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The Role of Green Supply Chain Management in Mediating the Effect of Internal Environmental Management: Environmental Performance at PT. Homeware International Indonesia

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ABSTRACT
This study investigates the relationship between Internal Environmental Management (IEM) and Environmental Performance at PT Homeware International Indonesia, focusing on both the direct effect and the mediating role of Green Supply Chain Management (GSCM). An explanatory quantitative approach with a cross-sectional design was employed. Data were collected from 50 purposively selected respondents with relevant knowledge of and involvement in the company's operational and environmental management activities. The responses were measured using a five-point Likert scale. The analytical procedures included instrument quality assessment, descriptive statistics, inter-variable correlation analysis, regression diagnostics, bootstrap-based regression analysis, and mediation testing using PROCESS Macro Model 4. The results indicate that stronger IEM is associated with higher Environmental Performance and greater implementation of GSCM. GSCM is also positively associated with Environmental Performance. Furthermore, the indirect effect analysis indicates that GSCM partially mediates the relationship between IEM and Environmental Performance. These findings highlight the importance of translating internal environmental policies, organizational commitment, coordination, monitoring, auditing, and management systems into effective green supply chain practices. From a practical perspective, companies should integrate internal environmental management with environmentally responsible supplier selection, the use of environmentally friendly materials, resource efficiency, sustainable packaging, and waste recovery practices. However, because this study focuses on a single company, uses a relatively small sample, and employs a cross-sectional design, the findings should be generalized with caution.

Keywords: Environmental Performance, Green Supply Chain Management, Internal Environmental Management, Manufacturing, Mediation.

I. Introduction

Pressure on manufacturing companies to reduce their environmental impact is increasing as governments, consumers, and other stakeholders place greater emphasis on sustainability issues. Consequently, environmental management should not be viewed merely as a form of regulatory compliance but should be integrated into decision-making processes related to procurement, production, distribution, and waste management. One approach to integrating environmental considerations into supply chain

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activities is Green Supply Chain Management (GSCM). Hariyani et al. (2024) explain that GSCM practices encompass sustainability considerations ranging from sustainable sourcing to sustainable distribution, while Green et al. (2012) demonstrate that the implementation of GSCM is associated with improvements in organizational and environmental performance. In the homeware industry, environmental issues are particularly relevant because manufacturing processes involve the consumption of various resources, including wood, metals, finishing materials, energy, water, and packaging, while also generating production waste. One internal capability associated with environmental management is Internal Environmental Management (IEM). This construct encompasses top management support, cross-functional coordination, environmental management systems, employee training, monitoring, auditing, target setting, and environmental performance reporting. Based on a meta-analysis of 65 independent studies, Fu et al. (2023) reported that IEM has a positive relationship with Environmental Performance ($r = 0.487$; $p < 0.001$) and is positioned as one of the key dimensions of GSCM. Similarly, García Alcaraz et al. (2022) found an association between environmental management systems and environmental impact in manufacturing companies. Nevertheless, empirical evidence concerning the relationship between IEM and GSCM remains inconclusive. Dzikriansyah et al. (2023) found no significant relationship between IEM and GSCM adoption among manufacturing SMEs in East Java. In contrast, Jermsittiparsert et al. (2019) found a positive relationship between IEM and GSCM and demonstrated that GSCM can mediate the relationship between internal organizational factors and Environmental Performance. These contrasting findings suggest that the relationship between IEM and GSCM warrants further investigation across different manufacturing contexts.

This study focuses on examining the relationships among IEM, GSCM, and Environmental Performance at PT Homeware International Indonesia. The study contributes not only by re-examining the relationship between IEM and GSCM in the context of a homeware manufacturing company but also by explaining the mechanism through which internal environmental management capabilities contribute to environmental performance. Conceptually, IEM is positioned as an internal organizational capability that provides environmental policies, commitment, coordination, and control systems, whereas GSCM is positioned as an operational mechanism that translates these capabilities into more environmentally responsible supply chain practices. Within this framework, examining the mediating role of GSCM enables the study to determine not only whether IEM is associated with Environmental Performance but also how this relationship operates through the implementation of green supply chain practices. The homeware manufacturing context is particularly relevant for examining this mechanism because the company's operations establish a direct link between internal organizational decisions and supply chain activities, including supplier and raw material selection, energy consumption during production, packaging, and waste management. Accordingly, this study addresses four main research questions: (1) Is IEM associated with Environmental Performance? (2) Is IEM associated with GSCM? (3) Is GSCM associated with Environmental Performance? and (4) Does GSCM mediate the relationship between IEM and Environmental Performance? Based on these research questions, this study aims to examine the relationship between IEM and Environmental Performance, the relationship between IEM and GSCM, the relationship between GSCM and Environmental Performance, and the mediating role of GSCM in the relationship between IEM and Environmental Performance at PT Homeware International Indonesia.

II. Literature Review and Hypothesis Development

This section presents the main concepts underlying the study and develops the hypotheses based on relevant theoretical and empirical evidence. The discussion focuses on Internal Environmental Management (IEM), Green Supply Chain Management (GSCM), and Environmental Performance, as well as the direct and indirect relationships among these three variables. The relationships among Internal Environmental Management, Green Supply Chain Management, and Environmental Performance in this study are theoretically grounded in the Natural-Resource-Based View (NRBV). In recent GSCM literature, the NRBV perspective has been used to explain how a company's environmental capabilities and practices can be

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developed and implemented to achieve improved environmental performance. Odamtten et al. (2025), for example, applied the NRBV to explain the relationship between GSCM practices and Environmental Performance in manufacturing firms, while Naz et al. (2024) employed the same perspective to explain the contribution of GSCM practices to carbon-neutral supply chain performance. Within the framework of this study, IEM is conceptualized as an internal organizational capability encompassing management support, organizational commitment, cross-functional coordination, control systems, training, monitoring, and environmental evaluation. These capabilities provide the organizational conditions necessary for the systematic implementation of environmental principles. From this perspective, GSCM can be understood as an operational mechanism through which a company's Internal Environmental Management capabilities are translated into supply chain practices. The environmental policies, commitments, coordination mechanisms, and management systems established through IEM can be reflected in sustainable supplier selection, the use of environmentally friendly raw materials, energy efficiency, eco-friendly packaging, waste management, and recycling. The implementation of these practices is subsequently associated with Environmental Performance through reductions in waste, energy consumption, emissions, and pollution, as well as improvements in resource efficiency. Accordingly, the theoretical framework of this study positions IEM as an internal organizational capability, GSCM as an operational implementation mechanism, and Environmental Performance as an environmental outcome associated with the application of these capabilities and practices.

