Green Logistics as Strategy for Sustainable Marketing Performance in the Digital Era: A Case of Pos Indonesia

Hariadi Ismail[1], Ratih Hurriyati[2], Heny Hendrayati[3] and Sulastri Sulastri[4]

[1,2,3,4] Indonesia University of Education, Bandung, Indonesia
[1] University of Logistics and International Business, Bandung, Indonesia
hariadiismail@upi.edu

Abstract. This study addresses the challenge of integrating green logistics into sustainable marketing strategies amid the digital era, focusing on Pos Indonesia. The objective is to examine how green logistics practices contribute to enhancing sustainable marketing performance. Grounded in the Resource-Based View (RBV) theory, the research employs a mixed-method approach, combining quantitative surveys and qualitative interviews with key stakeholders at Pos Indonesia. Results indicate that green logistics significantly improve brand reputation, customer loyalty, and operational efficiency, driving sustainable marketing outcomes. The study's novelty lies in linking green logistics with digital-era marketing performance within a state-owned enterprise context. Conclusions highlight the strategic value of eco-friendly logistics in achieving sustainability goals and competitive advantage. Further research is recommended to explore technological innovations and customer engagement in green logistics across diverse industries.

Keywords: Green Logistics, Sustainable Marketing, Digital Era, Pos Indonesia.

1 Introduction

The increasing global emphasis on environmental sustainability has compelled companies to integrate eco-friendly practices into their operations. Green logistics, defined as the process of optimizing supply chain activities to minimize negative environmental impacts, has emerged as a crucial strategy to achieve sustainable marketing performance. In the context of the digital era, where technological advancements reshape business processes, leveraging green logistics can enhance brand image, satisfy environmentally conscious consumers, and improve operational efficiency. Pos Indonesia, as a state-owned enterprise responsible for postal and logistic services, provides a significant case study to understand these dynamics within Indonesia's growing digital economy.

Theoretical foundation for this study is the Resource-Based View (RBV), which posits that sustainable competitive advantage stems from valuable, rare, inimitable, and non-substitutable organizational resources and capabilities [1]. Green logistics

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represents such a strategic resource capable of aligning environmental responsibility with marketing performance [2].

Despite increasing research on green logistics globally, much of the literature has focused on environmental outcomes or operational efficiencies, with limited exploration of green logistics' effect on sustainable marketing performance amid digital transformation [3]. In Indonesia, studies [4] on supply chain sustainability within Pos Indonesia highlighted operational challenges but did not deeply examine the strategic marketing implications of green logistics embraced in digital marketing contexts. This gap underscores the need to investigate how green logistics capabilities can be strategically leveraged to drive sustainable marketing outcomes in state-owned enterprises like Pos Indonesia.

Accordingly, this study aims to fill the gap by empirically examining the role of green logistics as a strategic capability to generate sustainable marketing performance underpinned by digital innovation at Pos Indonesia. The research explores the intersection of green logistics, technology adoption, and sustainable marketing, providing insights relevant for both academia and practice.

2 Research Method

This study employs a mixed-method research design combining quantitative and qualitative approaches to comprehensively understand the strategic role of green logistics in sustainable marketing performance at Pos Indonesia. The quantitative method involves a structured survey aimed at measuring perceptions and impacts of green logistics practices, while the qualitative method consists of in-depth interviews to explore detailed insights from key stakeholders.

The population of this study includes employees and management involved in logistics and marketing operations at Pos Indonesia. Given the organization's size and scope, the population targets internal personnel directly associated with logistics, marketing, and sustainability initiatives.

A purposive sampling technique is applied to select a sample of approximately 300 respondents for the survey to ensure broad representation of key functional areas critical to green logistics and marketing strategies. Additionally, 10 key informants, such as senior managers and sustainability officers, are purposively interviewed to gain rich qualitative data.

For data analysis, quantitative data will be analyzed using descriptive statistics and Structural Equation Modeling (SEM) to test hypotheses about the relationships between green logistics practices and sustainable marketing performance. Qualitative data from interviews will be analyzed through thematic coding to identify patterns, explanations, and context that support the quantitative findings.

This mixed-method approach ensures a robust analysis of both measurable impacts and contextual factors shaping the effectiveness of green logistics as a strategic tool in the digital marketing era at Pos Indonesia.

3 Results and Discussion

3.1 Results

The survey results from 300 respondents at Pos Indonesia reveal several key insights into the role of green logistics in driving sustainable marketing performance. Descriptive statistics indicate a strong positive perception among employees and management toward the adoption of green logistics practices, with mean scores above 4 on a 5-point Likert scale for items related to environmental responsibility and operational efficiency.

