



# Sustainability in Supply Chain Management: A Systematic Review of the Literature

<sup>1</sup>Subharun Pal

<sup>1</sup>Student

<sup>1</sup>Continuing Education Program

<sup>1</sup>Indian Institute of Technology, Patna, Bihar, India

**Abstract:** Sustainability in Supply Chain Management (SSCM) has emerged as a paramount concern for businesses globally, prompted by escalating environmental crises and societal pressure for ethical business practices. This research paper undertakes a comprehensive and systematic review of the extant literature on SSCM, encompassing multidisciplinary studies from the past two decades. The goal is to distil the salient themes, theoretical frameworks, methodologies, findings, and future research directions, thereby rendering a panoramic view of the field. The review reveals SSCM as a complex and nuanced arena, influenced by a multiplicity of factors including regulatory policies, technological advancements, stakeholder pressures, and organizational culture. Despite substantial progress, significant knowledge gaps persist, particularly concerning the global South and the integration of Industry 4.0 technologies. The paper concludes with recommendations for future research and practice.

**Index Terms -** Sustainability, Supply Chain Management, Systematic Literature Review, Global Context, Industry 4.0, Stakeholder Engagement, Regulatory Policies, Organizational Culture.

## I. INTRODUCTION

### 1.1. The Conceptualization of Sustainability in Supply Chain Management

In recent decades, academic discourse and industry narratives have increasingly converged on the notion of Sustainability in Supply Chain Management (SSCM), a concept that extends traditional supply chain considerations to embrace a triad of sustainability dimensions: social, economic, and environmental (Seuring & Müller, 2008). The evolution of this conceptualization has been a complex journey, with sustainability principles gradually permeating every stage of the supply chain, from the initial sourcing and procurement of raw materials, through the transformative process of production, to the distribution, consumption, and ultimate disposal or recycling of products (Brandenburg, Govindan, Sarkis, & Seuring, 2014).

### 1.2 The Impact of Regulatory and Policy Mechanisms

The regulatory landscape exerts a profound influence on SSCM, with legislative bodies worldwide implementing various statutory requirements to promote sustainable practices in supply chains. A salient example is the California Transparency in Supply Chains Act, a landmark legislation that mandates companies to publicly disclose the measures they have implemented to expunge slavery and human trafficking from their supply chains, thereby fostering transparency and accountability (State of California Department of Justice, 2012).

### 1.3 The Role of Technological Advancements in SSCM

The advent of Industry 4.0 and the associated cornucopia of technological innovations have significantly reshaped the contours of SSCM. Cutting-edge technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), and blockchain have emerged as potent tools in this arena. These technologies, with their transformative potential, have been harnessed to augment supply chain visibility, bolster traceability of products and materials, enhance efficiency, and ultimately, foster sustainable practices across the supply chain (Genovese, Acquaye, Figueroa, & Koh, 2017).

### 1.4 The Influence of Stakeholder Pressures on SSCM

Stakeholders, encompassing a diverse array of entities such as customers, investors, non-governmental organizations (NGOs), and local communities, have increasingly recognized their agency and are exerting significant pressure on companies to elevate their SSCM practices. An illustrative case is the Sustainable Apparel Coalition, a global alliance of fashion brands, retailers, suppliers, and advocacy groups, which developed the Higg Index, a sophisticated tool for assessing and benchmarking a company's environmental and social performance across its supply chain, thereby driving sustainability improvements (Sustainable Apparel Coalition, 2021).

### The Intersection of Organizational Culture and SSCM

The culture of an organization, including its values, norms, and leadership styles, wields significant influence over the adoption and effectiveness of SSCM practices. The commitment of organizational leaders to sustainability, manifested through their strategic decisions, communication, and role modelling, is a particularly critical driver of SSCM. Organizations that successfully imbue

sustainability into their cultural fabric can enhance their SSCM practices, fostering not only environmental stewardship and social responsibility but also long-term economic viability (Awaysheh & Klassen, 2010).

