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Sustainability Practices as Mediator of Internal and External Drivers on Food and Beverage SME Business Performance

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Abstract

Background: The growing activities of SMEs increase energy consumption and waste, creating environmental challenges. Therefore, SMEs need to adopt sustainability practices, although their effectiveness depends on internal and external factors.
Objective: This study examines how internal factors, including top management support, organizational resources, and green open innovation, as well as external factors, such as green supplier collaboration, influence the business performance of small and medium-sized enterprises (SMEs) in the food and beverage (F&B) sector in the Greater Jakarta Area (Jabodetabek), with sustainability practices serving as a mediating variable. This sector was selected due to its important contribution to the national economy and the urgent need to address its environmental impacts.
Methods: Employing a confirmatory quantitative approach with a cross-sectional research design, data collected from 215 SME managers were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). This study provides a novel integration of internal and external sustainability drivers with sustainability practices as a mediator of business performance in F&B SMEs. The respondents consisted primarily of small-business managers (72.1%) with 3–5 years of managerial experience operating in the Greater Jakarta Area (Jabodetabek).
Results: Organizational resources demonstrated the strongest total effect on business performance (β = 0.518), followed by top management support (β = 0.446). Green supplier collaboration exhibited full mediation, indicating that its influence on business performance occurs entirely through sustainability practices. Meanwhile, internal factors demonstrated partial mediation effects.
Conclusion: This study extends RBT by showing that sustainability practices act as dynamic capabilities that enhance business performance through internal capabilities and supplier collaboration.

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INTRODUCTION

Globally, the food and beverage sector faces critical sustainability challenges. According to the UNEP Food Waste Index Report (2024), the world generated approximately 1.05 billion tonnes of food waste in 2022, with the food service sector contributing 28% of consumer-level food waste. Food loss and waste account for 8–10% of global greenhouse gas emissions, which is nearly five times the total emissions generated by the aviation sector (UNEP, 2024). In Indonesia, the environmental footprint of the food and beverage (F&B) industry is particularly concerning, as the country is among the largest food waste generators in Southeast Asia. These statistics underscore the urgency for F&B SMEs to adopt sustainability practices that can simultaneously

reduce environmental impacts and improve operational efficiency.

In this context, sustainability practices have emerged as a key strategic approach for aligning business performance with socio-environmental responsibility through the triple bottom line framework (Zaman et al., 2025). Although the F&B sector faces significant challenges related to waste generation and emissions, the implementation of sustainability practices among SMEs remains constrained by technological limitations, financial barriers, and regulatory challenges (Caputo et al., 2024). However, empirical evidence demonstrates that sustainable practices can enhance organizational reputation and operational efficiency Yudawisastra (2023), supported by the increasing trend that 50% of Indonesian consumers now prefer environmentally friendly products (Johan et al., 2023).

Regarding the adoption of sustainability practices among Indonesian SMEs, recent evidence indicates that progress remains uneven. Indonesian SMEs absorb up to 97% of the national workforce and contribute more than 60% of the country's GDP (Permatasari et al., 2023). Nevertheless, many SMEs continue to face substantial barriers to sustainability implementation, including limited knowledge of environmental regulations, financial constraints, and inadequate technological capabilities (Setyaningsih et al., 2024). A survey conducted by Haryono Insight (2025) revealed that approximately 68% of Indonesian consumers have adopted sustainable purchasing practices, reflecting growing market demand that SMEs must address through improved sustainability-oriented strategies.

A literature review reveals several limitations in previous studies. Akomea (2023) focused primarily on internal organizational dimensions while overlooking external organizational factors. In contrast, Al-Kwifi (2025) did not examine the mediating role of sustainability practices in explaining the relationship between internal and external organizational factors and business performance in developed countries. This situation highlights a research gap regarding the absence of an integrative model that simultaneously examines internal and external drivers affecting F&B SME performance in urban Indonesian contexts and the role of sustainability practices as mediator between both drivers. Importantly, previous findings demonstrate several inconsistencies. While Akomea (2023) found that sustainability practices positively influences SME business performance, their study also measured performance primarily through financial indicators, thereby overlooking broader social and environmental dimensions.

Conversely, Al-Kwifi (2025) demonstrated that internal and external factors influence sustainability practices but focused exclusively on the hospitality industry in developed countries, where institutional support, infrastructure, and resource availability differ substantially from developing-country SME contexts. Furthermore, Hossain (2025) reported mixed findings regarding organizational resources, indicating that financial resources alone are insufficient to ensure sustainability practices without complementary human capital development. Empirically, no previous study has simultaneously examined the mediating role of sustainability practices across multiple antecedents, including both internal and external drivers, within metropolitan F&B SMEs in developing countries. Existing studies have generally examined single mediation pathways or concentrated on manufacturing and hospitality sectors, leaving the distinctive resource limitations and supply chain characteristics of F&B SMEs insufficiently explored.

The state of the art of this research lies in the development of a holistic conceptual model incorporating several research novelties, including more comprehensive variable integration, triple bottom line-based performance measurement, and a specific focus on metropolitan SMEs in developing countries. The primary conceptual contribution of this study is the simultaneous examination of differential mediation mechanisms, demonstrating that sustainability practices may function as either partial or full mediators depending on whether the antecedent originates from internal capabilities or external collaborations. This distinction has not been sufficiently established in previous SME sustainability literature and provides new insights into how different organizational resources and external relationships are transformed through sustainability practices to generate improved business performance outcomes.

This research aims to examine the influence of internal and external drivers on business performance through the mediating role of sustainability practices, thereby providing theoretical contributions to strategic management and practical implications for enhancing SME competitiveness. Specifically, this study extends the Resource-Based Theory (RBT) by positioning sustainability practices as dynamic capabilities that transform heterogeneous organizational

resources into sustainable competitive advantages. Furthermore, this research contributes to sustainability capability theory by explaining the differential pathways through which internal capabilities and external drivers influence business performance through sustainability-oriented mechanisms.