2.1. Internal Environmental Management

Internal Environmental Management (IEM) refers to an organization's internal capability to direct and integrate environmental considerations into managerial and operational processes. However, the conceptual positioning of IEM in the literature is not entirely consistent. Jermsittiparsert et al. (2019) conceptualized IEM as an internal organizational factor that precedes the implementation of Green Supply Chain Management (GSCM), whereas Fu et al. (2023) and Liu et al. (2026) positioned internal environmental management as one component of GSCM practices. These different conceptualizations indicate that IEM can be understood either as part of the broader GSCM system or as an organizational capability that enables the development and implementation of GSCM practices. Sahoo and Vijayvargy (2021) also positioned Internal Environmental Management as one of the dimensions of GSCM, alongside green purchasing, customer cooperation, eco-design, and investment recovery in manufacturing firms. This conceptualization further demonstrates that the position of IEM within the GSCM literature varies across studies, highlighting the need to explicitly distinguish IEM as an internal organizational capability from GSCM as an operational mechanism in the present study. This study adopts the latter perspective by conceptualizing IEM as an internal organizational capability that is distinct from GSCM implementation. Within this framework, management support, organizational commitment, cross-functional coordination, control systems, training, monitoring, auditing, goal setting, and environmental reporting are not viewed merely as a collection of individual practices but as interrelated elements that collectively shape an organization's capacity to manage environmental issues.

This distinction is important for conceptually differentiating IEM, as an internal organizational capability, from GSCM, which represents the application of environmental principles throughout supply chain activities. This perspective is consistent with the literature suggesting that the implementation of environmental practices is influenced by an organization's internal conditions and characteristics. Vanalle et al. (2017) highlighted the importance of organizational conditions in GSCM implementation, while Fianko et al. (2021) demonstrated that firm characteristics can influence the relationship between GSCM practices and Environmental Performance. Javed et al. (2025) also linked organizational capabilities to the achievement of sustainable performance, while Rihal et al. (2025) showed that a green-oriented organizational identity and culture are associated with Environmental Performance. Overall, these findings suggest that Internal Environmental Management capabilities depend not only on the existence of formal procedures but also on an organization's ability to integrate environmental commitment, coordination, control, and environmental orientation into its corporate activities.

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2.2. Green Supply Chain Management

Green Supply Chain Management (GSCM) refers to the integration of environmental considerations into a company's supply chain activities. Green et al. (2012) conceptualized GSCM as an approach that links supply chain decisions with organizational and environmental performance, while Hariyani et al. (2024) emphasized that GSCM encompasses sustainability practices ranging from procurement to distribution. Thus, GSCM is not limited to a single activity but represents the integration of environmental principles throughout material flows and operational processes across the supply chain. Agyabeng-Mensah et al. (2020) found that internal green supply chain practices are associated with green human resource management and environmental cooperation across the supply chain. Their findings suggest that GSCM implementation depends not only on technical practices but also on internal coordination and environmental collaboration that facilitate the integration of green principles throughout supply chain activities. In the manufacturing context, GSCM can be reflected in the integration of environmental considerations into supplier and raw material selection, production processes, energy consumption, packaging, and waste management. However, this study conceptually distinguishes GSCM from Internal Environmental Management (IEM). IEM represents an organization's internal environmental capabilities and readiness, whereas GSCM represents the translation of these capabilities into operational practices throughout the supply chain. This distinction is important because it enables the study to examine the relationship between internal environmental management and the implementation of green practices across supply chain activities.

In addition to its association with environmental outcomes, GSCM implementation is also related to operational outcomes. Akbar et al. (2025) found that GSCM practices involving suppliers and customers are associated with product quality and production costs. These findings suggest that GSCM represents a cross-functional approach that integrates environmental considerations into supplier decisions, operational processes, and relationships with supply chain stakeholders. Empirical evidence indicates that GSCM implementation is associated with improved Environmental Performance. Dzikriansyah et al. (2023) found a positive relationship between GSCM practices and Environmental Performance in the Indonesian manufacturing context. Fu et al. (2023) also reported a positive relationship between GSCM and Environmental Performance, while Odamtten et al. (2025) found that several GSCM practices, particularly green purchasing and green distribution and packaging, are positively associated with Environmental Performance in manufacturing firms. Haryanti et al. (2026) further reported that GSCM is associated with environmental outcomes through waste management and green innovation. Overall, these findings support the conceptualization of GSCM as an operational mechanism that links a company's environmental orientation to its environmental outcomes.