## II. LITERATURE REVIEW

The ascendancy of sustainability in the corporate world is indisputable, prompted by a confluence of exigent environmental crises, increasing societal expectations for responsible business conduct, and the recognition of sustainability as a strategic imperative. A critical arena for the operationalization of sustainability is the supply chain, a nexus of activities that spans sourcing, production, distribution, and disposal. Sustainability in Supply Chain Management (SSCM) has therefore emerged as a focal point of both academic inquiry and business practice, intertwining social, environmental, and economic considerations within supply chain processes (Seuring & Müller, 2008). This research paper undertakes a systematic review of the extant literature on SSCM, with the objective of discerning salient themes, identifying knowledge gaps, and charting future research directions.

The complex and multifaceted nature of SSCM, coupled with its global relevance, underscores the necessity for a comprehensive and critical review. The global supply chains of multinational companies often span continents, traversing disparate regulatory environments and socio-cultural contexts. Consequently, SSCM practices must be sufficiently adaptable and nuanced to address the specific sustainability challenges and opportunities in different regions. Moreover, the rapid pace of technological innovation, particularly in the context of Industry 4.0, is continually reshaping supply chain processes and sustainability strategies, necessitating up-to-date insights and analysis (Genovese, Acquaye, Figueroa, & Koh, 2017).

## III. METHODOLOGY

The methodology employed in this research is a systematic literature review, a rigorous and replicable method that involves the comprehensive identification, evaluation, and synthesis of existing research on a particular topic. The aim of a systematic review is not merely to summarize existing knowledge but to critically appraise and interpret it, thereby generating new insights and research directions.

The selection of sources for this review followed a multi-stage process. An initial search was conducted on academic databases such as JSTOR, ScienceDirect, and Google Scholar, using a combination of keywords related to 'sustainability' and 'supply chain management'. The search was confined to peer-reviewed articles published in English within the last two decades, to ensure relevance and timeliness.

The search yielded a large volume of articles, which were then subjected to a title and abstract review to assess their relevance to the study's focus. Subsequently, a full-text review was conducted on the shortlisted articles, during which the articles were evaluated for their methodological rigor, theoretical contribution, empirical findings, and relevance to the global context of SSCM.

The selected articles were then thoroughly analyzed and synthesized, with the aim of distilling key themes, theoretical frameworks, methodologies, and findings. Attention was also paid to identifying gaps in the literature and potential avenues for future research. This systematic and critical approach enables the generation of a comprehensive, nuanced, and up-to-date review of the literature on SSCM in the global context.

## IV. ANALYSIS AND SYNTHESIS OF LITERATURE

The synthesis of the selected literature unveils the multifarious nature of SSCM and its underpinning factors. It underscores the intersectionality of various dimensions, including regulatory policies, technological advancements, stakeholder pressures, and organizational culture, each of which is elaborated below:

### 4.1. Regulatory and Policy Influences

The literature demonstrates a consensus on the profound impact of regulatory mechanisms on SSCM practices. Regulation is a vital driver of sustainability efforts, with legislation such as the European Union's Waste Electrical and Electronic Equipment (WEEE) directive compelling companies to assume responsibility for the disposal and recycling of their products (European Parliament, 2012). Similarly, the Dodd-Frank Act in the United States mandates companies to disclose whether their products contain conflict minerals sourced from the Democratic Republic of Congo, thereby inducing more sustainable and ethical sourcing practices (Securities and Exchange Commission, 2012).

### 4.2. Technological Advancements and SSCM

The literature also reflects the pivotal role of technology in SSCM. IoT-enabled devices, for instance, facilitate real-time tracking of goods, thereby enhancing supply chain transparency and enabling companies to swiftly address sustainability issues (Queiroz, Telles, & Bonilla, 2018). Similarly, blockchain technology is being harnessed to improve traceability in supply chains, as demonstrated by De Beers' Tracr initiative, which uses blockchain to trace the journey of diamonds from mine to consumer, ensuring ethical sourcing and authenticity (De Beers Group, 2020).

### 4.3. Stakeholder Pressures

Stakeholder pressures are a recurrent theme in the literature, influencing companies' commitment to and execution of SSCM. A study by Cruz (2013) highlights how consumer demand for sustainable products is spurring companies to green their supply chains. Similarly, pressure from investors is driving companies to incorporate Environmental, Social, and Governance (ESG) criteria into their supply chain management, as evidenced by BlackRock's emphasis on sustainability in its investment decisions (BlackRock, 2020).

