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Impact of Green Logistics Practices on Sustainable Performance: A Comprehensive Analysis

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Abstract

The rapid growth of the global economy has intensified the role of logistics in meeting evolving societal needs but has also exacerbated environmental and sustainability challenges. This study investigates the impact of green logistics practices on sustainable performance, with a focus on both inbound and outbound logistics. The research develops a theoretical framework to explore how green logistics practices affect social, environmental, and economic performance. Using data collected from 221 firms through a structured questionnaire and analyzed via structural equation modeling (SEM), the results reveal that both inbound and outbound green logistics practices positively influence environmental, social, and economic performance. The study contributes to the literature by clarifying the distinct effects of different logistics processes and providing empirical evidence on green logistics' role in enhancing sustainability within a developing country context. This research offers valuable insights for firms and policymakers aiming to improve business performance through effective green logistics practices.

Keywords: *Green Logistics Management, Sustainability, Firm Performance, Inbound Logistics, Outbound Logistics*

INTRODUCTION

The rapid expansion of the global economy has substantially increased the significance of logistics in meeting society's evolving needs (Afum, Agyabeng-Mensah, Baah, Asamoah, & Kusi, 2022; Lai & Wong, 2012). However, this growth has also brought about various negative consequences for the environment, society, and the long-term sustainability of businesses (Baah, Jin, & Tang, 2020). As environmental concerns escalate, companies are increasingly compelled to assess the external costs associated with logistics, including those related to climate change, air pollution, noise, vibrations, and accidents. Consequently, achieving a sustainable balance between economic, environmental, and social objectives has become an urgent priority for businesses.

In recent years, the logistics industry has faced mounting pressure to address environmental sustainability due to its heavy dependence on fossil fuels and non-renewable resources (Agyabeng-Mensah et al., 2021). This pressure stems from the heightened awareness among stakeholders regarding the environmental impacts of logistics operations. As a result, logistics companies are increasingly integrating sustainability into their core strategies. The shift toward green logistics is not merely a reaction to external pressures but also a strategic initiative aimed at enhancing social well-being, reducing environmental footprints, and improving competitiveness and business performance (Agyabeng-Mensah, Afum, & Ahenkorah, 2020; Dinh Khoa & Mai Anh, 2023).

Green logistics practice is described as the integration of sustainable approaches into both forward and reverse logistics activities to achieve balanced improvements in social, environmental, and economic performance (Jayarathna, Agdas, & Dawes, 2023). Despite the considerable body of research on green logistics practices and sustainable performance, significant gaps in the literature persist. Notably, previous studies tend to conceptualize green logistics as a singular, holistic construct, which may obscure the distinct impacts of different

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logistics processes. This approach may not provide corporate leaders with the nuanced insights necessary for implementing effective green strategies (Afum et al., 2022). Moreover, studies on green logistics practices have produced mixed result, partly due to implementation challenges and concerns regarding the economic feasibility of green logistics management in various contexts (Afum et al., 2022). While some research suggests that green logistics practices can enhance sustainable performance (Khan et al., 2024; Khayyat, Balfaqih, Balfaqih, & Ismail, 2024b), other studies highlight potential drawbacks, such as the high costs associated with technology adoption, training, and process changes, which may threaten profitability and business viability (Borin, Lindsey-Mullikin, Krishnan, & Management, 2013; Lenox & King, 2004). These mixed findings underscore the need for further investigation into the specific conditions under which green logistics practices are most effective.

In developed countries and rapidly growing economies, the adoption of green logistics practices has been more prevalent, supported by extensive research. However, in emerging markets such as Vietnam, the implementation and study of green logistics are still in the early stages (Nguyen, Lei, Vu, & Le, 2019). This gap highlights the importance of conducting research in the Vietnamese context to provide corporate leaders and policymakers with the insights necessary to align with global sustainability trends.

