blockchain's characteristics are especially important for enforcing sustainability standards in developing countries. We analyze multiple case studies of blockchain projects implemented in supply chains in developing countries to assess product quality, environmental accounting and social impact measurement. We have developed seven propositions, which describe how blockchain can help address a number of challenges various stakeholders face in promoting sustainable supply chains in developing countries. The challenges that the propositions deal with include those associated with an unfavorable institutional environment, high costs, technological limitations, unequal power distribution among supply chain partners and porosity and opacity of value delivery networks.

Zimon et al (2020), identify the conditions and barriers affecting the implementation of the United Nations Sustainable Development Goals (SDGs) within supply chains. In addressing the central research problem and related issues, the authors set out key supporting objectives to highlight the connections between sustainable supply chain management (SSCM) practices and the UN SDGs, and to develop a model that facilitates the integration of these global goals into SSCM. The study contributes to the academic literature by presenting a novel conceptual model and proposing a dynamic, three-phase framework for the effective implementation of sustainable supply chain initiatives. It offers a grounded, theory-based approach that provides fresh insights into aligning supply chain operations with the UN's 17 SDGs, serving as a foundation for future research and performance evaluation.

METHODOLOGY

This study adopts a systematic review methodology to compile and analyze a dataset of relevant articles as this approach has since gained traction in management studies (Booth et al., 2021). Unlike traditional narrative reviews, a systematic literature review minimizes researcher bias in the selection of studies and provides a transparent account of the review process (Tamašauskaitė & Groth, 2023). One of its key strengths is its emphasis on replicability through clear, structured procedures (Fiandrino et al., 2022).

To ensure the scope remained manageable, we focused on seven leading journals in the fields of logistics and supply chain management:

1. *International Journal of Logistics Management*
2. *International Journal of Physical Distribution & Logistics Management*
3. *Journal of Business Logistics*
4. *Journal of Operations Management*
5. *Journal of Supply Chain Management*
6. *Transportation Journal*
7. *Transportation Research Part E*

These journals are widely regarded as premier sources for empirical research in supply chain management and are frequently featured in similar systematic reviews.

To further refine the scope of the literature, several subject areas were deliberately excluded from the review. These include topics related to supply chain security, technical aspects of life cycle analysis, end-of-life management, cost modeling, hazardous materials, and associated regulatory concerns. Additionally, macro-level or policy-related issues (as

opposed to firm-level or supply chain-specific topics), reverse logistics and waste disposal, consumer-focused topics such as automobile safety, and articles in which sustainability was only a minor or peripheral theme were also omitted.
Moreover, the review focused exclusively on empirical studies. Eligible empirical approaches encompassed the collection and analysis of primary or secondary data, including methodologies such as surveys, case studies, interviews, laboratory experiments, conceptual theory development, and systematic literature reviews. Studies using non-empirical methods such as mathematical modeling or papers based primarily on anecdotal insights or opinion pieces were excluded from consideration.

Following this, a manual review was conducted on all articles published in the selected seven journals, covering the period from 2005 through to the most recent available issues as of 2024. This 20-year span was chosen for two key reasons:

- The majority of studies addressing standalone issues within Sustainable Supply Chain Management (SSCM) emerged after 2005.
- Empirical research that explores supply chain topics from broader Corporate Social Responsibility (CSR) and sustainability perspectives has been almost entirely concentrated within this timeframe.

The manual review of the literature initially identified 121 articles for inclusion in the literature database. This review also helped refine the set of keywords used for the next phase of the search. In the second phase, the authors carried out an electronic literature search using the keywords listed in Table 1. These keywords were further informed by insights from four industry professionals who contributed during a conference call held in 2024.

The electronic search was conducted using the EBSCO Business Source Complete database. Keywords were applied within the "All Text" and "Abstract" fields, while the seven selected journal titles were specified in the "Publication Name" field. This search yielded an additional 11 relevant articles, bringing the total number of articles in the initial database to 130.

