Analysis of green packaging adoption behavior in culinary small and medium enterprises in Bandar Lampung City: The SOR model approach towards sustainable innovation

[1*]Risda Marvinita, [2]Tazkiyah Sakinah, [3]Nuzul Inas Nabila, [4]Azzahra Angelita, [5]Lintang Nur Rohmah

[1,2,3,4,5] *Department of Management, Faculty of Economics and Business, University of Lampung - Indonesia*

e-mail:
[1*]risda.marvinita@feb.unila.ac.id *(corresponding author)*
[2]tazkiyah.sakinah@feb.unila.ac.id
[3]nuzul.inas@feb.unila.ac.id
[4]azzahraangelita94@gmail.com
[5]lintangnurrohmah2@gmail.com

ABSTRACT

This study examines the behavioral factors influencing the adoption of green packaging among culinary micro, small, and medium enterprises (MSMEs) in Bandar Lampung using the Stimulus–Organism–Response (SOR) framework. As sustainability concerns become increasingly important within the business environment, understanding the determinants of environmentally responsible practices among MSMEs is essential for promoting sustainable entrepreneurship. Employing a quantitative explanatory approach, data were collected from 205 culinary MSME owners through purposive sampling and analyzed using Structural Equation Modeling (SEM) to investigate the relationships among green packaging innovation, perceived environmental value, attitudes toward green innovation, and adoption intention. The findings reveal that green packaging innovation positively influences MSMEs' perceptions of environmental value and fosters favorable attitudes toward green innovation, which subsequently enhance their intention to adopt environmentally friendly packaging practices. These results support the applicability of the SOR model in explaining behavioral responses to sustainability-oriented innovations within the MSME sector. Nevertheless, the study also identifies several barriers to adoption, including higher production costs, limited access to eco-friendly materials, and relatively low levels of environmental awareness among business owners. The study contributes to the growing literature on sustainable entrepreneurship and green innovation by providing empirical evidence from the culinary MSME sector in an emerging economy. Future research is encouraged to incorporate broader samples and additional behavioral, institutional, or contextual factors to further explain green innovation adoption among small businesses.

Keywords: *Green Packaging; SOR Model; MSMEs; Sustainable Innovation*

INTRODUCTION

Green packaging has emerged as a crucial innovation in addressing global environmental challenges caused by excessive plastic waste, pollution, and unsustainable production practices (Petrenko et al., 2024). As consumer awareness of environmental sustainability increases, businesses are expected to adopt eco-friendly packaging that reduces ecological impacts while maintaining product quality and market appeal (Chen et al., 2023; Deng & Yang, 2024). According to Almeida and Rodrigues (2021), green packaging serves not only as an alternative to conventional materials but also as a medium that communicates sustainability values between producers and consumers. This form of packaging enhances brand image, strengthens environmental responsibility, and shapes positive consumer perceptions toward sustainable products.

Despite its growing importance, the adoption of green packaging among Micro, Small, and Medium Enterprises (MSMEs) in developing countries remains limited. In Indonesia, particularly in Bandar Lampung City, most culinary MSMEs still rely on single-use plastic packaging due to cost constraints, lack of access to eco-materials, and limited awareness of environmental benefits. Out of 221,000 MSMEs in Lampung Province, approximately 35% operate in the culinary sector, yet only a small portion have transitioned to eco-friendly packaging (Diskop UKM, 2023). These findings are consistent with Sarma and Banik (2025), who revealed that small enterprises in developing economies face structural and psychological barriers in adopting sustainable practices such as high production costs, limited technological access, and low eco-entrepreneurial literacy.

The research problem lies in the gap between sustainability awareness and actual implementation of green packaging practices by MSMEs. While environmental responsibility is increasingly recognized, economic and behavioral factors continue to hinder adoption. Mahmoud et al. (2022) emphasized that consumer environmental awareness and willingness to pay significantly influence sustainable purchase behavior. Similarly, Chang and Chen (2022) found that environmental stimuli such as government regulations and consumer expectations can shape positive attitudes toward green innovation. However, these studies primarily focus on consumers and large corporations, leaving a research gap in understanding how MSME owners respond to green innovation at the business level.

To address this gap, the present study adopts the Stimulus–Organism–Response (SOR) model proposed by Mehrabian and Russell (1974), which explains how external stimuli (e.g., regulations, market pressure, environmental education) influence internal psychological factors such as perceptions, attitudes, and emotions, which in turn shape behavioral responses (Steg & Vlek, 2009; Chang & Chen, 2022). In this research, stimulus refers to green packaging innovation and environmental pressures, organism represents perceived environmental value and attitudes toward green innovation, and response refers to the intention to adopt green packaging. Prior studies have confirmed the effectiveness of this framework in analyzing green consumer behavior (Ghazali et al., 2017; Mahmoud et al., 2022), yet empirical applications to MSMEs remain scarce.

The motivation behind this study is to provide a deeper understanding of how psychological, social, and environmental factors influence green packaging adoption among culinary MSMEs. This research builds on the authors' previous works (2023–2024), which explored customer value, trust, and sustainability behaviors in digital and e-commerce contexts. By extending this line of inquiry into the MSME sector, the study seeks to uncover how perceived environmental value and green attitudes can translate into actual adoption of eco-friendly packaging practices. Furthermore, this research

aligns with Sustainable Development Goal (SDG) 12, which emphasizes responsible consumption and production.

Ultimately, this study aims to provide empirical evidence and theoretical insight that can help bridge the gap between environmental awareness and sustainable business practices. Its findings are expected to inform policymakers, educators, and MSME stakeholders about the behavioral determinants of green innovation adoption and contribute to Indonesia's transition toward a green and circular economy.

LITERATURE REVIEW, RESEARCH FRAMEWORK, AND HYPOTHESIS

The global agenda on sustainability has become increasingly urgent as societies face escalating environmental crises ranging from climate change, waste accumulation, to the depletion of natural resources (Ansori & Yusuf, 2023). Among the many contributors to environmental pollution, packaging waste, particularly from plastics, remains one of the most persistent and visible problems. In response, green packaging has emerged as an innovative concept that aims to mitigate environmental damage through the use of eco-friendly materials, minimal waste designs, and efficient recycling systems (Chen et al., 2023; Deng & Yang, 2024). Green packaging is defined not only as an environmental initiative but also as a comprehensive business strategy that supports corporate sustainability, enhances reputation, and aligns with Sustainable Development Goal 12 regarding responsible production and consumption (Shaikh & Hyder, 2023). As Almeida and Rodrigues (2021) emphasize, packaging has evolved from a mere protective container into a vehicle for communicating sustainability values to consumers, influencing both emotional attachment and purchasing decisions.

