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# The Impact of Green Supply Chain Management on Economic, Operational, Environmental, and Marketing Performance in Vietnam's Fashion Sector

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## Abstract

**Purpose:** Although Green Supply Chain Management (GSCM) has been widely examined in relation to environmental and operational outcomes, its role in creating economic value through market-based mechanisms remains underexplored, particularly in emerging economies. This study investigates how GSCM influences the business performance of Vietnamese fashion firms across economic, environmental, operational, and marketing dimensions. It addresses a critical gap by clarifying the mediating role of marketing performance in translating sustainable practices into competitive advantage. **Research design, data, and methodology:** A structured survey was conducted with 314 Vietnamese fashion firms. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to assess both direct and indirect pathways. GSCM is defined at its first mention to ensure conceptual clarity. **Results:** GSCM directly improves economic performance and exerts even stronger indirect effects through operational and marketing performance. Despite its substantial environmental benefits, its economic impact remains modest, reflecting emerging-market conditions. **Conclusions:** Marketing performance is the key channel through which GSCM creates economic value, as green initiatives enhance credibility and responsibility, strengthening consumer trust, loyalty, and price-premium acceptance. Theoretically, this broadens GSCM by incorporating marketing mechanisms. Practically, it guides firms and policymakers in aligning green practices with branding and market positioning.

**Keywords :** Green Supply Chain Management, Supply Chain Management, Vietnam, Business Performance.

**JEL Classification Code:** M11, F64, M2

## 1. Introduction

The global fashion industry is widely regarded as one of the most environmentally polluting sectors, with massive consumption of water, energy, and chemicals. In this context, Vietnam has emerged as one of the world's top five textile and garment exporters while also becoming a rapidly

growing domestic consumer market. The industry contributes significantly to GDP growth, job creation, and integration into global value chains, with export turnover estimated at approximately USD 44 billion in 2024 and an ambitious target of USD 47–48 billion in 2025. Key export markets include the United States, the European Union, Japan, and South Korea (Hong, 2024).

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However, this rapid expansion is accompanied by mounting sustainability challenges. The sector faces increasing pressure from both domestic regulators and international buyers to meet stricter environmental and social responsibility standards. Core issues include intensive energy and resource use, greenhouse gas emissions, waste management, and traceability requirements. In addition, the restructuring of logistics networks, warehousing systems, and transportation operations poses new sustainability demands, especially in supply chain management and distribution planning. In response, Vietnam has implemented major policy frameworks such as the National Green Growth Strategy and the Environmental Protection Law (2020), including Extended Producer Responsibility (EPR), to promote green production and align with its COP26 and UN 2030 Sustainable Development Goals commitments.

In parallel, market pressures are intensifying. Surveys by McKinsey reveal that 65% of consumers are shifting from fast fashion to basic, durable, and sustainable products, and 67% are concerned about the environmental and social responsibility of fashion brands. Consumer awareness is also changing shopping behavior across physical stores, shopping centers, and online retailing platforms, creating a hybrid retail environment where logistics performance and last-mile delivery efficiency significantly influence purchasing decisions. As a result, Vietnamese firms face increasing requirements from global buyers related to sustainable inputs, carbon footprint, and green certification. Although the industry has not yet been legally bound by mandatory emission-reduction regulations, voluntary green transition has become a strategic imperative to maintain competitiveness. Nevertheless, several barriers remain, such as trade policy uncertainties, limited access to sustainable raw materials, financial constraints for green investment, and uneven awareness among firms, hindering the speed and scale of this transformation.

These dynamics highlight a critical research gap: while Green Supply Chain Management (GSCM) is increasingly promoted as a strategic pathway for green transition, there is still limited understanding of how GSCM practices translate into firm performance within emerging economies like Vietnam, where structural, regulatory, and market conditions differ substantially from those in developed economies.

GSCM is recognized as a strategic solution to mitigate environmental impacts by managing the entire product lifecycle, which includes design, procurement, production, transportation, distribution, and recycling, with the participation of all stakeholders (Hart et al., 2010; Tseng et al., 2019). In the fashion context, GSCM extends to retail and wholesale operations, inventory management, and logistics integration, connecting manufacturers, retailers,

and consumers through sustainable channel management. Prior studies have demonstrated that GSCM offers multiple benefits, such as improving operational efficiency and reducing costs through resource optimization, recycling, and waste management (Liu, 2023; Mishra et al., 2022), expanding market share and enhancing customer loyalty through green branding (Liu, 2023; Zerbakhshnia et al., 2019), and improving both environmental and financial performance (Gonzalez et al., 2022; Roh et al., 2022). GSCM has also been identified as a driver of green innovation, thereby creating sustainable competitive advantages (Fantazy et al., 2025). Nonetheless, the effectiveness of GSCM is not uniform; it varies by industry type, firm size, socio-economic conditions, and logistics capabilities (Li & Zhang, 2024). Notably, some studies report conflicting results, showing that activities such as green procurement or eco-design may sometimes increase costs and negatively affect economic performance (Dzikrianyah et al., 2023; Yimer et al., 2025).

While many existing studies have focused on developed economies, Vietnam's fashion industry represents a distinctive context shaped by rapid export growth, rising sustainability pressures, and structural challenges. The interplay between logistics infrastructure, retail formats, and consumer shopping patterns further complicates the effectiveness of green initiatives. This raises important questions about how GSCM influences firm performance in such a setting. Although substantial evidence suggests that GSCM enhances business performance across environmental, operational, financial, and innovation dimensions, most research remains limited to exploring its direct effects or indirect pathways through environmental and operational performance (Abdallah & Al-Ghwayeen, 2019; Govindan et al., 2020). In contrast, a critical factor in the fashion industry, where green branding and consumer engagement can be directly transformed into competitive advantage and profitability, namely marketing performance, has not been sufficiently examined as a mediating mechanism linking GSCM to economic performance. This represents an important research gap.