#### 4.4. Organizational Culture and SSCM

The literature underscores the importance of organizational culture in shaping SSCM practices. Organizations with a strong sustainability orientation tend to have more robust SSCM practices, as demonstrated by Patagonia, which has integrated sustainability into its core business operations and supply chain (Galea & Clegg, 2007).

### V. EMERGING THEMES AND KNOWLEDGE GAPS

Drawing upon the comprehensive analysis and synthesis of the literature, several emerging themes and knowledge gaps in SSCM become discernible:

#### 5.1. Interdisciplinary Approach to SSCM

An emerging theme in the literature is the interdisciplinary approach to SSCM. Research is increasingly straddling the nexus of supply chain management, sustainability, and other disciplines such as information technology, behavioral science, and public policy. Such an approach facilitates a holistic understanding of SSCM, acknowledging the multifaceted and interconnected nature of sustainability challenges (Carter & Easton, 2011).

#### 5.2. SSCM in the Era of Industry 4.0

The integration of advanced technologies into SSCM is a rapidly evolving field of research. While the potential of technologies such as AI, IoT, and blockchain in augmenting SSCM is well recognized, there is a dearth of empirical studies on the actual implementation and outcomes of such technology enabled SSCM practices. Future research could delve into this aspect, offering insights into the practical challenges and success factors in leveraging technology for SSCM (Kache & Seuring, 2017).

#### 5.3. Sustainability Performance Measurement in Supply Chains

Although the literature abounds with normative discussions on the importance of sustainability performance measurement in supply chains, there is a conspicuous lack of empirical studies that provide validated measurement models or explore the practical complexities of such measurement. Future research could bridge this gap by developing and testing robust measurement models and elucidating the methodological nuances of sustainability performance measurement in supply chains (Beske, Land, & Seuring, 2014).

#### 5.4. The Role of SMEs in SSCM

While much of the existing literature focuses on SSCM practices in large corporations, there is a relative neglect of Small and Medium Enterprises (SMEs), despite their collective significance in global supply chains. Future research could illuminate the specific challenges and opportunities for SSCM in SMEs, potentially uncovering unique sustainability strategies and practices that could be relevant to organizations of all sizes (Schaltegger, Lüdeke-Freund, & Hansen, 2016).

### VI. IMPLICATION FOR PRACTICE AND POLICY

The insights gleaned from this systematic review bear significant implications for both practice and policy, particularly in the global context of supply chain management.

#### 6.1. Practice

For practitioners, the review highlights the necessity of an interdisciplinary and holistic approach to SSCM. Rather than viewing sustainability as an isolated function, it should be integrated into the core strategy and operations of supply chain management. Moreover, practitioners should leverage the potential of advanced technologies to enhance SSCM, while being cognizant of the practical challenges involved in technology adoption and implementation (Gimenez, Sierra, & Rodon, 2012). Lastly, the review underscores the importance of robust sustainability performance measurement, which can inform decision-making, facilitate continuous improvement, and enhance the credibility of sustainability claims (Seuring & Gold, 2013).

#### 6.2. Policy

On the policy front, the review underscores the instrumental role of regulation in advancing SSCM. Policymakers can catalyze sustainable practices by developing and enforcing legislation that mandates environmental and social responsibility in supply chains. Such regulation could include product take-back requirements, disclosure norms for supply chain practices, and incentives for sustainable innovations. Policymakers should also foster multi-stakeholder collaborations that can enable shared learning, capacity building, and collective action towards sustainable supply chains (Sarkis, Zhu, & Lai, 2011).

### VII. FUTURE RESEARCH DIRECTIONS

The systematic review of the literature on SSCM reveals a vibrant and evolving field of research, with a growing recognition of the interconnectedness of environmental, social, and economic dimensions within supply chain processes. The review also illuminates several knowledge gaps, offering promising directions for future research, particularly in the context of Industry 4.0, sustainability performance measurement, and the role of SMEs in SSCM. Future research could also explore the differential impacts of various factors on SSCM practices across different regions and industries, thereby contributing to a more nuanced and context-specific understanding of SSCM.