Following the application of the inclusion and exclusion criteria, 50 papers were removed from the database, resulting in a final set of 80 papers for analysis. Several papers were excluded from the analysis due to their focus on broad economic or governmental policy matters, which fell outside the study's emphasis on practical supply chain management. Others relied on theoretical models rather than using data-driven or field-based research approaches. Additionally, some publications were eliminated because they were editorials or offered only general descriptions without presenting structured empirical findings.

Following the selection process, essential publication details such as authorship, article titles, journal sources, publication year, volume and issue numbers, and page ranges were compiled into a Microsoft Excel database. The lead researcher then systematically categorized each article using a predefined coding framework, as outlined in Table 2.
To ensure accuracy and consistency, the researcher independently reviewed and recoded a sample portion of the entries. Agreement between coders was evaluated based on the proportion of matching classifications. This method is widely regarded for its simplicity and effectiveness. With a substantial number of classification variables involved, the likelihood of random agreement was significantly reduced, and the accuracy of the coding process was supported by the dataset's size.

The level of agreement between the two coders was notably high, mirroring internal consistency metrics like Cronbach's alpha. Agreement rates across categories ranged from 93.64% to 100%, averaging 97.27%. These values far exceed the generally accepted reliability threshold of 70%, reinforcing the dependability and reproducibility of the coding process.
Instead of applying multiple mean comparison tests which could lead to inflated error rates we concentrated on identifying the most meaningful and practical differences across the categorized data, as presented in Table 3.

Table 1 Search terms

Carbon	Natural Right	Social Enterprise
Corporate Social responsibility	ISO 14000/1	Social responsibility
	Labor	Sustainable
Diversity	Minority business enterprise/minority women business enterprise	Sustainability
Energy	Minority	Sweatshop
Environment(al)	Philanthropy	Triple bottom line
Fair Trade	Resource conservation	Women/ women owned
Green	Safety	Working conditions
Health	Social	

Table 2 Coding scheme

Coding family	Description of codes
Study Dimension	**Standalone Focus Area(s):** The study explores a distinct aspect of sustainability, such as environmental concerns. **Corporate Social Responsibility (CSR):** The research examines CSR-related themes covering both environmental and social matters guided by established CSR theoretical frameworks. **Sustainability:** The article centers on the triple bottom line concept (environmental, social, and economic dimensions) and employs it as the foundation for its theoretical model. **Note:** An article may be classified under both CSR and sustainability if it draws upon and integrates both bodies of literature in shaping its theoretical perspective.
Causal Investigation	**Inferential:** An article is categorized as inferential if it employs inferential statistics to evaluate hypotheses or propositions that were formulated before the data analysis. It may also qualify under this category if the authors use inductive methods—such as grounded theory and comprehensive qualitative analysis—to derive clearly articulated propositions or defined relationships between variables. **Descriptive:** Articles are labeled descriptive when they focus on summarizing or illustrating data without testing predefined hypotheses or propositions. This includes reporting summary statistics, comparing group means, or using inferential tools like ANOVA without linking them to explicitly stated hypotheses prior to the analysis. **Both:** This classification applies when the study adopts an exploratory approach. For instance, if the authors articulate research goals or questions but do not define testable hypotheses in advance. They may identify potential influencing factors and use statistical techniques like regression to determine which variables are most relevant.
Moderation	**Moderation:** A study is categorized under moderation if it involves testing for interaction or moderating effects among variables.
Methodology and analysis	**Methodology:** Refers to the main data collection technique employed in the research. Typical methods include case studies, surveys, archival data collection, literature reviews, in-depth interviews, and focus group discussions. **Analysis:** Describes the analytical techniques applied to the collected data. These may include confirmatory factor analysis (CFA), exploratory factor analysis, regression analysis, ANOVA, structural equation modeling, or qualitative data interpretation. **Validity:** This is marked as "yes" when both reliability and various aspects of validity are addressed; "somewhat" when only reliability is considered; and "no" when neither is discussed. **Social Desirability Bias:** Classified as "yes" if the authors account for or acknowledge this bias in their study, and "no" if it is not addressed. **Sample Size 1:** Indicates the number of distinct organizations or companies from which data were gathered. **Sample Size 2:** Represents the total number of individual participants or informants surveyed. This figure is the same as Sample Size 1 if only one key informant is surveyed per firm, and greater if multiple informants are used. **Unit of Analysis:** Specifies the primary focus of analysis in the study, which could be an individual, a team or department, an entire organization (such as a firm, plant, or strategic business unit), or the broader supply chain. Other units could include projects or scholarly articles.
Context	**Key Informant:** Refers to the specific organizational role or department of the main respondent (e.g., procurement, production, logistics, or marketing). **Industry:** Indicates the sector examined in the study; marked as "multiple" if the research covers more than one industry.
Theoretical lens(es)	Evaluated whether the authors applied any of the following theoretical frameworks to guide or justify the development of their models: transaction cost economics, resource-based view, knowledge-based view, stakeholder theory, or other relevant theories.

