The Sixth International Conference on Innovation in Social Science and Engineering Education (ICoISSEE-6)
Bandung, Indonesia, July 25, 2026

TOWARDS SUSTAINABLE LOGISTICS: A SYSTEMATIC LITERATURE REVIEW OF GREEN LOGISTICS IMPLEMENTATION DRIVERS

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Abstract. *This study aims to identify and analyze factors influencing green logistics implementation using a Systematic Literature Review (SLR) approach. The analysis was conducted systematically to develop a comprehensive conceptual synthesis of key determinants in green logistics. Findings from 100 articles indicate that green logistics implementation is influenced by four main factors: operational innovation (37%), environmentally friendly technology (29%), operational efficiency (17%), and government policy (17%). These results indicate that internal organizational factors, particularly innovation capability and technology adoption, play a more dominant role than external factors in driving the transformation towards a sustainable logistics system. Meanwhile, operational efficiency and government policy serve as supporting factors that strengthen implementation effectiveness. Overall, this study provides theoretical and practical contributions to the development of an integrated, adaptive, and sustainability oriented green logistics strategy.*

Keywords: *Environmentally Friendly Technology; Government Policy; Green Logistics; Operational Efficiency; Operational Innovation*

1. INTRODUCTION

The development of the global logistics sector has demonstrated an increasingly strategic role in driving economic growth, particularly in supporting international trade and goods distribution. An efficient logistics system has been proven to enhance national competitiveness and significantly reduce trade costs. The Logistics Performance Index (LPI) (World Bank, 2023) indicates that countries with strong logistics performance tend to experience trade costs that are 10–15% lower. Along with the rapid growth of e-commerce activities and supply chain globalization, the global logistics market has continued to expand, exceeding USD 10 trillion. However, the logistics sector also contributes significantly to environmental degradation. Transportation activities that rely heavily on fossil fuels remain one of the major contributors to greenhouse gas emissions. According to the International Energy Agency (IEA, 2023), the transportation sector accounts for approximately 24% of global energy-related CO_2 emissions, with emission levels continuing to rise (EEA, 2022). This condition highlights the urgent need for a transition toward a more sustainable logistics system.

In response to these challenges, the concept of *green logistics* has emerged as an approach to minimizing environmental impacts without compromising operational efficiency. This approach involves practices such as the adoption of environmentally friendly technologies, distribution optimization, energy efficiency improvement, and the implementation of reverse logistics. Globally, commitment to sustainability has increased significantly, driven by international agreements such as the Paris Agreement 2015 and the adoption of sustainability strategies by more than 60% of companies (McKinsey & Company, 2022).

In Indonesia, the implementation of green logistics continues to face several challenges. The transportation and warehousing sector contributes approximately 5–6% to the national Gross Domestic Product (GDP) (BPS, 2023); however, it remains highly dependent on fossil fuel-based land transportation (Ministry of Transportation, 2022). Furthermore, Indonesia's logistics performance still lags behind that of several other ASEAN countries (World Bank, 2023). Major barriers include limited infrastructure, low adoption of environmentally friendly technologies, weak regulations and incentives, and limited awareness among industry stakeholders (PwC, 2023). Previous studies have identified that green logistics implementation is influenced by internal factors, such as organizational resources, technological capabilities, and management commitment, as well as external factors, including regulations, market pressure, and stakeholder demands. These studies are generally grounded in theoretical frameworks such as the Resource-Based View (RBV), Institutional Theory, and Stakeholder Theory. However, existing research remains fragmented and lacks comprehensive integration.

Therefore, this study aims to identify and synthesize the factors influencing green logistics implementation through a Systematic Literature Review (SLR) approach. This method enables a systematic, transparent, and comprehensive analysis of the literature. The findings are expected to provide theoretical contributions while also serving as a practical reference for industry practitioners and policymakers in designing sustainable logistics strategies.

2. LITERATURE REVIEW

2.1 Logistics

Logistics refers to the process of planning, implementing, and controlling the flow of goods, services, and information from the point of origin to the final consumer in an efficient manner. The rapid growth of global trade and e-commerce has increased the strategic importance of logistics; however, these activities also contribute significantly to carbon emissions and energy consumption (Zhang et al., 2023). Therefore, a more sustainable logistics approach is required.