The increasing environmental awareness among consumers worldwide has significantly shifted market expectations (Kosyak & Popov, 2020). Companies are no longer judged solely by product quality or price competitiveness but also by their contribution to ecological sustainability (Belz et al., 2012). Research by Chen, Wang & Li (2023) shows that consumers now associate packaging aesthetics and eco-labeling with credibility and environmental commitment, while Deng & Yang (2024) add that visually appealing green packaging stimulates trust and positive emotion. However, despite such global progress, small enterprisesparticularly micro, small, and medium enterprises (MSMEs) still lag behind in adopting sustainable packaging practices (Imani et al., 2025). This disparity is even more pronounced in developing nations, where limited financial capacity, insufficient knowledge, and weak regulatory enforcement hinder sustainable transformation (Sarma & Banik, 2025).

Indonesia stands among the world's largest contributors to plastic pollution, much of which originates from the food and beverage industry (Wang & Karasik, 2022). Within this sector, culinary MSMEs play a significant role due to their high consumption of single-use packaging materials (Munawar et al., 2025). According to Diskop UKM Provinsi Lampung (2023), the province houses more than 221,000 MSMEs, about 35 percent of which operate in the culinary industry. Yet, the adoption of eco-friendly packaging solutions remains minimal. Plastic remains the preferred choice due to its low price, easy access, and suitability for wet or oily foods (Channa et al., 2022). Studies reveal that most MSME owners are aware of environmental issues but perceive green packaging as economically infeasible and technically challenging to implement (BPS, 2023; Sarma & Banik, 2025).

Empirical studies have indicated that the barriers to green packaging adoption among MSMEs include limited access to sustainable materials, lack of environmental education, and the absence of financial incentives or government support (Mahmoud et

al., 2022; Lin & Niu, 2023). Moreover, consumer pressure in local markets remains weak, which further reduces MSME motivation to invest in innovation (Aggarwal & Joshi, 2024). In contrast, large corporations are often driven by global market standards and corporate social responsibility (CSR) regulations (Fransen, 2012). Therefore, a deeper understanding of behavioral and psychological determinants is necessary to explain why MSME owners hesitate to adopt eco-innovation despite growing public awareness of sustainability (Kirom et al., 2022).

The Stimulus–Organism–Response (SOR) model provides a suitable theoretical foundation for analyzing behavioral mechanisms underlying green packaging adoption (Rivas et al., 2022). Originally proposed by Mehrabian and Russell (1974), the SOR framework postulates that external environmental stimuli (S) influence internal psychological and affective states (O), which subsequently lead to specific behavioral responses (R). Steg & Vlek (2009) refined this approach for environmental psychology, showing that both cognitive and emotional processes mediate environmental actions. In the marketing domain, Chang & Chen (2022) applied the SOR framework to study how environmental cues such as eco-labels, sustainability campaigns, and product innovation shape consumer attitudes and behaviors.

In the context of MSMEs, this model offers a comprehensive lens for understanding how external factors like innovation, policy, and social norms stimulate internal responses such as perception and attitude, which eventually shape behavioral intentions. Here, Green Packaging Innovation functions as the stimulus; Perceived Environmental Value and Attitude toward Green Innovation act as the organism; and Intention to Adopt Green Packaging represents the behavioral response. The SOR model's explanatory strength lies in its integration of cognitive, affective, and behavioral dimensions, offering a holistic understanding of sustainable decision-making processes among small business owners (Lin & Niu, 2023; Mahmoud et al., 2022).

Green packaging innovation encompasses the creation and utilization of packaging systems that minimize negative environmental impact throughout the product life cycle (Almeida & Rodrigues, 2021. This includes design optimization, the use of renewable or recyclable materials, and technological integration for waste reduction (Deng & Yang, 2024). Research demonstrates that innovation serves as an external trigger that influences perceptions and attitudes toward sustainability. Almeida & Rodrigues (2021) found that sustainable design innovations enhance consumer perception of brand authenticity and stimulate positive emotional responses. Similarly, Chen et al. (2023) observed that visible environmental cues in packaging, such as eco-certification symbols or biodegradable textures, function as stimuli that trigger cognitive awareness of environmental responsibility.

In organizational settings, Mahmoud et al. (2022) reported that adopting green innovation practices leads to improved environmental performance, market reputation, and long-term competitiveness. Ali et al. (2021) further revealed that green packaging across supply chains positively impacts corporate image and operational efficiency. However, Lin & Niu (2023) noted that for MSMEs, innovation adoption remains largely dependent on perceived feasibility and financial capability. Without adequate resources and support, many MSME owners perceive green packaging innovation as an additional burden rather than an opportunity for growth. Thus, in the SOR framework, innovation functions as the external "stimulus" whose impact depends on how it is cognitively and emotionally processed within the organization (Relifra et al., 2025).

Perceived Environmental Value (PEV) refers to the extent to which individuals or organizations recognize and appreciate the environmental and social benefits of adopting

sustainable practices (Chen et al., 2023). It represents an internal cognitive appraisal of how valuable a particular innovation is in protecting the environment and generating broader social welfare. Empirical research supports its role as a significant predictor of pro-environmental behavior. Ghazali et al. (2017) demonstrated that consumers who perceive greater ecological value in green products are more likely to adopt them, while Almeida & Rodrigues (2021) found that PEV mediates between product design innovation and customer loyalty.

Within the MSME context, high perceived environmental value encourages owners to consider sustainability as both a moral obligation and a strategic asset (Mahmoud et al., 2022). However, when perceived costs or complexity outweigh the benefits, adoption likelihood declines (Sarma & Banik, 2025). Lin & Niu (2023) found that in developing economies, the perceived cost-benefit ratio remains the most critical determinant of whether an enterprise will implement eco-innovation. Hence, strengthening environmental knowledge and demonstrating tangible business advantages such as waste reduction, efficiency, and customer appeal are crucial to improving PEV among MSMEs.

Attitude toward Green Innovation (AGI) reflects an individual's evaluative tendency both cognitive and emotional toward environmentally oriented innovation (Hsu et al., 2020). It represents whether a person views green innovation as beneficial, necessary, or burdensome. A positive attitude serves as a psychological bridge that translates awareness into intention. Chang & Chen (2022) proved that attitude significantly mediates the influence of environmental stimuli on behavioral intention, while Mahmoud et al. (2022) emphasized that a manager's positive attitude directly enhances organizational readiness for eco-innovation. Igbomor (2024) found that consumer attitudes toward eco-packaging predict willingness to pay more for sustainable products, reinforcing the notion that attitude functions as a central driver of green behavior.