Hypothesis Development

The Influence of Top Management Support on Sustainability Practices

Top management support is a crucial driver of the successful implementation of sustainability practices across various organizational scales, including SMEs, as leadership commitment determines a company's values, priorities, and daily operations. Indrawati (2025) emphasize that this commitment extends to energy-saving strategies, while Oriade (2021) explain that, in developing countries, SME managers are key actors in shaping the understanding of sustainability practices through consistent organizational culture and standardized procedures. In addition to directly influencing environmental and community performance through strategic decisions, such as budget allocation and green operation policies Ilyas (2020), leadership support also serves as a key driver of resource efficiency and ethical work standards. Specifically, in the context of SMEs in Indonesia, synergy between business owners and managers is crucial for motivating employees to adopt environmentally friendly practices, given the significant influence leaders have over resource allocation and the facilitation of green innovation (Al-Kwifi et al., 2025; Huang et al., 2023; Indrawati et al., 2025). Based on previous research, the first hypothesis is formulated as follows:

H1: Top Management Support has a positive effect on Sustainability Practices.

The Influence of Organizational Resources on Sustainability Practices

The effective implementation of sustainability practices depends heavily on the availability of adequate organizational resources, including financial resources, human resource capabilities, and technological capacity, which form the foundation of responsible operations (Al-Kwifi et al., 2025). In the context of SMEs, effective internal resource management is an essential prerequisite for adopting sustainable business practices, where the availability of competent and environmentally conscious human resources plays a central role in overcoming technical and financial barriers (Rodrigues & Franco, 2023). Human resource quality, internal organizational support, and access to financing have been shown to determine the success of business process innovation, as resource limitations often hinder SMEs from improving their sustainability practices (Gimin et al., 2026). Furthermore, resource management aligned with sustainability principles through human resource management practices and organizational structures that support employee competency development can improve pro-environmental behavior and enhance the overall sustainability performance of SMEs. Based on previous research, the second hypothesis is formulated as follows:

H2: Organizational Resources have a positive effect on Sustainability Practices

The Influence of Green Supplier Collaboration on Sustainability Practices

Green supplier collaboration is a crucial mechanism that enables companies, including SMEs, to align sustainability objectives and overcome internal capability limitations through active supplier involvement in planning and addressing environmental challenges. Based on a resource-based perspective, this collaboration functions as a collective effort to manage resources and develop solutions that reduce operational impacts, such as waste reduction and increased process efficiency (Geng et al., 2020). Feng (2020) assert that environmentally oriented collaboration accelerates the adoption of sustainability values within organizational routines through collective learning and information exchange with suppliers as strategic partners. In the SME context, where internal resources are often limited, collaboration with external partners becomes particularly important.

Andalib (2023) demonstrate that well-coordinated supplier collaboration improves operational efficiency and strengthens the implementation of sustainability practices. Accordingly, higher levels of green supplier collaboration are expected to enhance sustainability practices. Based on previous research, the third hypothesis is formulated as follows:

H3: Green Supplier Collaboration has a positive effect on Sustainability Practices

The Impact of Sustainability Practices on Business Performance

Sustainability practices are increasingly recognized as strategic capabilities that integrate economic, environmental, and social dimensions into company operations to create long-term business value. From an environmental performance perspective, the integration of sustainability practices, such as energy conservation and waste management, has been shown to improve environmental outcomes through reduced emissions and enhanced resource efficiency (Fok et al., 2022; Iqbal et al., 2025; Moursellas et al., 2022). Furthermore, the implementation of sustainability practices strengthens social performance through more responsible employee welfare management, improved occupational health and safety, and stronger relationships with local communities, which are essential for SME sustainability (Karia & Michael, 2022; Wang et al., 2022). Based on previous research, the fourth hypothesis is formulated as follows:
H4: Sustainability Practices have a positive effect on Business Performance

The Influence of Sustainability Practices in Mediating the Relationship between Top Management Support and Business Performance

Top management support is a significant determinant of successful sustainability practices implementation because organizational leaders establish strategic vision and provide legitimacy and authority for sustainability initiatives, consistent with upper echelon theory (Lee et al., 2020). Lee (2020) demonstrate that top management support does not necessarily influence performance directly but operates through sustainability practices, such as environmental collaboration, which integrate sustainability initiatives into organizational activities.

Explain that sustainability practices function as strategic capabilities that transform managerial support into competitive advantages and improved business performance in SMEs. Similarly, Ilyas (2020) emphasize that top management support plays an essential role in promoting environmentally responsible supply chain management as a sustainability practice to achieve sustainable development goals. Based on previous research, the fifth hypothesis is formulated as follows:
H5: Sustainability Practices Mediate the Relationship Between Top Management Support and Business Performance

The Influence of Sustainability Practices in Mediating the Relationship between Organizational Resources and Business Performance

Research on sustainability in SMEs confirms that the availability and effective management of organizational resources are essential prerequisites for developing and consistently implementing environmental management practices (Salim et al., 2023). Hossain (2025) demonstrate that appropriate resource allocation, including time, financial resources, and human resource competencies, strengthens SMEs' ability to implement sustainability practices as operational activities that connect internal capabilities with broader organizational outcomes.