2.2 Supply Chain Management

Supply Chain Management (SCM) encompasses the integration of all activities within the supply chain to improve efficiency and value creation. This concept has evolved into Sustainable Supply Chain Management (SSCM), which integrates economic, environmental, and social dimensions (Liu et al., 2024). In this context, green logistics has become an essential component in supporting supply chain sustainability (Kumar & Anbanandam, 2022).

2.3 Green Logistics

Green logistics is a logistics approach aimed at reducing environmental impacts through practices such as energy efficiency, distribution optimization, and reverse logistics. Its implementation has been shown to improve both environmental and economic performance within organizations, although challenges such as high costs and technological limitations remain significant barriers (Wang et al., 2021; Chen et al., 2022).

2.4 Operational Efficiency

Operational efficiency plays a critical role in green logistics through the optimization of resource utilization, such as reducing travel distances and increasing transportation capacity. This not only lowers operational costs but also contributes to carbon emission reduction (Wang et al., 2021).

2.5 Government Policy

Government policy serves as a key driver of green logistics implementation through environmental regulations, emission standards, and incentive mechanisms. Regulatory pressure encourages companies to adopt green logistics practices to comply with legal requirements and gain organizational legitimacy (Zhang et al., 2023; Chen et al., 2022).

2.6 Operational Innovation

Operational innovation reflects a company's capability to develop more efficient and environmentally friendly logistics processes. Innovative companies tend to be more adaptive in implementing green logistics practices and enhancing their competitive advantage (Kumar & Anbanandam, 2022).

2.7 Environmentally Friendly Technologies

The adoption of environmentally friendly technologies, such as electric vehicles and digital systems, supports efficiency improvement and emission reduction in logistics operations. However, implementation remains constrained by investment costs and infrastructure limitations (Liu et al., 2024; Chen et al., 2022).

3. RESEARCH METHODS

This study employs a Systematic Literature Review (SLR) method to systematically identify and synthesize the factors influencing green logistics implementation. SLR is a structured and transparent approach used to collect and evaluate scientific literature in order to comprehensively address research questions (Paul & Criado, 2020; Donthu et al., 2021). This method has been widely applied in the fields of management and logistics to understand research developments and identify existing research gaps. The research question addressed in this study is**:** "What factors influence the implementation of green logistics?"

The SLR process in this study follows the stages proposed by Donthu et al. (2021), which include literature identification, initial screening, eligibility assessment, and final selection. The identification stage was conducted by searching reputable scientific databases, namely IEEE Xplore, Emerald Insight, ScienceDirect, SpringerLink, and Google Scholar. The search strategy employed a combination of keywords, such as *"green logistics," "green logistics implementation,"* and *"factors influencing green logistics,"* combined with Boolean operators (AND, OR) to broaden the scope of search results.

Furthermore, the initial screening stage was conducted based on the relevance of article titles to the research topic, followed by an eligibility assessment through the evaluation of abstracts and keywords to ensure content relevance and specificity. The final stage involved article selection through the application of inclusion and exclusion criteria, ensuring that only publications meeting the required standards of quality and relevance were included in the literature analysis and synthesis process.

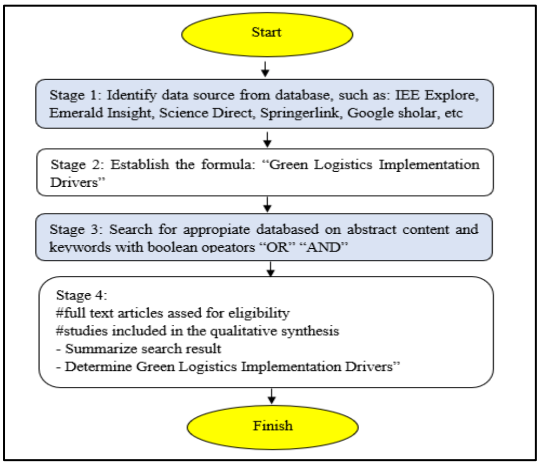

Fig. 1. Steps in a Systematic Literature Review

Table 1. Number of Publications by Database Source

Database	Stage 1 (Articles)	Stage 2 (Title Screening)	Stage 3 (Abstract and Keyword)	Stage 3 (Abstract and Keyword)
IEEE Xplore	368	97	46	21
Emerald Insight	289	84	39	22
Science Direct	532	124	55	30
SpringerLink	294	77	29	15
Google Scholar	305	69	35	12
Total	**1.788**	**451**	**204**	**100**

Based on this process, a total of 1.788 articles were identified during the initial identification stage. Following the title screening process, the number of articles was reduced to 451. Subsequently, the evaluation of abstracts and keywords resulted in 204 articles meeting the eligibility criteria. In the final selection stage, by applying the inclusion and exclusion criteria, 100 articles were selected as the primary sources for analysis. The analyzed articles consisted of publications published between 2021-2025. Through this SLR approach, the study is expected to generate a comprehensive literature synthesis regarding the factors influencing green logistics implementation, while also providing a strong conceptual foundation for future research development.