In the MSME context, the owner's attitude is particularly decisive because strategic decisions are often centralized. Ali et al. (2021) reported that enterprises with proactive sustainability attitudes experience better market performance and brand differentiation. Conversely, skepticism or indifference often leads to inertia, delaying innovation. Thus, cultivating a positive attitude toward green packaging among MSME owners is essential to bridge the gap between environmental awareness and behavioral execution.

Intention to Adopt Green Packaging (IAGP) is the behavioral response within the SOR model, representing the degree of willingness and commitment of MSME owners to implement eco-friendly packaging solutions (Vafaei-Zadeh et al., 2024). Drawing upon the Theory of Planned Behavior (Ajzen, 1991), intention is a direct antecedent of behavior, shaped by attitude, subjective norms, and perceived behavioral control. Mahmoud et al. (2022) confirmed that environmental intention strongly predicts actual implementation of green technologies in organizations. Yadav & Pathak (2022) also found that attitudes and perceived social pressure jointly determine consumers' willingness to adopt green products. For MSMEs, however, financial limitations, customer demand, and access to innovation resources can weaken the relationship between intention and action (Sarma & Banik, 2025). Nevertheless, intention remains the most reliable indicator of future adoption and is therefore used as the dependent variable in this study.

Recent research provides extensive evidence supporting the relationships among innovation, perception, attitude, and intention. Chang & Chen (2022) observed that

environmental innovation enhances consumers' positive emotions, which in turn lead to adoption behaviors. Chen et al. (2023) identified perceived environmental benefit as a mediator between green product design and purchase intention. Mahmoud et al. (2022) linked eco-innovation to organizational performance, confirming that psychological variables mediate the relationship. Ghazali et al. (2017) emphasized the moral and value dimensions of environmental perception in driving sustainable choices, while Ali et al. (2021) linked innovation to firm performance and reputation.

In developing contexts, Lin & Niu (2023) and Sarma & Banik (2025) highlighted financial and cognitive barriers, calling for more behavioral research on MSMEs. Yadav & Pathak (2022) demonstrated the cross-cultural relevance of pro-environmental attitudes, while Hsu, Chang & Lin (2020) confirmed that positive environmental attitudes predict green purchase intention across industries. Collectively, these findings underscore the importance of applying the SOR model in explaining MSME decision-making processes related to sustainability.

Although substantial research exists on green packaging, most studies center on consumers or large corporations in developed economies. Few have explored how MSMEs especially culinary MSMEs in Indonesia perceive and respond to green packaging innovation. Existing studies often address environmental awareness but rarely investigate the psychological pathways through which innovation leads to behavioral intention (Kı ymalı oğlu et al., 2024). Moreover, studies integrating Green Packaging Innovation, Perceived Environmental Value, Attitude toward Green Innovation, and Intention to Adopt Green Packaging within one SOR-based framework remain limited. This research aims to fill these gaps by empirically examining the behavioral mechanism that underlies MSME adoption of green packaging, thus contributing new evidence to the green innovation literature in developing contexts.

The motivation for this study stems from the growing policy emphasis on sustainable entrepreneurship in Indonesia. Encouraging MSMEs to adopt green packaging aligns directly with national sustainability agendas and the global SDGs. By understanding the behavioral determinants of adoption, policymakers can design more effective interventions such as training, incentives, and awareness campaigns to empower MSMEs as drivers of sustainable transformation.

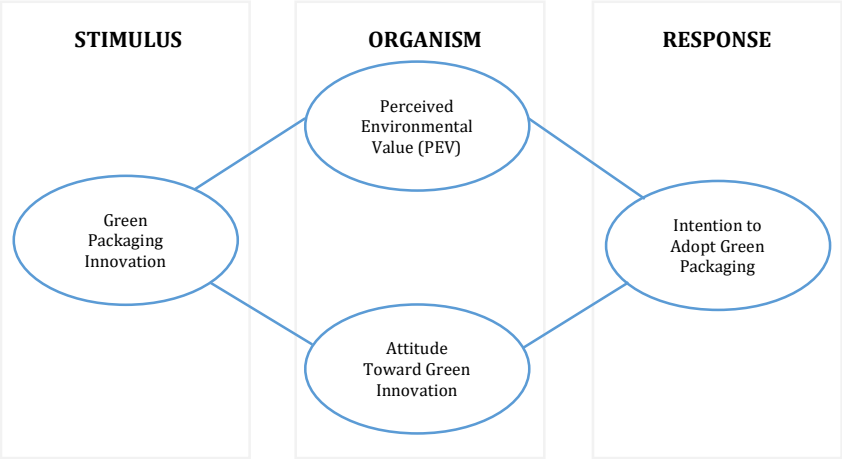
Research Framework

The adoption of green packaging among culinary MSMEs serves as an essential driver for sustainable innovation and environmental responsibility within the local business ecosystem (Natalie et al., 2024). The green packaging initiative functions as both an environmental and strategic stimulus that encourages entrepreneurs to shift toward more sustainable production and marketing practices (Kıymalıog˘lu et al., 2024). Using the Stimulus–Organism–Response (SOR) model (Inggrid et al., 2024), this study explains how external factors such as green packaging innovation act as stimuli that influence the internal state of MSME owners, represented by perceived environmental value and attitudes toward green innovation. These internal cognitive and affective responses then determine the behavioral response, namely the intention to adopt green packaging as part of business sustainability practices.

The factors that affect this behavioral framework are the level of green packaging innovation, perceived environmental value, and attitudes toward green innovation (Wang et al., 2026). These factors work together to create the mediating path that connects awareness of innovation to the intention to adopt it. The model also acknowledges that MSMEs encounter internal and external obstacles, including elevated

production costs, restricted access to sustainable materials, insufficient environmental literacy, and diminished consumer awareness (Jaramillo et al., 2018). These factors collectively determine the extent to which MSMEs can translate environmental awareness into actionable adoption behavior. In summary, the research framework conceptualizes green packaging innovation as the primary stimulus, perceived environmental value and attitude toward green innovation as mediating organism factors, and intention to adopt green packaging as the final behavioral response leading to sustainable innovation.

Based on the Stimulus–Organism–Response (SOR) framework and the theoretical relationships discussed previously, the conceptual model of this study illustrates the proposed relationships among Green Packaging Innovation, Perceived Environmental Value, Attitude Toward Green Innovation, and Intention to Adopt Green Packaging. The framework positions Green Packaging Innovation as the external stimulus, Perceived Environmental Value and Attitude Toward Green Innovation as the organism components, and Intention to Adopt Green Packaging as the behavioral response. The proposed research framework is presented in Figure 1.