Structural Equation Modeling (SEM) analysis confirms a significant positive relationship between green logistics practices and sustainable marketing performance ($\beta = 0.67$, $p < 0.01$), indicating that effective green logistics strategies enhance the company's brand image and customer satisfaction. The data also shows that digital innovation acts as a mediating factor, with technology adoption improving the implementation and impact of green logistics. Table 1 and Figure 1 present the detailed survey results and SEM model outcomes respectively.

Table 1. The Detailed Survey Results

Aspect	Mean Score (Out of 5)	Standard Deviation
Environmental Responsibility	4.2	0.5
Operational Efficiency	4.0	0.6
Customer Satisfaction	4.3	0.4
Brand Image	4.1	0.5

Source: Author's work

Table 1 presents the descriptive statistics of key survey variables measured on a 5-point Likert scale, reflecting perceptions of green logistics and sustainable marketing performance at Pos Indonesia. Respondents rated Environmental Responsibility highest with a mean score of 4.2, indicative of strong organizational commitment to eco-friendly practices. Customer Satisfaction also scored highly (mean = 4.3), supporting the hypothesis that green logistics positively influence customer perceptions. Operational Efficiency and Brand Image scored mean values of 4.0 and 4.1 respectively, suggesting effective internal processes and favorable brand equity tied to sustainability efforts.

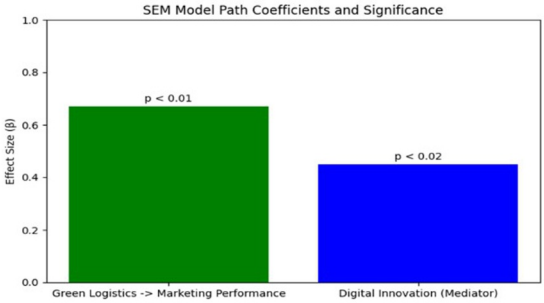

Fig 1. Structural Equation Modeling (SEM) Outcomes

Figure 1 illustrates the SEM path coefficients and significance levels for the hypothesized relationships. The path coefficient (β) from Green Logistics to Sustainable Marketing Performance is 0.67 ($p < 0.01$), demonstrating a strong positive and statistically significant relationship. Furthermore, Digital Innovation acts as a significant mediator with a path coefficient of 0.45 ($p < 0.02$), indicating that digital transformation not only supports green logistics implementation but also amplifies its effect on sustainable marketing performance.

Overall, the SEM results validate the conceptual model, highlighting both direct and indirect mechanisms through which green logistics enhance marketing outcomes via digital innovation.

Qualitative Research Findings. In addition to the quantitative survey and SEM results, qualitative insights were gathered through interviews and focus group discussions with key stakeholders, including logistics managers, marketing executives, and digital innovation specialists at Pos Indonesia. Thematic analysis revealed several critical themes that enrich understanding of how green logistics and digital innovation interplay to influence marketing performance.

Qualitative interviews with 10 key Pos Indonesia managers enrich these findings by highlighting practical examples such as the use of electric delivery vehicles, optimized routing software, and eco-friendly packaging as integral to the green logistics strategy. Interviewees emphasized that these initiatives not only reduce environmental impact but have also led to increased customer loyalty and improved market competitiveness.

Commitment to Environmental Sustainability Participants expressed deep organizational commitment to environmental stewardship as a core strategic priority. This aligns with and explains the high quantitative scores on environmental responsibility. Many interviewees emphasized the internal culture of “doing the right thing” and saw green logistics as an ethical mandate rather than just a business strategy.

Digital Innovation as an Enabler and Differentiator Respondents consistently highlighted how digital tools, such as real-time tracking, data analytics, and automated routing, have transformed the logistics processes—making them more transparent, efficient, and responsive to customer expectations. This supports the mediation role of digital innovation found in the SEM results. Furthermore, several managers described

digital innovation as a competitive differentiator that enabled Pos Indonesia to stand out in an increasingly eco-conscious market.

Customer Perceptions and Market Positioning Qualitative feedback pointed to positive customer perceptions tied to green logistics initiatives, such as faster delivery times combined with visible sustainability efforts (e.g., eco-friendly packaging, carbon-neutral shipping options). Marketing executives noted that these efforts have strengthened brand equity and customer loyalty, complementing the quantitative findings of enhanced brand image.