The benefits of organizational resources for business performance, including reputation, brand value, and financial outcomes, can only be maximized when these resources are directed toward sustainability practices integrated into business processes (Lopez-Perez et al., 2018). Therefore, organizational resources function as strategic inputs that support sustainability practices implementation, which ultimately becomes a key mechanism for improving overall business performance. Based on previous research, the sixth hypothesis is formulated as follows:
H6: Sustainability Practices Mediate the Relationship Between Organizational Resources and Business Performance

The Influence of Sustainability Practices in Mediating the Relationship between Green Supplier Collaboration and Business Performance

Green supplier collaboration is a crucial element in implementing sustainability practices, as external pressures and partnerships significantly influence SME sustainability behavior through improvements in internal operational practices (Sawang et al., 2024). Although green supplier collaboration can enhance internal capabilities and promote green innovation, these relationships do not always directly influence environmental or economic performance, indicating the importance of intermediary mechanisms (Jo & Kwon, 2021). Research by Kosasih

(2023) on manufacturing SMEs in Indonesia confirms that the adoption of green practices and lean-green practices serves as an important mechanism linking supply chain initiatives with measurable organizational outcomes. Therefore, sustainability practices function as a key mediator that channels the benefits of supplier collaboration toward improving overall business and operational performance. Based on previous research, the seventh hypothesis is formulated as follows:

H7: Sustainability Practices Mediate the Relationship Between Green Supplier Collaboration and Business Performance

METHOD

Development of a conceptual framework

This research model was formulated by synthesizing previous research findings that emphasize the influence of internal factors, such as top management support and organizational resources, as well as external factors, such as green supplier collaboration, on business performance as a dependent variable, with sustainability practices positioned as a mediating variable. This synthesis is informed by studies conducted by Akomea (2023) and Al-Kwifi (2025), both of which highlight the critical role of sustainability practices in improving SME performance. Building on Akomea et al. (2023), this study adopts a broader conceptualization of business performance by incorporating financial, social, and environmental dimensions based on the Triple Bottom Line (TBL) theory. This multidimensional approach enables a more comprehensive assessment of SME performance beyond purely financial outcomes.

Furthermore, drawing on Al-Kwifi (2025), this study extends the proposed framework to SMEs in the food and beverage industry within a developing-country context. Although Al-Kwifi's study focused on the hospitality industry, its conceptual framework remains highly relevant to the food and beverage SME sector because both industries are customer-oriented, rely heavily on supply chain collaboration, and face increasing stakeholder and regulatory pressures to adopt sustainable business practices. Moreover, both sectors are characterized by significant environmental impacts associated with resource consumption, waste generation, and operational activities, making sustainability practices a strategic imperative. Accordingly, internal organizational factors (i.e., top management support, organizational resources, and entrepreneurial orientation) and external organizational factors (i.e., green supplier collaboration and competitive intensity) are integrated to examine their influence on sustainability practices and, subsequently, business performance. (Alonso et al., 2022; Swarbrooke & Horner, 2007). The findings demonstrate that these factors positively influence sustainability practices, which subsequently contribute to improved economic, social, and environmental performance.

The synthesis of these two studies resulted in the development of a conceptual model that integrates internal and external variables, with specific modifications that position business performance as the dependent variable and the primary outcome of interest. Within this framework, two internal variables, namely top management support and organizational resources, and one external variable, namely green supplier collaboration, are identified as independent variables that influence sustainability practices as a mediating mechanism.

From a methodological perspective, this study employs Partial Least Squares Structural Equation Modeling (PLS-SEM) because of its effectiveness in analyzing complex structural relationships, including mediation effects, and its suitability for studies with relatively small sample sizes and data that do not satisfy multivariate normality assumptions (Hair et al., 2017). In addition, the higher-order constructs are estimated using the repeated indicator approach, which enables the simultaneous assessment of hierarchical component models within the PLS-SEM framework. (Hair et al., 2017). The research focuses specifically on food and beverage SMEs located in the Greater Jakarta area (Jabodetabek), thereby providing contextual contributions to sustainability research in developing countries. Following the establishment of this conceptual model, the research framework was developed, as presented in Figure 1.

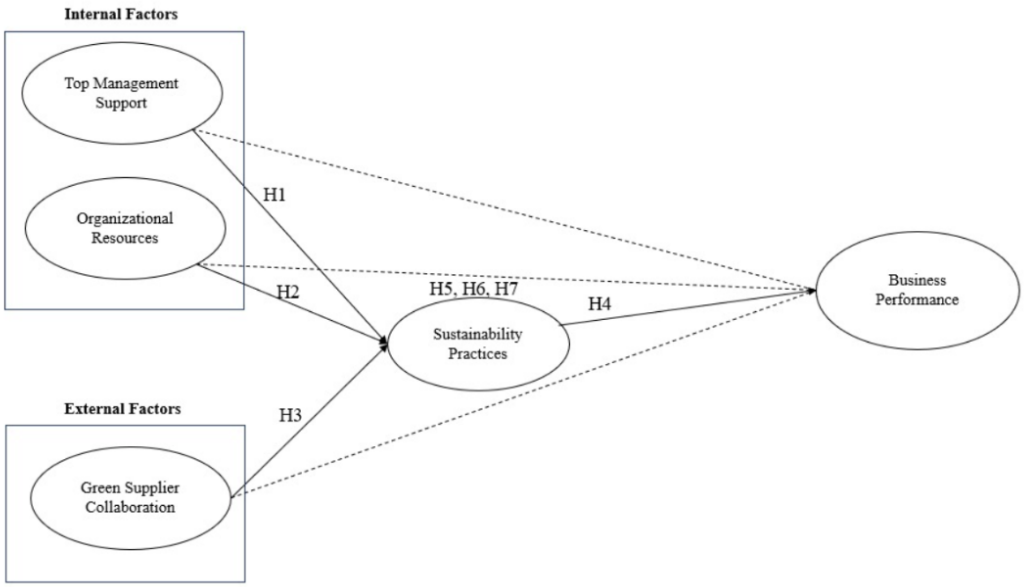

Figure 1. Conceptual Framework
Source: Processed by researchers (2026)

Research Hypothesis

Based on the literature review and theoretical framework presented in the introduction, this study proposes seven hypotheses. Four hypotheses test direct effects: H1 (Top Management Support → Sustainability Practices), H2 (Organizational Resources → Sustainability Practices), H3 (Green Supplier Collaboration → Sustainability Practices), and H4 (Sustainability Practices → Business Performance). Three hypotheses test mediation effects: H5, H6, and H7 examine the mediating role of Sustainability Practices between each independent variable and Business Performance.