4. RESULTS AND DISCUSSION

This section presents the results of the article selection process using the Systematic Literature Review (SLR) method. A total of 100 selected articles relevant to the topic of factors influencing green logistics implementation were obtained through a systematic selection process based on predefined inclusion and exclusion criteria. These articles were subsequently classified according to their research focus to identify the key determinants of green logistics implementation. In addition, an annual publication distribution analysis was conducted to illustrate research trends in the field, followed by an in-depth analysis of the key factors influencing the implementation of green logistics.

4.1 Publication Year

The results of the article selection process conducted for the purpose of the Systematic Literature Review (SLR) indicate that a total of 100 articles met the inclusion criteria and were considered relevant to the research topic. These articles focus on the factors influencing the implementation of green logistics during the period from 2021 to 2025**.** The distribution of articles by publication year is presented in detail in Figure 2 and Table 2.

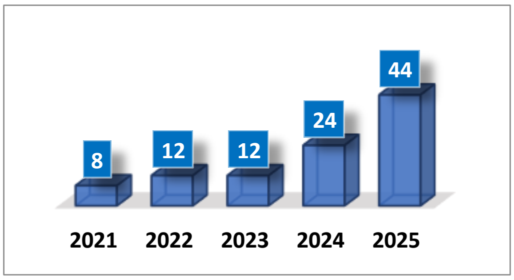

Figure 2. Number of Articles by Publication Year

The distribution of articles by publication year during the 2021–2025 period demonstrates a significant upward trend. In 2021, the number of publications remained relatively low, with **8** articles (8%)**,** followed by an increase in 2022 and 2023, each recording 12 articles (12%)**.** A more substantial increase occurred in 2024, with 24 articles (24%), and the number of publications peaked in 2025, reaching 44 articles (44%)**.**

4.2 State of the Art Analysis of Green Logistic Implementation

Based on Table 1, the search results identified a total of 100 articles relevant to the research topic concerning the factors influencing green logistics implementation. The analysis of these studies provides insights into the current state of research in the field of green logistics, particularly regarding the key determinants affecting its implementation.

Table 2 Analysis of Selected Articles

Authors	Conclution	Authors	Conclution
(Moshood et al., 2021)	Operational innovation plays a significant role in promoting green logistics implementation through the development of more sustainable and low emission supply chain practices.	(L. Wang et al., 2024)	Operational innovation contributes to green logistics implementation through the integration of environmental accounting, supporting sustainability based decision making.
(Nilsson & Göransson, 2021)	Operational innovation accelerates green logistics implementation by enabling companies to adopt new, more efficient, and environmentally friendly processes.	(AFIAH et al., 2024)	Technology enhances green logistics implementation by enabling the integration of digital systems in cross border distribution, improving efficiency and transparency.
(Becerra et al., 2021)	Operational efficiency supports green logistics implementation through inventory management optimization, reducing waste and emissions.	(He et al., 2024)	Government policy strengthens green logistics implementation by promoting closed loop supply chain systems oriented toward recycling and waste reduction.
(Liu & Wang, 2021)	Operational efficiency enhances green logistics implementation by ensuring more effective distribution processes with minimal environmental impact.	(Cao et al., 2024)	Government policy and organizational cultural factors influence green logistics implementation through the establishment of sustainability values and commitments.
(Lee et al., 2021)	Operational innovation strengthens green logistics implementation through process improvements oriented toward efficiency and sustainability.	(Iddik, 2024)	Government policy plays a role in overcoming barriers to green logistics implementation through regulations and institutional support.
(Hebaz & Oulfarsi, 2021)	Government policy promotes green logistics implementation through environmental regulations and external pressures on organizations.	(Krishankumar et al., 2024)	Government policy enhances green logistics implementation by strengthening transparency and preventing greenwashing practices.
(Pramesti et al., 2021)	Operational innovation serves as a foundation for green logistics implementation through the integration of sustainability principles into supply chain operations.	(Santos et al., 2025)	Operational innovation promotes green logistics implementation through the development of innovation-based strategies to address climate change.
(Samarakkody & Alagalla, 2021)	Operational efficiency optimizes green logistics implementation by reducing travel distances and fuel consumption.	(Song et al., 2025)	Government policy supports green logistics implementation through the adoption of low carbon policies in supply chain operations.
(Rowan et al., 2022)	Environmentally friendly technology promotes green logistics implementation through digitalization and green technology-based innovation.	(Zhu et al., 2025)	Government policy strengthens green logistics implementation by integrating environmental strategies into corporate policies.
(Wu, 2022)	Technology enhances green logistics implementation by improving transparency and efficiency in logistics processes.	(Zhang et al., 2025)	Operational innovation enhances green logistics implementation through improvements in manufacturing and distribution process efficiency.
(Malleeswaran & Uthayakumar, 2022)	Operational efficiency improves green logistics implementation through more effective cost and energy management.	(Gupta et al., 2025)	Technology strengthens green logistics implementation by supporting green technology innovation in supply chain operations.
(Joshi, 2022)	Operational innovation supports green logistics implementation through the design of sustainable distribution networks.	(Huan, 2025)	Technology enhances green logistics implementation through the use of computation based optimization models.
(Warasthe et al., 2022)	Operational efficiency enhances green logistics implementation by improving optimal resource utilization.	(G. Wang, 2025)	Technology supports green logistics implementation by improving data transparency, security, and operational efficiency.

