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Green Supply Chain Management in SMEs: A Conceptual Framework for Integrating Operational Performance and Green Organizational Culture

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Abstract **Review Article**

This conceptual paper integrates the Natural Resource-Based View (NRBV) and Resource Dependency Theory (RDT) to propose a framework that connects Green Supply Chain Management (GSCM) practices to economic performance in SMEs, with operational performance as a mediator and green organizational culture as a moderator. This study addresses a gap in existing research by theorizing the interaction between internal capabilities (operational efficiency) and external dependencies (green culture) in influencing economic outcomes, despite past studies focusing on the direct effects of GSCM. This study contends that in Nigeria's food and beverage manufacturing sector, the mere adoption of GSCM is inadequate without the alignment of organizational culture and operational processes. The approach presents testable hypotheses for forthcoming empirical research and furnishes policymakers and SME managers with insights on using green practices for competitive advantage.

Keywords: Natural Resource-Based View (NRBV), Resource Dependency Theory (RDT), Green Supply Chain Management (GSCM), Economic Performance, Operational Performance, and Green Organizational Culture.

INTRODUCTION

Environmental sustainability has become central to business strategy over the past few decades, which means that it is necessary to consider environmentally friendly activities in the business, which should be involved in the company (Zhang et al., 2024). Green Supply Chain Management (GSCM), including sustainable design, supply, production, and transportation, has become a serious solution to minimizing the destruction of the environment and maximizing the financial status (Chen & Li, 2024). Although multinational corporations were at the forefront of implementing GSCM, it has different challenges when applied in the context of the developing economy and in SMEs in countries such as Nigeria because they have limited digital infrastructures, financing options, and uncertainty related to regulations (Ofori & Jia, 2025; Adebanjo et al., 2024).

Food and beverage manufacturing, which accounts for a major percentage of Nigeria's GDP (NBS, 2023), is a very resource-intensive industry that produces a lot of waste and emissions. GSCM is not only an ethical requirement for the SMEs in this industry but has also become a strategic requirement to comply with the increasing number of environmental regulations, demand by more and more consumers for sustainability of products, and long-term periodic cost benefits (Ngo & Nguyen, 2025). Nonetheless, there are disparities in the empirical evidence regarding the economic gains of GSCM to SMEs of Nigeria. On one hand, enhanced profitability with operational efficiencies is found using some studies (Gupta et al., 2024), whereas insignificant or even negative short-term returns are found with high implementation costs, and technology barriers are another aspect that has been reported (Almeida & Sousa, 2025). These contradictory results indicate that the financial effectiveness of GSCM can be mediated by such factors as operational performance and moderated by such aspects as the organizational culture (Kim & Park, 2025; Abdullah et al., 2024).

The developments in recent digital technologies (in the form of AI, blockchain, etc.) and the dynamic policy frameworks provide new opportunities that SMEs can use to break the traditional barriers of adoption (Zhang et al., 2024; Adebanjo et al., 2024). The interaction among these innovations, internal

operational strengths, and preparedness in terms of culture is, however, less understood in a resource-constrained setting (Rodrigues et al., 2025). This literature helps fill these gaps since the study presents how the Nigerian SMEs may gain competitive advantages using the GSCM practices, including both operational mediation ELF and cultural moderation effects.

Research Gap

Even though there is increasing research on Green Supply Chain Management (GSCM), discrepancies exist in the literature on the effectiveness of GSCM on the performance of the economy, especially SMEs in developing economies such as Nigeria. Whereas other studies suggest that green design and manufacturing are some of the GSCM practices that received beneficial outcomes of cost savings and enhanced market competitiveness (Amjad et al., 2022; Le, 2020), others argue that the financial returns are so minor or even negative since implementation costs are estimated to be very high and cause a major disruption of operations (Qalati et al., 2022; Younis et al., 2016). This mismatch points to a massive gap in the knowledge of how the mechanism works that leads to economic benefits of GSCM to the SMEs.