To address this gap, this study analyzes the role of GSCM in shaping the business performance of fashion companies in Vietnam, adopting a multidimensional approach that encompasses environmental, operational, marketing, and economic outcomes. By situating the study within the context of Vietnam's green transition, it seeks to clarify how GSCM practices interact with emerging sustainability demands and market pressures. Particular attention is paid to the logistics–marketing interface, retail and wholesale coordination, and the influence of power-dependence and channel management structures in shaping firm responses to green supply chain challenges. In particular, the study highlights the indirect pathway from

GSCM to economic performance through marketing performance. By doing so, it not only contributes to the theoretical development of GSCM but also provides valuable practical evidence for Vietnamese fashion enterprises in implementing sustainable development strategies.

The remainder of this study is organized into five sections. Section 2 presents the theoretical background and hypotheses development. Section 3 outlines the methodology. Section 4 discusses the empirical results and findings. Finally, Section 5 concludes with limitations and future research.

## 2. Theoretical Background and Hypotheses Development

### 2.1. Green Supply Chain Management

Green Supply Chain Management is defined as “integrating environmental thinking into supply chain management, including product design, material sourcing and procurement, manufacturing processes, delivery of the final product to consumers, as well as end-of-life product management” (Srivastava, 2007). The scope of GSCM spans all stages of the supply chain, from suppliers and manufacturers to customers (Ahi & Searcy, 2013; Zhu & Sarkis, 2004). The concept began to attract attention in the early 1990s, particularly after the oil crises of the 1980s heightened environmental awareness and the demand for sustainable development (Fahimnia et al., 2019; Mohanty & Prakash, 2014). Over time, the conceptualization of GSCM has evolved from a narrow focus on pollution control to a broader perspective that integrates strategic management, innovation, and stakeholder engagement. This evolution has also led to diverse theoretical interpretations and empirical findings.

Given its broad scope, scholars have proposed various classifications and conceptualizations of GSCM practices. One widely adopted framework includes three core dimensions: (i) internal environmental management (IEM), (ii) green purchasing (GP), and (iii) eco-design (ED). This approach has been empirically validated in several studies (Alghababsheh et al., 2022; Martinez-Costa et al., 2025). However, other scholars argue for more extended frameworks, incorporating green logistics, reverse logistics, and closed-loop supply chains, highlighting the ongoing theoretical debate over what constitutes the “core” of GSCM. These conceptual differences reflect not only the multidimensionality of GSCM but also the lack of consensus in defining its boundaries and mechanisms.

In practice, GSCM is regarded as a form of environmental management innovation that enables firms to

comply with regulatory requirements while simultaneously responding to pressures from stakeholders such as governments, non-governmental organizations, customers, and communities (Jell-Ojobor & Raha, 2022; Seuring & Müller, 2008). Key drivers of GSCM adoption include intense market competition, increasingly stringent environmental regulations, consumer pressure, and globalization, which has amplified supply chain complexity (Chakraborty et al., 2023; Schorsch et al., 2017). Furthermore, the demand for shorter product life cycles, high demand volatility, and rapid technological innovation have created additional pressure for firms to integrate GSCM in order to maintain competitive advantage (Negri et al., 2021). While these studies emphasize enabling forces, others highlight significant structural and institutional barriers, such as regulatory fragmentation, cost burdens, and capacity gaps, which limit the diffusion and effectiveness of GSCM practices across industries and countries. This tension between drivers and barriers constitutes a central theoretical issue in understanding GSCM implementation.

Numerous studies affirm that the implementation of GSCM can help firms improve operational efficiency, reduce costs, enhance brand reputation, and build sustainable competitive advantage (Bressanelli et al., 2020; Zhu et al., 2012). The application of the 3R principle (Reduce, Reuse, Recycle) optimizes resource utilization, lowers emissions, and enhances long-term efficiency (Assumpção et al., 2019; Epoh & Mafini, 2018). However, the practical adoption of GSCM also faces considerable barriers, including high investment costs, lack of top management commitment, technological limitations, insufficient government support, and resistance from stakeholders within the supply chain (de Sousa Jabbour et al., 2013; Dube et al., 2016). However, a growing body of literature also reports contradictory results. Several empirical studies suggest that while GSCM can generate long-term efficiency gains, it often requires high upfront investments, introduces supply chain complexity, and may temporarily reduce firms’ cost competitiveness, particularly in resource-constrained environments (de Sousa Jabbour et al., 2013; Dube et al., 2016) (de Sousa Jabbour et al., 2013; Dube et al., 2016). Such conflicting evidence reflects theoretical tensions between environmental performance and economic performance, especially in emerging markets.

Overall, GSCM is an integrated management strategy that aligns supply chain activities with environmental efficiency while sustaining long-term competitiveness. Yet, its effectiveness is far from universal. Contradictory empirical findings suggest that outcomes are heavily mediated by industry characteristics, firm capabilities, and the institutional environment (Tseng et al., 2019). Moreover, most existing research has concentrated on operational and environmental impacts, while less attention has been

devoted to marketing and economic mechanisms through which GSCM may generate competitive advantage. Therefore, further investigation into GSCM within specific industries, such as the fashion sector in developing countries, is essential to better understand its underlying mechanisms and practical effectiveness.