(Hariyani & Mishra, 2022)	Operational innovation accelerates green logistics implementation through the integration of efficiency and sustainability-oriented methods.	(Al Amin et al., 2025)	Operational innovation strengthens green logistics implementation through sustainability oriented human resource management.
(Sabet & Farooq, 2022)	Operational efficiency reduces emissions in green logistics implementation through transportation route optimization.	(Ndiango et al., 2025)	Operational innovation enhances green logistics implementation among SMEs through flexible process adaptation.
(Mutie Mutua et al., 2022)	Operational innovation strengthens green logistics implementation through the development of sustainable logistics strategies.	(Tsikada et al., 2025)	Technology accelerates green logistics implementation through comprehensive supply chain digitalization.
(Astete, 2022)	Operational efficiency supports green logistics implementation through effective reverse flow management.	(T. Wang & Shen, 2025)	Operational innovation supports green logistics implementation through increased sustainability awareness and organizational practices.
(Le et al., 2022)	Government policy encourages green logistics implementation through trade and environmental regulations.	(Alomari et al., 2025)	Operational innovation enhances green logistics implementation by promoting sustainable innovation strategies.
(Cataldo et al., 2022)	Operational innovation enhances green logistics implementation in complex construction sectors.	(Gloria, 2025)	Operational innovation strengthens green logistics implementation through the development of knowledge-based innovation.
(Silva et al., 2022)	Operational innovation strengthens green logistics implementation through practice-based sustainability approaches.	(Junejo et al., 2025)	Environmentally friendly technology promotes green logistics implementation through the use of clean alternative energy sources.
(Inês et al., 2023)	Government policy strengthens green logistics implementation by enhancing transparency and accountability in sustainable supply chain practices.	(Bindi et al., 2025)	Technology supports green logistics implementation by reducing transportation emissions toward net zero emissions.
(Bommenahalli Veerabhadrappa et al., 2023)	Operational innovation supports green logistics implementation by encouraging more environmentally responsible consumption and procurement behaviors.	(Alreshidi et al., 2025)	Technology accelerates green logistics implementation through the use of environmentally friendly fuels.
(Haleem et al., 2023)	Operational innovation accelerates green logistics implementation through sustainability-oriented production and distribution processes.	(Tak et al., 2025)	Technology enhances green logistics implementation through sustainable energy systems.
(Abbasi & Ahmadi Choukolaei, 2023)	Government policy regulates green logistics implementation through carbon policy mechanisms that encourage emission reduction.	(Zahraee & Shiwakoti, 2025)	Technology enhances green logistics implementation through the application of artificial intelligence in process optimization.
(Carissimi et al., 2023)	Operational innovation strengthens green logistics implementation by enhancing supply chain resilience to environmental changes.	(Ma et al., 2025)	Technology strengthens green logistics implementation through the integration of Industry 4.0 technologies.
(Hasan et al., 2023)	Operational efficiency improves green logistics implementation through the optimization of more energy-efficient transportation procurement processes.	(Han & Li, 2025)	Operational efficiency enhances green logistics implementation through warehouse system optimization, reducing energy consumption and improving productivity.
(Pérez-Cardona et al., 2023)	Environmentally friendly technology supports green logistics implementation through the use of more energy-efficient transportation components.	(Chen, 2025)	Operational innovation supports green logistics implementation through the development of more efficient and environmentally friendly construction methods.
(Mallah et al., 2023)	Operational efficiency optimizes green logistics implementation through improved distribution efficiency in port operations.	(Reddy Durgam & Ramani, 2025)	Government policy regulates green logistics implementation through the adoption of carbon taxes that encourage companies to reduce emissions.
(Y. Wang et al., 2023)	Technology accelerates green logistics implementation through digitalization and supply chain system integration.	(Su & Sukhotu, 2025)	Technology enhances green logistics implementation through the use of environmentally friendly vehicles in transportation systems.
(Yuik et al., 2023)	Operational innovation supports green logistics implementation through the development of recycling and remanufacturing systems.	(Altaf et al., 2025)	Operational efficiency supports green logistics implementation through more efficient agricultural product distribution optimization.
(Pratono et al., 2023)	Operational innovation improves green logistics implementation through greater supply chain flexibility and adaptability.	(Hu, 2025)	Technology enhances green logistics implementation through the use of data analytics for more accurate decision making.
(Cao et al., 2023)	Government policy promotes green logistics implementation through the provision of incentives and subsidies.	(J. Xu & Bo, 2025)	Operational innovation strengthens green logistics implementation through improvements in industrial manufacturing logistics systems.
(Ashraf & Idrisi, 2024)	Government policy supports green logistics implementation through the development of sustainable public transportation systems.	(Romerio, 2025)	Operational innovation supports green logistics implementation through sustainable event logistics management.
(S. Xu et al., 2024)	Government policy regulates green logistics implementation through carbon emissions trading policies.	(Rafnas, 2025)	Operational efficiency optimizes green logistics implementation through more effective and energy efficient distribution route planning.
(Sahebi et al., 2024)	Operational innovation expands green logistics implementation through the development of new concepts and approaches.	(Jian et al., 2025)	Operational innovation enhances green logistics implementation through increased efficiency in the shipping industry.
(Kumar et al., 2024)	Operational efficiency improves green logistics implementation by enhancing overall supply chain performance.	(Park & Kang, 2025)	Operational innovation supports green logistics implementation through the integration of lean principles and sustainability practices.
(Okeke, 2024)	Operational innovation supports green logistics implementation in complex and high risk industrial sectors.	(Pierli et al., 2025)	Operational innovation strengthens green logistics implementation through more efficient food supply chain management.
(Islam et al., 2024)	Operational innovation accelerates green logistics implementation through the development of systematic adoption models.	(Marcone, 2025)	Technology enhances green logistics implementation through the integration of digital systems and automation.
(Deste et al., 2024)	Operational innovation strengthens green logistics implementation through the enhancement of sustainability practices.	(Duong et al., 2025)	Technology supports green logistics implementation through the strengthening of efficient reverse logistics systems.

