An Exploratory Assessment of Behavioral Green Supply Chain Management Practices in Indonesian Halal Foodservice: A Two-Stage PLS-SEM Approach

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DOI: https://doi.org/10.47772/IJRISS.2026.101100041

Received: 31 October 2026; Accepted: 05 November 2026; Published: 24 November 2026

ABSTRACT

The sustainability trend has emerged as a pivotal issue amid rising global awareness of intensifying climate change, the need for effective resource management, and pressing social disparities. To promote sustainability, it is crucial to adopt Green Supply Chain Management (GSCM) practices as essential strategies by reforming operational practices from behavioral perspectives in accordance with environmental management principles. This study presents a conceptual framework to provide an exploratory assessment of how behavioral GSCM practices influence sustainability performance. This research employs a quantitative design, using cross-sectional surveys to gather data from Indonesian halal foodservice managers in the hospitality and tourism industry, yielding 40 responses. The collected data were analyzed through model evaluation and Structural Equation Modeling (SEM) using SmartPLS4, following the higher-order embedded two-stage approach. This preliminary empirical assessment found that behavioral GSCM practices significantly influence sustainability performance. As a result, it enhances the understanding of behavioral GSCM practices in the Indonesian halal foodservice sector. Moreover, further research with larger, more diverse samples will offer valuable insights for policymakers, businesses, customers, and communities, thereby promoting green initiatives that align with the Sustainable Development Goals (SDGs).

Keywords: Behavioral Green Supply Chain Management (GSCM), Sustainability Performance, Structural Equation Modeling (SEM), SmartPLS, Two-stage Approach

INTRODUCTION

The increased focus on sustainability has emerged as a significant issue due to the rising global consciousness surrounding the worsening effects of climate change, the need for effective resource utilization, and the pressing social inequalities that continue to exist (Nogueira et al., 2025). As a prominent global industry, the hospitality and tourism sector plays a crucial role in both economic growth and environmental impact (Wang & Cheablam, 2025). Although it plays a vital role in the economy, this sector has a significant ecological footprint, as it heavily relies on natural resources and contributes to greenhouse gas emissions and waste. This situation highlights the urgent need for a shift towards more sustainable practices (Haldorai et al., 2025; Makoondlall-Chadee & Bokhoree, 2024; Kim et al., 2019). Prior studies have explored the importance of GSCM practices in achieving sustainability outcomes. Although the implementation of GSCM remains inconsistent, these practices are recognized for the potential to reduce emissions and liquid or solid waste. In Indonesia's foodservice tourism sector, various challenges, including inadequate waste management, inefficient resource utilization, and a lack of effective collaboration among stakeholders, hinder sustainability initiatives (Marlina et al., 2025; Chantarungsri & Alam, 2024). Dewantara & Ardi (2023) found that Indonesia ranks among the leading contributors to global food waste, generating an estimated 23 to 48 million tons annually. A considerable portion of this waste occurs at the consumption stage, particularly within the

hospitality and foodservice (HaFS) sector. Research indicates that restaurants and catering services account for approximately 12% of total food waste, with key factors contributing to this problem including inadequate inventory management, excessive food production, and suboptimal waste reduction practices.

Related studies suggest that food waste in the hospitality industry can often be attributed to operational procedures, societal habits surrounding food consumption, and challenges such as unpredictable sales and low customer awareness (Aditya & Kurniawati, 2023; Papargyropoulou et al., 2019). Previous investigations have identified food preparation waste as the principal source of food waste in restaurants, followed by leftover food from buffets and plate waste, which point to inefficiencies in both kitchen management and consumer behavior (Tomaszewska et al., 2021; Papargyropoulou et al., 2019). This issue is particularly evident in the halal foodservice sector, where the emphasis on halal compliance often overshadows critical considerations for environmental sustainability. Therefore, this study highlights the urgent need for a focused examination of Indonesia's halal foodservice industry. The growth of this sector within Indonesia's hospitality and tourism landscape is heavily influenced by the expanding possibilities of the global halal market. The State of the Global Islamic Economy report (DinarStandard, 2025) indicates that Indonesia has improved its aggregate ranking in the 2024 Global Islamic Economy Indicators compared to 2022, now standing competitively alongside nations such as Malaysia and Saudi Arabia, where it has achieved a commendable third place. This improved ranking reflects the positive results stemming from initiatives aimed at strengthening the Halal Assurance System (HAS) ecosystem, which is essential for the advancement of the Islamic economy.