## 2.2. Hypothesis Development

From a theoretical perspective, GSCM can fundamentally restructure the firm's cost–revenue function toward greater sustainability. At the upstream stage, eco-design reduces costs at the outset by minimizing energy use, material consumption, and waste treatment, while at the same time ensuring compatibility with sustainable consumer preferences. This combination lowers marginal costs, increases willingness to pay, and ultimately expands profit margins. At the midstream stage, green purchasing allows firms to transform institutional and regulatory pressures into competitive advantages by embedding environmental criteria into supplier selection. At the internal stage, internal environmental management is grounded in the resource-based view (RBV). It develops organizational capabilities that optimize resource allocation, reduce energy intensity, and enhance operational efficiency, which together strengthen firms' economic viability over time. Although initial investment costs may dampen short-term effects, these costs are often outweighed by long-term gains in cost efficiency, risk reduction, and brand value.

Empirical studies provide substantial support for this reasoning. Eco-design practices have been found to reduce production costs and enhance profitability (Borchardt et al., 2011; Lin, 2013). Green purchasing improves price–quality competitiveness and lowers transaction frictions (Awan et al., 2019; Carter et al., 2000; Reuter et al., 2010). Internal environmental management enhances profit margins by increasing operational efficiency and reducing resource intensity (Gallego-Álvarez et al., 2014; Rust et al., 2002). Although some evidence notes short-term cost pressures (Bowen et al., 2001; Min & Galle, 2001), a large body of research confirms long-term positive impacts on firms' economic performance through savings, lower legal risks, and enhanced brand value (Feng et al., 2018; Guang Shi et al., 2012; Zhu & Sarkis, 2004). Accordingly, this study proposes the following hypothesis:

**H<sub>1</sub>:** GSCM has a positive effect on the economic performance (EP) of firms.

In addition to its direct impact, Green Supply Chain Management also influences economic performance indirectly through environmental performance, operational performance, and marketing performance.

### \* *Environment performance*

SCM is considered a core strategic approach that enhances firms' environmental performance (EVP) by integrating environmental considerations across the entire value chain (De Giovanni & Cariola, 2021). Eco-design, green purchasing, and internal environmental management contribute to pollution prevention, waste reduction, and risk mitigation. These practices also improve environmental compliance and foster a positive corporate image. Drawing on the Dynamic Capabilities View, GSCM builds adaptive capabilities that enable firms to innovate, coordinate cross-functional activities, and optimize resource utilization, which together lead to a reduction in environmental impacts.

Empirical evidence reinforces this theoretical reasoning. Prior studies have shown that eco-design and green purchasing can reduce pollution and prevent environmental risks while improving sustainability performance (Islam et al., 2021; Kraus et al., 2020; Yu et al., 2019). Other research highlights how dynamic capabilities embedded in GSCM support innovation and emissions reduction (Shou et al., 2020). Although contextual factors may influence the magnitude of the impact, most studies confirm the positive relationship between GSCM and EVP, which serves as a key foundation for sustainable competitive advantage (Jabbour & de Sousa Jabbour, 2016; Zhu & Sarkis, 2004).

**H<sub>2</sub>:** GSCM has a positive effect on EVP.

In addition to its direct impact, improved EVP can also function as a mediating channel through which GSCM efforts are transformed into tangible economic value. When environmental performance improves, firms can reduce treatment costs, save energy, lower legal risks, enhance reputation, and expand market opportunities. This environmental–economic linkage aligns with both the resource-based and dynamic capabilities perspectives, which emphasize the role of environmental innovation in creating long-term value.

Empirical studies further support this mediating pathway. Improved environmental performance has been linked to reduced operational costs, enhanced efficiency, and strengthened market position (Feng et al., 2018). Firms that adopt comprehensive GSCM practices not only achieve better environmental outcomes but also convert these gains into superior economic performance.

**H<sub>3</sub>:** GSCM impacts EP indirectly and positively through EVP.

### \* *Operational Performance*

In theory, GSCM can be understood as a strategic instrument that strengthens firms' operational performance (OP) through the systematic integration of environmental

considerations into production and distribution processes. By emphasizing process optimization, clean input control, and waste recycling, firms can enhance resource utilization, reduce treatment costs, and limit regulatory risks. GSCM also encourages closer collaboration with suppliers and customers, which creates the foundation for continuous improvement approaches such as total quality management and just-in-time systems. These mechanisms jointly increase supply chain flexibility, responsiveness, and overall process efficiency.

Empirical research provides substantial support for this theoretical reasoning. Process optimization and waste reduction have been shown to enhance productivity and product quality (Dou et al., 2014; Green et al., 2012). Closer supplier–customer integration improves flexibility and responsiveness (Fang & Zhang, 2018). Evidence from emerging Asian economies further indicates that GSCM adoption leads to lower defect rates, shorter delivery times, and more efficient inventory management (Gunasekaran et al., 2001; Zhu et al., 2012). These operational improvements translate directly into economic advantages, including cost savings, greater customer satisfaction, and enhanced competitive positioning (Raut et al., 2019).

**H<sub>4</sub>** : GSCM has a positive effect on OP.

Beyond its direct impact, OP also represents an important pathway through which GSCM contributes to EP. By increasing production efficiency, improving lead times, and enhancing responsiveness, operational improvements allow firms to convert environmental initiatives into measurable financial gains. These gains strengthen their cost advantage and competitive position in the market.

A growing body of empirical evidence confirms this mediating role. Enhancements in operational performance are closely associated with cost reductions, productivity growth, and market responsiveness, which together support stronger economic outcomes. This suggests that OP functions as a critical mechanism through which GSCM creates value.

**H<sub>5</sub>** : GSCM impacts EP indirectly and positively through OP.

#### \* Marketing Performance

In contemporary markets, where public and stakeholder expectations regarding social and environmental responsibility are increasingly pronounced, cultivating a brand associated with sustainable values has become an important source of strategic advantage. Through eco-design, green purchasing, and environmentally responsible distribution, GSCM allows firms to minimize ecological impacts while simultaneously building a green brand image that is visible to customers, regulators, and the wider public.