To address these gaps, this study develops a theoretical framework grounded in stakeholder theory, the resource-based view and Natural Resource-Based View to explore the relationship between green logistics practices and three dimensions of sustainable performance: social, environmental, and economic. The research focuses on two critical components: Inbound Green Logistics Practices and Outbound Green Logistics Practices. Inbound logistics refers to the transportation and handling of materials and products entering a company, while outbound logistics involves the distribution of finished goods to customers (Marques, Soares, Santos, & Amorim, 2020; Göran Svensson, 2002). By examining these components separately, this study seeks to clarify how each process contributes to sustainable performance.

This research aims to address three key questions:

How do inbound green logistics practices influence social, environmental, and economic performance?

How do outbound green logistics practices influence social, environmental, and economic performance?

What are the implications of these practices for sustainable performance in the context of a developing country?

This study makes three significant contributions. First, it addresses the inconsistent empirical findings of previous research by developing a theoretical framework that explores the effects of inbound and outbound green logistics practices on social, environmental, and economic performance, thereby providing more specific managerial guidelines for firms seeking to achieve superior performance. Second, it offers empirical evidence on the role of green logistics in enhancing sustainable performance within the context of a developing country, an area that has been under-researched.

The structure of this paper is as follows: Section 2 reviews the relevant literature on green logistics practices and develops the hypotheses. Section 3 outlines the research methodology and presents the results. Section 4 discusses the findings, contributions, and implications of the study.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Stakeholder theory, the Resource-Based View (RBV) theory and Natural Resource-Based View

Stakeholder theory emphasizes the complex relationships between a firm and all individuals or groups with a vested interest in its operations. According to (Parmar et al., 2010), stakeholder theory posits that businesses must effectively address and manage the diverse expectations and needs of their stakeholders. Stakeholders are concerned not only with the economic success of the firm but also with its approach to social and environmental issues. This perspective underscores the necessity for firms to balance financial performance with social responsibility and environmental stewardship, reflecting a broader commitment to sustainable business practices

The Resource-Based View (RBV) offers a pivotal framework for understanding how firms can strategically leverage their internal resources and capabilities to gain a competitive advantage, particularly through the adoption of green logistics practices. RBV focuses on resources that are valuable, rare, and difficult to imitate. By capitalizing on these strategic resources and developing dynamic capabilities, firms can integrate environmental considerations into their logistics operations, thereby enhancing their overall performance (Barney, Ketchen Jr, & Wright, 2011). The RBV theory also emphasizes the importance of developing and protecting these strategic resources, as they are central to sustaining a competitive edge (Crook, Ketchen Jr., Combs, & Todd, 2008). Building on this foundation, the Natural Resource-Based View (N-RBV) proposed by Hart (1995) extends the RBV framework by suggesting that environmental management practices should not merely serve regulatory compliance but can also be leveraged to create competitive advantages. The N-RBV posits that firms can use proactive environmental strategies to improve their overall performance, positioning themselves as leaders in sustainable business practices. This approach not only helps in achieving compliance but also fosters innovation, operational efficiency, and market differentiation, thereby enhancing long-term firm performance.

In summary, while stakeholder theory underscores the importance of addressing the diverse interests of stakeholders in relation to social and environmental concerns, the RBV and N-RBV offer strategic frameworks for leveraging internal resources and environmental management practices to achieve a competitive advantage and improve firm performance. By integrating these theories, firms can align their operational strategies with stakeholder expectations and capitalize on their resources to drive sustainable business success.

Green Logistics Practices

Green logistics practices embody the application of eco-friendly policies and strategies within a firm's logistics operations, aiming to reduce waste, conserve energy and resources, and minimize the negative impacts of logistics activities on both the environment and society while simultaneously enhancing corporate performance (Agyabeng-Mensah, Afum, et al., 2020; Agyabeng-Mensah & Tang, 2021). Scholars have noted the importance of examining green logistics practices across different stages and configurations to fully understand their benefits for firm outcomes (Baah et al., 2020). In this study, green logistics practices are systematically divided into two key processes: inbound logistics and outbound logistics, each addressing different stages of the supply chain with specific environmental strategies.