To enhance sustainability outcomes in this resource-intensive sector, it is essential to focus on ethical sourcing and environmental stewardship (Alreahi et al., 2023; Rejeb et al., 2021). GSCM practices that take behavioral factors into account have emerged as vital strategies for addressing these complex sustainability issues (Nureen et al., 2022; Liu et al., 2020). Nevertheless, a significant gap remains in the exploration of how various organizational practices in the halal industry, particularly human aspects, can contribute to improved overall sustainability performance. This oversight has resulted in a relatively underdeveloped approach to sustainability in the Indonesian halal foodservice context, underscoring the potential relevance for further research into the behavioral factors that influence it. As a consequence, this research provides an exploratory empirical assessment that incorporates behavioral GSCM factors (internal environmental management, environmental cooperation with customers, and supplier collaboration) and examines how its elements influence sustainability performance.

The paper is structured as follows: Section 2 outlines the literature review and hypothesis development. Section 3 presents the methodology. Section 4 explains the results and analysis, and Section 5 highlights the discussion and conclusion.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Stakeholder Theory

The framework for this study is grounded in stakeholder theory, which was initially proposed by Freeman in 1984. This theory has gained significant relevance in the context of Green Supply Chain Management (GSCM), emphasizing that organizational success depends on managing the interests of a diverse range of stakeholders, including suppliers, customers, regulatory bodies, and societies (Li et al., 2025; Bamgbade et al., 2024; Ahmed et al., 2020b; Yoon & Chung, 2018). Rather than perceiving stakeholders as abstract entities, this research takes a practical approach by analyzing how their influence manifests through specific behavioral practices in GSCM. For example, collaboration with suppliers highlights the importance of connecting with upstream stakeholders who prioritize environmentally sustainable sourcing practices.

Companies that neglect to uphold a strong environmental reputation may encounter reluctance from suppliers in offering their support, thereby illustrating the imperative for businesses to implement sustainable practices to protect their image (Rivera-Camino, 2007). Conversely, the increasing awareness among customers signals a market demand for products that are both sustainable and compliant with halal standards, compelling companies to adhere to these sustainability requirements and ultimately deliver eco-friendly products (Kassinis & Vafeas, 2006). Moreover, strong commitment from top management reflects how internal

stakeholders align their efforts to address these external challenges. Consequently, the behavioral practices associated with GSCM emerge as strategic responses by companies to the demands posed by stakeholders, thus positioning these practices as critical independent variables influencing sustainability performance.

Behavioral Green Supply Chain Management Practices

Behavioral GSM practices highlight the significance of interpersonal and human factors in the supply chain, including the support from top management, customer engagement, and supplier involvement (Nureen et al., 2022; Liu et al., 2020). According to Liu et al. (2020), behavioral practices are characterized by internal management support, customer cooperation, and supplier collaboration. Shin & Cho (2022) emphasize that internal GSCM practices are predicated on a company's internal environmental management (IEM), while external GSCM focuses on the collaborative relationships between buyers and suppliers. Furthermore, organizational commitment plays a crucial role as an internal driver that significantly affects the implementation of Halal Food Standards (HFS) in Indonesia by facilitating companies' adherence to halal regulations (Putri et al., 2025).

According to Hartono et al. (2023), the supply chain represents a network of interconnected activities and relationships among various organizations that collaborate to create value. Research suggests that effective integration across the supply chain requires collaborative efforts from all participating partners (Yu et al., 2014). The trend of collaboration within the supply chain has become increasingly important, with top management playing a key role in fostering relationships with customers and suppliers, which can enhance overall performance by facilitating environmental advancements (Wongthongchai & Saenchaiyathon, 2019).

Internal environmental management (IEM) encompasses various behavioral aspects, including management commitment and collaboration across departments (Seman et al., 2019). Cooperation with customers is another critical aspect that can enhance green process innovation and promote the development of products with more sustainable materials and designs, thus reducing negative environmental effects (Guo et al., 2021; Melander, 2018). In addition, supplier collaboration is also essential, starting in the design phase and extending through to the final product delivery, ensuring that the materials and production methods are eco-friendly (Lo et al., 2018).

Sustainability Performance

Sustainability performance refers to how well an organization balances economic, environmental, and social sustainability (Abu-Rayash & Dincer, 2021). It reflects the organization's commitment to long-term economic viability, ecological health, and social accountability (Rodríguez-García et al., 2023) while meeting stakeholder expectations. Social responsibility, environmental sustainability, and the social impact of modern business practices are increasingly linked to financial outcomes (Opoku et al., 2023). Companies will consider sustainable practices not just as ethical imperatives but also as opportunities that can enhance profitability (Ma et al., 2023). Nogueira et al. (2025) note that companies strive for sustainability performance not only to meet environmental demands but also to achieve their economic goals and social considerations. As a result of this achievement, companies believe they can maintain competitiveness and ensure their long-term survival (Opoku et al., 2023), helping them differentiate themselves in the marketplace (Peng et al., 2020). Additionally, research conducted by Castillo-Díaz et al. (2023) emphasizes the importance of sustainability performance in facing social and environmental issues, particularly in resource-limited countries. Many studies indicate that GSCM practices can lead to sustainability performance, especially within the food industry (Al-Shammari & Al-Maathidi, 2026; Wabanhu et al., 2025; Maaz et al., 2022).

