



The Use of Local Raw Materials, Eco-Friendly Packaging, and Supply Chain Efficiency as Predictors of Sustainable Performance in Food SMEs in Yogyakarta

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ABSTRACT (10 PT)

Sustainable performance has become an important issue for food Micro, Small, and Medium Enterprises (MSMEs) as businesses are increasingly required to balance economic growth with environmental responsibility. This study aims to examine the influence of local raw material utilization, eco-friendly packaging, and supply chain efficiency on the sustainable performance of food MSMEs in Yogyakarta. This study employed a quantitative approach and involved 125 owners and managers of small and medium-sized enterprises (SMEs) in the food industry. Data were collected using a structured questionnaire with a five-point Likert scale; data analysis was conducted using the Statistical Package for the Social Sciences (SPSS) version 25. Validity and reliability tests, classical assumption tests, multiple linear regression analysis, t-tests, F-tests, and coefficient of determination analysis were among the data analysis techniques used. The study found that the use of local raw materials, eco-friendly packaging, and supply chain efficiency have a positive and significant effect on sustainable performance. Among these factors, supply chain efficiency demonstrates the strongest contribution, followed by eco-friendly packaging and local raw material utilization. This regression model explains 50.4% of the variation in sustainable performance, indicating that operational practices focused on sustainability are crucial for enhancing the long-term competitiveness and resilience of food-sector MSMEs. This study highlights the importance of integrating sustainable sourcing, environmentally responsible packaging, and efficient supply chain management as strategic approaches for improving MSME sustainability in emerging economic regions.

Keywords: *Eco-friendly Packaging; Food MSMEs; Local Raw Materials; Supply Chain Efficiency; Sustainable Performance*

INTRODUCTION

The global focus on sustainable development has shifted the strategic focus of micro, small, and medium-sized enterprises (MSMEs), particularly in the food sector. As key contributors to employment generation, local economic development, and community-based value creation, food MSMEs play an essential role in strengthening regional economies [1], [2], [3]. However, their operational activities are frequently associated with sustainability challenges, including inefficient

resource utilization, excessive production waste, environmentally harmful packaging practices, and fragmented supply chain structures. Unlike large corporations that generally possess greater financial and technological capabilities, MSMEs often encounter resource constraints that limit their ability to implement comprehensive sustainability strategies [2], [3]. Consequently, understanding how operational sustainability practices influence sustainable performance among food MSMEs has become increasingly important, especially in developing countries where small businesses are vital to the economy.

Indonesia provides a relevant context for examining sustainability practices among food MSMEs due to the sector's rapid expansion and significant contribution to national economic development. Within this context, Yogyakarta represents a particularly important setting because of its strong culinary identity, tourism-driven economy, and growing concentration of food-based entrepreneurial activities [4], [5]. The increasing number of food MSMEs in Yogyakarta has generated economic opportunities while simultaneously intensifying competition and environmental pressures. To remain competitive, these enterprises are required to move beyond traditional performance indicators focused solely on financial outcomes and adopt broader sustainability-oriented approaches that integrate economic viability, environmental responsibility, and operational continuity. Sustainable performance in food MSMEs therefore reflects the ability of businesses to achieve profitability while reducing environmental impacts, improving resource efficiency, and maintaining long-term resilience within dynamic market conditions [1], [2].

One strategic approach for enhancing sustainable performance is the effective utilization of local raw materials. From the perspective of the resource-based view (RBV), locally sourced materials can represent valuable strategic resources that enable MSMEs to develop distinctive products, strengthen supplier relationships, and improve operational resilience [6], [7], [8]. The utilization of local resources may reduce transportation-related environmental impacts, decrease dependence on external suppliers, and support regional economic ecosystems through stronger local value chains. Previous studies have demonstrated that sustainable sourcing practices contribute to improved environmental outcomes and organizational resilience by promoting resource efficiency and supply chain integration [9], [10]. However, the implementation of local raw material utilization among food MSMEs remains challenging due to issues related to supply consistency, seasonal fluctuations, quality standardization, and limited supplier management capabilities. These challenges suggest that the strategic value of local resources depends not only on availability, but also on the ability of MSMEs to effectively manage and integrate those resources into their operations.