Inbound logistics encompasses the initial phase of the logistics process, where raw materials, components, and products are acquired and transported to manufacturing or assembly sites (Anh & Khoa, 2024; Dey, LaGuardia, & Srinivasan, 2011). This phase is crucial as it sets the foundation for the efficiency and sustainability of the entire supply chain. Greening inbound logistics refers to the adoption of environmentally responsible practices from the outset of this process. It involves the sourcing of eco-friendly materials, reducing the transport of bulk items, and minimizing the use of virgin materials through the implementation of the 3Rs: reduce, recycle, and reuse (Sahoo & Vijayvargy, 2021)

Outbound logistics, on the other hand, is concerned with the latter part of the supply chain, where finished goods are prepared and delivered to the final consumers (Marques et al., 2020). Green logistics practices in this phase are centered around green consumption, which encompasses several components aimed at minimizing the environmental impact during the distribution and delivery of products (Dey et al., 2011). This includes green transportation, where companies employ vehicles that are energy-efficient, use alternative fuels, or optimize delivery routes to reduce carbon emissions. Inventory management and warehousing also play a crucial role, as they involve the efficient storage and handling of products in ways that reduce energy consumption, such as using energy-efficient lighting and temperature control systems (Li, 2024; Yadav, Gaur, & Jain, 2021).

Sustainable Performance

Sustainable performance gained significant attention following the first United Nations Conference on Environment and Development (UNCED) in 1972 (Dangelico & Pontrandolfo, 2015). Sustainability is defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs (Yildiz Çankaya & Sezen, 2019). The sustainable performance of a firm involves achieving long-term

success by balancing economic, environmental, and social objectives (Han & Huo, 2020). Environmental performance encompasses a firm's initiatives to mitigate its ecological impact. This involves reducing waste, conserving natural resources, and decreasing carbon emissions through various practices such as efficient resource use, waste management, and energy reduction strategies. By focusing on these areas, firms aim to minimize their environmental footprint and contribute to broader ecological sustainability goals (Orsic, Rosi, & Jereb, 2019; Van Hoof & Thiell, 2014). Social performance pertains to a firm's commitment to ethical practices and positive social impact. It includes ensuring fair labor conditions, promoting ethical business conduct, and actively engaging with the community. Social performance is reflected in practices that uphold human rights, support community development, and foster inclusive and equitable workplaces (Agyabeng-Mensah et al., 2021). Lastly, economic performance focuses on achieving and maintaining long-term profitability and financial stability. This dimension emphasizes the creation of value for shareholders and stakeholders while ensuring that financial success does not come at the expense of environmental or social responsibilities (Agyabeng-Mensah, Ahenkorah, Afum, Dacosta, & Tian, 2020). By addressing these three pillars, firms can enhance their overall performance while contributing positively to society and the environment.

Hypotheses Development

According to previous studies, greening inbound logistics involves optimizing transportation processes to minimize the movement of bulk items, prioritizing the procurement of sustainable and environmentally friendly materials, and implementing practices to reduce, recycle, and reuse materials (Dey et al., 2011; Jayarathna et al., 2023; Khayyat, Balfaqih, Balfaqih, & Ismail, 2024a). These efforts allow firms to significantly reduce their overall environmental impact (Afum et al., 2022). This reduction can be achieved through better route planning, shipment consolidation, and the use of more energy-efficient transportation methods, leading to decreased greenhouse gas emissions and energy consumption, minimized waste, lower resource extraction, and reduced environmental degradation associated with raw material production (Baah et al., 2020; Doherty & Hoyle, 2009). Moreover, according to (Chen et al., 2023), firms that actively engage in inbound green logistics can build stronger relationships with stakeholders, including customers, suppliers, and regulators. By sourcing eco-friendly materials, firms support suppliers who adhere to sustainable practices, fostering a supply chain that is both environmentally responsible and socially ethical. Additionally, reducing environmental impact through green logistics practices can improve the firm's reputation as a socially responsible entity (Cousins, Lawson, Petersen, & Fugate, 2019; Mai Anh, Hui, & Khoa, 2018). his positive reputation can attract environmentally conscious consumers and investors, strengthening the firm's market position and long-term viability, increasing customer loyalty, higher sales, and a stronger market presence, all of which contribute to long-term economic success (Agyabeng-Mensah & Tang, 2021; Hernandez, Escolano, Juanatas, & Elvambuena, 2022). Moreover, by minimizing waste and pollution, the firm contributes to the well-being of communities by reducing health risks associated with environmental degradation(Agyabeng-Mensah, Ahenkorah, & Korsah, 2019).