Source : Author's Compliation, 2025

Figure 1
SOR Model Conceptual Framework

Hypotheses

Based on theoretical discussions and prior empirical findings, this study proposes the following hypotheses:

H1: Green Packaging Innovation has a positive and significant effect on Perceived Environmental Value among culinary MSMEs in Bandar Lampung.

Innovative packaging stimulates awareness of ecological benefits, increasing perceived environmental value (Chen et al., 2023; Almeida & Rodrigues, 2021; Deng & Yang, 2024).

H2: Green Packaging Innovation has a positive and significant effect on Attitude toward Green Innovation among culinary MSMEs in Bandar Lampung.

Exposure to innovation strengthens positive attitudes toward environmental practices (Chang & Chen, 2022; Mahmoud et al., 2022; Igbomor, 2024).

H3: Perceived Environmental Value has a positive and significant effect on the Intention to Adopt Green Innovation among culinary MSMEs in Bandar Lampung.

When MSME owners perceive environmental benefits and sustainability value from green packaging, they are more likely to develop intentions to adopt such packaging in their business operations (Ghazali et al., 2017; Hsu, Chang & Lin, 2020; Lin & Niu, 2023).

H4: Attitude toward Green Innovation has a positive and significant effect on the Intention to Adopt Green Packaging among culinary MSMEs in Bandar Lampung.

A positive attitude toward green innovation serves as an important determinant of behavioral intention and encourages the adoption of environmentally friendly practices (Mahmoud et al., 2022; Chen, Lin & Chang, 2023; Sarma & Banik, 2025).

H5: Perceived Environmental Value and Attitude toward Green Innovation mediate the relationship between Green Packaging Innovation and the Intention to Adopt Green Packaging among culinary MSMEs in Bandar Lampung.

According to the SOR framework, environmental perceptions and attitudes function as organism factors that transform external stimuli into behavioral responses. Therefore, green packaging innovation is expected to influence adoption intention indirectly through perceived environmental value and attitude toward green innovation (Ali et al., 2021; Chang & Chen, 2022; Yadav & Pathak, 2022).

H6: Culinary MSMEs in Bandar Lampung face various challenges and obstacles in implementing Green Packaging.

Despite the growing awareness of environmental sustainability, MSMEs often encounter barriers such as high implementation costs, limited availability of environmentally friendly materials, and insufficient consumer awareness, which may hinder the adoption of green packaging practices (Sarma & Banik, 2025).

METHOD

This study employs a quantitative explanatory approach designed to examine the causal relationships among four main constructs: Green Packaging Innovation (GPI), Perceived Environmental Value (PEV), Attitude Toward Green Innovation (AGI), and Intention to Adopt Green Packaging (IAGP). A quantitative explanatory approach is appropriate for testing theoretical relationships and examining causal effects among variables through statistical analysis (Slater & Hasson, 2024). The research is grounded in the Stimulus–Organism–Response (SOR) theoretical framework, which explains how external stimuli such as green packaging innovation affect internal psychological factors and subsequently influence behavioral intentions toward sustainable practices among MSME owners.

The scope of this research focuses on culinary Micro, Small, and Medium Enterprises (MSMEs) located in Bandar Lampung City, Indonesia, which engage in food

and beverage production or sales. The study seeks to analyze how behavioral, psychological, and environmental factors drive MSME owners to adopt eco-friendly packaging practices. The research population consists of all culinary MSMEs registered in Bandar Lampung City, totaling approximately 78,000 enterprises, according to data from the Department of Cooperatives and MSMEs of Lampung Province (2023).

A non-probability purposive sampling technique was used to select respondents who met specific criteria (Memon et al., 2025): (1) MSMEs operating in the culinary sector, (2) located in Bandar Lampung City, (3) owners or managers with authority over packaging decisions, and (4) businesses operating for at least one year. Following Hair et al. (2019), the minimum sample size for Structural Equation Modeling (SEM) is ten times the number of indicators. With 20 indicators, a minimum of 200 responses was required. A total of 230 questionnaires were distributed, and 205 valid responses were used for analysis.

Data were collected through a structured questionnaire, distributed both online via Google Forms and offline at culinary business clusters such as Enggal, Tamin Market, and Sukarame. The questionnaire consisted of two sections: the first covered respondent demographics (gender, age, education, business duration, and business scale), while the second measured research variables using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). Prior to data collection, a pilot test involving 30 MSME owners was conducted to assess the clarity and reliability of the instrument. Feedback from the pilot test was used to refine the wording of several items.

To ensure the accuracy and reliability of the data collected, several assumptions and research conditions were established throughout the study. First, the assumption of homogeneity was applied, indicating that the MSMEs involved in this research shared relatively similar characteristics in terms of operational scale, available resources, and managerial structure. This assumption was important to maintain comparability among respondents and to minimize potential bias arising from differences in business capacity (Sulastini & Darmawi, 2022). Second, the assumption of linearity was considered, in which the relationships among the main constructs ; Green Packaging Innovation, Perceived Environmental Value, Attitude toward Green Innovation, and Intention to Adopt Green Packaging, were presumed to be linear. This assumption was verified through preliminary scatterplot analyses that indicated a consistent linear pattern among the observed variables (Nguyen Quoc et al., 2025). To ensure construct validity and measurement consistency, each variable was operationalized into several indicators adapted from previous studies. The operational definitions, measurement indicators, and supporting references for each construct are presented in Table 1.

Table 1
Operational Definition and Measurement Indicators of Research Variables

Variable Type	Variable	Measurement / Indicators	Source Reference
Dependent Variable	Intention to Adopt Green Packaging (IAGP)	1. Intention to use green packaging 2. Long-term use of green packaging 3. Recommendation to others 4. Willingness to pay extra for green packaging	Chang & Chen (2022); Ali et al. (2022)

Variable Type	Variable	Measurement / Indicators	Source Reference
Independent Variable (Stimulus)	Green Packaging Innovation (GPI)	1.Packaging waste reduction 2.Innovative design according to product 3.Environmental safety 4.Marketing added value	Mahmoud et al. (2022); Chang & Chen (2022); Lin & Niu (2023)
Mediating Variable (Organism 1)	Perceived Environmental Value (PEV)	1.Environmental impact 2.Concern for sustainability 3.Positive image 4.Environmental responsibility	Chen et al. (2023); Almeida & Rodrigues (2021); Rodrigues (2021)
Mediating Variable (Organism 2)	Attitude Toward Green Innovation (AGI)	1. Positive attitude toward green innovation 2.Importance of green trend 3.Confidence in competitiveness 4.Satisfaction with green innovation adoption	Ghazali (2017); Hsu et al. (2020)

All indicators were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The collected data were analyzed using SmartPLS version 4.0.13 with the Structural Equation Modeling–Partial Least Squares (SEM-PLS) technique. This method was chosen for its ability to analyze complex relationships between latent variables, including mediation effects, and its suitability for small sample sizes and non-normal data (Subhaktiyasa, 2024). The analysis followed several steps: descriptive analysis to summarize respondent profiles, measurement model (outer model) testing to evaluate validity and reliability through outer loading, AVE, and Cronbach's Alpha values, and structural model (inner model) testing to assess path coefficients, R^2, and predictive relevance (Q^2) (Changalima & Chuwa, 2025). Finally, mediation testing was conducted using the bootstrapping method with 5,000 subsamples to determine indirect effects between variables (Li et al., 2026).