Economic performance refers to an organization's ability to maximize profits and achieve financial goals while minimizing the use of raw materials and lowering production costs (Bhattacharya et al., 2019). It consists a company's proficiency in reducing the material procurement cost, energy usage, as well as expenses related to waste disposal and treatment (Hejazi et al., 2023). In contrast, social performance relates to the organization's initiatives that embody its social principles (Levi-Bliech & Dahan, 2026).

This aspect of performance focuses on the effectiveness and satisfaction generated by products and services that enhance stakeholder welfare, promote social initiatives, and contribute to overall societal well-being. Environmental performance, on the other hand, pertains to a business's ability to conserve energy, minimize waste, and limit the use of hazardous materials (Han & Huo, 2020). It describes how effectively organizations decrease their dependence on toxic substances, mitigate environmental incidents, reduce air pollution, and the amount of waste produced in their operations (Fianko et al., 2021; Younis et al., 2016).

Hypothesis Development

The Influence of Behavioral Green Supply Chain Management (GSCM) Practices on Sustainability Performance

Many studies indicate that GSCM practices can significantly enhance organizational performance. For example, Khan et al. (2021b) suggest that these practices improve both economic and environmental outcomes by encouraging the intellectual capabilities of middle management and employees. The impact of GSCM practices on performance is closely tied to the active involvement of internal management (Govindan et al., 2015). Moreover, top management commitment to environmental issues is essential for the successful implementation of GSCM initiatives (Zhu et al., 2013; Hoejmose et al., 2012; Olugu et al., 2011). Masudin et al. (2021) further emphasized that managerial initiatives can lead to significant improvement in organizational performance.

To enhance sustainability performance, managers are encouraged to cultivate collaborative relationships with supply chain partners (Hartono et al., 2023; Del Giudice et al., 2021). Chin et al. (2015) highlight that a deeper understanding of such collaboration contributes positively to sustainable performance. Collaboration with supply chain partners significantly affects the achievement of economic sustainability performance in Indonesia's food SMI sector (Meuthia et al., 2024).

By engaging with environmentally aware customers, manufacturers can align more closely with sustainability expectations, gain a competitive advantage, and improve their environmental impact (Guo et al., 2021; Zhu et al., 2013). Furthermore, collaboration with customers supports compliance with GSCM requirements and promotes the development of eco-friendly products (Li et al., 2016). While Zhu et al. (2005) highlighted the beneficial effects of green customer collaboration on various performance dimensions, Ahmad et al. (2022) reported only limited impacts.

Additionally, many companies often underestimate the value of strategic partnerships with suppliers in the context of GSCM, despite the significant benefits these collaborations can offer, such as enhanced quality and reduced waste (Idris et al., 2023; Jabbour et al., 2017). Suppliers' collaboration can also enhance reputations through collective green initiatives and training, thereby creating new business opportunities (Mishra et al., 2022; Laari et al., 2016).

Joint efforts in green product development not only elevate supplier competitiveness but also strengthen the buyer's reputation for sustainable sourcing in response to increasing consumer reviews of environmental claims (Vachon & Klassen, 2008). In this study, Internal Environmental Management, Environmental Cooperation with Customers, and Supplier Cooperation are conceptualized as first-order dimensions of the higher-order Behavioral GSCM construct. The structural hypothesis is formulated at the higher-order level to examine the overall effect of Behavioral GSCM on Sustainability Performance. Thus, the following hypothesis is is explored through preliminary empirical evidence.

Behavioral GSCM practices have a significant effect on sustainability performance