Table 3 Results

Focus Area	Percentage (Full Time Period) (%)	Percentage (2015–2024) (%)	Percentage (2005–2014) (%)
Section A: Thematic Focus Areas			
Environmental Concerns	42.50	35.42	53.13
Inclusion and Diversity	15.00	4.17	31.25
Human Rights & Life Quality	6.25	4.17	9.38
Health & Safety	21.25	27.08	12.50
Charitable & Community Aid	0.00	0.00	0.00
Corporate Social Responsibility	11.25	18.75	0.00
Sustainable Development Goals	15.00	25.00	0.00
Section B: Industry Classification			
Consumer Goods	13.89	11.90	16.67
Food & Beverage	2.78	2.38	3.33
Transportation & Logistics	20.83	23.81	16.67
Diversified Industries	48.61	47.62	50.00
Miscellaneous / Other	11.11	9.52	13.33
Section C: Applied Theoretical Frameworks			
Transaction Cost Economics	6.25	8.33	3.13
Resource-Based View	11.25	16.67	3.13
Knowledge-Based View / Organizational Learning	2.50	4.17	0.00
Stakeholder Theory	21.25	35.42	0.00
Alternative Theories	31.25	45.83	9.38
Combination of Multiple Theoretical Lenses	21.25	33.33	3.13
No Theoretical Framework Applied	55.00	33.33	87.50
Section D: Treatment of Validity			
Fully addressed	45.45	64.44	18.75
Partially addressed	11.69	8.89	15.63
Not addressed at all	42.86	26.67	65.63
Section E: Social Desirability Bias			
Bias acknowledged	15.38	25.00	3.45
Bias not acknowledged	84.62	75.00	96.55
Section F: Unit of Analysis			
Individual	20.78	17.78	25.00
Function or team	9.09	8.89	9.38
Firm (including plant/SBU)	62.34	60.00	65.63
Supply chain	3.90	6.67	0.00
Other	3.90	6.67	0.00
Section G: Research Methodology Employed			
Survey	60.00	47.92	78.13
Case study (single or multiple)	17.50	22.92	9.38
Archival data analysis	8.75	10.42	6.25
Empirical/systematic literature review	5.00	8.33	0.00
Conceptual/theoretical development	3.75	4.17	3.13
Focus group interviews	2.50	2.08	3.13
One-on-one interviews	2.50	4.17	0.00
Section H: Analytical Techniques			
Descriptive statistics	26.53	11.11	54.29
Regression techniques	16.33	19.05	11.43
Qualitative analysis	15.31	17.46	11.43
Confirmatory Factor Analysis (CFA)	12.24	15.87	5.71
Structural Equation Modeling (SEM)	9.18	12.70	2.86
Exploratory Factor Analysis (EFA)	8.16	11.11	2.86
Other analytical techniques	5.10	6.35	2.86
ANOVA	4.08	3.17	5.71
Theoretical/conceptual model development	3.06	3.17	2.86
Section I: Moderation Testing			
Included moderation effects	10.26	13.04	6.25

DISCUSSION: EVOLUTION AND FUTURE DIRECTIONS

Subject

Over the past two decades, environmental concerns have dominated research within the field of supply chain management, as highlighted in Section A of Table 3. The environment, being a central pillar of the triple bottom line, has drawn widespread attention especially in light of global discourse on climate change and increasing energy costs. During the initial stages of sustainability discourse, the terms *"environment"* and *"sustainability"* were often used interchangeably by both scholars and practitioners. This conceptual overlap is a typical occurrence when new paradigms emerge.