2.3. Environmental Performance

Environmental Performance refers to the outcomes achieved by a company in managing and reducing the environmental impacts of its operational activities. In the manufacturing context, Environmental Performance may be reflected in resource efficiency, reductions in waste and emissions, and increased use of environmentally friendly materials. Fu et al. (2023) reported a positive relationship between Environmental Performance and the implementation of Green Supply Chain Management, while García Alcaraz et al. (2022) found that environmental management practices and collective GSCM are associated with environmental impacts and environmental cost savings. A meta-analysis by Galdos-Urbizu et al. (2024) also found a positive relationship between GSCM and Corporate Environmental Performance across various research contexts. The meta-analysis further indicated that the strength of this relationship may vary depending on the type of GSCM practice and the conditions surrounding the firm. These findings reinforce the position of Environmental Performance as an important outcome for evaluating the relationship between green supply chain practices and a company's environmental results. In this study, Environmental Performance is conceptualized as an

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outcome associated with an organization's internal capabilities and the implementation of green supply chain practices. This conceptualization distinguishes Environmental Performance from IEM, which represents internal organizational capabilities, and GSCM, which represents an operational implementation mechanism. Therefore, Environmental Performance is not viewed merely as a set of environmental indicators but as an outcome that reflects the extent to which internal environmental policies and green supply chain practices are associated with improvements in the company's environmental conditions. This conceptual distinction is important within the research model because it enables the relationships among IEM, GSCM, and Environmental Performance to be examined within a coherent conceptual framework. IEM represents internal organizational capabilities, GSCM represents the operational implementation of environmental principles throughout supply chain activities, and Environmental Performance represents the environmental outcomes associated with these capabilities and practices. This framework provides the basis for examining both the direct relationships among the variables and the indirect relationship through the mediating role of GSCM.

2.4. Hypothesis Development

a. The Relationship Between Internal Environmental Management and Environmental Performance

From the Natural-Resource-Based View (NRBV) perspective, organizational capabilities directed toward environmental management can contribute to improved environmental performance when they are integrated into decision-making processes and operational controls (Odamtten et al., 2025; Naz et al., 2024). In this study, Internal Environmental Management (IEM) represents such internal capabilities through management support, cross-functional coordination, environmental management systems, training, monitoring, auditing, target setting, and environmental performance reporting. These capabilities enable companies to identify, control, and evaluate activities that may generate environmental impacts. Therefore, from a theoretical perspective, stronger IEM is expected to be positively associated with Environmental Performance. This argument is supported by empirical evidence. Fu et al. (2023) reported a positive relationship between Internal Environmental Management and Environmental Performance, while García Alcaraz et al. (2022) found that environmental management systems are associated with environmental impacts in manufacturing firms. These findings suggest that stronger internal environmental management capabilities are associated with improved environmental outcomes. Based on the theoretical arguments and empirical evidence presented above, the following hypothesis is proposed:

H1 : Internal Environmental Management is positively associated with Environmental Performance at PT Homeware International Indonesia.

b. The Relationship Between Internal Environmental Management and Green Supply Chain Management

From the Natural-Resource-Based View (NRBV) perspective, internal organizational capabilities can provide the foundation for developing and implementing environmentally oriented operational practices (Odamtten et al., 2025; Naz et al., 2024). In this study, Internal Environmental Management (IEM) represents these capabilities through management support, organizational commitment, cross-functional coordination, training, monitoring, auditing, and environmental control systems. These internal capabilities provide organizational direction, support, and coordination mechanisms that enable environmental principles to be translated into supply chain activities. Therefore, from a theoretical perspective, stronger IEM is expected to be positively associated with greater implementation of Green Supply Chain Management. Empirical evidence regarding this relationship remains inconsistent. Jermsittiparsert et al. (2019) reported a positive relationship between Internal Environmental Management and GSCM implementation. Usman et al. (2025) likewise found a positive relationship between Internal Environmental Management and Green Supply Chain Management in the SME context. In contrast, Dzikriansyah et al. (2023) found no significant relationship between IEM and GSCM adoption among manufacturing SMEs in Indonesia. These contrasting findings suggest that the

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strength of the relationship between IEM and GSCM may vary across organizational characteristics and contexts, highlighting the need for further examination in different manufacturing settings. Habib et al. (2022) further demonstrated that Internal Environmental Management and stakeholder collaboration can serve as antecedents to the implementation of various GSCM practices in manufacturing companies. This finding provides additional empirical support for the view that internal environmental management capabilities are associated with a company's ability to implement green supply chain practices. Based on the theoretical arguments and empirical evidence presented above, the following hypothesis is proposed:

H2 : Internal Environmental Management is positively associated with Green Supply Chain Management at PT Homeware International Indonesia.

c. The Relationship Between Green Supply Chain Management and Environmental Performance

From the Natural-Resource-Based View (NRBV) perspective, operational practices that integrate environmental considerations can help companies reduce the negative environmental impacts associated with supply chain activities and contribute to improved environmental outcomes (Odamtten et al., 2025; Naz et al., 2024). In this study, Green Supply Chain Management (GSCM) reflects the implementation of environmental principles through sustainable supplier selection, the use of environmentally friendly raw materials, energy efficiency in production processes, eco-friendly packaging, and waste management and recycling. These practices can reduce resource consumption, waste, emissions, and pollution associated with operational activities. Therefore, from a theoretical perspective, stronger GSCM implementation is expected to be positively associated with Environmental Performance. This argument is supported by empirical evidence. Fu et al. (2023) reported a positive relationship between GSCM and Environmental Performance, while Dzikriansyah et al. (2023) found a similar relationship in the Indonesian manufacturing context. More recent evidence from Odamtten et al. (2025) also indicates that several GSCM practices, particularly green purchasing and green distribution and packaging, are positively associated with Environmental Performance in manufacturing firms. These findings suggest that integrating environmental principles into supply chain activities is associated with improved environmental outcomes. Based on the theoretical arguments and empirical evidence presented above, the following hypothesis is proposed:

H3 : Green Supply Chain Management is positively associated with Environmental Performance at PT Homeware International Indonesia.