RESULTS AND DISCUSSION

The analysis was conducted using SmartPLS version 4.0.13 following the procedures described in the methodology section. The results are presented in three main stages: (1) descriptive analysis, (2) evaluation of the measurement model (outer model), and (3) evaluation of the structural model (inner model), followed by a detailed discussion of the findings. The demographic analysis of 205 valid respondents revealed that most participants were owners or managers of culinary MSMEs aged between 25 and 45 years, with educational backgrounds ranging from high school to bachelor's degree. The majority of respondents operated micro- or small-scale enterprises that had been in business for more than three years. This indicates that the sample represents active entrepreneurs with growing awareness of sustainable packaging practices.

The first stage of analysis tested the measurement model (outer model) to ensure that all constructs met the criteria for reliability and validity. The assessment included Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE). The results are summarized in Table 2.

Table 2
Validity and Reliability Results

Variable	Cronbach's Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)	AVE	Interpretation
Green Packaging Innovation	0.787	0,801	0.855	0.544	Reliable and valid
Perceived Environmental Value	0.900	0,91	0.919	0.589	Reliable and valid
Attitude Toward Green Innovation	0.823	0,843	0.884	0.657	Reliable and valid
Intention to Adopt Green Packaging	0.851	0,852	0.899	0.691	Reliable and valid

Data analysis results, 2025

The convergent validity test shows that the loading values of all indicators exceed 0,70, indicating that each indicator properly represents its construct. Furthermore, the Average Variance Extracted (AVE) values for all variables were greater than 0,50, fulfilling the minimum requirement for convergence.

The Composite Reliability (CR) and Cronbach's Alpha values for all constructs also exceeded 0.70, confirming the internal consistency reliability of the research instrument. These results suggest that the indicators used in this study are statistically valid and reliable for subsequent hypothesis testing.

This measurement confirmation aligns with Hair et al. (2019), who state that indicators with loading factors above 0.70 and AVE above 0.50 reflect a valid measurement model, while CR and Alpha values above 0.70 indicate strong construct reliability.

The second stage examined the structural model by assessing the coefficient of determination (R^2), effect size (f^2), and path coefficients. The R^2 values indicate the model's explanatory power for each endogenous variable, as shown in Table 3.

Table 3
R-Square Results

Endogenous Variable	R^2	Adjusted R^2	Interpretation
Perceived Environmental Value	0.556	0.554	Moderate explanatory power
Attitude Toward Green Innovation	0.407	0.404	Moderate explanatory power
Intention to Adopt Green Packaging	0.580	0.576	Substantial explanatory power

Data analysis results, 2025

These results suggest that green packaging innovation explains 55.6% of the variance in perceived environmental value, 40.7% of the variance in attitude, and 58% of the variance in intention to adopt green packaging. According to the criteria proposed by Hair et al. (2019), these values indicate moderate to substantial explanatory power, demonstrating that the model has good predictive capability in explaining behavioral intentions toward green packaging adoption. Before testing the structural relationships among the constructs, a collinearity assessment was conducted to ensure that the predictor variables did not exhibit excessive multicollinearity. The Variance Inflation

Factor (VIF) values were examined for each construct, and the results are presented in Table 4.

Table 4
Collinearity Test Results (VIF Values)

Construct	GPI	PEV	AGI	IAGP
Green Packaging Innovation (GPI)	—	1.000	1.000	—
Perceived Environmental Value (PEV)	—	—	—	1.964
Attitude Toward Green Innovation (AGI)	—	—	—	1.964

Data analysis results, 2025

The Variance Inflation Factor (VIF) values for all constructs are below 3.3, indicating that multicollinearity is not a concern in the model. This confirms that the independent variables, Green Packaging Innovation (GPI), Perceived Environmental Value (PEV), and Attitude Toward Green Innovation (AGI) are statistically independent and do not exhibit high intercorrelations. Following the collinearity assessment, the predictive relevance of the model was examined using the Q^2 Predict criterion. According to Hair et al. (2022), positive Q^2 values indicate that the model has predictive relevance for the endogenous constructs. The results of the predictive power analysis are presented in Table 5.

Table 5
Predictive Power (Q^2 Predict)

	SSO	SSE	Q^2 (=1-SSE/SSO)
Green Packaging Innovation (GPI)	1035	1035	0
Perceived Environmental Value (PEV)	1656	1130.734	0.317
Attitude Toward Green Innovation (AGI)	828	610.98	0.262
Intention to Adopt Green Packaging (IAGP)	828	502.524	0.393

Data analysis results, 2025

Predictive relevance (Q^2) was evaluated via the Q^2 (PLS) predictive power test (Table 5). The Q^2 values are 0.317 for Organisme perilaku, 0.262 for Attitude Toward Green Innovation (AGI), and 0.393 for the Intention to Adopt Green Packaging (IAGP) construct. As all Q^2 values are > 0, the model demonstrates satisfactory out-of-sample predictive relevance for these endogenous constructs. To further evaluate the contribution of each exogenous construct to the endogenous variables, an effect size (f^2) analysis was conducted. The results of the effect size assessment are presented in Table 6.

Overall model fit is supported by the GoF and related indices reported in the file; the model shows adequate explanatory and predictive capabilities for the endogenous variables included in this research. In addition to assessing overall model fit, examining

effect sizes provides a deeper understanding of the relative importance of each predictor in explaining the variance of the endogenous constructs.

Table 6
Effect Size (f2 Test Results)

Relationship	f^2	Effect Size Interpretation
GPI → PEV	1.251	Large Effect
GPI → AGI	0.687	Large Effect
PEV → IAGP	0.040	Small-to-Medium Effect
AGI → IAGP	0.471	Large Effect

Data analysis results, 2025

The effect size (f^2) measures the impact of each exogenous variable on its corresponding endogenous construct. According to Hair et al. (2019), f^2 values above 0.35 represent large effects. Thus, Green Packaging Innovation (GPI) has a large impact on both Perceived Environmental Value (PEV) and Attitude Toward Green Innovation (AGI). Attitude also has a strong influence on Intention to Adopt Green Packaging (IAGP), while Perceived Environmental Value shows a smaller but still meaningful contribution. To further assess the model's predictive capability, a Cross-Validated Predictive Ability Test (CVPAT) was conducted. The results, presented in Table 7, provide evidence regarding the predictive superiority of the proposed PLS-SEM model.