This image provides a foundation for enhancing customer satisfaction, loyalty, and trust (Hoffman, 2001), and it also strengthens stakeholder relationships and internal motivation by elevating brand reputation (Testa & Iraldo, 2010; Xie et al., 2012). Drawing on signaling theory, GSCM sends credible signals of a firm's environmental commitment, thereby reducing information asymmetry and increasing consumer acceptance of green products.

Empirical research supports these theoretical arguments. Previous studies show that strong environmental positioning enhances brand image, improves customer perceptions of reliability, and contributes to greater market acceptance of sustainable products (Testa & Iraldo, 2010; Xie et al., 2012). A positive green reputation is also linked to improved marketing outcomes, including greater customer loyalty, higher willingness to pay, and stronger stakeholder engagement (Akbari et al., 2023; Delaney et al., 2016).

**H<sub>6</sub>**: GSCM has a positive effect on MP

Marketing performance reflects the extent to which marketing activities contribute to both financial and non-financial success. When customers clearly perceive a firm's commitment to sustainability, they are more likely to increase spending and maintain long-term relationships, thereby boosting revenues and improving returns from existing customers. At the same time, strong green brand reputation enhances perceived credibility, which helps attract new customers and expand market share in an increasingly sustainability-oriented marketplace. These mechanisms make marketing performance a critical channel through which GSCM influences economic outcomes.

Empirical studies provide additional evidence for this mediating pathway. Research has shown that firms with strong green brand positioning and credible sustainability signals achieve higher revenue growth, customer acquisition, and market expansion compared with their competitors (Akbari et al., 2023; Delaney et al., 2016). This evidence underscores marketing performance as a key mechanism linking GSCM implementation to economic success.

**H<sub>7</sub>**: GSCM impacts EP indirectly and positively through MP.

Based on the research model presented in Figure 1, the study proposes seven hypotheses. First, GSCM is expected to have a direct effect on economic performance (H1), while also improving environmental performance (H2), operational performance (H3), and marketing performance (H4). These three mediating dimensions are, in turn, hypothesized to exert positive effects on economic performance through environmental performance (H5), operational performance (H6), and marketing performance (H7).

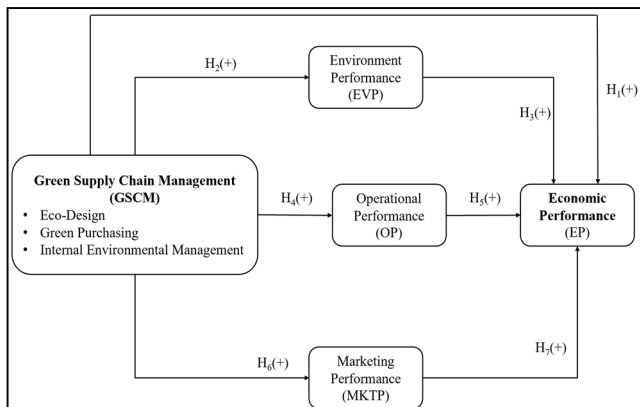


Figure 1: The Research Framework

### 3. Methodology

#### 3.1. Data Collection and Samples

The research data were collected from companies in the fashion industry in Vietnam. Both on-site and online survey methods were employed to reach a broader range of firms. Measurement scales were adapted from prior studies and modified to fit the Vietnamese context. To ensure content validity, the questionnaire was reviewed by academic experts and experienced managers in the field of GSCM, whose feedback was incorporated to improve clarity and contextual relevance.

The survey was conducted in two phases. In the pilot phase, a preliminary questionnaire was distributed to 15 managers from several fashion companies, and their feedback was used to refine and finalize the survey instrument. The main survey was administered in March 2025. Because the exact population size of fashion firms in Vietnam could not be accurately determined, a non-probability purposive sampling strategy was adopted. This approach was chosen to ensure that the respondents possessed sufficient knowledge and experience related to supply chain and environmental practices. The questionnaires were distributed through fashion and apparel associations as well as professional networks in Vietnam. Respondents were required to be managers working in fashion companies. Full anonymity and confidentiality were guaranteed throughout the survey, and participants were informed that they could withdraw at any time without providing a reason.

A total of 350 questionnaires were distributed through both online and offline channels. After screening for completeness and excluding surveys with missing information or unrealistically short completion times, 293 valid responses were retained for analysis, corresponding to

a response rate of approximately 83.7%. This sample size is considered adequate for Structural Equation Modeling (SEM), as Hair et al. (2019) recommend a minimum of ten times the number of estimated parameters in the model.

#### 3.2. Measurement

The questionnaire was designed to capture all constructs in this study. All items were measured using a five-point Likert scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”), which reflects the degree of respondents’ agreement with each statement.

##### Dependent Variable

*Economic Performance (EP)* provides a comprehensive view of both immediate cost savings and long-term financial sustainability. This latent variable is based on Younis et al. (2016). The scale captures cost efficiency through reduced material purchasing (EP1), energy consumption (EP2), and waste treatment (EP3). It also reflects long-term outcomes through return on sales and investment (EP4), profit growth (EP5), and market share growth (EP6) over the past three years.

##### Independent Variable

*Green Supply Chain Management (GSCM)* is based on Alkandi et al. (2024) and Zaid et al. (2018) and was measured through three dimensions. Specifically, *Eco-design* focuses on product design for reduced material and energy use, recyclability, minimization of toxic substances, and emission control. *Green purchasing* reflects supplier cooperation, use of eco-friendly materials, environmental criteria in evaluation, and partnerships for green solutions. *Internal environmental management* covers management commitment, cross-functional cooperation, compliance programs, and regulatory tracking.

##### Mediating Variables

*Marketing Performance (MKTP)* was measured based on Alkandi et al. (2024) with four items comparing the firm’s performance relative to competitors. The scale reflect the firm’s relative marketing effectiveness.