d. The Mediating Role of Green Supply Chain Management

From the Natural-Resource-Based View (NRBV) perspective, internal environmental capabilities may contribute to Environmental Performance not only directly but also through operational practices that translate these capabilities into environmentally oriented business activities. In this study, Internal Environmental Management (IEM) represents internal capabilities through environmental policies, organizational commitment, coordination, monitoring, auditing, training, and environmental control systems. These capabilities can be translated into supply chain activities through Green Supply Chain Management (GSCM), including sustainable supplier selection, the use of environmentally friendly raw materials, energy efficiency, eco-friendly packaging, and waste management and recycling. Through this mechanism, GSCM is positioned as an operational pathway linking internal environmental management capabilities to Environmental Performance. This argument is consistent with Jermsittiparsert et al. (2019), who reported that Internal Environmental Management is associated with GSCM implementation and that GSCM may mediate the relationship between internal organizational factors and Environmental Performance. Usman et al. (2025) also identified an indirect relationship between Internal Environmental Management and Environmental Performance through Green Supply Chain Management. In addition, Bwaliez (2025) demonstrated that examining mediation mechanisms in GSCM research can provide a more comprehensive understanding of

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how green supply chain practices are associated with various organizational performance outcomes. Based on the theoretical arguments and empirical evidence presented above, the following hypothesis is proposed:

H4 : Green Supply Chain Management mediates the relationship between Internal Environmental Management and Environmental Performance at PT Homeware International Indonesia.

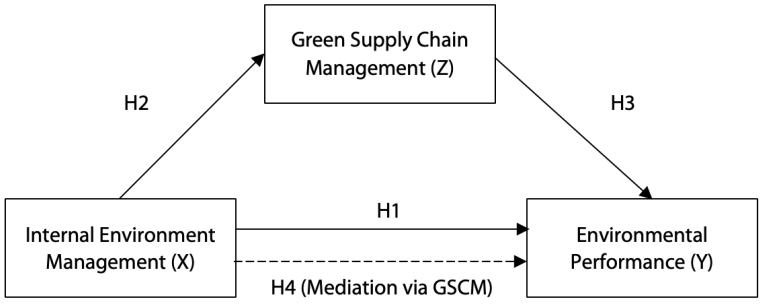


Figure 1. Conceptual Framework

Based on the conceptual framework presented in Figure 1, the hypotheses examined in this study are formulated as follows:

a. H1 Examines the relationship between Internal Environmental Management (IEM) and Environmental Performance.
b. H2 Examines the relationship between Internal Environmental Management (IEM) and Green Supply Chain Management (GSCM).
c. H3 Examines the relationship between Green Supply Chain Management (GSCM) and Environmental Performance.
d. H4 Examines the mediating role of Green Supply Chain Management (GSCM) in the relationship between Internal Environmental Management (IEM) and Environmental Performance.

III. Research Method

3.1. Research Design and Data Collection

This study employed a quantitative approach with a cross-sectional design. Data were collected during a single period to examine the statistical relationships among the study variables based on respondents' perceptions at the time of data collection (Maier et al., 2023). Primary data were collected using a structured questionnaire measured on a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree. The questionnaire was administered in April 2026 to respondents who met the predefined study criteria. The questionnaire was developed using Google Forms and distributed via WhatsApp with the assistance of the Human Resources Development (HRD) department of PT Homeware International Indonesia. The questionnaire was distributed to 50 employees who met the eligibility criteria, and all 50 employees completed the questionnaire, resulting in a 100% response rate. At the beginning of the questionnaire, respondents were informed about the purpose of the study and the intended use of their responses for research purposes. Respondents were also asked to provide informed consent before proceeding with the questionnaire. All 50 responses met the eligibility criteria and were included in the analysis. The collected data were analyzed using IBM SPSS Statistics.

3.2. Sampling Technique and Sample Size

Respondents were selected using purposive sampling, a non-probability sampling technique. The selection criteria were based on respondents' knowledge of and involvement in activities related to raw

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material procurement, production, distribution, waste management, and environmental management within the company. These criteria were applied to ensure that the assessment of Internal Environmental Management, Green Supply Chain Management, and Environmental Performance was provided by individuals familiar with the relevant organizational and operational activities. A total of 50 respondents met the specified criteria, and all were included in the analysis. Purposive sampling was considered appropriate because it enabled the study to obtain information from respondents who were relevant to the research objectives (Sekaran & Bougie, 2016). Most respondents were staff members or employees. However, respondent selection was not based solely on job position but also on their involvement in operational and environmental management activities. Therefore, staff members and employees were considered capable of providing relevant information regarding the implementation of environmental practices at the operational level of the company. The sample consisted of 50 respondents who met the purposive sampling criteria within the single-company research setting and were accessible during the data collection period. All 50 employees who received the questionnaire completed it, and all responses were included in the analysis. Accordingly, the sample represented the complete pool of accessible respondents who satisfied the predefined eligibility criteria within the study setting, rather than an attempt to statistically represent the broader manufacturing population. The study examined a simple mediation model involving one independent variable, one mediator, and one dependent variable using composite scores. A bootstrapping procedure with 5,000 resamples was employed to support statistical inference regarding the direct and indirect relationships. Nevertheless, the relatively small sample size and single-company setting constitute important limitations. Therefore, the findings should be interpreted within the context of the study and should not be broadly generalized beyond the population and organizational setting examined.

3.3. Measurement of Variables and Indicators

The research instrument consisted of 20 measurement items, comprising 10 items for Internal Environmental Management (IEM), 5 items for Green Supply Chain Management (GSCM), and 5 items for Environmental Performance. All items were measured using a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. The measurement indicators were adapted from relevant literature and adjusted to reflect the operational characteristics of PT Homeware International Indonesia. In particular, the measurement of Environmental Performance was informed by studies addressing environmental impacts and corporate environmental performance, particularly García Alcaraz et al. (2022) and Fu et al. (2023). The measurement items for each construct are presented in Table 1.