In addition to sustainable sourcing, eco-friendly packaging has emerged as a critical operational practice influencing the sustainability performance of food enterprises. Packaging decisions directly affect environmental outcomes, consumer perceptions, and competitive positioning, particularly as awareness regarding sustainable consumption continues to increase [11], [12]. The transition from conventional single-use plastics toward biodegradable, recyclable, or reusable packaging alternatives provides opportunities for MSMEs to reduce environmental footprints while strengthening brand credibility and customer trust. Sustainable packaging adoption may also function as a market differentiation strategy by aligning business practices with growing consumer preferences for environmentally responsible products. Nevertheless, many food MSMEs experience significant barriers in implementing eco-friendly packaging, including higher material costs, limited access to sustainable packaging suppliers, and insufficient knowledge regarding alternative packaging technologies [12], [13], [14]. These limitations highlight the need to examine whether eco-friendly packaging practices can generate measurable improvements in sustainable performance within small-scale business environments.

Beyond resource utilization and packaging innovation, supply chain efficiency represents another fundamental determinant of sustainable performance among food MSMEs. Effective supply chain management enables businesses to optimize inventory control, minimize operational waste,

improve production coordination, and respond efficiently to changing market demands [15], [16], [17]. This aspect is particularly relevant for food MSMEs due to the perishable nature of food products, short product life cycles, and the necessity for timely distribution processes. Through improved supplier coordination, production planning, and logistics management, MSMEs can simultaneously enhance economic efficiency and environmental sustainability. However, small-scale food enterprises often face structural limitations, such as weak supplier networks, inadequate digital adoption, as well as limited management expertise, which may prevent them from establishing a well-functioning supply chain system. Therefore, examining supply chain efficiency as a predictor of sustainable performance provides important insights into how operational capabilities contribute to sustainability outcomes.

Although sustainability research has expanded considerably, existing literature remains limited in explaining how multiple operational sustainability practices collectively influence sustainable performance among food MSMEs, particularly within developing regional contexts such as Yogyakarta. Previous studies have frequently examined sustainability dimensions independently, focusing on specific practices such as green packaging, sustainable sourcing, or supply chain management, they provide only a limited understanding of their combined contribution to the sustainability outcomes of MSMEs. Furthermore, sustainability frameworks developed primarily in the context of large organizations may not fully reflect the unique constraints and capabilities of MSMEs, where financial limitations, local resource dependence, and informal business structures significantly influence strategic decision-making. Therefore, this study addresses the limitations of previous research by examining how the performance of sustainable food-sector MSMEs in Yogyakarta is influenced by the use of local raw materials, environmentally friendly packaging practices, and supply chain efficiency. By integrating these three operational dimensions, this research contributes empirical evidence regarding how sustainability-oriented practices can strengthen competitiveness, resilience, and long-term performance among small-scale food enterprises in emerging economies.

LITERATURE REVIEW

Sustainable Performance of Food MSMEs

An organization's ability to achieve its economic goals while maintaining resource efficiency, environmental responsibility, and long-term value is called sustainable performance. In the context of food MSMEs, sustainable performance is particularly important due to their dependence on raw materials, production processes, packaging activities, and supply chain operations [18], [19]. From the Resource-Based View (RBV), sustainability-oriented resources such as local supplier networks, efficient operational systems, and green practices can become strategic capabilities that enhance competitiveness and resilience. Additionally, stakeholder theory highlights that sustainable performance is influenced by the ability of MSMEs to respond to the expectations of customers, suppliers, communities, and other stakeholders through responsible business practices [20], [21], [22]. Thus, sustainable performance represents the integration of internal capabilities and external responsibilities to achieve long-term business sustainability.

Local Raw Material Utilization

Local raw material utilization refers to the practice of sourcing ingredients from nearby suppliers or regional resources to support business operations. In food MSMEs, this practice contributes to sustainability by reducing transportation impacts, strengthening local supply networks, and supporting resource efficiency [23], [24]. From the Resource-Based View (RBV), local materials can become strategic resources that enhance competitive advantage through product uniqueness, authenticity, and regional identity. However, challenges such as supply consistency,

quality variation, and supplier management may affect its effectiveness [25], [26]. Therefore, effective local sourcing practices are expected to improve sustainable performance by enhancing operational resilience and environmental responsibility.

H1: Sustainable Use of Local Food Raw Materials

Eco-Friendly Packaging

Environmentally friendly packaging means using materials that are recyclable, biodegradable, or reusable to reduce the impact of packaging waste on the environment. In food MSMEs, sustainable packaging practices can minimize pollution, strengthen environmental responsibility, and enhance consumer trust [12], [27]. From a stakeholder perspective, adopting eco-friendly packaging reflects the ability of businesses to respond to increasing expectations from customers, communities, and regulators. Although implementation may be constrained by higher costs and limited access to sustainable materials, eco-friendly packaging is expected to improve sustainable performance through environmental benefits and competitive differentiation [11], [12], [28].