*Operational Performance (OP)* was based on Younis et al. (2016) and was measured with six items capturing reduced lead times, improved product quality, stronger market position, enhanced product development, waste reduction, and better access to international markets.

*Environmental Performance (EVP)* was measured based on Younis et al. (2016) with five items reflecting reductions in wastewater, solid waste, and toxic material use, fewer environmental accidents, and overall improvement in environmental outcomes.

### 3.3. Method of Estimating

The present study adopted Partial Least Squares Structural Equation Modeling (PLS-SEM) to estimate the research model and test the hypotheses. PLS-SEM, first developed by Wold (1985), operates as a variance-based structural equation modeling technique. Unlike covariance-based SEM (CB-SEM), which focuses on reproducing the empirical covariance matrix, PLS-SEM emphasizes maximizing the explained variance of endogenous constructs by estimating component scores for latent variables (Gudergan et al., 2008; Hair et al., 2012). Through its iterative algorithm, each indicator contributes variably to the composite score of its latent construct, thereby allowing for a more flexible representation of measurement models (Chin et al., 2003).

A key advantage of PLS-SEM is its ability to handle complex models with multiple latent variables, mediation, moderation, and higher-order constructs, while requiring minimal distributional assumptions (Sarstedt et al., 2014; Sharma et al., 2021). Unlike CB-SEM, which assumes multivariate normality and is typically suited for theory confirmation, PLS-SEM tolerates non-normal data and relatively small sample sizes, offering stronger statistical power in prediction-oriented and exploratory studies (Bacq & Alt, 2018; Reinartz et al., 2009). Moreover, it accommodates both formative and reflective constructs without requiring model respecification (Xin et al., 2015). These features make PLS-SEM particularly appropriate for the current research context, where the aim is to assess direct and indirect pathways between GSCM, marketing performance, operational performance, environmental performance, and economic performance in the Vietnamese fashion industry.

In this study, the author accomplish the estimation followed two steps. First, the measurement model was tested for reliability and validity using composite reliability, AVE, and discriminant validity criteria such as Fornell–Larcker. Second, the structural model was evaluated through path coefficients and confirmed by a bootstrapping procedure of 5,000 resamples.

### 3.4. Demographic Information

Table 1 presents the demographic characteristics of the 314 respondents. In terms of position, the majority were middle managers (61.78 %), followed by first-line managers (26.11 %) and top-level managers (12.10 %), indicating that the sample captures perspectives from both strategic and operational levels. Regarding firm type, most respondents belonged to limited liability companies (64.01 %), followed by joint stock companies (30.25 %) and joint venture companies (5.73 %). In terms of firm size, a majority of

firms employed between 50 and 100 workers (63.38 %), whereas only 2.55 % had more than 200 employees, showing that the sample is largely composed of small and medium-sized enterprises. Finally, regarding firm age, 63.38 % had operated between 5 and 10 years, 35.67 % between 3 and 5 years, and less than 1 % for more than 10 years, suggesting that most firms in the sample are relatively young but already established in their industries.

**Table 1:** Demographic Profiles of Respondents

Characteristics	Number of respondents (n = 314)	Percentage (%)
<b>Respondent Position</b>		
Top-level	38	12.10
Middle	194	61.78
First-line	82	26.11
<b>Type</b>		
Joint Stock Company	95	30.25
Limited Liability Company	201	64.01
Joint Venture Company	18	5.73
<b>Number of workers</b>		
< 50 people	51	16.24
50 ≤ people < 100	199	63.38
100 ≤ people < 200	56	17.83
200 people ≤	8	2.55
<b>Firm ages</b>		
3 ≤ age < 5	112	35.67
5 ≤ age < 10	199	63.38
10 ≤ age	3	0.96

## 4. Results and Discussion

### 4.1. Reliability and Validity of the Measurement

Table 2 presents the results of the exploratory factor analysis (EFA). The KMO value of 0.9028 and the Bartlett's test ( $\chi^2 = 6081.86$ ,  $df = 314$ ,  $p < 0.001$ ) indicate that the data are highly suitable for factor analysis. Five factors were extracted in line with the proposed research model, with observed items for GSCM, economic performance, environmental performance, operational performance, and marketing performance loading strongly on their respective constructs. All factor loadings exceeded the acceptable threshold of 0.7, confirming good convergent validity. These results demonstrate a clear factor structure and provide a reliable basis for subsequent CFA and SEM analyses.

**Table 2:** The Results of Exploratory Factor Analysis (EFA)

Variable	Factor1	Factor2	Factor3	Factor4	Factor5
EP1	0.046	0.769	0.066	0.064	0.103
EP2	0.113	0.827	0.106	0.028	0.073
EP3	0.051	0.809	0.098	0.057	-0.028
EP4	0.086	0.833	0.051	0.035	0.044
EP5	0.165	0.792	-0.005	-0.061	0.028
EP6	0.152	0.824	0.068	0.009	0.059
EVP1	0.044	-0.078	-0.008	0.800	-0.013
EVP2	0.041	0.097	0.047	0.848	-0.009
EVP3	0.062	-0.014	0.019	0.856	-0.037
EVP4	0.107	0.046	0.030	0.767	0.053
EVP5	0.046	0.054	0.048	0.868	0.027
OP1	0.052	0.073	0.756	-0.030	0.072
OP2	0.055	0.102	0.763	0.005	0.082
OP3	0.057	0.034	0.798	0.036	0.023
OP4	0.019	-0.027	0.833	0.021	-0.009
OP5	0.048	0.131	0.756	0.034	-0.082
OP6	0.109	0.122	0.821	0.090	-0.016
MP1	0.059	0.062	-0.082	0.023	0.759
MP2	0.090	0.108	0.079	-0.032	0.758
MP3	0.122	0.052	0.055	-0.016	0.791
MP4	0.027	0.042	-0.004	0.031	0.810
GSCM1	0.818	0.042	0.000	0.019	0.036
GSCM2	0.781	0.135	0.040	0.055	0.032
GSCM3	0.865	0.124	0.053	0.080	0.053
GSCM4	0.825	0.068	-0.020	0.025	0.015
GSCM5	0.758	0.096	0.015	0.062	-0.003
GSCM6	0.715	0.094	0.047	0.028	0.088
GSCM7	0.763	0.059	0.016	0.056	-0.007
GSCM8	0.762	0.023	0.109	0.072	0.113
GSCM9	0.755	0.050	0.066	0.018	0.008
GSCM10	0.696	0.142	0.100	-0.015	0.025
GSCM11	0.792	0.084	0.074	0.043	0.023
GSCM12	0.824	0.058	0.055	0.038	0.104