Table 1. Measurement Items for the Study Variables

Variable	Code	Indicator/Statement	Source
Internal Environmental Management	X1	Top management support for environmental management	Dzikriansyah et al. (2023); Jermsittiparsert et al. (2019)
	X2	Cross-functional collaboration for environmental improvement	
	X3	Organizational commitment to environmental management	
	X4	Internal environmental management system	
	X5	Compliance with environmental regulations	
	X6	Employee training on green practices	
	X7	Environmental monitoring and evaluation	

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Variable	Code	Indicator/Statement	Source
	X8	Setting environmental performance targets	
	X9	Internal environmental auditing	
	X10	Environmental performance reporting	
Green Supply Chain Management	Z1	Supplier selection based on sustainable practices	Green et al. (2012); Dzikriansyah et al. (2023)
	Z2	Use of environmentally friendly raw materials	
	Z3	Energy efficiency in the production process	
	Z4	Use of eco-friendly packaging	
	Z5	Management and recycling of production waste	
Environmental Performance	Y1	Reduction in production waste volume	García Alcaraz et al. (2022); Fu et al. (2023)
	Y2	Reduction in energy consumption	
	Y3	Reduction in emissions and air pollution	
	Y4	Water-use efficiency	
	Y5	Increased use of environmentally friendly raw materials	

3.4. Analysis Methods

Data analysis was conducted in several stages. First, the quality of the research instrument was assessed using the Corrected Item-Total Correlation, with a critical r value of 0.2787, and Cronbach's alpha to evaluate internal consistency reliability (Ghozali, 2021). Descriptive statistics were then used to summarize respondent characteristics and the distribution of scores for each study variable. Pearson correlation analysis was employed to examine the relationships among the study variables. Regression diagnostics included assessments of residual normality, multicollinearity, and heteroscedasticity. Hypotheses H1–H3 were tested using linear regression at a 5% significance level. Because the regression residuals did not satisfy the formal normality assumption, statistical inference for the direct relationships was supplemented with a bootstrapping procedure based on 5,000 resamples and 95% confidence intervals. A relationship was considered statistically supported when the corresponding bootstrap confidence interval did not include zero. Bootstrapping was used to provide a more robust basis for statistical inference and was not interpreted as a correction for non-normal residuals. Hypothesis H4 was tested using PROCESS Macro Model 4 with 5,000 bootstrap resamples and a 95% confidence interval (Hayes, 2022). Model 4 was selected because the proposed model represents a simple mediation structure involving one independent variable, one mediator, and one dependent variable. This procedure allows the total, direct, and indirect effects to be estimated within a single regression-based framework. The regression-based PROCESS approach was selected because the study uses observed composite scores and focuses on estimating the indirect effect in a simple single-mediator model rather than estimating a latent-variable measurement model. The significance of the indirect effect was evaluated using the bootstrap confidence interval. Mediation was considered statistically supported when the BootLLCI–BootULCI interval did not include zero. The type of mediation was then determined based on whether the direct effect remained statistically significant after GSCM was included as the mediator. Although bootstrapping is appropriate for evaluating indirect effects, the relatively small sample size remains a methodological limitation and was taken into consideration when interpreting the findings.

IV. Results and Discussion

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4.1. Respondent Demographics

A total of 50 respondents met the study criteria and were included in the analysis. The gender distribution was relatively balanced, comprising 48.0% male and 52.0% female respondents. The largest age group was 35–44 years, accounting for 32.0% of the sample, while most respondents held a bachelor's degree (58.0%). In terms of job position, the majority were staff members or employees (84.0%). Regarding length of service, the largest proportion of respondents had worked for more than 10 years (44.0%), followed by those with 4–6 years of service (36.0%). The characteristics of the respondents are presented in Table 2.

Table 2. Respondent Demographics

Characteristics	Category	Frequency	Percentage
Gender	Male	24	48.0%
	Female	26	52.0%
Age	< 25 years	14	28.0%
	25–34 years	9	18.0%
	35–44 years	16	32.0%
	45–54 years	10	20.0%
	55 years and older	1	2.0%
Education	High School/Vocational High School/Equivalent	13	26.0%
	Diploma (D1/D2/D3)	8	16.0%
	Bachelor's Degree (S1)	29	58.0%
Position	Manager	1	2.0%
	Supervisor	3	6.0%
	Operator	4	8.0%
	Staff/Employees	42	84.0%
Length of service	< 1 year	1	2.0%
	1–3 years	7	14.0%
	4–6 years	18	36.0%
	7–10 years	2	4.0%
	> 10 years	22	44.0%

4.2. Validity and Reliability Test Results

The validity and reliability results indicate that all 20 measurement items had Corrected Item-Total Correlation values above the critical r value of 0.2787, indicating adequate item consistency. Cronbach's alpha values were 0.959 for Internal Environmental Management (IEM), 0.890 for Green Supply Chain Management (GSCM), and 0.920 for Environmental Performance, indicating high internal consistency reliability. However, the very high Cronbach's alpha value for IEM should be interpreted cautiously because it may indicate substantial similarity or potential redundancy among the measurement items. Therefore, an additional assessment of construct distinctiveness was conducted using the Heterotrait-Monotrait Ratio (HTMT). Discriminant validity was evaluated using the Heterotrait-Monotrait Ratio (HTMT) to assess the empirical distinctiveness of the constructs (Henseler et al., 2015). The HTMT value between IEM and GSCM was 1.022, between IEM and Environmental Performance was 0.989, and between GSCM and Environmental Performance was 1.022. All values exceeded the commonly used threshold of 0.90, indicating that discriminant validity among the three constructs was not adequately established. These findings suggest a high degree of empirical overlap among IEM, GSCM, and Environmental Performance. Accordingly, the relationships among the constructs should be interpreted cautiously, and this limitation is considered in the discussion and limitations of the study. Potential common method bias was assessed using Harman's single-factor test by entering all 20 measurement items into an unrotated factor analysis. The first factor explained 70.838% of the total variance, exceeding the commonly used threshold of 50%. This finding indicates the

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potential presence of common method variance, which should be considered when interpreting the results. This issue represents a methodological limitation because all constructs were measured using self-reported perceptual data obtained from the same respondents. Recent methodological literature also emphasizes the importance of considering potential common method bias in studies relying on self-reported data from a common source (Chen & Ding, 2026).