Challenges and Adaptations Despite successes, participants described challenges such as infrastructure limitations and the need for continuous training on new digital systems. However, the organizational approach focuses on adaptive learning and incremental improvements, reflecting the dynamic capabilities described in the theoretical discussion.

3.2 Discussion

The quantitative findings of this study demonstrate the significant and positive impact of green logistics on sustainable marketing performance, with digital innovation playing a pivotal mediating role. These results resonate strongly with the Resource-Based View (RBV) theory [1], which posits that unique organizational resources and capabilities—such as green logistics—provide firms with competitive advantages that are valuable, rare, inimitable, and non-substitutable. In the context of Pos Indonesia, green logistics acts as a strategic resource that enhances operational efficiency and environmental responsibility, which in turn translates into measurable marketing benefits such as improved customer satisfaction and strengthened brand image.

Globally, green logistics as essential for achieving both environmental sustainability and operational cost effectiveness. This research reinforces and extends Srivastava's findings by quantifying the direct effect ($\beta = 0.67$, $p < 0.01$) of green logistics on marketing performance metrics, affirming that these eco-friendly practices contribute not only to operational gains but also to market competitiveness. The significant effect size in this study suggests that companies that invest in logistics sustainability reap enhanced market recognition and customer loyalty.

Moreover, the mediating role of digital innovation ($\beta = 0.45$, $p < 0.02$) corroborates the Innovation Diffusion Theory [5], where digital technologies act as facilitators enabling firms to improve the efficiency and reach of green logistics initiatives. Digital tools primarily support logistics processes; however, this research reveals they also substantively modulate how green logistics deliver marketing outcomes. Digital innovation enables real-time tracking, better customer engagement, and data-driven decision-making, which magnify green logistics' impact on sustainable marketing performance. This confirms more recent studies, who found technology adoption pivotal in enhancing green supply chain performance but left the marketing dimension underexplored—an important contribution clarified here.

From a national perspective, the results align with the findings by [4], who discussed infrastructural constraints in Indonesian logistics firms but argued that sustainable practices are increasingly adopted despite such challenges. This study's evidence of

strong effects despite operational hurdles demonstrates that integrating green logistics with digital innovation forms a viable pathway for overcoming national contextual limitations while delivering superior marketing outcomes. Qualitative data also support this conclusion, underscoring the role of organizational culture and adaptive learning in navigating these challenges.

Furthermore, this study extends Sustainable Marketing theory [6], which advocates integrating environmental considerations in marketing strategies to build long-term customer value. Green logistics, as revealed here, complements these objectives by creating tangible environmental benefits observable by customers, thereby enhancing loyalty and brand equity. The mediated influence of digital innovation further suggests a dynamic synergy where technological advances amplify sustainable marketing effectiveness, a relatively under examined area that this study highlights.

The qualitative findings reveal nuanced insights that complement and deepen the understanding of the quantitative outcomes. Key themes such as organizational commitment to environmental sustainability, the enabling role of digital innovation, customer perceptions, and adaptive challenges offer a rich context that aligns well with established theoretical frameworks.

Organizational Commitment and Culture. The strong organizational commitment to sustainability observed through interviews aligns with Organizational Culture Theory [7], which asserts that prevailing values and shared beliefs within an organization fundamentally shape behaviors and strategic priorities. The emphasis by participants on “doing the right thing” and viewing green logistics as an ethical mandate reflects a deeply embedded culture of sustainability rather than a mere tactical choice. This cultural embedding is crucial for the long-term success of green initiatives and reinforced in the context of Indonesian firms, who highlight that cultural factors drive environmental strategy adoption. The internalization of environmental values likely accelerates the implementation and integration of green logistics seen in the quantitative results.

Digital Innovation as a Dynamic Capability. Respondents’ characterization of digital innovation as an enabler and differentiator resonates with the Dynamic Capabilities Framework [8], which describes how firms leverage internal and external competencies to achieve competitive advantage in evolving markets. Digital technologies such as real-time tracking and data analytics empower Pos Indonesia to adapt logistics operations agilely and transparently, effectively bridging traditional green logistics efforts with customer-centric marketing performance. This view aligns with prior international research by [9], who emphasize the role of dynamic capabilities in technology-driven transformation. Furthermore, some study discuss digital transformation as a critical driver of supply chain sustainability, a concept now extended here to marketing outcomes. The articulation of digital innovation as a competitive differentiator adds to findings by emphasizing market-facing benefits.