Research Design

This study used confirmatory quantitative approach to test the influence of independent variables on dependent variables, both directly and through mediators, using a survey method. It should be noted that the cross-sectional design captures data at a single point in time, which limits the ability to establish temporal causality between variables or observe the dynamic evolution of sustainability practices over time. This design choice was made for practical feasibility given the study scope, but the implications for causal inference should be considered when interpreting the results.

Measurement of variables

Data were gathered utilizing a closed-ended questionnaire that employed a Likert Scale. The questionnaire was constructed based on validated measurement scales from previous research. In particular, top management support was derived from the works of Al-Kwifi (2025) and Ilyas (2020); organizational resources were adapted from Al-Kwifi (2025); green supplier collaboration was informed by Al-Kwifi (2025) and Vachon (2008); sustainability practices were based on Akomea (2023) and Maletic (2015); and business performance was referenced from (Al-Kwifi et al., 2025; Pett, 2025). Each construct was evaluated using a standardized seven-point Likert scale, which ranged from strongly disagree to strongly agree. The implementation of a seven-point scale increases sensitivity, enhances data distribution, and facilitates more comprehensive multivariate analysis (Hair et al., 2019).

Population and sampling techniques

The unit of analysis was the food and beverage SMEs in the Greater Jakarta area (Jabodetabek). The sampling technique used purposive sampling, with managers as respondents to avoid owner bias because this research examine Top Management Support as independent variable. Inclusion criteria included having been operational for at least two years and implementing environmentally friendly practices. After a pre-test on 30 respondents, 215 valid

respondents were collected and also used for main test, deemed sufficient for PLS-SEM analysis (Hair et al., 2022). Primary data was obtained through a questionnaire survey, while secondary data was collected through literature review (printed and digital documents). Respondents were identified and recruited through multiple channels: (1) official databases from local government SME registries in the Greater Jakarta Area (Jakarta, Bogor, Depok, Tangerang, and Bekasi); (2) using referrals from industry associations, specifically the Indonesian Food and Beverage Association. The association was identified through its official social media presence, which served as the initial point of contact for participant recruitment; and (3) purposive sampling technique was adopted by administering screening questions to assess whether respondents had implemented sustainability practices in their SME. Examples of sustainability practices included in the screening questions were implementing energy-efficient measures, using environmentally friendly product packaging, reducing the use of single-use packaging, separating and/or minimizing production waste, and using environmentally friendly raw materials (Mengistu & Panizzolo, 2023). Only respondents who satisfied the predefined screening questions were allowed to participate in the main survey.

Data analysis method

The analysis used descriptive statistics (SPSS 26) and inferential analysis using Structural Equation Modeling (SEM) with Smart-PLS 4. Testing was conducted for two evaluation: (i) 1. Outer Model Evaluation: Validity and reliability testing using loading factors, AVE, and HTMT. (ii) 2. Inner Model Evaluation: Test the relationship between variables using VIF, R^2, and Q^2. The hypothesis is declared significant if the t-statistic is > 1.645 or the p-value is < 0.05.

Common Method Bias Assessment

Given that all variables were obtained from a singular self-reported survey tool, common method bias (CMB) was evaluated utilizing the full collinearity VIF method as suggested by (Kock, 2015). This approach entails computing variance inflation factors (VIFs) for each latent construct within the model. A model is deemed free from common method bias if all VIF values are at or below 3.3. The findings from the full collinearity assessment are displayed in Table 1.

Table 1. Common Method Bias Assessment Results

Construct	Full Collinearity VIF	Threshold	Conclusion
Top Management Support	1.329	≤ 3.3	No CMB
Organizational Resources	1.323	≤ 3.3	No CMB
Green Supplier Collaboration	1.024	≤ 3.3	No CMB
Sustainability Practices	1.091	≤ 3.3	No CMB
Business Performance	1.734	≤ 3.3	No CMB

Source: Processed by researchers (2026). All VIF values are below the 3.3 threshold Kock (2015), confirming that common method bias is not a significant concern in this study.

RESULTS AND DISCUSSION

Results

Validity and Reliability Test Results

The pre-test, conducted with 30 respondents (n = 30), included validity and reliability assessments using SPSS version 26 software. The validity test employed the Confirmatory Factor Analysis (CFA) method, including the Kaiser–Meyer–Olkin (KMO) test, Bartlett's Test of Sphericity, Communalities, Measures of Sampling Adequacy (MSA), and the Component Matrix (factor loading) (Hair et al., 2019). The results indicated that all 29 indicators were valid based on the CFA results. Similarly, the reliability test results using Cronbach's alpha demonstrated that the research instrument was reliable, as confirmed through both Cronbach's alpha analysis for item deletion and the corrected item–total correlation test (Hair et al., 2019). The reliability criteria were satisfied at all levels, including both indicator and construct levels.

Respondent profile

A total of 278 respondents completed the online questionnaire distributed through Google Forms. Of these respondents. Among these, 16 respondents did not pass the screening process, leaving 262 eligible responses. Subsequently, 30 respondents were used for the main study. During the data cleansing process using Mahalonobis Distance, 17 additional responses were excluded due to data quality issues. Consequently, 215 valid responses were retained for the final data analysis.

The respondent characteristics based on their length of service as SME managers or operational managers indicate that the majority of respondents had held managerial positions for 3–5 years, totaling 106 respondents (49.3% of the 215 respondents). This finding indicates that most respondents possessed moderate managerial experience, providing sufficient knowledge and understanding of SME operational practices.