KMO test = 0.9028, Bartlett test ( $\chi^2 = 6081.86, df = 314, p = 0.000$ )  
 Source: Authors own work

Table 3 reports the results of the confirmatory factor analysis (CFA). All factor loadings are above the acceptable threshold of 0.7, ranging from 0.721 to 0.884, indicating that the observed items strongly represent their latent constructs. The composite reliability (CR) values range from 0.865 (marketing performance) to 0.951 (GSCM), confirming high internal consistency. Similarly, the average variance extracted (AVE) values fall between 0.616 and 0.681, above the threshold of 0.5, providing evidence of convergent validity. In terms of model fit, the CFA results demonstrate an excellent fit to the data, with  $\chi^2 = 656.65$  ( $p = 0.000$ ), RMSEA = 0.034, CFI = 0.970, TLI = 0.968, and SRMR = 0.041, all within the acceptable range. These findings confirm that the measurement model has strong reliability and validity, ensuring that the constructs are appropriate for subsequent structural analysis.

**Table 3:** The Results of Confirmatory Factor Analysis (CFA)

Items	Mean	Factor loadings	CR	AVE
<b>Economic Performance</b>			<b>0.925</b>	<b>0.673</b>
EP1	3.029	0.776		
EP2	2.959	0.853		
EP3	2.978	0.802		
EP4	3.016	0.836		
EP5	3.022	0.800		
EP6	2.990	0.850		
<b>Environmental Performance</b>			<b>0.914</b>	<b>0.681</b>
EVP1	2.981	0.726		
EVP2	2.994	0.867		
EVP3	2.990	0.831		
EVP4	2.990	0.830		
EVP5	2.952	0.865		
<b>Operational Performance</b>			<b>0.909</b>	<b>0.626</b>
OP1	3.089	0.758		
OP2	3.073	0.792		
OP3	3.108	0.775		
OP4	3.070	0.772		
OP5	3.092	0.781		
OP6	3.105	0.865		
<b>Marketing Performance</b>			<b>0.865</b>	<b>0.616</b>
MP1	3.013	0.735		
MP2	3.013	0.819		
MP3	3.035	0.826		
MP4	3.035	0.755		
<b>Green supply chain managements</b>			<b>0.951</b>	<b>0.621</b>
GSCM1	2.949	0.806		
GSCM2	2.904	0.799		
GSCM3	2.930	0.884		
GSCM4	2.889	0.814		
GSCM5	2.943	0.761		
GSCM6	2.898	0.735		
GSCM7	2.939	0.757		
GSCM8	2.965	0.778		
GSCM9	2.997	0.756		
GSCM10	2.968	0.721		
GSCM11	2.959	0.801		
GSCM12	2.914	0.833		

$\chi^2 = 656.65$  ( $p = 0.000$ ), RMSEA = 0.034, CFI = 0.970, TLI = 0.968, SRMR = 0.041  
 Source: Authors own work

In addition, the results of the Fornell–Larcker test in Table 4 indicates that the square root of AVE for each construct (EP = 0.821, EVP = 0.825, OP = 0.791, MP = 0.785, GSCM = 0.788) is higher than the correlations with other constructs. This means that each construct is more strongly related to its own items than to others. The result confirms good discriminant validity of the measurement model.

**Table 4:** Formell-Larcker Criterion

	EP	EVP	OP	MP	GSCM
EP	0.821				
EVP	0.085	0.825			
OP	0.196	0.089	0.791		
MP	0.158	0.023	0.058	0.785	
GSCM	0.240	0.135	0.154	0.165	0.788

Source: Authors own work

**4.2. The Empirical Results of Structural Model**

Table 5 and Figure 2 present the empirical results from PLS-SEM. The findings indicate that GSCM has a significant positive direct effect on economic performance ( $\beta = 0.191, p = 0.001$ ), supporting H1. Environmental performance does not significantly influence economic performance ( $\beta = 0.042, p = 0.584$ ), so H2 is not supported. In contrast, both operational performance ( $\beta = 0.156, p = 0.003$ ) and marketing performance ( $\beta = 0.116, p = 0.027$ ) show significant positive effects on economic performance, supporting H4 and H6. Regarding indirect effects, GSCM is found to significantly enhance environmental performance ( $\beta = 0.135, p = 0.013$ ), operational performance ( $\beta = 0.154, p = 0.006$ ), and marketing performance ( $\beta = 0.165, p = 0.006$ ), thereby supporting H3, H5, and H7. Overall, the results confirm that GSCM improves economic performance both directly and indirectly through operational and marketing performance, while the mediating role of environmental performance is not supported.