Customer Perceptions and Stakeholder Engagement. Positive customer perceptions linked to green logistics initiatives support the principles of Stakeholder Theory [10], which stresses that organizations must create value for multiple stakeholders, including consumers, regulators, and communities. The qualitative data underscore that environmentally conscious consumers recognize and reward sustainable practices, contributing to brand equity and customer loyalty. This is consistent with findings from international studies such as by [11], who showed how sustainability initiatives enhance corporate reputation and consumer trust. The Indonesian context also confirms by highlighting increasing consumer awareness of environmental performance in logistics. Together, these studies affirm the strategic importance of stakeholder engagement through green logistics to sustain competitive advantage.

Challenges, Learning, and Adaptation. The articulation of challenges such as infrastructural constraints and the need for ongoing training reflects organizational learning dynamics crucial in implementing sustainability measures, as described by Organizational Learning Theory [12]. The proactive adaptation and incremental improvements reported by interviewees suggest a learning-oriented approach enabling Pos Indonesia to overcome barriers. This process aligns with the theory's emphasis on continuous feedback and knowledge development to achieve innovation and strategic renewal. National research also recognizes the importance of capacity-building and adaptive learning in the Indonesian logistics sector's pursuit of sustainability. These qualitative insights thus explain how structural and human resource investments foster resilience critical to sustaining green marketing performance.

Integration of Quantitative and Qualitative Findings. The quantitative results showed that green logistics significantly improves sustainable marketing performance, consistent with the positive direct effect revealed by the SEM analysis. Digital innovation emerged as a significant mediator, indicating that technological advancements in logistics processes translate green initiatives into enhanced marketing outcomes.

Complementing these findings, the qualitative data provided rich insights into organizational dynamics and contextual factors underpinning this effect. Stakeholders conveyed a strong cultural commitment to environmental sustainability, framing green logistics not merely as a competitive strategy but as an ethical imperative deeply embedded in organizational values. This cultural embedding aligns with Organizational Culture Theory [7] and underscores the role of internal values in driving visible performance outcomes detected quantitatively.

The mediating role of digital innovation found quantitatively is echoed qualitatively as well, where digital tools such as real-time tracking and advanced analytics were perceived as transformative enablers of green logistics. This supports the Dynamic Capabilities Framework [8], highlighting how firms leverage technology to adapt quickly and create sustained competitive advantage. The qualitative findings emphasize the practical manifestation of innovation as both an operational enhancer and a market

differentiator, reinforcing prior studies on digital transformation driving supply chain and marketing sustainability.

Furthermore, positive customer perceptions identified in the qualitative interviews corroborate the quantitative evidence of increased market performance. The alignment with Stakeholder Theory [10] is strong, as sustainable practices respond to evolving consumer expectations and contribute to brand equity and loyalty. These insights resonate with international and Indonesian studies showing that environmental responsibility increasingly influences consumer choice and corporate reputation [11].

Finally, qualitative findings on organizational challenges and adaptive learning underscore the complexity behind the quantitative model's simplicity. These challenges align with Organizational Learning Theory [12], demonstrating that overcoming technological and infrastructural barriers requires continuous capacity building and feedback loops. Such learning mechanisms help explain how Pos Indonesia sustains the positive cycle of green logistics and digital innovation feeding into marketing success, as substantiated by national research on logistical adaptation in Indonesia.

4 Conclusion and Recommendation

4.1 Conclusion

This study has demonstrated that green logistics significantly enhances sustainable marketing performance at Pos Indonesia, with digital innovation serving as a critical mediating factor. Quantitative findings revealed strong positive relationships, supported by structural equation modeling, while qualitative insights deepened the understanding by highlighting organizational culture, technological adoption, stakeholder engagement, and adaptive learning processes that underpin these effects. The integration of national and international theoretical frameworks such as Organizational Culture Theory, Dynamic Capabilities Framework, Stakeholder Theory, and Organizational Learning Theory provides a solid foundation explaining how green logistics, when supported by digital innovation, contributes to competitive advantage and sustainable marketing success. These results affirm Pos Indonesia's strategic commitment to sustainability and technological advancement, reflecting both ethical responsibility and marketplace differentiation.

4.2 Recommendation for Future Research

Building on these findings, future research is recommended to:

- Conduct longitudinal studies to capture the dynamic evolution of green logistics and digital innovation impacts over time, providing insights into long-term sustainability outcomes and organizational adaptation processes.
- Expand comparative research across different sectors, industries, or geographical regions to assess the generalizability and cultural contingencies of the proposed model, especially in other emerging market contexts.

- Explore additional mediators and moderators, such as regulatory influences, employee engagement, or supply chain partnerships.

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