Table 3. Summary of Validity and Reliability Tests

Variable	Number of Items	Range of Calculated r	Cronbach's Alpha	Conclusion
Internal Environmental Management	10	0.763–0.902	0.959	Consistent and reliable
Green Supply Chain Management	5	0.675–0.868	0.890	
Environmental Performance	5	0.662–0.884	0.920	

4.3. Descriptive Statistics, Correlation, and Regression Diagnostics

The mean scores of the three study variables were relatively high. Internal Environmental Management (IEM) had the highest mean score of 4.56, followed by Green Supply Chain Management (GSCM) at 4.49 and Environmental Performance at 4.43. These findings indicate that respondents generally reported positive perceptions of the company's internal environmental management, green supply chain practices, and environmental performance.

Table 4. Descriptive Statistics of the Study Variables

Variable	N	Min	Max	Mean
Internal Environment Management	50	3	5	4.56
Green Supply Chain Management				4.49
Environmental Performance				4.43

Table 5. Correlations Among Study Variables

Variable	1	2	3
Internal Environment Management	1		
Green Supply Chain Management	0.945**	1	
Environmental Performance	0.929**	0.929**	1

Note: ** Correlation is significant at the 0.01 level (two-tailed).

Pearson correlation analysis showed a very strong positive relationship between IEM and GSCM ($r = 0.945$, $p < 0.001$). IEM was also very strongly and positively associated with Environmental Performance ($r = 0.929$, $p < 0.001$), while GSCM showed a similarly strong positive relationship with Environmental Performance ($r = 0.929$, $p < 0.001$). The particularly high correlation between IEM and GSCM indicates substantial empirical overlap between the two constructs. Therefore, the relationships among the variables should be interpreted cautiously, particularly in regression models that include IEM and GSCM simultaneously as predictors. Regression diagnostics indicated that the residuals of all four regression models did not satisfy the formal normality assumption based on the Kolmogorov–Smirnov and Shapiro–Wilk tests, with $p < 0.001$ for all models. Accordingly, statistical inference for the direct relationships tested in H1–H3 was supplemented with a bootstrapping procedure using 5,000 resamples and 95% confidence intervals. In the model including IEM and GSCM simultaneously as predictors of Environmental Performance, the tolerance value was 0.107 and the VIF was 9.331, indicating relatively high multicollinearity between IEM and GSCM. This finding is consistent with their very high correlation ($r = 0.945$). Accordingly, the regression coefficients from this model should be interpreted with caution because the high degree of overlap between the predictors may affect the stability

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and precision of the coefficient estimates. The residual scatterplot showed no systematic pattern, providing no visual indication of heteroscedasticity.

Table 6. Summary of Regression Diagnostics

Diagnostic	Results	Interpretation
Residual Normality	All models: Kolmogorov–Smirnov and Shapiro–Wilk tests, $p < 0.001$	Residuals did not satisfy the formal normality assumption; statistical inference for the direct relationships was supplemented with bootstrapping.
Multicollinearity	Tolerance = 0.107; VIF = 9.331	Indicates relatively high multicollinearity between IEM and GSCM; regression coefficients should therefore be interpreted with caution.
Heteroscedasticity	The residual scatterplot showed no systematic pattern.	No visual indication of heteroscedasticity was observed.

4.4. Results of Direct Hypothesis Testing

The regression analyses for H1–H3 yielded positive coefficients for all examined relationships. Because the regression diagnostics indicated that the residuals did not satisfy the formal normality assumption, the interpretation of the regression results was supplemented with a bootstrapping procedure using 5,000 resamples and 95% confidence intervals. The regression coefficients and bootstrap results are presented in Table 7.

Table 7. Results of Direct Hypothesis Testing with Bootstrapping

Hypothesis	Relationship	B	β	t	p	R^2	BootSE	95% BootCI	Decision
H1	IEM → Environmental Performance	1.060	0.929	17.344	< 0.001	0.862	0.055	0.950–1.169	Supported
H2	IEM → GSCM	1.024	0.945	19.997	< 0.001	0.893	0.051	0.929–1.132	
H3	GSCM → Environmental Performance	0.979	0.929	17.397	< 0.001	0.863	0.066	0.857–1.118	

The results indicate positive and statistically significant relationships between IEM and Environmental Performance, between IEM and GSCM, and between GSCM and Environmental Performance. All bootstrap confidence intervals were entirely above zero, providing statistical support for the three hypothesized relationships. Therefore, H1, H2, and H3 were empirically supported. All three regression models produced high coefficients of determination. The model examining the relationship between IEM and Environmental Performance yielded an R^2 of 0.862, indicating that 86.2% of the variation in Environmental Performance was explained by IEM within the sample. The model examining the relationship between IEM and GSCM yielded an R^2 of 0.893, indicating that 89.3% of the variation in GSCM was explained by IEM. Meanwhile, the model examining the relationship between GSCM and Environmental Performance yielded an R^2 of 0.863, indicating that 86.3% of the variation in Environmental Performance was explained by GSCM. Despite these high R^2 values, the findings should be interpreted cautiously because the correlations among the constructs were also very strong, particularly between IEM and GSCM. The common data source, substantial empirical overlap among the constructs, and the single-company sample may have contributed

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to the high explanatory power of the models. Therefore, the R^2 values are interpreted as indicators of explanatory power within the study sample rather than as evidence of causal relationships.