The major constraint of earlier studies is the high proportion of the studies that concentrate on the direct connections between the GSCM practices and the economic performance and that ignore the mediating role of the operational performance. GSCM measures might curtail wastage and power use; however, the overall economic development might hinge on whether this green development carries over to measurable operational benefits, which can be lower production expenditures, better quality of products, or rapid shipping. This mediating pathway has only been explored in very few studies that are quite empirical, and the question of how such operational improvements fill the gap between the GSCM adoption and the financial outcomes is yet to be answered.

Additionally, literature has been silent to an extent on how green organizational culture has been set in context to determine the effectiveness of GSCM practices. Shared values and norms that focus on sustainability and are called organizational culture may facilitate or inhibit the implementation of green initiatives (Wang, 2019). As an example, SMEs that have a high green culture are likely to better allocate the behavior of employees, supplier relations, and internal procedures to the objectives of sustainability, thus increasing economic payoffs of GSCM. The opposite is also true: that in a company where there is a peripheral focus on human environmental issues, even a properly framed GSCM initiative is unlikely to bring about expected changes because of resistance or lack of alignment. However, the effect of green culture on mediating the relationship between operational performance and economic performance is unexplored, especially in resource- and demand-intensive environments of the SMEs, where cultural transformation is both gradual and difficult to achieve.

Such gaps are essential to be addressed in both theory and practice. In theory, mediation and moderation mechanisms can help in bridging the gap between such conflicting results in GSCM literature by explaining the reason why some SMEs have gained an economic advantage, whilst others did not. In practice, those insights would allow policymakers and SME managers to recognize the most optimal levers that can be applied to maximize sustainable profitability, which can be operational improvements, cultural shifts, and specific GSCM investments. The proposed conceptual framework that suggests relationships between GSCM practices, economic performance, operational performance (mediator), and green culture (moderator) allows this study to offer a more refined knowledge of the circumstances in which GSCM efforts can be profitable to SMEs in the emerging economies.

Research Objectives

The aim of this conceptual paper would be to:

1. Present a model between GSCM activities and economic performance through operations performance (mediator) and green culture (moderator).
2. Formulate propositions that can become the bases of imaginary studies in the future.
3. Provide viable suggestions SMEs can make as they attempt to create a venture that is both sustainable and profitable.

Significance of the Study

This study makes several important contributions to theory, practice, and policy. From a theoretical perspective, it advances the literature on Green Supply Chain Management (GSCM) by integrating the Natural Resource-Based View (NRBV) and Resource Dependency Theory (RDT) into a unified framework. While prior research has often examined GSCM practices in isolation, this study provides a more nuanced understanding of how internal capabilities (e.g., operational performance) and external influences (e.g., green organizational culture) interact to shape economic outcomes. By explicitly modeling operational performance as a mediator and green culture as a moderator, the framework helps reconcile conflicting findings in existing studies and offers a clearer pathway for future empirical research on sustainable supply chains in SMEs.

For practitioners and SME managers, the study offers actionable insights into how to implement GSCM practices effectively. Many SMEs struggle with the perceived trade-off between sustainability and profitability, often viewing green initiatives as costly compliance measures rather than strategic investments. This research highlights that the economic benefits of GSCM are not automatic but depend on improving operational efficiencies—such as waste reduction, energy savings, and process optimization—while fostering a workplace culture that prioritizes environmental responsibility. By identifying which GSCM practices (e.g., green design, manufacturing) have the most direct impact on performance and how organizational culture can amplify these effects, the study provides SME leaders with a roadmap for aligning

sustainability efforts with business growth.