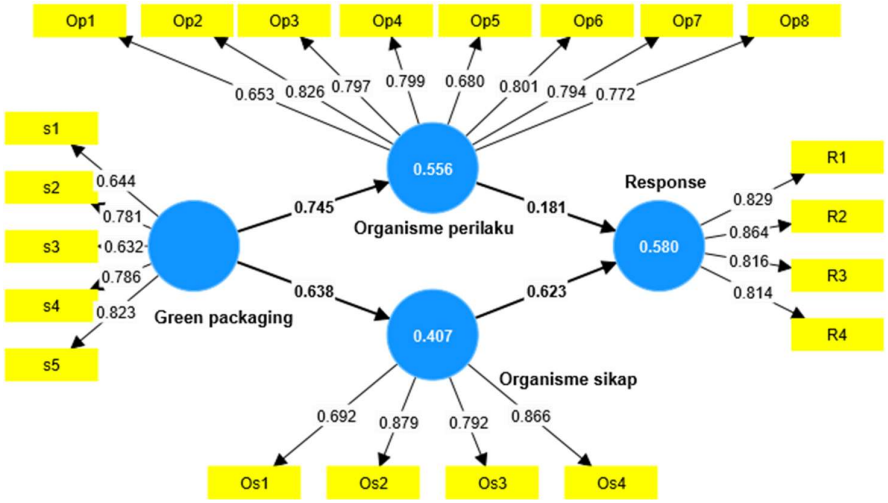
Table 7
CVPAT Test Results (Average Loss Difference)

Construct	PLS loss	IA loss	Average loss difference	t value	p value
Perceived Environmental Value (PEV)	0.291	0.433	-0.142	7.031	0
Attitude Toward Green Innovation (AGI)	0.377	0.509	-0.132	4.808	0
Intention to Adopt Green Packaging (IAGP)	0.444	0.601	-0.156	5.786	0
Overall	0.351	0.494	-0.143	7.093	0

Data analysis results, 2025

Based on the CVPAT test results in Table 7, all endogenous variables (Organism behavior, Organism attitude, and Response) and the overall value (Overall) show a negative Average Loss Difference value. These values, ranging from -0.156 to -0.132, meet the ≤ 0.00 criteria. This indicates that the level of prediction error (loss) produced by the PLS model is smaller than the level of prediction error produced by the Independent Approach model. Statistically, the proposed model has better predictive accuracy and is reliable for predicting out-of-sample data.

To provide a visual representation of the measurement and structural model, the PLS-SEM algorithm results are presented in Figure 2. The figure illustrates the relationships among the latent constructs, including indicator loadings and path coefficients obtained from the SmartPLS analysis.



Data analysis results, 2025

Figure 2
PLS-SEM Algorithm

Further, hypothesis testing was conducted to evaluate the relationships among variables. Table 8 presents the path coefficients, t-values, and p-values for each hypothesized path.

Table 8
Path Coefficients

Relationship	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Green Packaging Innovation → Perceived Environmental Value	0.745	0.749	0.032	23.307	0
Green Packaging Innovation → Attitude Toward Green Innovation	0.638	0.643	0.047	13.638	0
Perceived Environmental Value → Intention to Adopt Green Packaging	0.181	0.183	0.064	2.848	0.004
Attitude Toward Green Innovation → Intention to Adopt Green Packaging	0.623	0.622	0.065	9.589	0

Data analysis results, 2025

The path coefficient results indicate that all direct relationships in the structural model are positive and significant at the 0.05 level, as all p-values are below 0.05 and t-values exceed the critical threshold of 1.96. These findings provide support for H1, H2, H3, and H4.

Provide logical and scientific analysis of the study's findings—present pieces of evidence to support your analysis by citing the work of earlier researchers or existing theories.

H1: Green Packaging Innovation has a positive effect on the Perception of Environmental Value among culinary MSME players in Bandar Lampung City.

This finding indicates a very strong and significant positive effect of Green Packaging Innovation on Perceived Environmental Value. The coefficient value of 0.745 with a t-value of 23.307 demonstrates that green packaging innovation substantially enhances MSME owners' perceptions of environmental benefits and sustainability values.

H2: Green Packaging Innovation has a positive effect on Attitudes towards Green Innovation among culinary MSME actors in Bandar Lampung City.

The positive and significant coefficient (β = 0.638; t = 13.638) indicates that Green Packaging Innovation has a direct and strong influence on Attitude Toward Green Innovation among MSME owners.

H3: Perceived Environmental Value has a positive effect on the Intention to Adopt Green Packaging among culinary MSMEs in Bandar Lampung City.

The results show a positive and significant relationship between Perceived Environmental Value and Intention to Adopt Green Packaging (β = 0.181; t = 2.848). Although the magnitude of the effect is relatively small, MSMEs that recognize the environmental value of green packaging demonstrate stronger intentions to adopt environmentally friendly packaging solutions. Therefore, H3 is supported.

H4: Attitude toward Green Innovation has a positive effect on the Intention to Adopt Green Packaging among culinary MSMEs in Bandar Lampung City.

This relationship demonstrates a strong and significant effect (β = 0.623; t = 9.589). The findings confirm that positive attitudes toward green innovation play a crucial role in shaping MSMEs' intentions to adopt green packaging practices. Therefore, H4 is supported.

H5: Perceived Environmental Value and Attitude toward Green Innovation mediate the relationship between Green Packaging Innovation and the Intention to Adopt Green Packaging among culinary MSMEs in Bandar Lampung City.

Based on the structural model results, Green Packaging Innovation significantly affects both Perceived Environmental Value and Attitude toward Green Innovation, while both organism variables significantly influence Intention to Adopt Green Packaging. These findings indicate the existence of indirect effects through the mediating variables. Thus, H5 is supported, suggesting that Green Packaging Innovation influences adoption intention not only directly but also indirectly through enhanced environmental value perception and positive attitudes toward green innovation.

H6: Culinary MSMEs in Bandar Lampung City face various challenges and obstacles in implementing Green Packaging

Based on the results of interviews and field observations, hypothesis H6 was not tested structurally, but rather through qualitative descriptive analysis. The results show that MSME actors still face several major obstacles in adopting green packaging, such as high production costs, limited availability of environmentally friendly materials, and low levels of consumer awareness and knowledge about the importance of green packaging.