Respondent characteristics related to sustainability practices among SMEs showed variation in the number of sustainability practices implemented. The majority of respondents reported implementing one sustainability practice, comprising 62 businesses (28.8%), representing the largest proportion among all categories. Furthermore, 46 businesses (21.4%) reported implementing four sustainability practices, followed by 43 businesses (20.0%) implementing three sustainability practices.

Meanwhile, 34 businesses (15.8%) implemented five sustainability practices, while the smallest proportion consisted of 30 businesses (14.0%) implementing two sustainability practices. Collectively, 62.8% of respondents had implemented up to three sustainability practices, indicating that most SMEs remain in the early to intermediate stages of sustainability adoption. However, 37.2% of respondents had implemented four to five sustainability practices, reflecting a more advanced group of SMEs in integrating sustainability principles into their business operations. These findings suggest that sustainability practice adoption among SMEs remains uneven but demonstrates significant potential for improvement as business actors' awareness and organizational capacity regarding sustainability continue to develop.

Regarding SME characteristics based on business category, the majority of respondents managed small businesses, accounting for 146 respondents or 67,9% of the total 215 respondents. In this study, the small business category refers to business units employing 5–19 employees or generating annual sales of more than Rp 300 million up to Rp 2.5 billion. The dominance of this category indicates that the sample structure primarily represents small-scale business actors, which generally face resource limitations in terms of workforce availability and financial capacity.

Meanwhile, respondents managing medium-sized businesses accounted for 69 respondents (32,1%). This category includes businesses with 20–99 employees or annual sales exceeding Rp 2.5 billion up to Rp 50 billion. Overall, all respondents (100%) were categorized into small and medium-sized businesses, indicating that no respondents from the micro-business category were included in the research sample.

Evaluation of measurement models

The evaluation of the outer model measurement included assessments of indicator reliability, convergent validity, internal consistency reliability, and discriminant validity (Hair et al., 2022). The results demonstrated that all constructs met the recommended model assessment criteria. In the internal consistency reliability assessment, all variables showed Composite Reliability and Cronbach's Alpha values above the minimum threshold of 0.70, confirming the reliability of the constructs.

Furthermore, the convergent validity assessment showed that all Average Variance Extracted (AVE) values exceeded 0.50, indicating that each construct adequately explained the variance of its respective indicators. In the indicator reliability assessment, all indicators demonstrated outer loading values greater than 0.70, confirming their ability to represent the corresponding latent constructs effectively.

The discriminant validity assessment also confirmed that each construct was empirically distinct from other constructs, indicating that the measurement model did not experience discriminant validity issues. Overall, these findings demonstrate that the measurement model fulfilled the required validity and reliability criteria and was therefore appropriate for further structural model analysis.

Table 2. Measurement Model Results (Outer Loading, AVE, Composite Reliability, and HTMT)

Construct/Indicator	Outer Loading	AVE	CR	Cronbach's α
Top Management Support		0.810	0.962	0.953
TMS1	0.890			
TMS2	0.904			
TMS3	0.904			
TMS4	0.898			
TMS5	0.912			
TMS6	0.892			
Organizational Resources		0.846	0.957	0.939
ORG1	0.924			
ORG2	0.927			
ORG3	0.915			
ORG4	0.914			
Green Supplier Collaboration		0.843	0.955	0.940
GSC1	0.915			
GSC2	0.912			
GSC3	0.938			
GSC4	0.907			
Sustainability Practices		0.756	0.949	0.920
SPS1	0.853			
SPS2	0.872			
SPS3	0.884			
SPS4	0.882			
SPS5	0.866			
SPS6	0.858			
Business Performance		0.810	0.883	0.851
EPF1	0.890			
EPF2	0.906			
EPF3	0.889			
VPF1	0.921			
VPF2	0.920			
VPF3	0.933			
SPF1	0,921			
SPF2	0.933			
SPF3	0.932			

Source: Processed by researchers (2026). Note: All outer loadings > 0.70; all AVE > 0.50; all CR and Cronbach's α > 0.70. HTMT values for all construct pairs were below 0.85, confirming discriminant validity (Hair et al., 2022).

Table 3. Heterotrait-Monotrait Ratio (HTMT) Results

	BPF	GSC	ORG	SPS	BPF
BPF					
GSC	0.137				
ORG	0.528	0.140			
SPS	0.848	0.153	0.524		
TMS	0.449	0.072	0.071	0.437	

Source: Processed by researchers (2026). Note: All HTMT values are below 0.85, confirming discriminant validity (Hair et al., 2022; Henseler et al., 2016).

Structural model evaluation

The structural model evaluation results included multicollinearity tests, coefficient of determination (R^2), predictive relevance (Q^2), effect size (f^2) tests, and goodness-of-fit tests (Hair et al., 2022). The inner model analysis aimed to ensure that the structural model was robust and

accurate through evaluations of multicollinearity, R^2, Q^2, f^2, and goodness-of-fit criteria. The multicollinearity test results showed that all VIF values were well below the threshold (ranging from 1.000 to 1.832), indicating the absence of multicollinearity issues and demonstrating that each construct provided a unique contribution to the model.

The coefficient of determination (R^2) indicated that the independent variables explained business performance with an R^2 value of 0.640, which represents a moderate-to-substantial level of explanatory power. The R^2 value for sustainability practices was 0.446, indicating that the three exogenous constructs (top management support, organizational resources, and green supplier collaboration) simultaneously explained 44.6% of the variance in sustainability practices, which is categorized as moderate. This finding suggests that the proposed research model provides an adequate explanation of the endogenous constructs, although additional external factors beyond the model may also contribute to business performance and sustainability practices.