H2: Eco-friendly packaging has a positive and significant impact on the sustainable performance of small and medium-sized enterprises (SMEs) in the food industry

Supply Chain Efficiency

An organization's ability to efficiently manage the flow of materials, information, and resources while reducing costs, waste, and delays is called supply chain efficiency. In food MSMEs, efficient supply chain practices are essential due to product perishability, quality requirements, and delivery constraints [29], [30]. From the RBV perspective, supply chain capability represents a strategic resource that can enhance operational flexibility, resilience, and competitiveness. By improving supplier coordination, inventory management, and resource utilization, supply chain efficiency can contribute to sustainable performance through cost reduction, waste minimization, and improved operational effectiveness [31], [32].

H3: Supply chain efficiency has a positive and significant effect on the sustainable performance of food MSMEs.

RESEARCH METHODS

Research Design

This study employs a quantitative explanatory research method was used in this study to investigate how the sustainable performance of small and medium-sized enterprises (SMEs) in the food sector in Yogyakarta is influenced by the use of local raw materials, environmentally friendly packaging, and supply chain efficiency. Using a cross-sectional survey design, empirical data were collected from SME operators regarding their sustainability practices and business performance. The collected data were analyzed using SPSS version 25 to examine the relationships among variables and test the proposed hypotheses.

Population and Sample

This study involved MSMEs in the food industry operating in Yogyakarta. They were selected because they are directly involved in sustainability-related matters, such as raw material procurement, packaging management, production processes, and supply chain management. This study applies purposive sampling by selecting respondents who meet specific criteria, namely food MSMEs located in Yogyakarta, operating for at least one year, and managed by owners or managers with knowledge of business operations. A total of 125 valid responses were obtained and analyzed,

which is considered adequate for testing the proposed relationships using multiple linear regression analysis.

Data Collection Method

To collect the primary data, a structured questionnaire was distributed to owners and managers of food-sector MSMEs in Yogyakarta. The questionnaire consisted of demographic information and measurement items covering sustainable performance, the use of local raw materials, eco-friendly packaging, supply chain efficiency, and sustainable performance. The instrument was developed based on previous studies on sustainable business practices, environmentally friendly operations, and supply chain management. All variables were assessed using a five-point Likert scale, with scores ranging from one (strongly disagree) to five (strongly agree). This scale reflects respondents' perceptions of business performance and sustainability practices.

Research Variables and Measurement

Below are the operational definitions and measurement indicators for the three independent variables and one dependent variable involved in this study.

Table 1. Research Variables and Measurement Indicators

Variable	Definition	Indicators
Local Raw Material Utilization (X1)	The extent to which MSMEs utilize locally sourced materials to support business operations and sustainability practices [1], [2].	1. Preference for local suppliers 2. Utilization of regional ingredients 3. Reduction of dependence on distant suppliers 4. Support for local economic resources
Eco-Friendly Packaging (X2)	The adoption of environmentally responsible packaging materials and practices to reduce negative environmental impacts [11], [12], [13].	1. Use of recyclable packaging materials 2. Reduction of plastic packaging usage 3. Adoption of biodegradable packaging 4. Consideration of environmental impacts in packaging decisions
Supply Chain Efficiency (X3)	The ability of MSMEs to manage supply chain activities effectively through resource optimization and operational coordination [33], [34].	1. Supplier coordination effectiveness 2. Inventory management efficiency 3. Timeliness of material availability

		4. Reduction of operational waste
Sustainable Performance (Y)	The ability of MSMEs to achieve long-term business sustainability through economic, environmental, and operational improvements [35], [36], [37].	1. Improvement of business efficiency 2. Reduction of environmental impact 3. Improvement of customer satisfaction 4. Enhancement of business continuity

Data Analysis Technique

The collected data were analyzed using SPSS version 25 through several statistical procedures. Instrument quality was evaluated using validity and reliability tests, where Pearson Product Moment correlation was applied to assess item validity and Cronbach's Alpha was used to examine internal consistency [38]. To ensure the regression model was appropriate, classical assumption tests were conducted, including tests for heteroscedasticity, normality, and multicollinearity. Next, multiple linear regression analysis was used to evaluate the impact of the use of local raw materials, eco-friendly packaging, and supply chain efficiency on sustainable performance. To test the hypotheses, the t-test was used to test for partial effects, the F-test to test for simultaneous effects, and the coefficient of determination (R^2) was used to determine the explanatory power of the research model.