Based on these arguments, we propose the following hypotheses:

H1: Inbound logistics has an indirect significant positive influence on the environmental performance of the firm.

H2: Inbound logistics has an indirect significant positive influence on the social performance of the firm.

H3: Inbound logistics has an indirect significant positive influence on the economic performance of the firm.

Outbound green logistics encompasses eco-friendly practices across various stages of the supply chain, from transportation and packaging to the final delivery of goods (Anh, Hui, Khoa, & Mehmood, 2019; Göran Svensson, 2002). Researchers have emphasized that integrating sustainable practices into inventory and warehousing, such as the use of energy-efficient storage systems and minimizing waste through enhanced inventory control, significantly bolsters a firm's environmental sustainability (Dey et al., 2011; Zowada, 2020). These practices contribute not only to reducing the ecological footprint but also to fostering a more responsible use of resources, which aligns with global environmental goals. Moreover, the implementation of efficient transportation and packaging strategies within outbound logistics can yield substantial cost savings. These

savings, derived from reduced energy consumption, optimized delivery routes, and sustainable packaging materials, directly enhance a firm's economic performance. By lowering operational costs, firms can achieve greater profitability, which, in turn, supports long-term economic sustainability (Choudhary & Seth, 2011). Outbound green logistics also plays a pivotal role in promoting green consumption by ensuring that every step of the process, from product acquisition to final delivery, adheres to environmental standards(Khayyat et al., 2024a; Zowada, 2020). This commitment to environmental responsibility can influence consumer behavior, encouraging the adoption of more sustainable consumption patterns. As consumers increasingly value sustainability, firms that prioritize outbound green logistics may experience heightened demand for their green products and services (Khoa & Anh, 2021a, 2021b; Sallnäs & Björklund, 2020). Thus, outbound green logistics not only aligns with environmental and social objectives but also serves as a catalyst for long-term economic success. Based on these arguments, we propose the following hypotheses:

H1: Outbound logistics has an indirect significant positive influence on the environmental performance of the firm.

H2: Outbound logistics has an indirect significant positive influence on the social performance of the firm.

H3: Outbound logistics has an indirect significant positive influence on the economic performance of the firm.

With these backdrop and hypotheses development, the theoretical framework is presented in Figure 1.

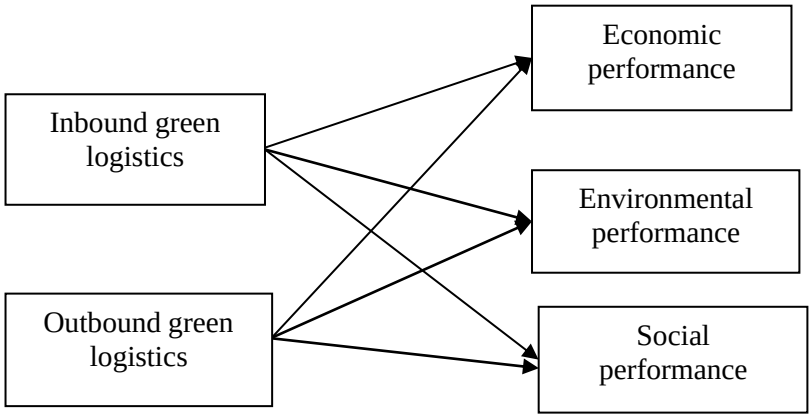

Figure 1. Theoretical framework

METHODOLOGY

Measures

The data for this study was collected through a questionnaire survey. In order to assure content validity, we rely on the literature review to derive the existing validated scales for measuring the constructs. We adopt a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). A higher score indicates a higher level of similarity.