The results of the predictive relevance (Q^2) test showed positive values for business performance (0.288) and sustainability practices (0.337), indicating that the model demonstrates satisfactory predictive capability with moderate predictive relevance. In the effect size (f^2) test, the strongest effect was observed from sustainability practices on business performance (0.587), followed by the effects of organizational resources and top management support on sustainability practices (0.458 and 0.372, respectively), all of which fall within the large effect category. Meanwhile, the other relationships demonstrated small-to-moderate effect sizes. The goodness-of-fit assessment indicated that the model achieved an acceptable level of fit, as demonstrated by an SRMR value below 0.07, along with acceptable d_G and d_ULS values. The NFI value of 0.820 indicates that the model falls within the marginal fit category but remains acceptable for PLS-SEM analysis. Overall, the structural model is considered adequate and appropriate for hypothesis testing.

The marginal NFI value of 0.820 requires further interpretation. Although the commonly recommended threshold is 0.90, Hair (2022) explain that NFI values in PLS-SEM are influenced by model complexity and sample characteristics, and values above 0.80 may still be considered acceptable, particularly in exploratory research contexts. Furthermore, recent PLS-SEM reporting guidelines Hair (2022) and Sarstedt (2022) emphasize that SRMR is one of the primary model fit criteria in PLS-SEM, and this model meets the recommended criterion (0.062 < 0.08). The d_ULS value should also be interpreted based on bootstrap confidence intervals rather than relying solely on fixed threshold values, as recommended by Henseler (2016), which has been applied in this study.

Table 4. Inner Model VIF Values

Predictor	Sustainability Practices	Business Performance
Top Management Support	1.006	1.380
Organizational Resources	1.021	1.490
Green Supplier Collaboration	1.021	1.044
Sustainability Practices	–	1.832

Source: Processed by researchers (2026). Note: All VIF values are below the threshold of 5.0 Hair (2022), indicating no multicollinearity issues in the structural model.

Table 5. Goodness of Fit Results

Criterion	Value	Threshold	Conclusion
SRMR	0.070	< 0.08	Good fit
d_ULS	0.741	Bootstrap CI upper bound	Acceptable
d_G	0.389	Bootstrap CI upper bound	Acceptable
NFI	0.820	> 0.90 (ideal); > 0.80 (acceptable)	Marginal fit
R^2 (Business Performance)	0.640	> 0.50 (moderate-strong)	Moderate-strong
R^2 (Sustainability Practices)	0.446	> 0.33 (moderate)	Moderate
Q^2 (Business Performance)	0.288	> 0 (predictive relevance)	Medium relevance
Q^2 (Sustainability Practices)	0.337	> 0 (predictive relevance)	Medium relevance

Source: Processed by researchers (2026).

Hypothesis testing

Next are the path coefficient values and hypothesis testing. There are seven hypotheses in the study. Four hypotheses (H1, H2, H3, H4) are direct effects, and three hypotheses (H5, H6, H7) are mediation effects. Table 6 summarizes the results of the hypothesis testing for the direct effects involving the four hypotheses.

Table 6. Results of Hypothesis Testing on Direct Effect

Hypothesis Statement	*Path Coefficient*	T value	P Value	Description
H-1: Top Management Support → Sustainability Practices	0.452	8.601	0.000	Supported
H-2: Organizational Resources → Sustainability Practices	0.506	10.185	0.000	Supported
H-3: Green Supplier Collaboration → Sustainability Practices	0.113	2.254	0.012	Supported
H-4: Sustainability Practices → Business Performance	0.617	11.720	0.000	Supported

Source: Processed by researchers (2026)

The analysis results show that the four hypotheses (H-1 to H-4) are supported by the data because they have a P-Value <0.05 and a T-value >1.645. All path coefficients are positive, indicating a unidirectional relationship (the higher the independent variable, the higher the dependent variable). These data strengthen the research framework regarding the importance of internal factors (management and resources) and external factors (supplier collaboration) in shaping sustainability practices, which ultimately crucially improve business performance. Overall, these results confirm that internal factors are more dominant than external factors, and sustainability practices are key in improving business performance. Next are the results of the indirect effect test, there are three hypotheses of mediating roles as presented in Table 7.

Table 7. Results of the Test of the Role of Mediator Variables

Hypothesis Statement	*Path Coefficient*	T value	P Value	Description
H-5: Top Management Support → Sustainability Practices → Bussiness Performance	0.279	6.760	0.000	Supported
H-6: Organizational Resources → Sustainability Practices → Bussiness Performance	0.312	7.462	0.000	Supported
H-7: Green Supplier Collaboration → Sustainability Practices → Bussiness Performance	0.031	2.233	0.002	Supported

Source: Processed by researchers (2026)

The results of the mediation test indicate that all three mediation hypotheses (H-5, H-6, and H-7) are supported by the data, with P-values < 0.05 and T-values > 1.645. This finding demonstrates that the Sustainability Practices variable effectively functions as a mediator that connects the independent variables with Business Performance. The mediation analysis further reveals that organizational resources exert a strong indirect influence on business performance through sustainability practices. This suggests that organizational assets and capabilities can generate optimal economic value and enhance performance when strategically allocated to support sustainability initiatives.

Furthermore, collaboration with green suppliers positively influences business performance through sustainability practices. Although the path coefficient is the smallest compared with the internal factors, this relationship remains statistically significant. Overall, the findings indicate that variables such as management support and organizational resources can directly affect business performance; however, their impact becomes more substantial and systematic when mediated through the strengthening of sustainability practices.

Table 8. Bootstrapping Confidence Intervals (90%)

Path	Path Coefficient	CI Lower (5%)	CI Upper (95%)	Conclusion
Direct Effects				
TMS → SPS	0.452	0.363	0.533	Significant
ORG → SPS	0.506	0.423	0.585	Significant
GSC → SPS	0.113	0.038	0.194	Significant
SPS → BPF	0.617	0.526	0.702	Significant
TMS → BPF	0.162	0.065	0.282	Significant
ORG → BPF	0.200	0.119	0.285	Significant
GSC → BPF	-0.003	-0.094	0.082	Not Significant
Indirect Effects (Mediation)				
TMS → SPS → BPF	0.279	0.213	0.347	Significant
ORG → SPS → BPF	0.312	0.245	0.383	Significant
GSC → SPS → BPF	0.069	0.023	0.121	Significant

Source: Processed by researchers (2026). Note: Confidence intervals are based on 5,000 bootstrap subsamples using a 90% confidence interval (5%–95%) for one-tailed hypothesis testing. An interval that does not include zero indicates significance at the 5% level (Hair et al., 2022) (Hair et al., 2022).