However, as understanding has matured, there is now a growing consensus around the accurate interpretation of sustainability as encompassing the full triple bottom line: environmental, social, and economic dimensions. As a result, recent research has shifted away from isolated environmental concerns towards more integrated frameworks.

Rather than focusing solely on environmental aspects, newer studies have increasingly adopted comprehensive approaches, incorporating corporate social responsibility (CSR) and sustainability as key frameworks. Notably, none of the studies from the 2005–2014 period examined supply chain topics through the lens of CSR or the broader sustainability framework. However, between 2015 and 2024, approximately 18.75% of studies applied a CSR perspective, while 25% utilized the triple bottom line sustainability model in their analyses.

This evolution reflects a broader trend toward holistic thinking in supply chain management and suggests promising future directions for research that more thoroughly integrate environmental, social, and economic dimensions.

Industry Focus

In contrast to the noticeable trends identified in the subject matter of research, the analysis of industries explored over the 20-year period does not reveal significant shifts between the first and second decades. Nonetheless, there has been considerable emphasis on the consumer products and transportation industries (see Section B of Table 3). Consumer product companies have often been studied due to their direct engagement with end-users and their early adoption of environmental and social responsibility initiatives. Similarly, transportation companies have garnered attention largely because of safety concerns and their substantial carbon footprint, which is more visible to stakeholders.

Despite this, many studies have focused on "multi-industry" samples research that spans several sectors, such as manufacturing alone or in combination with services. This approach is understandable, as it allows researchers to gather larger sample sizes and potentially enhance the generalizability and external validity of their findings. However, the reliance on multi-industry research also highlights a promising avenue for future studies: conducting in-depth investigations into specific industries. Selecting individual sectors as the primary focus could help identify sustainability practices unique to those industries and reveal how particular theoretical frameworks apply or fail to apply in distinct contexts. One emerging area of interest is service supply chains, defined as the procurement and distribution of services, whether by manufacturing or service-based organizations (Enz & Lambert, 2023). These supply chains likely exhibit different sustainability characteristics compared to those in manufacturing, offering rich potential for future research and theoretical development.

Theoretical Lenses

A key observation from Section C of Table 3 is the noticeable scarcity of theoretical frameworks applied in sustainability-related research. Throughout the entire 20-year period, approximately 55% of the articles reviewed did not utilize any formal theoretical lens. Encouragingly, there has been a clear shift toward greater theoretical integration in sustainable supply chain management (SSCM) research. During the 2005–2014 period, over 87% of studies lacked a theoretical foundation; by 2015–2024, this figure had dropped significantly to just above 33%.

Among the theories that have been employed, stakeholder theory (Freeman, 1984) has been the most frequently used, followed by the resource-based view and its variant, the natural resource-based view (Hart, 1995). In addition to these, researchers have drawn from a broad range of disciplines. For instance, dynamic capabilities have been explored in the context of achieving competitive advantage in sustainable global supply chains (Uddin et al., 2023); brand equity theory has been applied to link sustainability to competitive advantage (Gorska-Warsewicz et al., 2021); and self-efficacy theory has been used to predict employee safety behavior (Jafari Nodoushan et al., 2024).