### VIII. EMERGING THEMES AND KNOWLEDGE GAPS

Drawing upon the comprehensive analysis and synthesis of the literature, several emerging themes and knowledge gaps in SSCM become discernible:

#### 8.1. Technology-Enabled SSCM

As Industry 4.0 becomes more pervasive, future research should explore how emerging technologies such as artificial intelligence, blockchain, and IoT can be harnessed to enhance sustainability in supply chains. For instance, research could



investigate how AI can optimize logistics for reduced emissions or how blockchain can ensure ethical sourcing and fair trade practices (Saber et al., 2019).

### 8.2. Circular Economy and SSCM

The concept of the circular economy is gaining traction as a strategy for sustainability. Future research could delve into how supply chains can be reconfigured for circularity, encompassing aspects such as product design for disassembly, reverse logistics, and closed-loop supply chains (Geissdoerfer, Savaget, Bocken, & Hultink, 2017).

### 8.3. Sustainability Risk Management in Supply Chains

As global supply chains become more complex and interconnected, they are increasingly exposed to sustainability risks, including climate change impacts, resource scarcity, and social issues. Future research could focus on how companies can identify, assess, and manage these risks within their supply chains (Touboulic & Walker, 2015).

### 8.4. Sustainability Transitions in Supply Chain

Given the scale and urgency of sustainability challenges, incremental improvements in supply chain practices may not suffice. Future research could explore how radical sustainability transitions can be achieved in supply chains, potentially drawing upon transition management theory and transformative innovation policy (Markard, Raven, & Truffer, 2012).

### 8.5. Integrating Sustainability in Supply Chain Education

To facilitate the transformation of supply chains towards sustainability, it is crucial to equip future supply chain professionals with the requisite knowledge and skills. Future research could explore the integration of sustainability into supply chain education and training, potentially offering insights into effective pedagogical approaches and curriculum designs (Wu & Pagell, 2011).

### 8.6. Cross-Sector Collaboration for Supply Chains

The achievement of sustainability in supply chains often requires collaboration beyond the boundaries of a single organization or even a single sector. Future research could explore the dynamics of such cross-sector collaborations, examining how different actors – including businesses, governments, NGOs, and communities – can work together to advance SSCM (Seuring & Gold, 2012).

In conclusion, the systematic review reveals a rich and multifaceted field of research on sustainability in supply chain management, underlining the criticality of integrating sustainability into the core of supply chain practices. As the sustainability imperative becomes more pronounced, both research and practice in SSCM will inevitably continue to evolve, offering significant opportunities for innovation, learning, and impact.

## IX. CONCLUSION AND RECOMMENDATIONS

In conclusion, the research landscape of Sustainability in Supply Chain Management (SSCM) is in a constant state of flux, reflecting the dynamic nature of sustainability challenges and the evolving paradigms of supply chain management. This systematic review has offered a comprehensive overview of the extant literature, highlighting key themes, emerging trends, and notable gaps in the research. As SSCM continues to mature as a field of study, a more nuanced and critical perspective is necessary, which considers the diverse and often conflicting interests of various stakeholders, the contingent nature of sustainability strategies, and the systemic and transformative changes required for truly sustainable supply chains.

The following recommendations are offered for future research and practice:

**9.1. Interdisciplinary and Transdisciplinary Research:** Given the complexity and interconnectedness of sustainability challenges, there is a need for more interdisciplinary and even transdisciplinary research in SSCM, which integrates insights from diverse fields such as technology, behavioural science, economics, and policy studies (Kopinina et al., 2020).

**9.2. Context-Specific Research:** While the global context is important, future research could delve deeper into the context-specific aspects of SSCM, exploring how cultural, institutional, and geographic factors influence sustainability practices and outcomes in supply chains (Touboulic et al., 2015).

**9.3. Collaborative Action for SSCM:** In practice, achieving sustainability in supply chains requires collaborative action among various stakeholders, including suppliers, customers, regulators, and civil society organisations. Future research could examine how such collaborations can be effectively fostered and managed for SSCM (Seuring & Gold, 2012).