To assess green logistics practices, we drew upon the study conducted by (Afum et al., 2022). Inbound green logistics was measured by four items and outbound green logistics was measured by fiveitems adapted from (Afum et al., 2022) and (Baah et al., 2021). Three aspects of sustainable performance were measured by four items for each adopted from (Khan et al., 2024)

Sample and Data Collection

Our study drew on data from firms located in Hanoi, Bac Ninh, Bac Giang, Vinh Phuc, Ninh Binh, Ha Nam, and Hai Phong provinces in Vietnam. To ensure the contextual relevance of the questionnaire, we conducted a comprehensive pretesting and sampling process. The survey underwent a two-phase pilot testing process. In

the first phase, the draft questionnaire was distributed to five academic faculty members with expertise in the relevant field. These scholars were asked to provide feedback on the content, clarity, and scaling of the survey instrument. Based on their insights, several revisions were made to improve the questionnaire. After that we conducted a pilot test with 10 managers. The outcomes of the pilot test necessitated further re-evaluation of the questionnaire to enhance its validity and readability.

After completing the pretesting and final revisions, the questionnaire was administered via Google Forms. The target respondents included managers or team leaders—such as general managers, CEOs, senior executives, operations managers, marketing managers, and supply chain managers—who possessed detailed knowledge of both inbound and outbound activities, as well as a thorough understanding of supply chain integration practices and organizational capabilities. A total of 468 questionnaires were distributed, yielding 221 valid responses, which corresponds to a response rate of approximately 47.22 percent. All responses were meticulously reviewed and deemed suitable for estimating the theoretical model.

To evaluate the potential risk of respondent bias, we followed the approach suggested by Armstrong and Overton (1977), which involves comparing the responses of early and late respondents following the first reminder, particularly with respect to firm size. The results of the t-test revealed no significant differences, indicating that non-response bias is not a concern in this study. The characteristics of the sample are summarized in Table 1.

Table 1 Characteristics of the sample

Characteristics	Items	Frequency	Percent
Operational period of the organization (in years)	<5	67	30.32%
	5-10	55	24.89%
	>=10	99	44.80%
Industry	Manufacturers	77	34.84%
	Suppliers	42	19.00%
	Services	45	20.36%
	Retailers and distributors	29	13.12%
	Others	28	12.67%
Number of Employees	<10	35	15.84%
	10-100	93	42.08%
	100-300	58	26.24%
	300-500	32	14.48%
	>=500	3	1.36%

RESULTS

Measurement Model

Data analysis was performed using SPSS 20 and AMOS 20. We followed a three-step approach to evaluate the measurement model, beginning with assessing scale validity using Cronbach's alpha, followed by exploratory factor analysis (EFA), and concluding with confirmatory factor analysis (CFA). The Cronbach's alpha values for all constructs were above the recommended threshold of 0.7, confirming their reliability (Nunnally & Bernstein, 1994).. EFA was utilized to eliminate items with commonalities and factor loadings below 0.5. Subsequently, CFA was conducted to assess the model's fit to the factors and variable items. The CFA results indicated that the model's fit indices were acceptable (see Table 2). All factor loadings exceeded 0.5, the construct reliability (CR) values were above 0.7, and the average variance extracted (AVE) surpassed the maximum shared variance (MSV), confirming the convergent validity of the constructs (Fornell & Larcker, 1981). Additionally, the AVE for each construct was greater than the squared MSV, indicating strong discriminant validity (Chin, Marcolin, & Newsted, 2003). The model fit was evaluated using multiple indices:

GFI exceeded 0.8, TLI and CFI exceeded 0.9, and RMSEA was within the range of 0.05 to 0.07. As shown in Table 3, the results demonstrate that our model fit is satisfactory.

