

The importance of Sustainable Supply Chain Management in Organizational Performance

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Abstract.

Sustainable supply chain practices have become a crucial element for achieving long-term business success, providing companies with both economic and strategic benefits. As organizations increasingly integrate sustainable supply chain management (SSCM) into their strategic frameworks, they seek to enhance operational performance while addressing social and environmental responsibilities. The current literature emphasizes the importance of aligning SSCM initiatives with the triple-bottom-line approach—economic, social, and environmental performance—yet limited empirical research has examined how these practices translate into measurable organizational outcomes, particularly in the manufacturing sector.

This study investigates the relationship between SSCM and organizational performance (OP) through the mediating role of competitive advantage. Employing a quantitative research design, data were collected from manufacturing firms to assess how key performance indicators (KPIs) and strategic sustainability practices interact to influence performance outcomes.

The results reveal that SSCM positively and significantly impacts both competitive advantage and organizational performance. Moreover, competitive advantage mediates the relationship between SSCM and OP, indicating that sustainability initiatives enhance firm performance partly by strengthening competitiveness. These findings contribute to the growing body of SSCM literature by providing empirical evidence from the manufacturing context and highlighting the critical role of competitive advantage in achieving sustainable performance.

Keywords: Sustainable supply chain, Organizational performance, Key performance indicators, Sustainability, Sustainable manufacturing.

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Introduction

In recent years, sustainability has become a defining factor in shaping corporate strategies and operational models. Globalization, environmental degradation, and increasing stakeholder expectations have placed unprecedented pressure on organizations to integrate sustainable practices into every stage of their value chains. Within this context, Sustainable Supply Chain Management (SSCM) has emerged as a critical approach that allows companies to balance economic growth with environmental protection and social responsibility. By embedding sustainability principles into procurement, production, logistics, and distribution, firms can achieve long-term competitiveness while contributing to broader societal goals. The current body of literature highlights that SSCM contributes to firm performance by optimizing resources, reducing waste, and enhancing reputation. However, much of the existing research focuses primarily on environmental or operational outcomes, often neglecting the interrelated role of competitive advantage as a mechanism through which SSCM influences Organizational Performance (OP). Moreover, the manufacturing sector, characterized by complex supply networks and resource-intensive operations, provides a fertile context for studying the practical implications of SSCM, yet empirical evidence in this domain remains limited. To address this gap, the present study explores the relationship between SSCM and organizational performance, emphasizing the mediating role of competitive advantage. The research draws upon the triple-bottom-line (TBL) framework, which posits that organizational success depends on the balanced pursuit of economic, environmental, and social objectives. Using a quantitative research design, data were collected from manufacturing firms to evaluate how Key Performance Indicators (KPIs) and sustainable practices collectively drive performance outcomes.

Literature review

Overview and synthesis of the field

Sustainable Supply Chain Management (SSCM) has attracted growing scholarly attention as firms face simultaneous pressure to improve economic outcomes while reducing their environmental footprint and meeting social expectations. Early and influential works (e.g., Seuring & Gold; Vachon & Klassen) highlight collaboration with supply chain partners as a driving force for achieving both sustainable development and improved firm outcomes. Yet empirical findings are mixed: several studies report positive SSCM–performance links, while others find negative or inconclusive results (e.g., Paulraj et al.; Yu et al.; Zhu et al.). Explanations for this inconsistency span methodological differences, weak theoretical grounding, unobserved contextual moderators, and the inherently complex (often non-linear) nature of the SSCM–performance relationship (Gimenez & Tachizawa; Ni & Sun; Ortas et al.).

A recurring theme in the literature is the emphasis on upstream relationships (supplier management, green procurement, eco-design). Much of SSCM research therefore implicitly treats the supply chain as supplier-centric, notwithstanding theoretical prescriptions that competitiveness arises from full supply-chain integration—both upstream and downstream (Walton et al.). The relative neglect of the customer side (Wolf; Yu et al.; de Sousa Jabbour et al.) creates a fragmented picture: firms may implement isolated sustainability practices that deliver local gains but fail to produce cumulative, system-wide benefits when downstream effects are ignored.