4.5. Results of the Mediation Analysis

The mediating role of Green Supply Chain Management (GSCM) in the relationship between Internal Environmental Management (IEM) and Environmental Performance was examined using PROCESS Macro Model 4 with 5,000 bootstrap resamples and a 95% confidence interval. The mediation analysis considered the total effect, direct effect, and indirect effect of IEM on Environmental Performance. The results showed that the total effect of IEM on Environmental Performance was 1.0604 ($p < 0.001$). After GSCM was included as the mediator, the direct effect of IEM on Environmental Performance remained statistically significant (effect = 0.5413, SE = 0.1709, p = 0.0027, 95% CI = 0.1975–0.8850). The indirect effect of IEM on Environmental Performance through GSCM was 0.5191, with a BootSE of 0.1935 and a 95% bootstrap confidence interval of 0.1464–0.9119. The mediation results are presented in Table 8.

Table 8. Results of the PROCESS Macro Model 4 Mediation Analysis

Effect Type	Effect	SE / BootSE	p	LLCI/ BootLLCI	ULCI/ BootULCI	Description
Total effect of IEM → Environmental Performance (without mediators)	1.0604	0.0611	< 0.001	0.9374	1.1833	Significant
Direct effect of IEM on Environmental Performance (after controlling for GSCM)	0.5413	0.1709	0.0027	0.1975	0.8850	
Indirect effect: IEM → GSCM → Environmental Performance	0.5191	0.1935	–	0.1464	0.9119	

The bootstrap confidence interval for the indirect effect ranged from 0.1464 to 0.9119 and did not include zero, indicating that the indirect relationship between IEM and Environmental Performance through GSCM was statistically supported. At the same time, the direct relationship between IEM and Environmental Performance remained statistically significant after GSCM was included in the model. Taken together, these findings indicate that GSCM partially mediates the relationship between IEM and Environmental Performance. Therefore, H4 was empirically supported. As supplementary information, the Variance Accounted For (VAF) was calculated as $0.5191/1.0604 \times 100\% = 48.95\%$, or approximately 49.0%. This value indicates that approximately 49% of the total effect of IEM on Environmental Performance was represented by the indirect pathway through GSCM. However, the conclusion of partial mediation was based primarily on the statistically significant indirect effect and the continued statistical significance of the direct effect after GSCM was included in the model. VAF was therefore treated as a supplementary measure rather than the primary basis for determining the type of mediation.

4.6. Discussion

a. The Relationship Between Internal Environmental Management and Environmental Performance

The findings indicate a positive relationship between Internal Environmental Management (IEM) and Environmental Performance. Respondents who reported stronger internal environmental management also tended to report higher levels of Environmental Performance. This relationship can be understood in terms of the role of internal environmental policies and management systems in providing organizational direction for identifying, monitoring, and controlling activities that may generate environmental impacts. Management support, regulatory compliance, employee training, environmental monitoring, target setting, and internal

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environmental auditing therefore represent important organizational mechanisms for integrating environmental considerations into operational activities. At PT Homeware International Indonesia, the relatively high evaluations of environmental compliance and management support suggest that environmental management receives considerable attention at the organizational level. These internal conditions are associated with practices related to waste reduction, efficient use of energy and water, and the control of emissions and pollution. However, because this study employed a cross-sectional design, the observed relationship should be interpreted as a statistical association rather than as evidence of a causal relationship. These findings are consistent with Fu et al. (2023), who reported a positive relationship between IEM and Environmental Performance, and with García Alcaraz et al. (2022), who identified an association between environmental management systems and environmental impacts in manufacturing firms. From the Natural-Resource-Based View (NRBV) perspective, these findings support the argument that internal environmental management capabilities can provide an organizational foundation associated with improved environmental outcomes.

b. The Relationship Between Internal Environmental Management and Green Supply Chain Management

The findings indicate a positive relationship between Internal Environmental Management (IEM) and Green Supply Chain Management (GSCM). This finding suggests that stronger internal environmental capabilities are associated with a greater implementation of green practices across supply chain activities. Environmental policies, management commitment, cross-functional coordination, and internal control systems provide an organizational foundation through which environmental considerations can be incorporated into supplier selection, raw material use, production processes, packaging, and waste management. These findings differ from those of Dzikriansyah et al. (2023), who found no significant relationship between IEM and GSCM adoption among manufacturing SMEs in East Java, but are consistent with the findings of Jermsittiparsert et al. (2019) and Usman et al. (2025). From the Natural-Resource-Based View (NRBV) perspective, this difference may be understood in terms of variations in the extent to which organizations are able to translate internal environmental capabilities into operational supply chain practices. Management commitment, cross-functional coordination, environmental control systems, monitoring, and evaluation may be more effectively embedded in supply chain routines in some organizational contexts than in others. Differences in organizational structure, the degree of formalization of environmental management, resource availability, and coordination mechanisms may therefore contribute to variations in the strength of the IEM–GSCM relationship across firms (Odamtten et al., 2025; Naz et al., 2024).