Table 2 Confirmatory factor analysis

Latent variable		Cronbach Alpha	CR	AVE	MSV
Inbound green logistics	IGL	0.819	0.836	0.513	0.388
Outbound green logistics	OGL	0.835	0.896	0.684	0.406
Environmental performance	ENP	0.900	0.851	0.589	0.250
Social performance	SOP	0.856	0.826	0.546	0.276
Economic performance	ECP	0.875	0.894	0.679	0.406
Model fit	**Chi-square/df**	**GFI**	**TLI**	**CFI**	**RMSEA**
Recommended threshold value	≤2[a]; ≤5[b]	≥0.90[a]; ≥0.80[b]	≥0.90[a]; ≥0.80[b]	≥0.90[a]; ≥0.80[b]	≤0.80[a]; ≤0.10[b]
Model	1.681	0.898	0.945	0.956	0.056

Note: a Acceptability: acceptable; b Acceptability: marginal

Hypotheses Testing

We employed structural equation modeling (SEM) to test the direct effects of the structural model. The results are presented in Table 3.

The results indicate that inbound green logistics significantly impacts all three aspects of sustainable performance—environmental, social, and economic. Specifically, the data confirms positive relationships, with correlations of 0.294 ($P < 0.001$) for environmental performance, 0.373 ($P < 0.1$) for social performance, and 0.188 ($P < 0.5$) for economic performance, supporting H1, H2, and H3, respectively. Similarly, the findings validate that outbound green logistics positively influences both environmental and economic performance, with path coefficients of 0.753 ($P < 0.001$) and 0.454 ($P < 0.5$), supporting H4 and H6. These results suggest that outbound green logistics enhances environmental and economic performance. However, the impact of outbound logistics on social performance is not statistically significant, leading to the rejection of H5.

Table 3 Testing results

Hypotheses	*Est*	*S.E.*	*C.R.*	*P*	Decision
H1: IGL -> ENP	0.294	0.073	4.027	***	Supported
H2: IGL -> SOP	0.373	0.097	3.837	***	Supported
H3: IGL -> ECP	0.188	0.087	2.153	*	Supported
H4: OGL -> ENP	0.753	0.139	5.423	***	Supported
H5: OGL -> SOP	0.166	0.139	1.194	0.233	Rejected
H6: OGL -> ECP	0.454	0.162	2.810	*	Supported

Note: *=P<0.5; ***=P<0.001

DISCUSSION AND CONCLUSION

This study investigates the impact of green logistics practices on a firm's sustainable performance by examining logistics through two distinct processes: inbound and outbound green logistics. The findings underscore the significant role that both inbound and outbound green logistics practices play in enhancing a firm's sustainable performance. As the global economy continues to expand, the logistics sector faces increasing scrutiny for its environmental impact, driving a shift toward more sustainable practices (Lin & Ho, 2011).

The study confirms that inbound green logistics, which involves the eco-friendly sourcing and transportation of materials, has a positive effect on a firm's environmental, social, and economic performance. The statistical correlations of 0.294 ($P < 0.001$), 0.373 ($P < 0.1$), and 0.188 ($P < 0.5$) for environmental, social, and economic performance, respectively, provide robust support for the hypotheses (H1, H2, and H3). These results highlight

the critical importance of sustainable practices in the early stages of the supply chain, where effective resource management can lead to significant gains across all dimensions of sustainability.

Similarly, the study validates the positive influence of outbound green logistics on both environmental and economic performance, with path coefficients of 0.753 ($P < 0.001$) and 0.454 ($P < 0.5$), respectively, supporting H4 and H6. This indicates that sustainable practices in the later stages of the supply chain—such as energy-efficient transportation and green packaging—contribute to reducing environmental impact while simultaneously enhancing economic performance through cost savings and improved operational efficiency. However, the study finds that the impact of outbound logistics on social performance is not statistically significant, leading to the rejection of H5. This suggests that while outbound logistics can generate environmental and economic benefits, its effect on social performance may be limited or require different approaches to achieve tangible social outcomes.