This finding is consistent with the research by Sarma & Banik (2025), which explains that structural, economic, and social challenges are the main factors hindering the adoption of environmentally friendly packaging in the small and medium-sized business sector.

CONCLUSION AND SUGGESTION

This study shows that green packaging innovation positively shapes MSME owners' perceptions and attitudes, which later encourage their intention to adopt eco-friendly packaging. Innovation works as an external stimulus that increases environmental awareness and builds supportive psychological responses. Perceived environmental value and attitude toward green innovation act as important internal drivers that translate sustainability knowledge into business intention. However, adoption is still slowed by production cost concerns, lack of access to eco-materials, and low consumer awareness in local markets. The findings confirm the relevance of the SOR framework in explaining sustainable behavior in MSMEs and extend previous studies by applying it to small food enterprises in an emerging economy context, where behavioral factors interact with structural challenges. This research contributes to sustainable entrepreneurship literature by proving that psychological mechanisms strongly influence MSME sustainability actions, especially in developing regions.

MSME owners are encouraged to strengthen their understanding of environmental benefits and build positive attitudes through training and exposure to sustainable business practices. Government and institutions should support firms with incentives, easier access to eco-friendly materials, and educational programs to reduce cost barriers and increase market readiness. Collaboration with suppliers and environmental organizations could help MSMEs adopt greener packaging options and build stronger customer trust.

Future research should include wider geographic samples, integrate consumer behavior variables, and compare different industry sectors to improve generalization. Researchers may also explore financial readiness, green supply chain support, and regulatory intervention as additional factors to better explain the transition toward sustainable packaging in MSMEs.

REFERENCES

Aggarwal, A., & Joshi, N. (2024). MSMEs' innovation: a barrier approach. *Journal of Small Business and Enterprise Development*, *31*. https://doi.org/10.1108/JSBED-07-2023-0304

Ali, M. H., Zhan, Y., Alam, R. M., & Tse, Y. K. (2021). *Green packaging*, green supply chain practices, and firm performance: Evidence from the food industry in China. *Journal of Cleaner Production, 292*, 126034. https://doi.org/10.1016/j.jclepro.2021.126034

Almeida, C. M. V. B., & Rodrigues, T. C. (2021). *Green packaging* from consumer and business perspectives. *Sustainability, 13*(3), 1356. https://doi.org/10.3390/su13031356

Ansori, S., & Yusuf, R. (2023). Addressing the Global Environmental Crisis : Strategies for Sustainable Development. *West Science Social and Humanities Studies*, *01*(02), 63–75

Belz, F. M, Peattie, & Ken. (2012). *Sustainability marketing a global perspective* (2nd Editio). Hoboken, N.J. : Wiley.

BPS. (2023). Statistik UMKM Provinsi Lampung. Badan Pusat Statistik.

Changalima, I. A., & Chuwa, M. P. (2025). Research in Business & Social Science Partial least squares structural equation modeling (PLS-SEM) in business research : A simple guide for novice researchers. *Research in Business & Social Science*, *14*(9), 497–506. https://doi.org/10.20525/ijrbs.v14i9.4601

Channa, I. A., Ashfaq, J., Gilani, S. J., Chandio, A. D., Yousuf, S., Makhdoom, M. A., & Jumah, M. N. bin. (2022). Sustainable and Eco-Friendly Packaging Films Based on Poly (Vinyl Alcohol) and Glass Flakes. *Membranes*, *12*(7), 1–14. https://doi.org/10.3390/membranes12070701

Chang, C. T., & Chen, Y. T. (2022). Environmental advertising and green consumption intention: The mediating role of emotional appeals and consumer environmental values. *Journal of Business Research, 140*, 66–75. https://doi.org/10.1016/j.jbusres.2021.10.062

Chang, C.-H., & Chen, Y.-S. (2022). Applying SOR model to green purchase intention in the context of environmental policy. *Journal of Cleaner Production, 368*, 133012. https://doi.org/10.1016/j.jclepro.2022.133012

Chen, X., Wang, C., & Li, Y. (2023). Green product packaging and sustainable consumption: A behavioral insight. *Journal of Environmental Management, 330*, 117052

Chen, S. Y., Lin, M. J. J., & Chang, H. C. (2023). Environmental values and *green packaging*: An extended SOR model. *Journal of Retailing and Consumer Services, 70*, 103117. https://doi.org/10.1016/j.jretconser.2022.103117

Deng, Y., & Yang, H. (2024). Green aesthetic packaging and sustainable brand image: Evidence from Chinese organic food sector. *Sustainability*, *16*(3), 1204. https://doi.org/10.3390/su16031204

Fransen, L. (2012). *Corporate social responsibility and global labor standards: Firms and activists in the making of private regulation* (1st Editio). Routledge

Ghazali, E. M., Soon, P. C., Mutum, D. S., & Nguyen, B. (2017). Health and cosmetics: Investigating consumers' values for buying organic personal care products. *Journal of Retailing and Consumer Services, 39*, 154–163. https://doi.org/10.1016/j.jretconser.2017.07.005

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2019). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). SAGE Publications.

Hsu, C. L., Chang, K. C., & Lin, T. T. (2020). Brand trust as a mediator of the relationship between consumer attitudes and purchase intentions toward green products. *International Journal of Environmental Research and Public Health, 17*(18), 6260. https://doi.org/10.3390/ijerph17186260

Igbomor, A. (2024). Eco-packaging and consumer intention: The mediating role of green brand image. *International Journal of Consumer Studies*, 48(1), 56–68.

Imani, N. A. C., Zakia, M., Permanadewi, I., Kusumaningrum, M., Fitrah, R. A. A., Harsya Pratama, G., Maharani, A., Muna, M. C., & Aulia, N. (2025). Awareness Campaign on Minimizing Single-Use Packaging to Support Sustainable Micro, Small, and Medium Enterprises in Mangunsari, Gunung Pati. *Kallandra: Knowledge for Society*, *2*(1), 26–31. https://journal.unnes.ac.id/journals/kallandra

Inggrid, P. T. R., & Yunus, U. (2024). Impact of Green Advertising and Packaging on Purchase Decisions via Green Perceived Value. *Ilomata International Journal of Social Science*, *5*(4), 1102–1119. https://doi.org/10.61194/ijss.v5i4.1354

Jaramillo, J. Á., Sossa, J. W. Z., & Mendoza, G. L. O. (2018). Barriers to sustainability for small and medium enterprises in the framework of sustainable development — Literature review. *Business Strategy and the Environment*, *28*(1), 512–524. https://doi.org/10.1002/bse.2261

Kirom, N. R., Sudarmiatin, S., & Hermawan, A. (2022). E-Commerce Strategy For Msme Innovation Development In The New Normal Era. *International Journal of Environmental, Sustainability, and Social Sciences*, *3*(1), 292–298.