Conceptual Framework

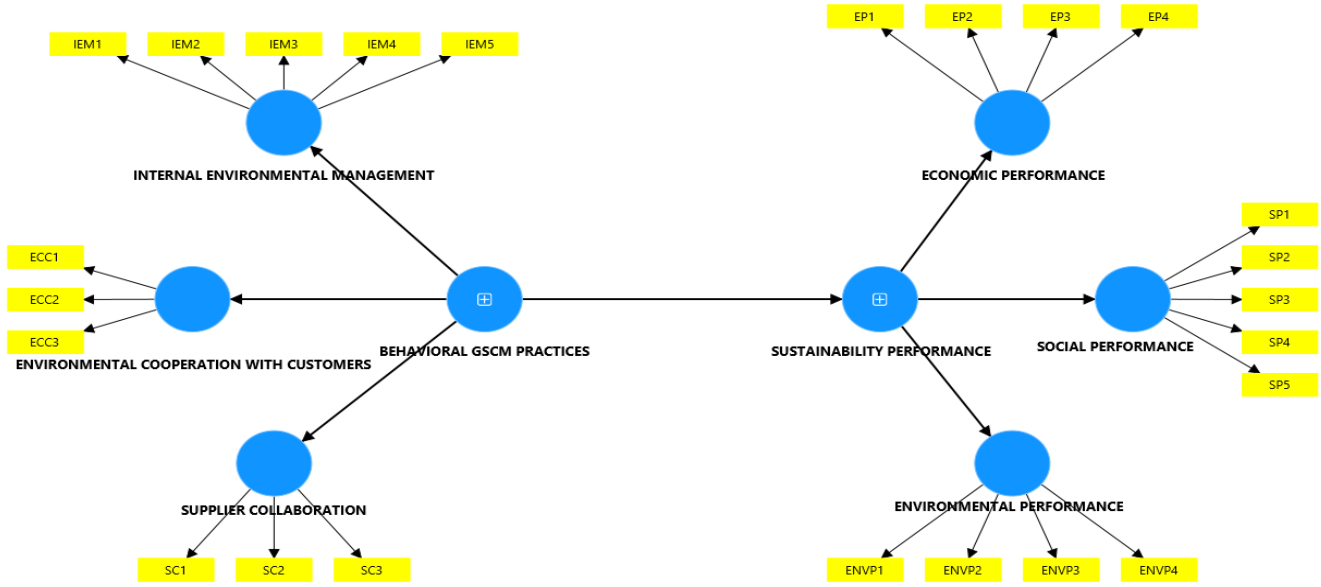


Figure 1. Proposed Conceptual Framework

METHODOLOGY

An exploratory quantitative research method was conducted to obtain the preliminary insights into the relationship between reflective latent constructs. To determine the respondents of this study, a cross-sectional data collection was used by distributing the questionnaire directly to halal foodservice managers in Indonesia, including halal-certified restaurants and cafes, in Indonesian tourism destinations. The unit of analysis is the organization. To ensure that the collected data accurately represent the organization, researchers used offline field surveys and a simple random sampling technique. A total of 40 valid responses were gathered as an exploratory empirical assessment. Due to research constraints, all eligible responses were included in the analysis since further data collection was not possible. The collected observations were subsequently used to explore a preliminary assessment of the suggested relationships, leading to an additional assessment of whether the sample size was sufficient for statistical sensitivity. To support this assessment, the inverse square root method by Kock & Hadaya (2018) was employed, as demonstrated in the formula below.

$$|\beta\text{min}| > \frac{2.486}{\sqrt{N}}$$

If N = 40,

$$|\beta\text{min}| > \frac{2.486}{\sqrt{40}}$$

$$|\beta\text{min}| > 0.393$$

The sampling frame for this study consisted of respondents who were selected from the same target population and geographical areas as those intended for the primary research, specifically halal-certified restaurants and cafes located in West Sumatra and Central Java. Participants were chosen based on their eligibility for inclusion in the study, as well as their familiarity and involvement with the operational practices of the restaurant or café that are relevant to the research constructs.

All variables were assessed using a Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire design was developed by validated constructs from several prior studies. Behavioral GSCM practices consist of three dimensions, including internal environmental management, cooperation with customers, and supplier collaboration. The internal environmental management items were taken from

Dzikriansyah et al. (2023), supplier collaboration was measured using Laari et al. (2016) metrics, and the items on cooperation with customers were adapted from Guo et al. (2021) and Zhu et al. (2008).

The sustainability performance measurement was adapted from Hejazi et al. (2023) for economic performance items, Levi-Bliech & Dahan (2026) for social performance, and Choi & Hwang (2015) for environmental performance. This measurement reflects the perceived sustainability performance based on perceptual measures regarding the respondent's knowledge about their business operations, instead of relying on independently verified quantitative performance results.

Moreover, this research utilizes Partial Least Squares Structural Equation Modeling (PLS-SEM) to assess both measurement and structural models, including a test for common method bias. In addition to the boundaries, this study focuses on halal foodservice firms and excludes manufacturing operations or sectors unrelated to halal products. In this research, Behavioral GSCM practices and sustainability performance are identified as second-order constructs, each consisting of three distinct dimensions. Therefore, it is essential to evaluate the measurement model for these second-order constructs to verify the inclusion and consistency of the underlying sub-dimensions. The PLS-SEM analysis incorporated an additional step to derive latent scores from the lower-order constructs that emerged from the first-order constructs (Hair et al., 2019). The initial assessment of the measurement model was carried out using an embedded two-stage approach. The latent variable scores for each lower-order construct were employed in the subsequent stage of the analysis.