(Deste et al., 2024)	Operational innovation strengthens green logistics implementation through the enhancement of sustainability practices.	(Duong et al., 2025)	Technology supports green logistics implementation through the strengthening of efficient reverse logistics systems.
(Hariyani et al., 2024)	Operational innovation supports green logistics implementation through sustainable resource management.	(Mbago et al., 2025)	Government policy reduces emissions in green logistics implementation through decarbonization regulations.
(Baziyad et al., 2024)	Technology enhances green logistics implementation through the utilization of digital systems to improve efficiency and transparency.	(Bauer et al., 2025)	Technology enhances green logistics implementation through the integration of digital systems into supply chain operations.
(Jayachandran et al., 2024)	Environmentally friendly technology promotes green logistics implementation through the use of alternative energy sources.	(Olusegun et al., 2025)	Operational innovation supports green logistics implementation through the development of future-oriented supply chain systems.
(Andres et al., 2024)	Technology acts as a key enabler in green logistics implementation through the integration of intelligent systems.	(Patidar et al., 2025)	Operational innovation strengthens green logistics implementation through sustainable digital transformation.
(Jiang et al., 2024)	Operational efficiency optimizes green logistics implementation through the reduction of distribution distance and delivery time.	(Naeem et al., 2025)	Technology enhances green logistics implementation through the use of intelligent data driven systems.
(Somantri & Surendro, 2024)	Technology supports green logistics implementation by reducing greenhouse gas emissions.	(Mohsin et al., 2025)	Operational efficiency enhances green logistics implementation through improved supply chain performance and productivity.
(Wan et al., 2024)	Environmentally friendly technology accelerates green logistics implementation in energy systems.	(Lau et al., 2025)	Technology supports green logistics implementation through enhanced product transparency and traceability.
(L. Wang, 2024)	Operational efficiency improves green logistics implementation through supply chain system optimization.	(Petrillo et al., 2025)	Operational innovation strengthens green logistics implementation through the development of best practices in Green Supply Chain Management (GSCM).
(Abhilasha & Danish, 2024)	Operational efficiency supports green logistics implementation through more efficient resource utilization.	(Tetteh et al., 2025)	Government policy supports green logistics implementation through strengthened recycling systems and regulatory frameworks.
(Y. Wang et al., 2024)	Government policy strengthens green logistics implementation through monitoring and regulatory mechanisms.	(Yang et al., 2025)	Technology enhances green logistics implementation through improved energy efficiency in operations.
(Gerrero-Molina et al., 2024)	Technology enhances green logistics implementation through the modernization of port systems.	(Mohammed et al., 2025)	Operational innovation and technology are dominant factors in green logistics implementation globally.