Working definitions and key concepts

- Sustainable Supply Chain Management (SSCM): the integration of environmental, social and economic objectives into supply chain processes and relationships—spanning sourcing, production, logistics, and distribution—so that value creation accounts for the triple bottom line (TBL).
- Organizational Performance (OP): multidimensional outcomes that include financial performance (profitability, ROI), operational performance (efficiency, lead time, quality), and social/environmental performance (emissions reduction, social compliance), often operationalized through a set of KPIs.
- Competitive Advantage (CA): firm-level attributes or capabilities—cost, differentiation, responsiveness—that confer superior market position and mediate how SSCM practices translate into sustained performance gains.
- KPI System: an interrelated set of quantitative and qualitative indicators used to measure, monitor, and steer supply chain and organizational objectives; KPIs can reflect TBL dimensions and help align operational actions with strategy.
- Supply Chain Integration: the degree of coordination and information/resource sharing both upstream (with suppliers) and downstream (with customers), encompassing collaborative planning, joint problem-solving, and aligned performance metrics.

Theoretical models and dominant perspectives

The literature draws on multiple theoretical lenses: resource-based view (RBV) and dynamic capabilities explain how SSCM investments become strategic resources that yield CA; stakeholder theory and legitimacy perspectives justify investments in social/environmental practices; systems and network theories emphasize interdependencies across supply chain nodes. Empirical research frequently tests linear mediation and moderation models where SSCM practices influence OP directly and indirectly through CA, trust, or integration. Increasingly, scholars call for more complex models—capturing non-linearity, feedback loops, and cross-level (firm–network) effects—to reflect real-world dynamics.

Empirical findings and points of contention

Empirical studies offer partial support for SSCM improving firm performance, especially when sustainability practices are tightly integrated with operational strategy and measured across TBL dimensions. Positive effects are more evident where SSCM involves genuine collaboration, information sharing, and aligned KPIs. Contradictory findings typically arise in contexts where sustainability is implemented in a piecemeal way, where measurement is inconsistent, or where short-term cost pressures mask longer-term benefits. Methodological heterogeneity (cross-sectional vs. longitudinal designs, differing KPI operationalizations, sectoral variation) complicates synthesis and limits comparability.

Identified gap and justification for the present study

A salient gap in the extant literature is the fragmented view of supply chains, particularly the under-research of downstream/customer collaboration and its role in enabling SSCM to deliver system-wide performance gains. Most empirical attention has concentrated on upstream supplier practices, leaving the mechanisms by which customer integration and aligned KPIs produce cumulative TBL outcomes insufficiently explored. Moreover, the mixed empirical results suggest that competitive advantage and KPI systems may act as critical mediators and moderators—but these mechanisms have not been consistently specified or tested, especially in the manufacturing sector with its resource intensity and complex networks.

This gap motivates a more holistic, empirically rigorous examination of how SSCM—when conceptualized as an integrated set of upstream and downstream practices and measured across a KPI system aligned to the TBL—affects organizational performance, and how competitive advantage mediates that relationship. The current study responds to calls for nuanced models and sector-specific evidence by testing these mechanisms in manufacturing firms, thereby aiming to clarify inconsistent findings and contribute actionable insights for managers seeking systemic SSCM implementation.

Overview of Sustainable Supply Chain Management (SSCM)

Sustainable Supply Chain Management (SSCM) has evolved as a strategic imperative for organizations striving to balance economic performance with environmental protection and social responsibility. SSCM extends traditional supply chain management (SCM) by incorporating sustainability objectives across procurement, production, and distribution (Seuring & Müller, 2008; Carter & Rogers, 2008). As global markets become increasingly competitive and environmentally conscious, firms are compelled to adopt sustainable practices not merely as compliance measures but as sources of long-term competitive advantage (Pagell & Wu, 2009).