RESULTS AND ANALYSIS

Demographic Profile of Respondents

Table 1 summarizes the demographic characteristics of the respondents. Of 40 respondents, males dominate (75%), and those aged 18-29 years (50%) predominate; the majority have a secondary education (52.5%), and less than 3 years of experience in their managerial positions. Although some respondents were relatively young and had shorter tenures, they were deemed appropriate key informants due to their organizational roles, involvement in relevant activities, and familiarity with the firm's practices. Young respondents with limited tenure can still be effective key informants regarding firm performance if their roles align closely with the construct being evaluated, which should be objective or salient (Ketokivi, 2019; Montabon et al., 2017).

Moreover, this study was conducted in the Indonesian halal foodservice context, which is dominated by SMEs rather than large firms. The formal reporting structures and specialized departments might not always be established. Many of them operate under owner-operated structures, where both ownership and key managerial duties are primarily held by the business owner. In owner-managed businesses, owners who are actively engaged in everyday operations often have hands-on knowledge regarding how resources are used, purchasing processes, supplier interactions, and other operational practices that are important for evaluating sustainability performance.

In addition, this initial exploratory assessment relied on perceptual indicators instead of objective quantitative data, such as financial audits, measured CO_2 emissions, or other numerical environmental statistics. Respondents were asked to evaluate how well the relevant practices and activities were represented in their businesses' actual operating conditions using a five-point Likert scale. For instance, one item regarding the role of environmental practices in reducing CO_2 emissions asked respondents to assess the perceived environmental impact of those practices rather than provide a specific measurement of emission reduction. Thus, the suitability of key informants depends more on their relationship to the measured construct than on their age or experience alone (Krause et al., 2018; Bou-Llusar et al., 2016; Homburg et al., 2012).

Table 1. Descriptive Statistics of Respondents' Demographics

Category	Description	Frequency	%
Gender	Male	30	75
	Female	10	25

Age	18-29 years	20	50
	30 - 39 years	12	30
	40 - 50 years	3	7.5
	>50 years	5	12.5
Education	Primary education	2	5
	Secondary education	21	52.5
	A diploma degree or equivalent	3	7.5
	Bachelor's degree or equivalent	14	35
Tenure	Less than 3 years	26	65
	3 - 6 years	10	25
	7 - 10 years	2	5
	More than 10 years	2	5

Outer Model Assessment

The outer model evaluates based on measurement reliability testing, both at the indicator level (indicator reliability 'factor loadings') and construct level (internal consistency reliability), and validity testing encompasses convergent validity using AVE and discriminant validity to compare all construct measurements based on the Fornell-Larcker criterion. Based on the conceptual framework that has been shown earlier in Figure 1, this study uses a multidimensional construct of first-order reflective and second-order reflective.

This study utilizes a reflective–reflective model that is primarily based on the theoretical principles of behavioral Green Supply Chain Management (GSCM) practices, which closely align with Stakeholder Theory. According to this theory, behavioral GSCM embodies a holistic organizational strategy that allows companies to address environmental challenges while engaging with diverse stakeholder groups (Liu et al., 2026). Within this framework, internal environmental management reflects the organization's commitment, while customer cooperation and supplier collaboration illustrate its downstream and upstream manifestations, respectively. These aspects represent unique stakeholder-focused interpretations of a cohesive behavioral orientation, rather than operating as separate elements contributing to the overall construct. Hence, the first-order measurement model comprises 3 dimensions of the behavioral GSCM practices construct: internal environmental management (IEM), environmental cooperation with customers, and supplier collaboration, and 3 dimensions of sustainability performance, including economic, social, and environmental.

Table 2. Reliability Analysis and Convergent Validity (First-Order)

CONSTRUCTS	DIMENSIONS	ITEMS	FACTOR LOADING	CRONBACH'S ALPHA	COMPOSITE RELIABILITY	AVE
BEHAVIORAL GSCM PRACTICES	**INTERNAL ENVIRONMENTAL MANAGEMENT (IEM)**	IEM1	0.969	0.825	0.897	0.748
		IEM2	0.919			
		IEM3	0.679			
		IEM4	DELETED			
		IEM5	DELETED			
	ENVIRONMENTAL COOPERATION WITH CUSTOMERS (ECC)	ECC1	0.932	0.805	0.886	0.725
		ECC2	0.907			
		ECC3	0.693			
	SUPPLIER COLLABORATION (SC)	SC1	0.874	0.744	0.843	0.645
		SC2	0.874			
		SC3	0.638			
SUSTAINABILITY PERFORMANCE	**ECONOMIC PERFORMANCE (EP)**	EP1	0.754	0.762	0.847	0.584
		EP2	0.718			
		EP3	0.902			
		EP4	0.660			
	SOCIAL PERFORMANCE (SP)	SP1	0.746	0.740	0.837	0.564
		SP2	0.708			
		SP3	0.835			