In the homeware manufacturing context examined in this study, internal environmental management is closely connected with activities involving suppliers, raw materials, production, packaging, and waste management. This operational interconnectedness may help explain the positive relationship between IEM and GSCM observed in the present study. However, these contextual factors were not examined as separate variables in this research. Therefore, this explanation should be regarded as a theoretical interpretation of the difference from Dzikriansyah et al. (2023), rather than as an empirically tested explanation. Within this framework, IEM can be understood as an internal organizational capability, whereas GSCM represents the operational implementation of environmental principles across supply chain activities. This distinction suggests that the existence of internal environmental policies alone may not be sufficient unless they are translated into relevant and consistently implemented operational practices.

c. The Relationship Between Green Supply Chain Management and Environmental Performance

The positive relationship between Green Supply Chain Management (GSCM) and Environmental Performance indicates that the integration of environmental considerations into supply chain activities is associated with improved environmental outcomes. These practices include selecting suppliers based on sustainable criteria, using environmentally friendly raw materials, improving energy efficiency, adopting eco-friendly packaging, and implementing waste management and recycling practices. Among the GSCM

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indicators, the use of environmentally friendly raw materials received the highest mean score (Z2 = 4.60), whereas waste management and recycling received the lowest mean score (Z5 = 4.40). This pattern indicates that the use of environmentally friendly materials was perceived more positively than waste management and recycling practices. Therefore, waste management and recycling may represent areas that require greater attention in strengthening the company's GSCM implementation. These findings are consistent with Fu et al. (2023), Dzikriansyah et al. (2023), and Green et al. (2012), who reported positive relationships between GSCM practices and Environmental Performance. Odamtten et al. (2025) also found that several GSCM practices, particularly green purchasing and green distribution and packaging, are positively associated with Environmental Performance. In addition, Camila et al. (2025) reported that sustainable supply chain management practices are associated with Environmental Performance in manufacturing companies. Taken together, these findings support the view that integrating environmental considerations into supply chain activities is associated with improved environmental outcomes. From the Natural-Resource-Based View (NRBV) perspective, GSCM can be understood as an operational mechanism through which internal environmental capabilities are translated into environmentally oriented supply chain practices that are associated with Environmental Performance. However, because this study employed a cross-sectional design, the observed relationship should be interpreted as a statistical association rather than as evidence of a causal effect.

d. The Mediating Role of Green Supply Chain Management

The mediation analysis indicates that Green Supply Chain Management (GSCM) functions as a partial mediator in the relationship between Internal Environmental Management (IEM) and Environmental Performance. This finding suggests that the relationship between IEM and Environmental Performance is observed not only through a direct pathway but also through the implementation of GSCM practices. In other words, part of the association between internal environmental management capabilities and Environmental Performance is represented by the extent to which internal environmental policies and organizational commitments are translated into greener supply chain practices. This mechanism can be understood through two complementary pathways. First, internal management mechanisms, including monitoring, auditing, employee training, target setting, and environmental controls, are directly associated with Environmental Performance. Second, internal environmental capabilities can be translated into operational practices involving supplier selection, raw material use, production efficiency, packaging, and waste management through GSCM. This interpretation is consistent with the NRBV perspective, which views organizational environmental capabilities as resources that can be developed and operationalized through environmentally oriented practices. These findings are consistent with Jermsittiparsert et al. (2019) and Usman et al. (2025), who provided evidence of indirect relationships between internal environmental factors and Environmental Performance through GSCM. In the present study, the indirect effect was 0.5191, with a 95% bootstrap confidence interval of 0.1464–0.9119, while the direct effect remained statistically significant after GSCM was included as the mediator. This pattern supports the conclusion that GSCM partially mediates the relationship between IEM and Environmental Performance. The VAF value of approximately 49% is treated as supplementary information rather than as the primary basis for determining the type of mediation. Because the study employed a cross-sectional design, the mediation finding should be interpreted as evidence of a statistically supported indirect relationship within the observed data rather than as definitive evidence of a temporal or causal mechanism.

V. Conclusion

The findings indicate that Internal Environmental Management (IEM) is positively associated with Environmental Performance and Green Supply Chain Management (GSCM), while GSCM is also positively associated with Environmental Performance. These findings suggest that internal environmental management capabilities and green supply chain practices are closely interconnected within the company's

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environmental management system. The mediation analysis further indicates that GSCM partially mediates the relationship between IEM and Environmental Performance. The indirect effect through GSCM was statistically significant, while the direct relationship between IEM and Environmental Performance remained statistically significant after GSCM was included in the model. This pattern indicates that the relationship between IEM and Environmental Performance is reflected through both a direct pathway and an indirect pathway involving GSCM practices. From a practical perspective, PT Homeware International Indonesia may maintain and strengthen management support, regulatory compliance, environmental monitoring, auditing, and internal environmental control systems while further integrating environmental principles into supply chain activities. Particular attention may be given to production waste management and recycling, which received the lowest mean score among the GSCM indicators. This study has several limitations. First, the sample consisted of only 50 respondents from a single company, limiting the generalizability of the findings to other organizational and manufacturing contexts. Second, the cross-sectional design does not allow the temporal ordering or causal relationships among the variables to be established. Third, all constructs were measured using self-reported perceptual data obtained from the same respondents. Harman's single-factor test showed that the first factor accounted for 70.838% of the total variance, indicating the potential presence of common method variance.

In addition, the HTMT values ranged from 0.989 to 1.022 and exceeded the indicative threshold of 0.90, indicating that discriminant validity among the constructs was not adequately established. Fourth, the regression residuals did not satisfy the formal normality assumption, while the VIF value of 9.331 indicated relatively high multicollinearity between IEM and GSCM. Therefore, the findings should be interpreted as statistical relationships within the specific context of this study rather than as general evidence of causal relationships. Future research should involve larger samples from multiple manufacturing companies to improve the generalizability of the findings and facilitate comparisons across organizational contexts. To strengthen the assessment of temporal relationships among the variables, future studies may employ longitudinal or multi-wave research designs, for example by measuring IEM at an initial stage, GSCM at a subsequent stage, and Environmental Performance at a later stage. Future research should also incorporate multiple data sources to reduce potential common method bias, such as combining employee assessments of IEM and GSCM with objective Environmental Performance indicators, including energy consumption, waste generation, water use, and emissions records. In addition, studies with larger samples may employ more comprehensive construct validation approaches, such as confirmatory factor analysis or structural equation modeling, to further assess the empirical distinctiveness of IEM, GSCM, and Environmental Performance. Such approaches may provide stronger evidence regarding construct validity and the temporal relationships among the variables.

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