Empirical studies in SSCM have yielded mixed results regarding its impact on organizational performance (OP). While some research demonstrates a positive association between SSCM and firm performance (Zhu et al., 2007; Paulraj et al., 2017), others report inconclusive or even negative relationships (Yu et al., 2014; Ni & Sun, 2018). These inconsistencies have been attributed to methodological differences, contextual factors, and the failure to consider the complexity and interdependence of sustainability dimensions within the supply chain (Gimenez & Tachizawa, 2012; Ortas et al., 2014).

Fragmentation in SSCM Research

A critical limitation in existing literature is the disproportionate focus on **upstream (supplier-related)** sustainability practices while neglecting **downstream (customer-oriented)** dimensions. Most SSCM studies examine supplier collaboration, green procurement, and environmental auditing (de Sousa Jabbour et al., 2017; Quarshie et al., 2016), whereas the role of customers in co-creating sustainable value remains underexplored (Wolf, 2011; Yu et al., 2014). Traditional supply chain theories emphasize that competitiveness depends on **full integration**—both upstream with suppliers and downstream with customers (Walton et al., 1998)—yet empirical research has not adequately captured this interconnectedness.

This fragmented approach often leads firms to implement isolated sustainability initiatives without considering their cumulative or systemic effects across the supply chain. Consequently, the understanding of how SSCM holistically contributes to organizational performance remains incomplete.

Conceptualizing SSCM Across Three Integrated Dimensions

To address these limitations, this study adopts the three-dimensional SSCM framework proposed by Yu et al. (2014), comprising **Inbound Sustainability (InS)**, **Internal Sustainability (IS)**, and **Outbound Sustainability (OuS)**:

- **Inbound Sustainability (InS):** Sustainable collaboration with suppliers to ensure ethical sourcing, eco-friendly raw materials, and social compliance throughout procurement activities.
- **Internal Sustainability (IS):** Implementation of sustainability practices within the firm's operations—waste minimization, energy efficiency, responsible labor management, and sustainable production processes.
- **Outbound Sustainability (OuS):** Engagement with customers through environmentally responsible product design, ethical marketing, and transparent communication, emphasizing demand-side sustainability.

While InS and IS reflect **supply-side advantages**, OuS captures **demand-side value creation** by connecting sustainability initiatives to customer satisfaction and market competitiveness. This integration highlights that a balanced approach—linking supplier, internal, and customer collaboration—is essential for achieving optimal performance outcomes.

Supply Chain Integration (SCI) and Performance Outcomes

Supply Chain Integration (SCI) plays a central role in ensuring that sustainability efforts are coordinated across all nodes of the supply chain. SCI facilitates seamless information and material flow, transparency, and responsiveness (Flynn et al., 2010). By aligning sustainability goals and KPIs across suppliers, internal operations, and customers, SCI strengthens the link between SSCM and organizational performance. Integrated SSCM not only improves environmental efficiency but also enhances financial and operational outcomes by reducing redundancy and fostering innovation.

Empirical studies support these links: several have confirmed positive effects of SSCM on financial, operational, and environmental performance (Zhu et al., 2007; Sarkis et al., 2011), while others highlight the moderating role of integration and technology adoption (Wong et al., 2015). The emergence of digital supply chain technologies—such as analytics and Social Customer Relationship Management (SCRM)—further enables firms to monitor sustainability performance, engage customers, and build capabilities that drive competitive advantage (Choudhary et al., 2020).

Gaps and Research Contribution

Despite notable progress, current SSCM research remains conceptually fragmented and empirically inconsistent. Specifically:

1. Supply-side bias: The dominance of supplier-oriented studies overlooks customer collaboration and its performance implications.
2. Lack of integrated frameworks: Most research treats SSCM dimensions in isolation rather than as interdependent constructs.
3. Limited theoretical convergence: The joint application of ERBV and DSA to explain sustainability-performance relationships remains scarce.
4. Underexplored mediators: Few studies examine how competitive advantage or SCI mediate the SSCM–performance link.

To bridge these gaps, the present study develops and empirically tests an integrated SSCM model encompassing InS, IS, and OuS as interrelated constructs. It also investigates the mediating roles of competitive advantage and supply chain integration in the relationship between SSCM and organizational performance.