**Table 5:** The Empirical Results from PLS-SEM

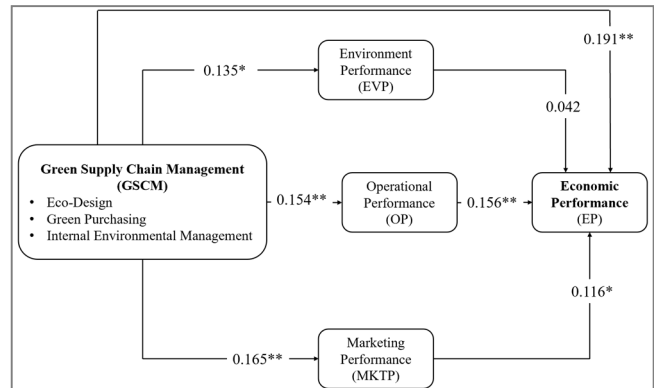
Path	Coef.	Std. Dev	t	p-values
<b>Direct effect</b>				
<b>Dependent variable: EP</b>				
GSCM	0.191	0.055	3.455	0.001
EVP	0.042	0.077	0.548	0.584
OP	0.156	0.053	2.945	0.003
MP	0.116	0.052	2.217	0.027
<b>Indirect effect</b>				
<b>Dependent variable: EVP</b>				
GSCM	0.135	0.054	2.505	0.013
<b>Dependent variable: OP</b>				
GSCM	0.154	0.055	2.771	0.006
<b>Dependent variable: MP</b>				
GSCM	0.165	0.060	2.770	0.006

Source: Authors own work

The findings reveal that GSCM plays a foundational role in enhancing the economic performance of Vietnamese fashion companies. The confirmation of H1 indicates that green practices are not merely about compliance or social responsibility, but indeed restructure the value chain toward

sustainability, thereby strengthening financial competitiveness. On the one hand, GSCM enables firms to control costs through waste reduction, energy savings, and minimizing compliance risks. On the other hand, it creates opportunities to enhance brand value and increase consumers' willingness to pay a premium. These results are consistent with Zhu and Sarkis (2004) and Feng et al. (2018).

However, the pathway from GSCM to economic performance is not straightforward. The mediating hypotheses show that environmental performance, operational performance, and particularly marketing performance act as critical bridges. Notably, although GSCM positively influences environmental performance, this channel does not demonstrate a clear impact on economic performance in the context of Vietnam's fashion industry. This suggests that environmental improvements often function as a "hygiene factor". Firms must adopt them to remain competitive, but the financial benefits are not immediately visible. In Vietnam's market, this may be due to the high costs of green practices, which are not instantly compensated. Moreover, customers in this market are not yet fully willing to pay more for green products unless there is a strong brand signal.



**Figure 2:** The Results of SEM

By contrast, operational performance shows a positive indirect effect, implying that improvements in productivity, quality, and delivery speed allow firms to leverage cost advantages and better meet market demands, which in turn translate into financial outcomes.

The most critical highlight of this study lies in the role of marketing performance. The results confirm that GSCM not only enhances marketing effectiveness but also transforms it into economic gains. In the fashion industry, green products are not primarily evaluated based on lower costs or cleaner processes, but on brand image and messaging. The adoption of GSCM sends a strong signal of legitimacy and responsibility, reducing information asymmetry between firms and consumers. As a result, it builds trust, loyalty, and greater willingness to pay among

customers. This effect not only strengthens current market share and revenue but also expands opportunities to penetrate premium segments and international markets, where “green” has become a prerequisite.

### 4.3. Implications

The findings demonstrate that GSCM significantly enhances the economic performance of Vietnamese fashion firms when translated into operational efficiency and, more importantly, marketing performance. However, to fully realize its potential, coordinated efforts are required from both businesses and policymakers.

From the managerial perspective, firms should view GSCM not merely as a compliance cost but as a strategic resource. Investments in eco-design, green purchasing, and internal environmental management allow firms to optimize costs while simultaneously generating credible brand signals. More importantly, these green initiatives must be strongly communicated through marketing strategies to strengthen customer trust, loyalty, and willingness to pay premium prices. This transformation not only consolidates domestic market share but also facilitates expansion into high-end segments and entry into international markets where “green” has become a prerequisite.

From the policy perspective, the government should establish a supportive framework that incentivizes GSCM adoption, including tax breaks, green financing, and innovation funds to reduce the burden of initial investment costs. At the same time, standardizing environmental certification systems for the fashion industry would enhance transparency and the global credibility of Vietnamese firms. Industry associations should also play a proactive role in fostering supply chain collaboration, resource-sharing, and green technology transfer, particularly for small and medium-sized enterprises. In addition, public campaigns and consumer education on green fashion products are essential to cultivating sustainable demand, thereby creating positive pressure on firms to strengthen their GSCM practices.

### 4.4. Theoretical Contribution

This study offers several theoretical contributions to the literature on GSCM and firm performance. First, while previous research has predominantly focused on the environmental and operational pathways through which GSCM contributes to firm performance (e.g., (Jabbour & de Sousa Jabbour, 2016; Zhu & Sarkis, 2004), this study extends these frameworks by incorporating marketing performance as a mediating mechanism between GSCM and economic performance. Although this is not a radical departure from existing research, it provides a more

comprehensive and nuanced understanding of how sustainable practices create value, particularly through market-facing channels such as brand reputation, customer engagement, and competitive positioning.

Second, this study contributes to theoretical refinement by bridging resource-based and dynamic capabilities perspectives with signaling theory. While the resource-based view and dynamic capabilities view explain how firms leverage internal green capabilities to achieve performance advantages, signaling theory helps clarify how these capabilities are translated into credible external signals that influence consumer perceptions and market responses. This integrative approach does not seek to replace existing theoretical explanations but rather extends and complements them by highlighting a less-examined mechanism of value creation.

Third, by examining the model in Vietnam’s fashion industry—an emerging economy undergoing rapid green transition—this study provides contextual insights that enrich the theoretical debate. Most existing studies have been conducted in developed countries with well-established regulatory and market systems. The findings here reveal how GSCM functions under different institutional pressures, allowing for a more nuanced understanding of boundary conditions for its effectiveness.