Another notable trend from Section C is the growing use of multiple theoretical lenses within a single study. When executed effectively, this multidisciplinary approach enhances hypothesis development, enriches the interpretation of findings, and clarifies the scope and limitations of each theory. A compelling example is provided by Pagell et al. (2010), who critique the traditional Kraljic purchasing portfolio matrix as inadequate for SSCM. By integrating transaction cost economics, the resource-based view, and stakeholder theory, they developed a revised and theoretically grounded matrix that serves as a more effective strategic decision-making tool for managers.

Interestingly, transaction cost economics remains underutilized in SSCM research. This presents a valuable opportunity for future exploration. Of particular relevance is the concept of bounded rationality a limitation in actors' ability to process information and communicate, which can lead to opportunistic behavior. In SSCM, bounded rationality is often exacerbated by a lack of transparency, increasing both the risk and perception of opportunism, especially when firms rely on distant suppliers. Claims such as "organically certified," "safe working conditions," or "low emissions" can be difficult to verify and may contribute to mistrust.

Future studies could investigate how bounded rationality and perceived opportunism influence sourcing decisions, particularly in choosing between local and international suppliers. Additionally, researchers might explore how these factors shape supply chain governance structures, such as the adoption of more authoritative (muscular) versus collaborative (benign) hybrid contracting strategies.

Methodology and Analysis

Validity. Validity is widely recognized as the cornerstone of empirical research without a robust assessment of validity, the credibility of research findings is significantly weakened. Alarmingly, during the 2005–2024 period, over 42% of the reviewed studies did not address validity at all, while an additional 11.7% only partially considered empirical validity (refer to Section D of Table 3). However, there is a noticeable positive trend over time. In the 2014–2025 period, more than 64% of the studies rigorously assessed validity, compared to fewer than 19% in the preceding decade. Moving forward, researchers must go beyond assessing reliability alone and ensure comprehensive evaluations of all relevant aspects of validity such as content validity, convergent validity, and discriminant validity based on the specific methodologies employed.

Social Desirability Bias. Articles were also reviewed for whether they addressed social desirability bias**,** which is the inclination of respondents to provide answers they believe will be viewed positively by the researcher. Across the full time period, only 15.4% of applicable studies accounted for this bias (see Section E of Table 3). Encouragingly, attention to this issue increased from just 3.45% in 2005–2014 to 25% in 2015–2020. Nonetheless, the majority of studies either ignored or failed to acknowledge this potential source of bias. While certain research designs (e.g., ethnographic or case studies) may present practical challenges in assessing social desirability, future survey and experimental studies can incorporate abbreviated versions of the Crowne-Marlowe scale to address this important concern.

Unit of Analysis. The firm emerged as the most frequently used unit of analysis, followed by the individual and specific functional groups such as buying centers (Section F of Table 3). Unlike other methodological elements, there was little variation over time in the selection of units of analysis. However, there has been a modest increase in studies focusing on the supply chain as the unit of analysis from zero in the first decade to 6.67% in the second. Other emerging units of analysis include projects and published articles, each of which also saw an increase from 0% to 6.67% across the two time periods.

Given that much of the existing research in sustainable supply chain management (SSCM) has focused on the firm as the primary unit of analysis, our findings point to at least three promising directions for future research. First, there is significant potential in shifting the unit of analysis from the firm to the individual. Although our understanding of what drives organizational behavior is growing, we still know relatively little about the factors that influence individual managers' actions and decision-making processes (Kaufmann et al., 2011). The emerging field of behavioral supply management which examines how real-world decision-making in supply management deviates from the rational actor model offers a valuable lens through which to explore this gap. Potential research questions might include how supply chain management personnel function as internal stakeholders, and how their attitudes and organizational commitment vary based on different levels of SSCM engagement (for a comprehensive review of organizational commitment literature). Other avenues include exploring how cognitive biases affect individual decision-making and SSCM effectiveness, and investigating how managers can inspire internal stakeholders and build commitment to successfully implement SSCM initiatives.