The results indicate that top management support (β = 0.452, CI = 0.363–0.533), organizational resources (β = 0.506, CI = 0.423–0.585), and green supply chain (β = 0.113, CI = 0.038–0.194) have significant positive effects on sustainable practices. Furthermore, sustainable practices significantly improve business performance (β = 0.617, CI = 0.526–0.702). Regarding the direct effects on business performance, top management support (β = 0.162, CI = 0.065–0.282) and organizational resources (β = 0.200, CI = 0.119–0.585) exhibit significant positive effects because their confidence intervals exclude zero. In contrast, the direct effect of green supply chain on business performance is not significant (β = −0.003, CI = −0.094–0.082) since the confidence interval includes zero. The mediation analysis further reveals that sustainable practices significantly mediate the relationships between top management support and business performance (β = 0.279, CI = 0.213–0.347), organizational resources and business performance (β = 0.312, CI = 0.245–0.383), and green supplier collaboration and business performance (β = 0.069, CI = 0.023–0.121), as all confidence intervals exclude zero.

Role of Sustainability Practices as Mediator

The mediation analysis reveals that sustainability practices serve as an important mechanism linking the independent variables to business performance, functioning as both a partial and full mediator. For top management support, both the direct effect (β = 0.452; t = 8.601) and the indirect effect through sustainability practices (β = 0.279; t = 6.760) are significant, indicating partial mediation. This finding suggests that top management support enhances business performance both directly and indirectly by promoting the adoption of sustainability practices. A similar result is observed for organizational resources, where both the direct effect (β = 0.506; t = 10,185) and the indirect effect (β = 0.312; t = 7.462) are significant, confirming partial mediation. This indicates that organizational resources contribute to improved business performance directly while also strengthening sustainability practices, which subsequently enhance performance outcomes.

In contrast, green supplier collaboration demonstrates a non-significant direct effect (β = 0.113; t = 2.254) but a significant indirect effect through sustainability practices (β = 0.031; t = 2.233), indicating full mediation. This finding implies that the influence of green supplier collaboration on business performance is entirely transmitted through sustainability practices. Furthermore, sustainability practices have a significant positive effect on business performance

(β = 0.617; t = 11.720), reinforcing their critical role as a strategic mechanism in improving SME performance. These findings are consistent with the mediation assessment criteria proposed by Hair (2022), in which partial mediation occurs when both direct and indirect effects are statistically significant, whereas full mediation occurs when only the indirect effect is significant.

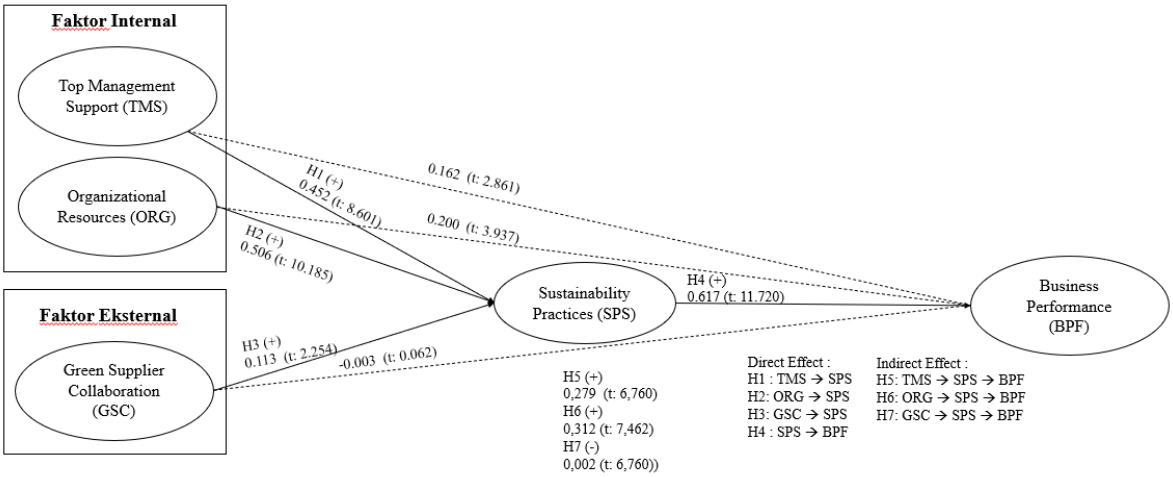

Figure 2. Results of the Direct Influence and Mediating Role Tests
Source: Processed by researchers (2026)

Discussion

The pathway analysis aims to identify the most effective mechanisms for improving business performance using the total effect approach, which combines direct and indirect effects through sustainability practices. The results show that the three key variables contribute differently to performance. Organizational resources have the strongest effect (β = 0.512; p = 0.000), followed by top management support (β = 0.441; p = 0.000), while green supplier collaboration has a weak and non-significant effect (β = 0.066; p = 0.117). These findings indicate that not all pathways are equally effective.

The strong role of organizational resources highlights their importance as both inputs and enablers of sustainability practices, consistent with the resource-based theory by Barney (2021) and previous findings that resources enhance performance when aligned with sustainability objectives (Qalati et al., 2023). Similarly, top management support plays a critical role by driving the implementation of sustainability practices through strategic decision-making and organizational commitment, in line with upper echelons theory (Lee et al., 2020; Nguyen et al., 2022). In contrast, green supplier collaboration does not directly influence performance but contributes indirectly through sustainability practices. This suggests that external collaboration generates value only when it is internalized into organizational practices, supporting previous studies on green supply chain mechanisms (Rehman et al., 2025; Zhu et al., 2022).