Finally, the study clarifies that the contribution lies not in proposing an entirely new theoretical paradigm but in broadening the explanatory scope of existing frameworks. By explicitly positioning marketing performance as a strategic link between sustainability initiatives and economic outcomes, this research distinguishes itself from prior studies and contributes to a more holistic view of how GSCM creates value in dynamic markets.

## 5. Conclusion

This study examined the role of GSCM in enhancing the performance of Vietnamese fashion enterprises, adopting a multidimensional perspective that incorporates economic, environmental, operational, and marketing outcomes. The results show that GSCM exerts a direct positive impact on economic performance through cost reduction, risk mitigation, and brand enhancement. More importantly, the relationship between GSCM and economic outcomes is mediated through operational and, most prominently, marketing performance. While environmental performance improves significantly with GSCM adoption, the link between environmental and economic outcomes appears weaker in Vietnam. This suggests that ecological compliance currently functions more as a necessary condition for maintaining legitimacy rather than an immediate source of profit. By contrast, marketing performance acts as a critical

bridge, as green initiatives send credible signals of legitimacy and responsibility that strengthen customer trust, loyalty, and willingness to pay premium prices.

From a distributional perspective, efficient logistics and coordinated supply chain management reinforce these effects by enhancing delivery reliability, warehouse operations, and information flow across retail, wholesale, and online channels. Balanced channel management and power-dependence between manufacturers, distributors, and retailers strengthen collaboration and ensure the consistent communication of green values throughout shopping centers, stores, and e-commerce platforms. These mechanisms create added value by improving customer accessibility, satisfaction, and shopping behavior in both physical and digital retail environments.

From a theoretical standpoint, this study contributes to the GSCM literature by incorporating marketing performance as a mediating mechanism, thereby extending the prevailing focus on environmental and operational pathways. This refinement broadens the explanatory scope of GSCM theory and highlights the strategic market-facing and distribution-related value of sustainability initiatives. Furthermore, the Vietnamese context reveals how GSCM functions in an emerging economy characterized by weaker regulatory enforcement, resource constraints, and strong international buyer pressures—conditions under which marketing- and logistics-based mechanisms may play a more pivotal role than in developed markets. This provides a context-sensitive theoretical extension, identifying potential boundary conditions for the applicability of GSCM frameworks across different institutional settings.

From a practical perspective, the findings highlight the need for Vietnamese fashion firms to integrate GSCM with branding, logistics, and marketing strategies, ensuring that sustainability efforts are clearly communicated to consumers and global buyers. Firms should prioritize eco-design, green purchasing, and internal environmental management, while leveraging these initiatives as strategic tools for differentiation, retail expansion, and supply chain efficiency. At the policy level, government support through green financing, tax incentives, standardized environmental certifications, and awareness campaigns is essential to reduce cost burdens and stimulate sustainable consumer demand.

This study is not without limitations. The measurement of GSCM practices relies primarily on self-reported survey data, which may not fully capture actual implementation in production and operations, potentially introducing perception bias. Moreover, the cross-sectional design reflects relationships at a single point in time, limiting dynamic and causal inference. Future research could address these issues by integrating objective indicators such as environmental reports, ESG indices, and green certifications,

and by employing panel data to capture changes over time. Cross-industry and cross-national comparative studies are also recommended to explore how environmental, operational, marketing, and distributional pathways interact across different institutional contexts.

## Declarations

### Ethics Approval and Consent to Participate

This study did not involve human participants or animal subjects.

### Competing Interests / Conflicts of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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### Data Availability Statement

### Available upon request

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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## Appendixes

### Appendix 1: Survey Questionnaire

Code	Question item
EP1	Decreased cost for materials purchasing
EP2	Decreased cost for energy consumption
EP3	Decreased fee for waste treatment and discharge
EP4	Average return on sales and investment over the past three years
EP5	Average profit and profit growth over the past three years
EP6	Average market share growth over the past three years
EVP1	Reduced waste water
EVP2	Reduced solid wastes
EVP3	Decreased consumption for hazardous/harmful/toxic materials
EVP4	Decreased frequency for environmental accidents
EVP5	Improve a company's environmental situation
OP1	Significantly reduced lead times
OP2	Significantly improved product quality
OP3	Significantly improved its position in the market place
OP4	Helped the company design/develop better products
OP5	Implementing green practices helps in reducing all types of wastes
OP6	Improved its chances in successfully selling its products in international markets
MP1	Relative to our competitors, we have stronger growth in sales revenue.
MP2	Relative to our competitors, we have a better ability to acquire new customers.
MP3	Relative to our competitors, we have a greater market share.
MP4	Relative to our competitors, we can increase sales to existing customers.
GSCM1	Our firm emphasizes design of products for reduced consumption of material/energy.
GSCM2	Our firm emphasizes design of products that can be reused, recycled and recovered of.
GSCM3	Our firm emphasizes design of products to reduce use of harmful/toxic material.
GSCM4	Our firm emphasizes optimization of design process to reduce air emission and noise.
GSCM5	Our firm cooperates with suppliers to meet environmental objectives.
GSCM6	Our firm emphasizes purchasing eco-friendly materials.
GSCM7	Our firm evaluates suppliers on the basis of specific environmental criteria.
GSCM8	Our firm has partnerships with suppliers that aim to build environmental solutions and/or develop environment-friendly products.
GSCM9	Senior managers in our firm are committed to green supply chain management.
GSCM10	Our firm emphasizes cross-functional cooperation for environmental improvements.
GSCM11	Our firm emphasizes environmental compliance and auditing programs.
GSCM12	Our firm has a system to track environmental laws and regulations.