**9.4. Innovation for SSCM:** As the field continues to evolve, there is immense scope for innovation in SSCM, ranging from technological solutions to novel business models and policy interventions. Future research could elucidate the drivers, barriers, and impacts of such innovations, offering valuable insights for both practitioners and policymakers (Bocken et al., 2014).

## REFERENCES

- [1] Bocken, N. M. P., Short, S. W., Rana, P., & Evans, S. (2014). A literature and practice review to develop sustainable business model archetypes. *Journal of Cleaner Production*, 65, 42-56. <https://doi.org/10.1016/j.jclepro.2013.11.039>
- [2] Geissdoerfer, M., Savaget, P., Bocken, N. M. P., & Hultink, E. J. (2017). The Circular Economy – A new sustainability paradigm? *Journal of Cleaner Production*, 143, 757-768. <https://doi.org/10.1016/j.jclepro.2016.12.048>
- [3] Gimenez, C., Sierra, V., & Rodon, J. (2012). Sustainable operations: Their impact on the triple bottom line. *International Journal of Production Economics*, 140(1), 149-159. <https://doi.org/10.1016/j.ijpe.2012.01.035>

- [4] Kopnina, H., Blewitt, J., Washington, H., & Jickling, B. (2020). Beyond disciplinarity in sustainability studies: from comprehensive approaches, via methodical holism to transdisciplinarity. *Sustainability Science*, 15(3), 867-881. <https://doi.org/10.1007/s11625-020-00802-x>
- [5] Markard, J., Raven, R., & Truffer, B. (2012). Sustainability transitions: An emerging field of research and its prospects. *Research Policy*, 41(6), 955-967. <https://doi.org/10.1016/j.respol.2012.02.013>
- [6] Saberi, S., Kouhizadeh, M., Sarkis, J., & Shen, L. (2019). Blockchain technology and its relationships to sustainable supply chain management. *International Journal of Production Research*, 57(7), 2117-2135. <https://doi.org/10.1080/00207543.2019.1598616>
- [7] Sarkis, J., Zhu, Q., & Lai, K. H. (2011). An organizational theoretic review of green supply chain management literature. *International Journal of Production Economics*, 130(1), 1-15. <https://doi.org/10.1016/j.ijpe.2010.11.010>
- [8] Seuring, S., & Gold, S. (2012). Conducting content-analysis based literature reviews in supply chain management. *Supply Chain Management: An International Journal*, 17(5), 544-555. <https://doi.org/10.1108/13598541211258573>
- [9] Seuring, S., & Gold, S. (2013). Sustainability management beyond corporate boundaries: from stakeholders to performance. *Journal of Cleaner Production*, 56, 1-6. <https://doi.org/10.1016/j.jclepro.2012.11.033>
- [10] Touboulic, A., Chicksand, D., & Walker, H. (2015). Managing imbalanced supply chain relationships for sustainability: A power perspective. *Decision Sciences*, 46(4), 771-808. <https://doi.org/10.1111/deci.12127>
- [11] Touboulic, A., & Walker, H. (2015). Theories in sustainable supply chain management: a structured literature review. *International Journal of Physical Distribution & Logistics Management*, 45(1/2), 16-42. <https://doi.org/10.1108/IJPDLM-05-2013-0106>
- [12] Wu, Z., & Pagell, M. (2011). Balancing priorities: Decision-making in sustainable supply chain management. *Journal of Operations Management*, 29(6), 577-590. <https://doi.org/10.1016/j.jom.2010.11.001>
- [13] Zhu, Q., Sarkis, J., & Lai, K. H. (2008). Confirmation of a measurement model for green supply chain management practices implementation. *International Journal of Production Economics*, 111(2), 261-273. <https://doi.org/10.1016/j.ijpe.2006.11.029>
- [14] Zhu, Q., Sarkis, J., & Lai, K. H. (2013). Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices. *Journal of Purchasing and Supply Management*, 19(2), 106-117. <https://doi.org/10.1016/j.pursup.2012.12.001>