Overall, the findings emphasize that internal capabilities, particularly organizational resources and top management support, are the most effective drivers of business performance, whereas the impact of green supplier collaboration depends on the successful implementation of sustainability practices. The finding of full mediation for green supplier collaboration deserves particular attention as a significant research contribution. This result suggests that external collaboration, unlike internal organizational capabilities, cannot independently generate performance improvements; rather, it requires internalization through sustainability practices to create value.

This phenomenon may be explained through the absorptive capacity perspective by Cohen (1990), which suggests that SMEs must first develop internal routines to absorb and apply knowledge and resources obtained from supplier collaboration. Without such internalization mechanisms, the benefits of green collaboration remain latent. This finding extends the supply chain management literature by demonstrating that the effectiveness of inter-organizational

collaboration is contingent upon a firm's ability to translate collaborative inputs into operational sustainability routines.

The dominance of organizational resources over green supplier collaboration can be attributed to several factors. First, internal resources, including financial capital, human competencies, and technological infrastructure, are directly controlled by firms, enabling more immediate and consistent implementation of sustainability initiatives. In contrast, green supplier collaboration involves inter-organizational coordination costs, information asymmetries, and dependence on external partners whose levels of commitment may vary (Andalib Ardakani et al., 2023). Second, in the context of Indonesian F&B SMEs, which are predominantly small-scale enterprises with limited bargaining power, the ability to leverage supplier relationships may be more constrained compared with larger firms that possess more established supply chain partnerships. Third, organizational resources function as foundational enablers that must be established before external collaborations can generate sustainability benefits, consistent with the resource orchestration perspective (Sirmon et al., 2011).

From a theoretical perspective, these findings provide several important contributions. First, by demonstrating that sustainability practices serve as both partial and full mediators, this study extends the Resource-Based Theory (RBT) beyond its traditional focus on resource-performance relationships by illustrating how resources are transformed into performance outcomes through sustainability capabilities. Specifically, the partial mediation findings for top management support and organizational resources indicate that these internal factors operate through dual pathways both directly enhancing performance and indirectly influencing performance through sustainability practices thereby enriching the RBT with a process-oriented perspective on value creation. Second, the full mediation finding for green supplier collaboration contributes to sustainability capability theory by establishing that external collaborative inputs require organizational processing through sustainability routines to generate performance outcomes. This aligns with and extends the dynamic capabilities framework Teece (2018), suggesting that sustainability practices represent a sensing-seizing-transforming capability that enables SMEs to capture and appropriate value from external partnerships.

This study contributes to the literature by integrating internal factors (top management support and organizational resources) and an external factor (green supplier collaboration) into a comprehensive model, with sustainability practices positioned as a mediating mechanism linking these antecedents to business performance. Unlike previous studies that predominantly examine direct relationships, this research demonstrates that the mediating role of sustainability practices varies across relationships, revealing both partial mediation (for top management support and organizational resources) and full mediation (for green supplier collaboration). These findings provide a more nuanced understanding of how sustainability practices function as strategic capabilities that transform organizational resources into superior business performance. Furthermore, the results indicate that internal factors are more influential than external factors in driving sustainability practices and performance, thereby extending the Resource-Based Theory (RBT) by reinforcing the importance of internal capabilities as the foundation of sustainable competitive advantage.

Another important contribution lies in identifying the full mediation effect of green supplier collaboration, which suggests that external collaboration does not automatically enhance business performance unless it is effectively internalized through sustainability practices. The novelty of this study is further strengthened by its focus on food and beverage SMEs in a developing-country context, which differs from much of the existing literature that concentrates on larger organizations or service industries, such as hospitality. By examining SMEs operating under resource constraints and distinct institutional conditions, this research provides empirical evidence that the effectiveness of sustainability practices and their mediating role may vary according to organizational scale, resource availability, and environmental context.

CONCLUSION

This study demonstrates that sustainability practices play a central role as a strategic capability in enhancing the business performance of food and beverage SMEs. The findings reveal that top management support, organizational resources, and green supplier collaboration significantly influence sustainability practices, which, in turn, positively affect business

performance. Sustainability practices demonstrate both partial and full mediation effects. Top management support and organizational resources influence performance through both direct and indirect pathways, indicating partial mediation, whereas green supplier collaboration affects performance exclusively through sustainability practices, indicating full mediation. These results highlight that internal organizational capabilities, particularly managerial commitment and resource availability, are more influential in driving business performance than external collaboration alone.

From a theoretical perspective, this study extends the Resource-Based Theory (RBT) by demonstrating that sustainability practices function as strategic capabilities that transform organizational resources into superior performance outcomes. The identification of differential mediation patterns enriches both RBT and sustainability capability theory by showing that internal and external resources follow distinct pathways in generating performance benefits. Despite these contributions, this study is limited by its focus on food and beverage SMEs in the Greater Jakarta Area (Jabodetabek), the use of a cross-sectional research design, and purposive sampling, which may restrict the generalizability of the findings. Future research is encouraged to examine diverse industrial and geographical contexts, adopt longitudinal research approaches, and incorporate additional variables such as absorptive capacity, digital capability, environmental orientation, and contextual factors, including environmental uncertainty, market turbulence, institutional pressure, and firm size, to further explain the effectiveness of sustainability practices in improving business performance.

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AUTHOR CONTRIBUTION STATEMENT

Maria Kristiana played a significant role in the study's conceptualization, research design, data collection, data analysis, interpretation of the findings, and preparation of the manuscript. Elok Savitri Pusparini was instrumental in developing the research methodology, overseeing the research process, validating the analytical results, interpreting the findings, and managing the overall project. Both authors have approved the final manuscript version and have agreed to take responsibility for all facets of the work.

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