At the policy level, the findings have important implications for governments and industry regulators seeking to promote sustainable development in emerging economies. In Nigeria and similar contexts, SMEs often face barriers such as limited access to green technologies, financial constraints, and weak regulatory enforcement. The study suggests that policymakers should move beyond generic awareness campaigns and instead design targeted interventions—such as tax incentives for eco-friendly process upgrades, training programs on operational efficiency, and platforms for knowledge-sharing among SMEs—to accelerate GSCM adoption. Additionally, by emphasizing the role of green organizational culture, the study underscores the need for policies that encourage leadership commitment to sustainability, such as certification schemes or awards for firms that demonstrate measurable progress in embedding environmental values into their operations. Ultimately, this research contributes to broader discussions about how SMEs can participate meaningfully in global sustainability transitions while remaining competitive in local markets.

By bridging theory and practice, the study not only enriches academic discourse on GSCM but also provides tangible guidance for stakeholders across the SME ecosystem—from entrepreneurs and supply chain managers to policymakers and sustainability advocates. Its interdisciplinary approach ensures relevance for diverse audiences interested in the intersection of environmental management, operational strategy, and economic performance in resource-constrained settings.

Structure of the Paper

This paper will go as follows:

- In section 2, the literature reviews of GSCM, operational performances, and green culture are reviewed.
- The part deals with the conceptual framework and propositions represented in section 3.
- Section 4 talks about the theory, practice, and policy implications.
- The final section of the report, section 5, will conclude by giving future directions of research.

Filling the perceived gaps between the theory and practice, the proposed study would give a guideline to small and medium-sized enterprises to cope with the realities of sustainable supply chain management in resource-constrained settings.

LITERATURE REVIEW

Green Supply Chain Management in the Digital Era

Technologically speaking, the recent research contributed majorly to the knowledge advancement on Green Supply Chain Management (GSCM). Particularly as far as real-time monitoring of the environmental implications of the supply chains is concerned, the article authored by Zhang et al. (2024) proves the influence artificial intelligence and internet of things technologies had on the revolutionization of the sustainable operations. Findings that they gave reveal that the small and medium-sized manufacturing enterprises (SMEs) that are having digitally connected GSCM systems can cut down on their carbon emission by 1822 percent as well as increase their cost efficiency. Along with this fact, Chen and Li (2024) provide empirical evidence on Asian markets that indicates how the introduction of blockchain technology potentially leads to superior visibility of green procurement relations, thus addressing the problems of materials tracking and supplier certification, which are not considered to be eliminated in the long run. However, the authors of the cross-African study conducted by Ofori and Jia (2025) describe the digital tools as essential means of helping conquer the historical opposition present when implementing a circular economy in resource-constrained environments. Precisely, small and medium-sized enterprises (SMEs) attach particular importance to such technological changes.

Operational Performance as a Mediating Mechanism

The last couple of years have encouraged a greater nuanced understanding of what the role of operational performance as a mediator is. In the study by Gupta et al. (2024), the lean-green synergy in the case of small and medium-sized manufacturing firms (SMEs) is quantified to prove that GSCM approaches improve the important indicators of operation, such as production output and inventory turnover, by 12-15 percent. An analysis of these findings shows that these operational gains explain about six in every ten economic values generated as a direct result of the adoption of GSCM. Almeida and Sousa use this technique to apply to Industry 4.0 settings, showing that the incorporation of digital GSCM with European automotive supply lines has operational effectiveness enhancements of 20-25% compared with standard GSCM systems (Almeida and Sousa 2025). Wang et al. (2024) caution that the relation is very context-specific when applied to small and medium-sized enterprises (SMEs) differing in the level of digital readiness; the results of the study, nevertheless, confirm that the mediation effects do increase with the extent of technology.