		SP4	0.706			
		SP5	DELETED			
	ENVIRONMENTAL PERFORMANCE (ENVP)	ENVP1	0.655	0.701	0.818	0.532
		ENVP2	0.758			
		ENVP3	0.659			
		ENVP4	0.831			

Table 3. Discriminant Validity (Fornell-Larcker Criterion, First-Order)

	EP	**ECC**	**ENVP**	**IEM**	**SP**	**SC**
EP	**0.764**					
ECC	0.053	**0.851**				
ENVP	0.371	0.367	**0.729**			
IEM	0.103	0.335	0.477	**0.865**		
SP	0.178	0.191	0.352	0.299	**0.751**	
SC	0.424	0.361	0.350	0.395	0.222	**0.803**

According to Table 2, the final measurement model assessment for the first-order construct has met the rule of thumb by Hair et al. (2021) for convergent validity (AVE and outer loading) and internal consistency (Cronbach's alpha and composite reliability) after deleting three invalid indicators (IEM4, IEM5, and SP5) due to their loading values below 0.60. Table 3 depicts that the Fornell-Larcker criterion was also met, as the diagonal values of the correlation matrix (in bold) were greater than the off-diagonal values, indicating that discriminant validity is adequate at the first-order level in this preliminary assessment.

Table 4. Discriminant Validity (HTMT Ratio, First-Order)

	EP	**ECC**	**ENVP**	**IEM**	**SP**	**SC**
EP						
ECC	0,300					
ENVP	0,486	0,522				
IEM	0,131	0,416	0,664			
SP	0,372	0,395	0,492	0,426		
SC	0,554	0,511	0,441	0,397	0,358	

Table 4 illustrates the Heterotrait-Monotrait (HTMT) ratio for first-order constructs, which confirms that all values are below the Hair et al. (2021) rule of thumb of 0.90.

In the subsequent phase, scores for latent variables are derived from the first-order constructs to enable a more detailed examination of the second-order constructs. This process closely resembles the repeated indicator method, where lower-order items are associated with the second-order construct during the initial stage of the embedded two-stage approach (Sarstedt et al., 2021).

Table 5. Reliability Analysis and Convergent Validity (Second-order)

CONSTRUCTS	**DIMENSIONS**	**FACTOR LOADING**	**AVE**	**COMPOSITE RELIABILITY**
BEHAVIORAL GSCM PRACTICES	IEM	0.790	0.574	0.801
	ECC	0.682		
	SC	0.795		
SUSTAINABILITY PERFORMANCE	EP	0.623	0.530	0.768
	SP	0.656		
	ENVP	0.879		

Table 6. Discriminant Validity (Fornell-Larcker Criterion, Second-order)

CONSTRUCTS	**Behavioral GSCM Practices**	**Sustainability Performance**
Behavioral GSCM Practices	**0.758**	
Sustainability Performance	0.537	**0.728**

As exhibited in Tables 5 and 6, all dimensions in the second-order construct were at adequate scores of outer loadings, AVE, composite reliability, and Fornell-Larcker criterion.

Table 7. Discriminant Validity (HTMT Ratio, Second-order)

CONSTRUCTS	Behavioral GSCM Practices	Sustainability Performance
Behavioral GSCM Practices		
Sustainability Performance	0,836	

In addition to the Fornell-Larcker results, this study also presents the Heterotrait-Monotrait (HTMT) ratio of correlations to evaluate the discriminant validity, as shown in Table 7. The HTMT findings reveal that all values remain under the cautious threshold of 0.90 (Hair et al., 2021).

Test of Common Method Bias

Given that all constructs were assessed through a self-administered questionnaire, an evaluation of potential common method bias (CMB) was conducted using a full collinearity assessment. The VIF values for full collinearity were all under 3.3, indicating that common method bias was not a significant concern (Hair et al., 2021). The results pertaining to common method bias are presented in Table 8.