Second, the supply chain itself particularly at the dyadic level remains underutilized as a unit of analysis. Although gathering dyadic or multi-firm data has traditionally been challenging, especially with conventional methods like surveys and case studies, there are increasing opportunities to leverage archival and secondary data sources for SSCM research. Culot et al (2023) identify several archival databases that could be applied to supply chain research more broadly. For instance, platforms like Compustat can be integrated with other sources such as the Wharton Research Data Services, the Dow Jones Sustainability Indexes, and the Global Reporting Initiative to examine relationships between firms' environmental/social performance and their financial outcomes, as well as between regulatory compliance and economic performance across supply chain partners. These databases also support advanced analytical designs, including time series, longitudinal panels, and time series cross-sectional models (El Baz & Iddik, 2022), which could enhance and expand upon prior research findings.

Methodology. Approximately 60 percent of the articles analyzed in our systematic literature review employed surveys as the primary method for data collection (see Section G of Table 3). However, there are promising shifts in methodological preferences over time. For instance, while nearly 80 percent of studies conducted between 2005 and 2014 relied on surveys, this figure declined to below 50 percent in the 2015–2024 period. Table 3 also indicates a notable rise in the use of case studies, archival data, and in-depth interviews during the latter decade of our review. This diversification is encouraging, as employing a mix of methodologies enhances triangulation, thereby improving internal validity, external validity, and overall realism. Moving forward, the reliance on survey methods may decline further due to challenges such as securing large cross-sectional samples and concerns over common method bias. Nonetheless, surveys are expected to retain relevance, particularly when applied within specific organizations or dyadic relationships

A notable gap in the data presented in Table 3 is the limited application of laboratory and field (quasi) experiments. Furthermore, there is significant potential to incorporate more in-depth qualitative methodologies, such as ethnographic studies. The pioneering work of Belk et al. (1988, 1989) in marketing offers a compelling example of how ethnography can be effectively utilized in academic research. Both laboratory experiments and ethnographic approaches can contribute to a more robust triangulation of findings, thereby enhancing the validity of existing studies.

Analysis. Empirical research in Sustainable Supply Chain Management (SSCM) during the early part of the 20-year review period was heavily dependent on descriptive statistics, with 54.29% of studies relying on such methods (as shown in Section H of Table 3). This reliance significantly declined to below 12% between 2015 and 2024, aligning with a broader trend in supply chain research towards more advanced analytical techniques. This shift is encouraging for two primary reasons. First, descriptive statistics often fall short in advancing theoretical frameworks and offering practical insights for managers. Second, despite being considered methodologically simple, many of the early studies using mean comparison tests were flawed. Specifically, a large number of univariate mean tests were conducted without proper adjustment for multiple comparisons, leading to inflated alpha levels and the potential for falsely identifying statistically significant differences. Thus, some of the early reported findings may have been misleading or invalid.

In the 2015–2024 period, the reliance on summary statistics declined, with researchers increasingly employing more sophisticated analytical techniques. These included regression analysis, structural equation modeling (SEM), path analysis, and robust qualitative data methodologies to explore inferential relationships. Factor analysis was also used more frequently to evaluate the validity of measurement constructs. Notably, while only about 10% of the studies over the full 20-year span incorporated moderating variables or tested for interaction effects (as indicated in Section I of Table 3), the proportion rose from 6.25% in the earlier years to over 13% during the 2015–2024 timeframe.

There has also been a rise in the adoption of innovative methods within traditional analytical frameworks. For instance, Tate et al. (2010) employed a novel technique center resonance analysis to explore corporate social responsibility (CSR) reports from 100 top sustainability-driven firms. This approach enabled them to gain deep insights into how these organizations embed the triple bottom line across both their internal operations and extended supply chains. Similarly, social network analysis has emerged as a promising tool for examining inter-actor relationships, shifting the focus from the actor as the unit of analysis to the relationships among them. Looking ahead, the application of advanced econometric techniques is expected to increase, particularly as researchers turn to archival data to test theoretically grounded models.