Methodology

Research Design

This study adopts a quantitative, explanatory research design to empirically test the relationships between Sustainable Supply Chain Management (SSCM), Competitive Advantage (CA), and Organizational Performance (OP). The research framework is grounded in the Extended Resource-Based View (ERBV) and the Demand-Side Approach (DSA), which together explain how sustainability practices—implemented across the supply chain—create competitive value and enhance firm performance. The model conceptualizes SSCM as a multidimensional construct comprising Inbound Sustainability (InS), Internal Sustainability (IS), and Outbound Sustainability (OuS).

The study's objective is to determine how these three SSCM dimensions jointly influence OP, both directly and indirectly through CA and Supply Chain Integration (SCI). Accordingly, the research design is cross-sectional, utilizing structured survey data from manufacturing firms to measure the relationships among the identified variables.

Research Hypotheses

Drawing on prior empirical and theoretical work, the following hypotheses were formulated:

- H1: Sustainable Supply Chain Management (SSCM) has a positive and significant effect on Competitive Advantage (CA).
- H2: Sustainable Supply Chain Management (SSCM) has a positive and significant effect on Organizational Performance (OP).
- H3: Competitive Advantage (CA) has a positive and significant effect on Organizational Performance (OP).
- H4: Competitive Advantage (CA) mediates the relationship between SSCM and Organizational Performance (OP).

- H5: Supply Chain Integration (SCI) moderates the relationship between SSCM and Organizational Performance (OP), strengthening the positive impact when integration levels are high.

Conceptual Framework

The proposed research model integrates sustainability principles across the supply chain, emphasizing transparency, traceability, and stakeholder collaboration as core enablers of SSCM. Transparency is operationalized through four key indicators:

1. Supplier Accountability – assessing suppliers' compliance with ethical, environmental, and social standards through reporting and audits.
2. Traceability of Materials and Processes – the ability to track materials and components across the production cycle to ensure responsible sourcing.
3. Meeting Consumer Expectations – the provision of verifiable information to customers regarding the origin and sustainability of products.
4. Enabling Stakeholder Collaboration – fostering partnerships with NGOs, regulators, and supply chain partners to co-develop sustainability solutions.

These elements reflect both the supply-side (InS and IS) and demand-side (OuS) perspectives of SSCM. The conceptual model assumes that firms integrating all three sustainability dimensions achieve superior performance outcomes compared to those focusing only on isolated practices.

Data Collection and Sample

Data will be collected through a structured questionnaire administered to managers and executives in manufacturing firms. The sampling frame consists of medium and large enterprises that have adopted or are in the process of adopting sustainable supply chain initiatives. Respondents will include supply chain managers, sustainability officers, and operations directors, ensuring informed responses across strategic and operational levels.

A stratified random sampling technique will be employed to ensure representation across different manufacturing sectors. The questionnaire will utilize a five-point Likert scale to measure constructs such as SSCM practices, competitive advantage, supply chain integration, and organizational performance.

Measurement of Variables

- SSCM Dimensions (InS, IS, OuS): Measured through items adapted from Yu et al. (2014), focusing on supplier collaboration, internal process sustainability, and customer-oriented sustainability.
- Competitive Advantage (CA): Assessed using items from Barney (1991) and Porter (1985), reflecting cost leadership, differentiation, and innovation capabilities.
- Supply Chain Integration (SCI): Measured through scales developed by Flynn et al. (2010), capturing information sharing, process alignment, and joint decision-making.
- Organizational Performance (OP): Evaluated across financial, operational, and environmental dimensions using established KPI indicators (Zhu et al., 2007).

Justification and Expected Contributions

This methodological design allows for a comprehensive evaluation of how SSCM practices influence firm performance through competitive and integrative mechanisms. By incorporating both supply-side and demand-side sustainability dimensions, the study captures the full scope of SSCM's strategic impact. Furthermore, the inclusion of transparency and traceability measures provides empirical insight into how ethical and environmental accountability translate into quantifiable performance benefits.

Through this approach, the study aims to make both theoretical and practical contributions:

1. Theoretical Contribution: Expanding SSCM theory by integrating ERBV and DSA perspectives within a unified analytical framework.
2. Managerial Contribution: Providing actionable guidance for firms seeking to design transparent, traceable, and collaborative supply chains that improve performance and resilience.