The Evolving Role of Green Organizational Culture

Recent research has also contributed a lot to our understanding of the reasons behind the culture that supports the effectiveness of GSCM. A cross-national study on the effectiveness of GSCM across 23 countries done by Kim and Park (2025) indicates that variance in the effectiveness of GSCM implementation in different institutional contexts is elucidated by green organizational culture to the extent of 38-42 percent. In their findings, the cultural aspect of long-term orientation is important in the maintenance of GSCM projects, which is a major insight. Abdullah et al. (2024) identify particular human resource management practices that lead to successful development of green culture in Southeast Asian small and medium-sized firms (SMEs). The leadership commitment and the training programs on the environment are

the main issues that were found to be most influential. Rodrigues et al. (2025) suggest a supplement to such approaches as the Natural Resource-Based View, which will take into account dynamic capabilities to change the organizational culture in response to the changes in the technological environment of a sustainable supply chain, showing the increasing importance of said cultural aspects in the ongoing process of digital transformation.

Theoretical and Practical Advancements

Theoretical developments have largely contributed to the increase of the NRBV-RDT scheme underlying GSCM research. In another study by Hassan and Lee (2024), the authors enhance the Resource Dependency Theory by coming up with a model of stakeholder salience. This model is more elaborate in explaining the trends of GSCM adoption patterns in developing economies, such as the reduction of power disparities in buyer-seller relationships. The work by Ngo and Nguyen (2025) provides realistic frameworks that small and medium-sized firms (SMEs) in new markets can embrace global supply chain management (GSCM) even when they do not have the necessary amounts of resources. Instead, they focus on gradual change measures in correspondence to realistic preparation steps. These empirical findings are supported by the policy study conducted by Adebanjo et al. (2024). The policy analysis reveals that the green supply chain management in African industry should be implemented as fast as possible, which requires three locations of the main interventions. The intervention areas include the promotion of digital infrastructure, the realization of a green finance framework, and the execution of capability-building initiatives.

Emerging Research Frontiers

Recent evidence suggests that a lot of different avenues should be explored through research. Generative artificial intelligence is still promising when applied to the role of an assistant in the GSCM decision-making process but needs extended empirical authentication (Zhang et al., 2024). The connection between the circular and green supply chain management requires additional studies that should focus on small and medium-sized firms (SMEs), especially scalability (Ofori & Jia, 2025). The aspects of technology in sustainable supply chains in terms of culture are under-researched, particularly in the poor economies (Abdullah et al., 2024). Since all of them are gaps in the context of GSCM implementation, there is an immense future research opportunity to ferment technological, operational, and cultural perspectives in context.

Conceptual Framework

The paper is a conceptual study that synthesizes the systems of mediating and moderating variables, focusing on the role of Green Supply Chain Management (GSCM) practices on the economy of SMEs in Nigeria. Improving on the Natural Resource-Based View (NRBV) and Resource Dependency Theory (RDT), the framework has seemingly posited that the GSCM practices, including green design, green purchasing, green manufacturing, and green transportation, have influences on economic performance in terms of two major channels: directly through resource efficiency and indirectly based on improved performance of operations (Rodrigues et al., 2025; Zhang et al., 2024).

The framework puts the operational performance front and center and in the middle of two variables to fill the gap between GSCM adoption and financial performance. Recent papers by Gupta et al. (2024) and Almeida and Sousa (2025) establish that there are several operational efficiencies that are demonstrated in GSCM practices, especially in the movement of green manufacturing and digitally enabled logistics, which in turn stimulates cost reductions and revenue growth. Nevertheless, this mediation is stronger in some practices compared to others: whereas green design and green production have a high tendency to directly result in monetary profit, green purchasing and green transportation depend more on operational efficiencies in order to result in profitability (Ofori & Jia, 2025).

One of the major contributions of this framework is the use of green organizational culture as a moderator, because it magnifies the interaction between operational performance and the resulting economic results. The studies by Kim and Park (2025) and Abdullah et al. (2024) support the fact that SMEs having high sustainability-oriented cultures—that is, leadership commitment, employee engagement, and aligned incentives—have much better opportunities to exploit their efficiencies in the operations. As an example, companies that incorporate environmental values into their base operations receive better returns on GSCM investments because the former have smoother implementation, stakeholders trust the companies more, and the companies have better capacities in innovation (Ngo & Nguyen, 2025).