Table 8. Common Method Bias (CMB)

CONSTRUCTS	DIMENSIONS	VIF (<3.3)
BEHAVIORAL GSCM PRACTICES	IEM	1.248
	ECC	1.211
	SC	1.273
SUSTAINABILITY PERFORMANCE	EP	1.163
	SP	1.144
	ENVP	1.285

Inner Model Assessment

As the measurement model is reliable and valid, the next step is to assess the structural model or inner model. This process involves examining the model's predictive capabilities and the hypothesis relationships within the inner model (Hair et al., 2021). As recommended by Hair et al. (2019), the following tables (Table 9 – 12) demonstrate the inner model assessment for this study.

Table 9. R-square

	R-square	R-square adjusted	Result
SUSTAINABILITY PERFORMANCE	0.288	0.269	Weak to Moderate (Sarstedt et al., 2021)

The R-square value of 28.8%, as shown in Table 9, is considered substantial, aligning with Sarstedt et al. (2021), who stated that an R-square of 0.20 is typically regarded as accepted in behavioral sciences. This value indicates that the model's predictors account for 28.8% of the variance in sustainability performance. Thus, the model effectively captures important relationships among the relevant constructs in the present sample.

Table 10. f-square

	BEHAVIORAL GSCM PRACTICES	SUSTAINABILITY PERFORMANCE
BEHAVIORAL GSCM PRACTICES		0.405
SUSTAINABILITY PERFORMANCE		

Table 10 exhibits that behavioral GSCM practices have a substantial effect size on sustainability performance. Aligning with Sarstedt et al. (2021), the f-square value of 0.02, 0.15, and 0.35 is considered small, moderate,

and large, respectively. It provides initial support for the proposition that behavioral GSCM practices have a significant impact on sustainability performance.

Table 11. Q-square

	SSO	SSE	Q^2 (=1-SSE/SSO)
SUSTAINABILITY PERFORMANCE	120.000	106.205	0.115

Table 11 displays the Q-square values derived from blindfolding procedures for sustainability performance. Sarstedt et al. (2021) posited that a Q-square value exceeding zero for an endogenous variable indicates that the path model results possess predictive relevance for that variable. In this analysis, Q^2 values exceed zero, thereby confirming that the independent variable is predictive relevance.

Table 12. Path Coefficients (Mean, STDEV, T values, p values)

HYPOTHESIS	B	T statistics (|O/STDEV|)	P values	Result
H1: BEHAVIORAL GSCM PRACTICES -> SUSTAINABILITY PERFORMANCE	0.537	2.393	0.017	Significant

The last important assessment of the inner model is hypothesis testing. Bootstrapping was conducted utilizing 5,000 subsamples, applying a 95% confidence interval and a two-tailed significance test with a significance level of $\alpha = 0.05$.

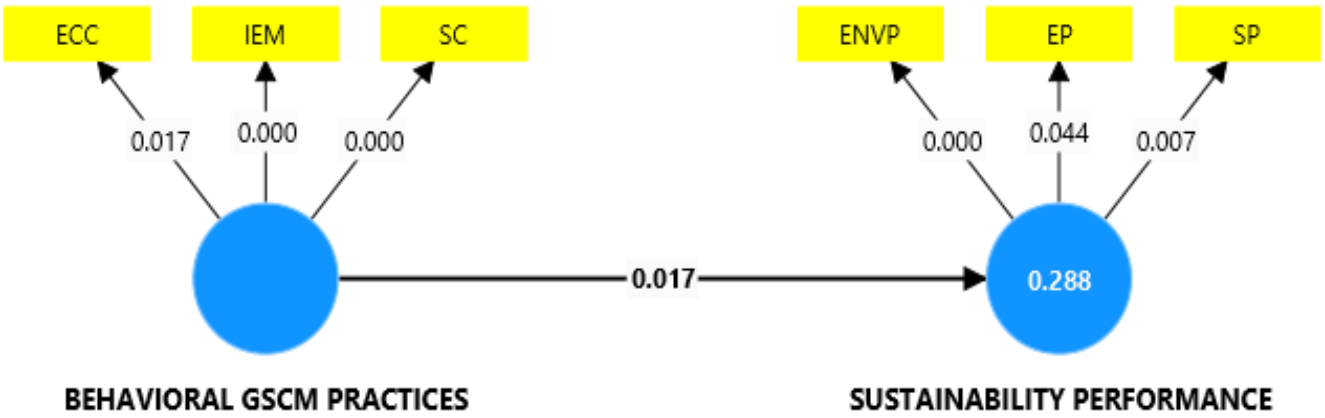


Figure 2. Results of Hypotheses

As can be seen from Table 12 and Figure 2, the hypothesis in this preliminary empirical study is supported because behavioral GSCM practices had a significant positive effect on sustainability performance, as the t-value of the two-tailed test is greater than 1.96, based on the significance level of 0.05 [$\beta 1 = 0.537$; $t = 2.393$; $p < 0.05$].