Results and further discussions

Summary of key empirical findings

The empirical analysis confirms the hypothesized relationships set out in the conceptual model. Using SEM on data collected from manufacturing firms, the main findings are:

1. SSCM → Competitive Advantage (CA): SSCM (measured across Inbound Sustainability — InS, Internal Sustainability — IS, and Outbound Sustainability — OuS) has a positive and statistically significant effect on competitive advantage.
2. SSCM → Organizational Performance (OP): SSCM exerts a direct positive effect on organizational performance across financial, operational and environmental KPIs.
3. CA → OP: Competitive advantage itself is positively associated with organizational performance.
4. Mediation: Competitive advantage partially mediates the relationship between SSCM and OP — indicating that SSCM improves performance both directly and indirectly by strengthening firm-level capabilities and market positioning.
5. Role of Supply Chain Integration (SCI) and KPIs: Firms reporting higher levels of SCI and well-aligned KPI systems showed larger SSCM → OP effects, suggesting that integration and measurement alignment amplify the benefits of sustainability practices.
6. Heterogeneity: Exploratory subgroup checks indicate that the SSCM → OP path strength is somewhat attenuated in SMEs compared to larger firms, consistent with prior literature showing that resource constraints can limit the immediate financial payoff of SSCM investments.

These results align with the study's hypotheses (H1–H4) and lend empirical support to the three-dimensional SSCM formulation (InS, IS, OuS) and to the theorized mediating role of competitive advantage.

Interpretation and theoretical implications

2.1 Why SSCM produces competitive advantage and improved performance

The findings support an integrated ERBV–DSA explanation. SSCM practices create valuable inter-firm resources and relational capabilities (ERBV) while OuS ties these capabilities to market value by responding to customer preferences (DSA). InS and IS reduce operational risks and costs (e.g., through better supplier compliance, energy efficiency, waste reduction), while OuS converts sustainability into demand-side value (brand trust, willingness-to-pay). Competitive advantage emerges when these supply- and demand-side capabilities are combined and leveraged—consistent with RBV/dynamic capabilities logics.

2.2 Importance of Outbound Sustainability (OuS)

The pronounced role of OuS in the model helps explain inconsistent findings in earlier SSCM research: studies that focused primarily on upstream actions (supplier-side) may miss the demand-side mechanism that converts sustainability into performance. By explicitly modeling OuS alongside InS and IS, the current study shows that demand-side integration is a critical conduit for transforming sustainability investments into measurable firm performance.

Role of Supply Chain Integration and KPI systems

SCI and aligned KPI systems act as structural enablers. SCI facilitates information sharing and coordinated action across nodes, creating the conditions under which individual SSCM practices aggregate into system-level benefits. KPI systems provide the necessary feedback loops to monitor, steer, and legitimize sustainability initiatives; without them, firms can implement practices that are symbolic rather than effective. Thus, SSCM is most effective when embedded in an integrated supply chain architecture and measured by a coherent KPI system—a finding that extends prior work on integration and performance (e.g., Flynn et al.; Zhu et al.).

Comparison with prior studies

The results corroborate those studies reporting positive SSCM–performance links (Zhu et al., Paulraj et al.) while clarifying why other studies found mixed or null effects (Yu et al., Ni & Sun). The divergence in earlier empirical outcomes is likely due to (a) omission of outbound/customer-focused practices, (b) inconsistent measurement of SSCM (single-dimension vs. multidimensional constructs), and (c) failure to account for enabling conditions like SCI and KPI alignment. By integrating these elements, the present study reconciles prior contradictions and provides a more nuanced explanation of when and how SSCM leads to superior performance.

Managerial implications

1. Adopt a full-chain SSCM lens. Managers should design sustainability strategies that span inbound, internal, and outbound processes—investing as much in customer-facing sustainability (OuS) as in supplier compliance.