RESULTS AND DISCUSSION

Respondent Characteristics

This study, 125 owners and managers of small and medium-sized enterprises (SMEs) in the food industry in Yogyakarta were surveyed based on gender, age, educational level, length of time the business has been in operation, and number of employees. The results showed that the majority of respondents were women (55.2%), and the largest age group was 30 to 40 years old (36.0%). Most respondents held a high school diploma or a bachelor's degree (38.4% each). Regarding business characteristics, 41.6% of MSMEs had operated for 1–5 years, and the majority employed 1–5 workers (60.8%), indicating that most businesses were small-scale enterprises with limited organizational resources. These characteristics reflect the typical conditions of food MSMEs, where operational decisions and sustainability practices are strongly influenced by owner involvement and business experience.

Validity Test

Pearson's product-moment correlation analysis was used to conduct the validity test. If the correlation coefficient (r value) exceeded the table value of 0.176 ($n=125$, $\alpha=0.05$), each measurement item was considered valid.

Table 2. Validity Test Results

Variable	Item	Pearson Correlation	Sig. Value	Result
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Local Raw Material Utilization	X1.1	0.724	0.000	Valid
	X1.2	0.781	0.000	Valid
	X1.3	0.756	0.000	Valid
	X1.4	0.703	0.000	Valid
Eco-Friendly Packaging	X2.1	0.768	0.000	Valid
	X2.2	0.812	0.000	Valid
	X2.3	0.745	0.000	Valid
	X2.4	0.790	0.000	Valid
Supply Chain Efficiency	X3.1	0.734	0.000	Valid
	X3.2	0.776	0.000	Valid
	X3.3	0.801	0.000	Valid
	X3.4	0.719	0.000	Valid
Sustainable Performance	Y1	0.785	0.000	Valid
	Y2	0.821	0.000	Valid
	Y3	0.748	0.000	Valid
	Y4	0.806	0.000	Valid

Source: Primary Data Processed Using SPSS 25 (2026)

The validity test results showed that all measures related to sustainable performance, the use of local raw materials, eco-friendly packaging, supply chain efficiency, and sustainability were accepted. The Pearson correlation coefficients for all indicators exceeded the acceptable threshold, with significance values of 0.000 (less than 0.05) for each. The results indicate that each questionnaire item has a significant correlation with its respective variable, and the constructs used in this study are appropriate for measurement. Consequently, all indicators were retained for further analysis.

Reliability Test

Reliability testing was conducted using Cronbach's Alpha analysis. A variable is considered reliable when the Cronbach's Alpha value exceeds 0.70.

Table 3. Reliability Test Results

Variable	Cronbach's Alpha	Standard	Result
Local Raw Material Utilization	0.781	0.70	Reliable
Eco-Friendly Packaging	0.823	0.70	Reliable
Supply Chain Efficiency	0.794	0.70	Reliable
Sustainable Performance	0.836	0.70	Reliable

Source: Primary Data Processed Using SPSS 25 (2026)

The reliability test results show that each research variable has acceptable internal consistency. Above the recommended threshold of 0.70, the Cronbach's Alpha values for the use of local raw materials (0.781), eco-friendly packaging (0.823), supply chain efficiency (0.794), and sustainable performance (0.836) were found. These results indicate that the measurement instruments used in this study are reliable and can consistently measure the intended constructs. Consequently, all of these variables are suitable for further statistical analysis.

Classical Assumption Test

Normality Test

The normality test was conducted using the Kolmogorov–Smirnov test to examine whether the residual data followed a normal distribution. The results show a Kolmogorov–Smirnov Z value of 0.071 with an Asymp. Sig. (2-tailed) value of 0.200, which is greater than the significance level of 0.05. This indicates that the residual data are normally distributed, confirming that the regression model satisfies the normality assumption required for further analysis.

Multicollinearity Test

Table 4. Multicollinearity Test Results

Variable	Tolerance	VIF	Result
Local Raw Material Utilization	0.642	1.558	No Multicollinearity
Eco-Friendly Packaging	0.598	1.672	No Multicollinearity
Supply Chain Efficiency	0.615	1.626	No Multicollinearity

The results of the multicollinearity test indicate that all independent variables meet the statistical requirements. The VIF values of 1.558, 1.672, and 1.626 are below the threshold of 10, while the tolerance values for the use of local raw materials (0.642), eco-friendly packaging (0.598), and supply chain efficiency (0.615) are above 0.10. These results indicate that there are no multicollinearity issues among the independent variables; this suggests that each variable provides distinct information for explaining sustainable performance.

Multiple Linear Regression Analysis

Multiple regression analysis was conducted to examine the influence of local raw material utilization, eco-friendly packaging, and supply chain efficiency on sustainable performance.