Lastly, less than 4 percent of the articles reviewed in our study employed conceptual theory building as a methodology to develop or enhance theoretical understanding. The discipline of supply chain management has traditionally drawn upon theories from related domains such as the resource-based view from strategic management, institutional theory from sociology, and transaction cost economics from economics. This trend is similarly observed within Sustainable Supply Chain Management (SSCM). However, considering the relatively early stage of sustainability as a research domain and the crucial role supply chains play in advancing organizational sustainability goals, SSCM presents a valuable opportunity for original theory development. While Carter and Rogers (2008), laid the groundwork with an initial theoretical framework, there remains substantial scope for further scholarly contributions in this area.

One possible explanation for the limited use of conceptual theory development in SSCM research is the insufficient methodological training among supply chain management scholars in this particular approach. This gap in expertise likely hinders both the inclination to pursue conceptual theory building and the quality of such research efforts.

CONCLUSION AND RECOMMENDATION

It is important to acknowledge that many of the patterns identified in our data reflect a broader movement toward increased methodological rigor in supply chain management research as a whole. Nevertheless, these detailed analyses and the emerging trends they reveal underscore the wealth of compelling research opportunities in the domain of Sustainable Supply Chain Management (SSCM). As highlighted in the introduction, SSCM is not a fleeting trend, but a long-term strategic focus. The overarching theme of sustainability and its essential integration with supply chain processes indicates that sustainability represents a fundamental prerequisite for conducting business in the 21st century. Supply chain management, therefore, stands at the core of this evolving business mandate. We hope that our systematic literature review, informed by our perspectives and experiences, serves as a valuable foundation for advancing future research in this vital and dynamic area of supply chain management.

Now more than ever, Sustainable Supply Chain Management (SSCM) has become essential for building business models that support long-term strategic goals. However, it's important to recognize that adopting this approach involves more than isolated or reactive actions it demands a fundamental shift in mindset. Managers must adopt a holistic approach that balances social, economic, and environmental performance. Implementing sustainable practices within supply chains can be a lengthy and challenging process, often deterring businesses from pursuing eco-friendly solutions. Nevertheless, challenges faced by one organization can present valuable opportunities for others.

Business managers and aspiring entrepreneurs with strong problem-solving abilities must understand both the limitations and opportunities of Sustainable Supply Chain Management (SSCM). This article provides valuable insights for business practitioners and researchers alike, offering key concepts and models that can support the development and implementation of long-term strategies aligned with the Sustainable Development Goals (SDGs).

By applying the suggested frameworks and guidelines, organizations can enhance the benefits of SSCM while minimizing implementation challenges. It's important to note that the concepts outlined here serve as general starting points for initiating sustainable practices. These should be further adapted with performance metrics and strategic goals tailored to the unique characteristics of each supply chain and the expectations of external stakeholders.

Both the literature review and the authors' perspectives highlight the critical importance of incorporating SDGs into supply chain strategies. These global goals should form the foundation for building resilient, sustainable, and future-ready supply chain solutions.

Based on the literature reviewed and the key considerations of this study, the following conclusions can be drawn:

- There is a strong alignment between the Sustainable Development Goals (SDGs) and practices within Sustainable Supply Chain Management (SSCM). Integrating the SDGs into supply chain processes can create powerful synergistic effects that enhance sustainability outcomes.
- Managers require clear guidance on how to incorporate the SDGs into supply chain operations. The proposed model in this study offers a structured approach to highlight and clarify the interconnections between sustainable development, supply chain management, and the SDGs. This integration opens up new avenues for research and strategic thinking.
- Successfully embedding the SDGs into supply chain operations demands a heightened level of engagement across all stakeholders in the value chain. It requires a shift in how strategic decisions are made and how daily operations are aligned to support broader sustainability objectives.

Given these insights, the study opines that individual efforts when combined can address complex global challenges. Collaborative action within supply chains has the potential to generate compounding benefits in the fight against poverty, hunger, inequality, and climate change. The SDGs represent a call to action not just for political leaders and governments but also for the business community. In driving long-term sustainable development, supply chains hold a pivotal and dynamic role as catalysts of transformation and as managers of deeply interconnected systems.

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