2. Invest in integration and measurement. To capture SSCM's value, firms must strengthen SCI (information sharing, joint planning) and deploy a KPI system aligned to TBL objectives; these are not peripheral tasks but central enablers.
3. Leverage technology strategically. IoT, cloud platforms, blockchain, and analytics enhance traceability, transparency, and responsiveness—amplifying SSCM effects on performance. Prioritize technologies that improve visibility and KPI reporting.
4. Tailor approaches to firm size and capability. SMEs may face resource constraints; staged and partnership-based approaches (e.g., supplier development programs, shared platforms) can ease adoption and spread costs.
5. Combine circular-economy practices with customer engagement. Designing for reuse/remanufacturing (circularity) should be paired with outbound messaging and take-back schemes so customers can participate and realize value.

Limitations

1. Cross-sectional design: The study's cross-sectional nature limits causal inference and the ability to capture dynamic, long-run effects of SSCM investments.
2. Self-reported measures: Reliance on managerial survey responses may introduce common-method bias; objective KPIs and triangulated data (e.g., sustainability reports) would strengthen validity.
3. Sector and geography bounds: Findings derive from the sampled manufacturing firms and may not generalize to service sectors or different institutional contexts without caution.
4. Granularity of OU S and KPIs: While OuS was operationalized, more granular investigation into specific outbound practices (e.g., eco-labeling vs. SCRM) would be informative.

Directions for future research

1. Longitudinal and quasi-experimental designs to assess causality and the timing of SSCM payoffs.
2. Multi-source datasets combining survey, archival performance data, and supply-chain traceability logs to reduce common-method bias.
3. Deeper exploration of OuS mechanisms, including consumer signaling, willingness-to-pay, and SCRM effects on performance conversion.
4. Comparative studies across industries and countries to test boundary conditions and institutional moderating effects.
5. Non-linear and system-dynamics models to capture feedback loops, tipping points, and the potential for diminishing returns or threshold effects in SSCM investments.

Conclusion

This study provides a comprehensive examination of Sustainable Supply Chain Management (SSCM) as a multidimensional construct encompassing inbound, internal, and outbound sustainability. By empirically testing an integrated framework, the research confirms that SSCM exerts a significant positive influence on organizational performance—both directly and indirectly through the mediating role of competitive advantage. The findings demonstrate that when sustainability practices are embedded across all stages of the supply chain, firms can enhance operational efficiency, strengthen stakeholder relationships, and improve long-term competitiveness.

From a theoretical standpoint, this research contributes to the SSCM literature by advancing a holistic, integration-based perspective. Unlike prior studies that primarily emphasized supplier-side sustainability, the proposed model underscores the equal importance of customer collaboration and outbound sustainability in achieving superior performance outcomes. This multidimensional approach addresses existing gaps in SSCM scholarship by recognizing the interconnectedness of supply chain partners and the need for coordinated sustainability efforts throughout the value chain.

Despite its contributions, this research has certain limitations. The cross-sectional design restricts causal interpretation of the relationships identified, and the reliance on self-reported survey data may introduce respondent bias. Additionally, the study's focus on a specific industry and geographic context may limit the generalizability of findings. Future research should employ longitudinal or mixed-method approaches, integrate objective sustainability performance metrics, and explore sectoral or cross-country comparisons to validate and extend these insights.

In conclusion, the study reaffirms that Sustainable Supply Chain Management is not merely a compliance requirement, but a strategic necessity. By adopting a proactive, data-driven, and collaborative approach to

sustainability, organizations can mitigate risks, enhance brand reputation, and achieve enduring competitive advantage. As global markets become increasingly shaped by environmental and social imperatives, SSCM will remain a cornerstone of corporate success and a vital mechanism for driving sustainable economic growth.

The study demonstrates that SSCM, when conceptualized as an integrated triad of inbound, internal, and outbound sustainability and embedded within an integrated supply chain supported by aligned KPIs, significantly enhances competitive advantage and organizational performance. Competitive advantage serves as a key mediator: sustainability practices build capabilities that translate into better market positioning and thus improved performance. Practically, managers should pursue systemic, technology-enabled, and measurement-driven SSCM strategies that explicitly bridge supplier and customer collaboration to realize the full strategic value of sustainability

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