Table 3 Factors Influencing Green Logistics Implementation Based on the State of the Art Analysis

No	Factor	Supporting Authors	Number of Articles	Percentage
1.	Operational Efficiency	(Becerra et al, 2021); (Liu & Wang, 2021); (Samarakkody, 2021); (Malleeswaran, 2022); (Warasthe et al, 2022); (Sabet & Farooq, 2022); (Astete, 2022); (Hasan et al, 2023); (Mallah et al, 2023); (Kumar et al, 2024); (Jiang et al, 2024); (Wang, 2024); (Abhilasha & Danish, 2024); (Chen, 2025); (Hu, 2025); (Jian et al, 2025); (Lau et al, 2025)	17	17%
2.	Government Policy	(Hebaz & Oulfarsi, 2021); (Le et al, 2022); (Abbasi & Ahmadi, 2023); (Cao et al, 2023); (Ashraf & Idrisi, 2024); (Xu et al, 2024); (Wang et al, 2024); (Iddik, 2024); (Krishankumar et al, 2024); (Santos et al, 2025); (Zhu et al, 2025); (Zhang et al, 2025); (Su & Sukhotu, 2025); (Bauer et al, 2025); (Yang et al, 2025); (Cao et al., 2024); (Inês et al., 2023)	17	17%
3.	Operational Innovation	(Moshood et al, 2021); (Nilsson & Göransson, 2021); (Lee et al, 2021); (Pramesti et al, 2021); (Joshi, 2022); (Hariyani & Mishra, 2022); (Mutua et al, 2022); (Cataldo et al, 2022); (Silva et al, 2022); (Veerabhadrappa et al, 2023); (Haleem et al, 2023); (Carissimi et al, 2023); (Yuik et al, 2023); (Pratono et al, 2023); (Sahebi et al, 2024); (Okeke, 2024); (Islam et al, 2024); (Deste et al, 2024); (Hariyani et al, 2024); (AFIAH et al, 2024); (Song et al, 2025); (Gupta et al, 2025); (Ndiango et al, 2025); (Tsikada et al, 2025); (Gloria, 2025); (Junejo et al, 2025); (Reddy & Ramani, 2025); (Romerio, 2025); (Rafnas, 2025); (Park & Kang, 2025); (Pierli et al, 2025); (Marcone, 2025); (Patidar et al, 2025); (Naeem et al, 2025); (Tetteh et al, 2025); (Alomari et al., 2025); (L. Wang et al., 2024)	37	37%
4.	Environmentally Friendly Technology	(Rowan et al, 2022); (Wu, 2022); (Pérez-Cardona et al, 2023); (Wang et al, 2023); (Baziyad et al, 2024); (Jayachandran et al, 2024); (Andres et al, 2024); (Somantri & Surendro, 2024); (Wan et al, 2024); (Gerrero-Molina et al, 2024); (He et al, 2024); (Huan, 2025); (Wang, 2025); (Al Amin et al, 2025); (Wang & Shen, 2025); (Bindi et al, 2025); (Alreshidi et al, 2025); (Tak et al, 2025); (Zahraee & Shiwakoti, 2025); (Ma et al, 2025); (Han & Li, 2025); (Altaf et al, 2025); (Xu & Bo, 2025); (Duong et al, 2025); (Mbago et al, 2025); (Olusegun et al, 2025); (Mohsin et al, 2025); (Petrillo et al, 2025); (Mohammed et al, 2025)	29	29%