The presented framework also addresses the contextual issues specific to non-digital infrastructure and stigmatizing regulations in Nigerian SMEs, i.e., poor digitalization and regulatory fragmentation (Adebanjo et al., 2024). According to the RDT, it puts an emphasis on how external pressures (such as customer demand and policy reforms) can be coupled with internal capabilities to effect GSCM adoption (Hassan & Lee, 2024). As an example, the use of blockchain solutions can help enhance transparency in green procurement (Chen & Li, 2024), and it will at least be neutralized until the company is prepared and its new technologies are acceptable culturally (Zhang et al., 2024).

Propositions:

1. Direct effects: Green design and manufacturing have positive influences on the economic performance in the sense that they are resource- and product-differentiated (Rodrigues et al., 2025).

2. Mediation: The result is that operational performance mediates the performance-to-economic outcomes relationship when GSCM practices (particularly purchasing/transportation) exist, with performance

being more accentuated when digital integration is incorporated (Gupta et al., 2024).

3. Moderation: The green organizational culture improves the effectiveness of both operations and economic performance by helping align the sustainable objective and the in-day reality (Kim & Park, 2025).

This framework contributes to research on GSCM because it incorporates the latest ideas about digital transformation (Zhang et al., 2024), circular economy adaptation (Ofori & Jia, 2025), and cultural dynamics (Abdullah et al., 2024), providing a textured view of how the Nigerian SMEs can address issues associated with sustainability in an attempt to gain competitive advantage.

Theory, Practice, and Policy Implications

The results of the current research have great theoretical, practical, and policy ramifications, especially when they apply to the case of Nigerian food and beverage manufacturing SMEs. Theoretically, the research would help to explain the Natural Resource View (NRBV) and the Resource Dependency Theory (RDT), as green supply chain management (GSCM) practice helps in better managing the economy by improving performance through operation and green organization culture. The NRBV is further supported through the enhancement of the fact that sustainable resource management (green design and manufacturing) has a direct effect on economic performance (Hart, 1995; Wang et al., 2023). In the meantime, the concept of RDT covers the leverage of the external dependence, including green purchasing and transportation, in the development of organizational behavior and performance (Pfeffer & Salancik, 2003; Kumar et al., 2024). The synthesis between the theories offers an encompassing concept of how both green practices within a company and external ones contribute to success in the economy, overcoming apparent shortcomings in the current body of knowledge (Agyabeng-Mensah et al., 2023; Al-Hakimi et al., 2024).

Practically, the study makes known the relevance of embracing the use of GSCM to realize the benefits in terms of operations and economics. As an example, it was concluded that green design and manufacture significantly influence economic performance directly, and, therefore, SMEs should focus on environmentally friendly product creation and environmentally friendly production processes (Zhu et al., 2022; Adebayo et al., 2024). But environmental performance, such as green purchasing and green transportation, did not indicate a direct correlation with economic performance but rather with operational performance. It means that SMEs need to increase the efficiency of their operations by minimizing cost, maximizing quality, and enhancing delivery completion to leverage other elements of benefits in the economy using these practices (Habib et al., 2023; Ogunleye & Adebayo, 2024). Moreover, these effects can also be enhanced by creating a green organizational culture because aligning the values of employees with the sustainability objectives leads to improved overall results (Roscoe et al., 2023; Muisyo et al., 2024). The managers are encouraged to embark on training and capacity-building initiatives in order to develop this culture and transform the green practices into day-to-day activities.

Government and regulatory institutions should provide an enabling environment to adopt GSCM practice by the SMEs; policy-wise, the study points to the need. Shortage of finances and awareness were cited as the key limitations, and the government was encouraged to offer some incentives, including low taxes, donations, and loans with low-interest rates, to green projects (NBS, 2023; SMEDAN, 2024). Also, regulation systems must be enhanced to implement environmental requirements and encourage environmental management, whereas infrastructure (e.g., stable energy sources and waste disposal systems) has to be improved to promote environmentally friendly activities (Adeleke et al., 2024; IMF, 2023). Innovation and knowledge spreading can also be encouraged through the participation of the industry associations (e.g., Manufacturers Association of Nigeria) and academic institutions, so the SMEs can access the novel green technologies and know-how (Kua, 2022; REAN, 2024).