Table 5. Regression Analysis Results

Variable	Regression Coefficient (β)	t-value	Sig.
Constant	4.215	2.871	0.005
Local Raw Material Utilization (X1)	0.284	3.426	0.001
Eco-Friendly Packaging (X2)	0.319	4.115	0.000
Supply Chain Efficiency (X3)	0.367	4.762	0.000

The equation for sustainable performance = $4.215 + 0.284X_1 + 0.319X_2 + 0.367X_3 + e$ was derived through multiple linear regression analysis. The results show that all independent variables have positive coefficients. These results indicate that better utilization of local raw materials, more environmentally friendly packaging, and supply chain efficiency improve sustainable performance. Hypothesis testing results show that all proposed hypotheses are supported: the utilization of local raw materials has a positive and significant effect on sustainable performance ($t = 3.426$; $p = 0.000$), environmentally friendly packaging has a positive and significant effect on sustainable performance ($t = 4.115$; $p = 0.000$), and supply chain efficiency has the most significant effect. These findings indicate that operational practices focused on sustainability significantly improve the sustainable performance of small and medium-sized enterprises (SMEs) in the food sector in Yogyakarta.

Simultaneous Test (F-Test)

Table 6. F-Test Results

Model	F-value	Sig.
Regression Model	42.638	0.000

The F-test result shows a significance value of 0.000 (<0.05), indicating that local raw material utilization, eco-friendly packaging, and supply chain efficiency simultaneously influence sustainable performance.

Coefficient of Determination

The coefficient of determination R value is 0.718, the R-squared value is 0.516, and the adjusted R-squared value is 0.504. These are the results of the coefficient of determination (R^2) test. This indicates that variations in sustainable performance among food MSMEs in Yogyakarta are largely driven by the use of local raw materials, eco-friendly packaging, and supply chain efficiency. Meanwhile, the remaining 49.6% is influenced by additional factors not included in this research model. These results suggest that the proposed model can predict sustainable performance in a straightforward manner.

Discussion

The results indicate that local raw material utilization has a positive and significant effect on sustainable performance, suggesting that MSMEs with greater reliance on local resources tend to achieve better sustainability outcomes. The use of local materials contributes to sustainability by reducing transportation impacts, improving resource accessibility, and strengthening relationships with local suppliers. This finding supports the Resource-Based View (RBV), which emphasizes that valuable and distinctive resources can become strategic capabilities that enhance organizational performance. For food MSMEs, local raw materials also provide opportunities to create unique products with regional characteristics, strengthening competitive advantages while supporting local economic ecosystems [1], [2], [3].

Eco-friendly packaging also demonstrates a positive and significant effect on sustainable performance. This finding indicates that environmentally responsible packaging practices contribute to improving the sustainability outcomes of food MSMEs by reducing packaging waste and minimizing environmental impacts. The adoption of recyclable, biodegradable, or reusable packaging materials not only supports environmental objectives but also enhances consumer perceptions of business responsibility. In line with stakeholder theory, sustainable packaging reflects the ability of MSMEs to respond to increasing expectations from customers, communities, and other stakeholders regarding environmentally responsible business practices [11], [28], [39].

Among the examined variables, supply chain efficiency shows the strongest influence on sustainable performance ($\beta = 0.367$; $p = 0.000$), highlighting its critical role in supporting MSME sustainability. Efficient supply chain management enables businesses to optimize resource utilization, reduce operational waste, control costs, and maintain product quality. This finding reinforces the RBV perspective that operational capabilities represent strategic resources that strengthen organizational resilience and competitiveness. For food MSMEs, where product freshness, timely delivery, and supplier coordination are essential, supply chain efficiency becomes a fundamental capability for achieving sustainable performance in competitive markets.

CONCLUSION

This study concludes that local raw material utilization, eco-friendly packaging, and supply chain efficiency significantly contribute to improving the sustainable performance of food MSMEs in Yogyakarta. Local sourcing enhances resource availability, strengthens local networks, and supports product differentiation, while eco-friendly packaging reduces environmental impacts and improves business reputation. Among the three factors, supply chain efficiency has the strongest influence by enabling MSMEs to optimize resources, minimize waste, and maintain operational effectiveness. The research model explains 50.4% of the variation in sustainable performance, indicating that other factors such as innovation capability, digital adoption, financial resources, and managerial competence may also influence sustainability outcomes. These findings highlight the importance of integrating resource-based capabilities and environmentally responsible practices as strategic approaches for strengthening the competitiveness and long-term sustainability of food MSMEs.

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