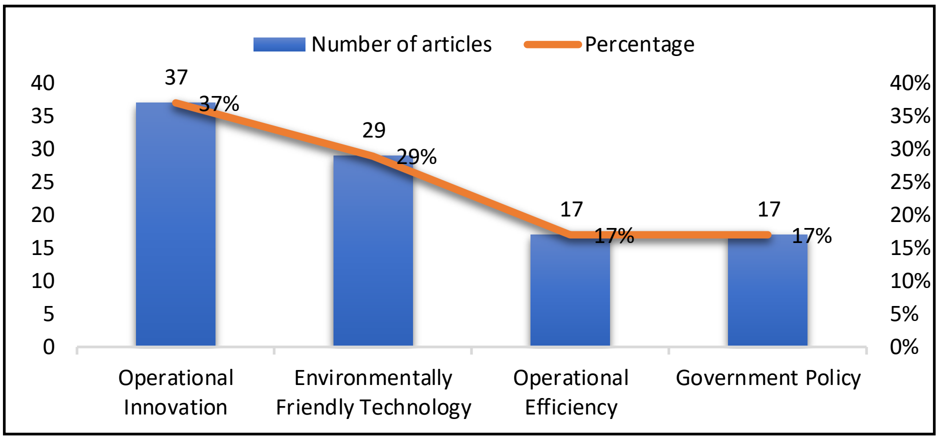

Figure 3. Trends Based on Green Logistics Implementation Factors

Based on the literature review findings presented in Table 3 and Figure 3, several key factors were identified as significantly influencing the implementation of green logistics. These factors reflect the interaction between internal organizational aspects and external pressures in driving the transformation toward a sustainable logistics system.

a) Operational Efficiency (17%)

Operational efficiency plays an important role in optimizing resource utilization while reducing costs and emissions through practices such as route optimization, capacity utilization, and process management. This factor serves as a foundation for integrating economic performance with environmental sustainability.

b) Government Policy (17%)

Government policy promotes the implementation of green logistics through regulations, incentives, and mechanisms such as carbon taxation. From the perspective of Institutional Theory, regulatory pressure strengthens organizational adoption of sustainable practices.

c) Operational Innovation (37%)

Operational innovation represents the dominant factor, encompassing the development of processes, business models, and sustainable logistics systems. Within the Resource-Based View (RBV) framework, innovation serves as a source of competitive advantage in responding to sustainability demands.

d) Environmentally Friendly Technology (29%)

Technology acts as a key enabler through digitalization, the adoption of clean energy, and intelligent systems that enhance supply chain efficiency and transparency. Technology adoption is considered a critical element in the transformation toward sustainable green logistics.

CONCLUSION

Based on the findings of the Systematic Literature Review (SLR) of 100 selected articles, this study identifies that the implementation of green logistics is influenced by the interaction of both internal and external factors. Four key determinants were identified, namely operational efficiency, government policy, operational innovation, and environmentally friendly technology. Among these factors, operational innovation emerged as the most dominant factor, highlighting the importance of organizational capabilities in developing sustainable logistics processes. Environmentally friendly technology acts as a strategic enabler through digitalization and the adoption of clean energy, while operational efficiency supports resource optimization and emission reduction. In addition, government policy reinforces implementation through regulations and incentives.

Overall, the successful implementation of green logistics depends on the synergy among these four factors. Therefore, organizations should adopt an integrated strategic approach to achieve sustainability and competitive advantage. From a theoretical perspective, this study strengthens the understanding of green logistics determinants through an integrative approach. Practically, the findings provide valuable insights for industry practitioners and policymakers in designing strategies to support sustainable logistics implementation. However, this study is limited by its literature-based approach. Therefore, future research is recommended to conduct empirical testing to further validate the findings.

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