DISCUSSION AND IMPLICATIONS

The findings offer initial empirical evidence supporting the proposed relationship that behavioral GSCM practices significantly and positively impact sustainability performance in the halal food service sector. This sector is characterized by a high level of interaction between businesses and their stakeholders. Unlike the manufacturing sector, food service establishments such as restaurants and cafes engage directly with customers, suppliers, and the broader community. Sustainability in halal food services is not merely a matter of technical green practices. It fundamentally depends on developing behavioral and relational competencies both internally and externally. Therefore, solely relying on internal environmental management practices does not suffice to enhance sustainability outcomes. In particular, internal environmental management, customer engagement, and supplier collaboration are critical in helping companies translate their environmental commitment into broader economic, social, and environmental outcomes. These findings align with Huang et al. (2024), which highlights the contribution of GSCM practices to sustainability performance, as well as the

research by Agyabeng-Mensah et al. (2020), which emphasizes the importance of internal green supply chain practices and environmental collaboration in enhancing firm performance.

Furthermore, the exploratory findings of this preliminary study emphasize that environmentally oriented behaviors can generate multifaceted value when incorporated into organizational and supply chain frameworks. Significantly, these results expand the existing literature on halal supply chains by illustrating how green-oriented behaviors can enhance sustainability within the halal food service sector. Haleem et al. (2021) frame halal supply chain management as intrinsically connected to sustainability, while Khan et al. (2021a) provide empirical evidence of the importance of economic, environmental, and social sustainability in halal supply chain management. Drawing on this literature, the current study suggests that halal sustainability and environmental sustainability should not be viewed as distinct organizational objectives. Rather, effective internal environmental management and collaborative efforts with both customers and suppliers can complement halal-oriented supply chain practices and support sustainability. This perspective offers a more cohesive understanding of sustainability within halal food services, where the principles of halal integrity and environmental stewardship can enhance value for both the organization and its stakeholders.

This study contributes to the understanding of GSCM and Stakeholder Theory by showing that integrating behavioral GSCM practices can boost sustainability in the foodservice industry. Instead of treating internal environmental management, customer collaboration, and supplier partnerships as separate factors, it emphasizes their combined impact on achieving economic, social, and environmental sustainability. This approach shifts the focus of GSCM research from a purely technical perspective to the importance of behavioral engagement for better sustainability performance. Practically, it suggests that managers of restaurants and cafes should develop an integrated strategy that combines internal environmental efforts with strong collaboration with customers and suppliers, rather than handling them separately.

CONCLUSION

The study focused on understanding how Indonesian foodservice managers perceived and engaged with the potential of behavioral GSCM factors in influencing sustainability performance in the halal tourism industry. This research was a quantitative study that tested its hypotheses and analyzed the influence of behavioral GSCM practices on sustainability performance. All research variables were tested at a second-order level. Behavioral GSCM practices are conceptualized in several dimensions, including internal environmental management (IEM), environmental cooperation with customers, and supplier collaboration, while sustainability performance comprises three dimensions (economic, social, and environmental). The proposed hypotheses are supported. This finding sheds light on the novel perspective that sustainability does not solely rely on the operational or technical GSCM practices. It requires the development of environmentally oriented organizational behaviours and collaborative relationships across the supply chain. Internal environmental management provides the organizational foundation for embedding environmental considerations into daily decision-making and operational activities, whereas customer cooperation and supplier collaboration extend these environmental orientations beyond organizational boundaries. Furthermore, this study contributes to the sustainability literature, moving from individual adoption to a collaborative perspective. It suggests that sustainability depends on how a company organizes internal environmental activities and integrates with supply chain stakeholders.

LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

Regarding the sample size (N = 40), the inverse square root assessment indicates a minimum detectable path coefficient of approximately $|\beta| = 0.393$ at the conventional 5% significance level and 80% statistical power. The observed path coefficient in our model ($\beta = 0.537$) exceeds this threshold, indicating that the sample has adequate sensitivity for detecting the relatively large effect observed in the study. This study acknowledged that the sample provides limited sensitivity for smaller effects and restricts the generalisability of the findings. It severely limits the statistical power to identify subtle effects, raises the risk of type II errors, and limits the ability to generalize findings to a wider context within Indonesia's hospitality sector. Hence, future studies using larger samples and more geographical locations are recommended to further validate the findings.

ACKNOWLEDGEMENT

The authors gratefully acknowledge Universitas Andalas for its support of the first author's PhD study. The authors also acknowledge Universiti Teknologi Malaysia, Nexus UTM Postgraduate Grant through VOT:Q.J130000.5329.00L94 and VOT:R.J130000.7629.4C787 for financial support and research publication.

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