Consistent with earlier studies (Agyabeng-Mensah et al., 2021; Agyabeng-Mensah et al., 2019), this research reaffirms the positive impact of green logistics on environmental and economic performance. However, it diverges from some prior studies that reported mixed results regarding the economic viability of green logistics, particularly in contexts where the high costs of technology and process changes were seen as barriers to profitability (Borin et al., 2013; Lenox & King, 2004). This study's findings suggest that, under certain conditions, green logistics can indeed enhance economic performance, supporting the notion that sustainable practices are not only environmentally beneficial but also economically viable.

Additionally, while earlier research often treated green logistics as a holistic concept (Agyabeng-Mensah et al., 2021; Agyabeng-Mensah & Tang, 2021; Lai & Wong, 2012), this study's distinction between inbound and outbound logistics provides a more nuanced understanding of how different logistics processes contribute to sustainability. The findings underscore the essential role that both inbound and outbound green logistics practices play in enhancing a firm's environmental, social, and economic outcomes. As the global economy expands, and the logistics sector faces increasing environmental scrutiny, the shift towards sustainable practices becomes crucial. The finding that outbound logistics does not significantly impact social performance contrasts with some studies that suggest a broader positive social impact from green logistics practices (Afum et al., 2022; Zowada, 2020). This discrepancy highlights the need for further investigation into the specific factors that influence the social outcomes of green logistics, particularly in different economic and cultural contexts.

This research makes a significant contribution to the field of sustainable logistics by enhancing our understanding of how green logistics practices impact sustainable performance, with a specific focus on emerging markets like Vietnam. By clearly differentiating between inbound and outbound logistics, the study offers a nuanced perspective that allows firms to tailor their sustainability strategies more effectively.This detailed analysis is instrumental for corporate leaders and policymakers, as it helps them address the complex challenge of aligning with global sustainability standards while striving to remain competitive and profitable in a dynamic market environment. Additionally, the research provides valuable, context-specific insights relevant to Vietnam, which can be leveraged to inform broader applications in other emerging economies facing similar sustainability challenges. For businesses, the study underscores the importance of adopting green logistics practices in both inbound and outbound processes to enhance environmental, social, and economic performance. Firms are encouraged to integrate eco-friendly practices into their supply chains, such as energy-efficient transportation and green packaging, to achieve significant sustainability gains. This approach not only aligns with global sustainability standards but also can lead to improved operational efficiency and cost savings. For policymakers, the research highlights the need for supportive regulations and incentives that encourage the adoption of green logistics practices. By fostering an environment that promotes sustainability, policymakers can help businesses navigate the dual challenges of achieving environmental goals while maintaining competitiveness. Additionally, the study's focus on Vietnam provides a valuable context for developing targeted policies that address specific local challenges and opportunities in emerging markets. This context-specific insight can also guide broader policy applications in similar developing economies, contributing to global sustainability efforts.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

This study, while providing valuable insights into the impact of green logistics practices on sustainable performance, has several limitations. Firstly, the research is limited by its geographic focus on Vietnam, which may not fully capture the diversity of logistics practices and sustainability challenges in other emerging markets. The findings might not be directly transferable to different cultural, economic, or regulatory contexts. Another limitation is the study's cross-sectional design, which captures a snapshot of the impact of green logistics practices at a single point in time. This approach does not account for potential changes in practices or performance over time. Future research could benefit from a longitudinal study design to examine how the impact of green logistics practices evolves. future research should aim to replicate the study in different geographic and economic contexts, employ longitudinal methods to track changes over time, and delve deeper into the interaction between inbound and outbound logistics practices. Addressing these limitations will enhance the understanding of green logistics' impact on sustainable performance and provide more comprehensive insights for both practitioners and policymakers.

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