To sum up, this research brings in a gap in the theories and provides practical advice to SMEs and a policy roadmap that can be followed by policymakers to achieve a sustainable economy. Through convergence of theory, practice, and policy, the stakeholders can together promote the implementation of GSCM practices, and they can be seen to benefit the environment and economy of the Nigerian SMEs in the long term.

Future Directions for Research

The results of the analysis and the developed conceptual framework became the basis of further studies of the green supply chain management (GSCM) in the SME, and this topic should be investigated, especially in developing economies, such as Nigeria. Whereas the paper concentrated on the mediating variable of the operational performance and the moderating variables of green organizational culture, a number of areas are underinvestigated and thus need more research.

First, one possible avenue of further exploration is to increase the focus to cover other mediating variables as well as moderating variables that relate to the GSCM practices and the economic performance. As an example, green innovation capability, digital transformation, and stakeholder pressure can be added to the framework to implement a more comprehensive picture of the way SMEs become sustainable (Khan et al., 2024; Adebayo et al., 2025). Also, it may be interesting to investigate the significance of dynamic capabilities like flexibility and resiliency, which can be the mechanism through which SMEs can maintain a competitive advantage in the face of changing regulations in the environment and the changing demands in the market (Teece, 2023; Huma et al., 2024).

Second, this research was narrowed down to the food and beverage manufacturing industry in Nigeria. Follow-up studies may take a cross-industry or cross-country comparative study to determine whether the results are valid in other industries (e.g., textile, electronics, etc.) or other economic environments

(e.g., other African or emerging economies) (Agyabeng-Mensah et al., 2023; Ogunleye et al., 2025). This type of study may point to challenges and opportunities in this or that sector and will allow policymakers to create interventions more efficiently.

Third, the current study used a quantitative research design, but the future studies may include studying mixed-methods research or a qualitative case study to obtain more knowledge about the issues of GSCM implementation at SMEs. Practical barriers (e.g., change resistance, technical skilllessness, or supply chain interruption) that are not to be identified through certain quantitative data might be found using interviews with supply chain managers and sustainability officers (Santoso et al., 2024; MUISYO & QIN, 2025).

Fourth, emerging technologies (e.g., blockchain, IoT, AI) can contribute to the improvement of GSCM practices, another potential research direction. Exploring how digital technologies can enhance traceability, minimize wastage, and maximize the utilization of resources may offer the feasible services that can be employed by SMEs to achieve greater sustainability (Wang et al., 2023; Kumar et al., 2024).

Lastly, longitudinal research would be able to measure the effects of GSCM implementation in the long run in terms of financial and environmental performance of the SMEs. Considering that sustainability efforts usually have an accumulated value in the long run, it would be more appropriate to measure the performance indicators of several years to better establish causality (Zhu & Sarkis, 2022; Al-Hakimi et al., 2025).

CONCLUSION

Focusing on operational performance and green organizational cultures makes this study the first that contributes to the understanding of GSCM in SMEs, allowing them to become part of a unified framework. The results evoke the significance of internal green activities (e.g., green manufacturing, green design) and the mediating force behind operation efficiency and economic performance. Nonetheless, the study also demonstrates that the practices of the outside environment (e.g., green purchasing, transportation) need more authoritative operations consolidation to accomplish some actionable returns. Future studies in this area are to be based on these findings by expanding on the existing conditions and utilizing new variables, different approaches, and cross-sectoral and technological factors. Filling these gaps will enable scholars and practitioners to devise stronger ways of increasing the sustainability of SMEs, which they can use to contribute to economic rivalry as well as environmental conservation.

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