Kı ymalı oğlu, A., Yetkiän Özbük, R. M., Aydın Ünal, D., Dirlik, O., & Akar, N. (2024). Unpacking Sustainable Packaging Through the Stimulus-Organism-Response Model: A Systematic Literature Review. *SAGE Open*, *14*(4), 1–23. https://doi.org/10.1177/21582440241302320

Kıymalıog˘lu, A., Ozbuk, R. M. Y., Unal, D. A., Dirlik, O., & Akar, N. (2024). Unpacking Sustainable Packaging Through the Stimulus-Organism- Response Model : A Systematic Literature Review. *SAGE Open*, *December*, 1–23. https://doi.org/10.1177/21582440241302320

Kosyak, A., & Popov, S. (2020). Analyzing Consumer Preferences for Green Products and Environmental Impact. *Journal of Energy and Environmental Policy Options*, *3*(4), 134–140. https://resdojournals.com/index.php/JEEPO/article/view/173

Lin, Y. T., & Niu, M. S. (2023). Understanding SMEs' behavioral intention to adopt eco-friendly packaging: An application of the S-O-R framework. *Sustainable Production and Consumption, 35*, 645–658. https://doi.org/10.1016/j.spc.2023.01.014

Li, X., Yang, Q., Qi, Z., Ma, C., Qi, S., & Ji, W. (2026). Unveiling the chain mediation model of sleep quality and fatigue in linking subjective exercise experience to depression in adolescent. *PLoS One*, *21*(4), 1–13. https://doi.org/10.1371/journal.pone.0333460

Mahmoud, M. A., Ibrahim, S. B., Ali, T. H., & Bleady, A. (2022). The role of green innovation on environmental and corporate performance: A stakeholder perspective. *Journal of Cleaner Production, 338*, 130604. https://doi.org/10.1016/j.jclepro.2022.130604

Mahmoud, M. A., Tsetse, E. K. K., Tulasi, E. E., & Muddey, D. K. (2022). *Green packaging*, environmental awareness, willingness to pay and consumers' purchase decisions. *Sustainability, 14*(23), 16091. https://doi.org/10.3390/su142316091

Memon, M. A., Thurasamy, R., Ting, H., & Cheah, J.-H. (2025). Purposive Sampling: A Review and Guidelines for Quantitative Research. *Journal of Applied Structural Equation Modeling*, *9*(1), 1–23. https://doi.org/10.47263/JASEM.9(1)01

Munawar, F., Widjajanta, B., & Yudanegara, A. (2025). Sustainable Gastronomy Practices in Evolving Markets : A Circular Economy Framework from Indonesian Culinary Enterprises. *International Journal of Sustainable Development and Planning*, *20*(11), 4877–4890. https://doi.org/10.18280/ijsdp.201127

Natalie, H. C., Bangsawan, S., & Husna, N. (2024). Driving Sustainable Business Performance : The Impact of Green Innovation on Food & Beverage SMEs in Bandar Lampung City. *International Journal of Business and Applied Economics (IJBAE)*, *3*(3), 371–384. https://doi.org/10.55927/ijbae.v3i3.9187

Nguyen Quoc, T., Nghiem Phuc, N., & Duong, N. H. (2025). Examining green packaging, branding, and eco-labeling strategies: The case of young consumers' perceptions and responses in F&B industry. *Cleaner and Responsible Consumption*, *16*(December 2024), 100258. https://doi.org/10.1016/j.clrc.2025.100258

Petrenko, B. L., Puzko, S., Lavrenenko, V., & Gernego, I. (2024). Fostering Sustainable Packaging Industry : Global Trends and Challenges. *European Journal of Sustainable Development*, *13*(2), 63–78. https://doi.org/10.14207/ejsd.2024.v13n2p63

Relifra, M. A., Eko, F. R., & Syafriani, O. (2025). Technological Innovation: Adoption Of Artificial Intelligence In Micro, Small, And Medium Enterprises (MSMES). *Jurnal*

Ilmiah Manajemen Bisnis Dan Inovasi, *12*(1), 162–176.

Rivas, A. A., Liao, Y., Vu, M., & Hung, C.-S. (2022). Toward a Comprehensive Model of Green Marketing and Innovative Green Adoption: Application of a Stimulus-Organism-Response Model. *Sustainability*, *14*(6), 1–17. https://doi.org/10.3390/su14063288

Sarma, S., & Banik, S. (2025). A study on evaluating the adoption and challenges of *green packaging* in select companies of Guwahati City. *Asian Journal of Sustainable Development, 12*(1), 44–57.

Sarstedt, M., Ringle, C. M., & Hair, J. F. (2022). Partial least squares structural equation modeling. In Homburg, C., Klarmann, M., & Vomberg, A. (Eds.), *Handbook of Market Research*. Springer. https://doi.org/10.1007/978-3-319-05542-8_15-2

Shaikh, M. J., & Hyder, M. (2023). Green Packaging as a Positive Catalyst for Green Environment: Implementation in Emerging Markets around the Globe. *Pakistan Journal of Humanities and Social Sciences*, *11*(1), 655–669. https://doi.org/10.52131/pjhss.2023.1101.0382

Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology, 29*(3), 309–317.

Slater, P., & Hasson, F. (2024). Quantitative Research Designs, Hierarchy of Evidence and Validity. *Journal of Psychiatric and Mental Health Nursing DEBATE*, *32*, 656–660. https://doi.org/10.1111/jpm.13135

Subhaktiyasa, P. G. (2024). PLS-SEM for Multivariate Analysis : A Practical Guide to Educational Research using SmartPLS. *EduLine: Journal of Education and Learning Innovation*, *4*(3). https://doi.org/10.35877/454RI.eduline2861

Sulastini, & Darmawi, A. (2022). MSME's Marketing Performance Measures: Examining The Role Of Innovativeness & Competitive Strategy. *Manajemen Bisnis*, *12*(02), 122–128. https://doi.org/10.22219/mb.v12i02.22231

Vafaei-Zadeh, A., Nikbin, D., Seong Zhen, K., & Hanifah, H. (2024). Exploring the determinants of green electronics purchase intention through the stimulus-organism-response model. *Social Responsibility Journal*, *21*(3), 473–497. https://doi.org/10.1108/SRJ-02-2024-0109

Wang, J., Li, G., & Luh, D. (2026). Influential factors shaping consumers' green packaging purchase intentions. *Frontiers in Psychology*, 16:1730088. https://doi.org/10.3389/fpsyg.2025.1730088

Wang, Y., & Karasik, R. (2022). Plastic Pollution Policy Country Profile: Indonesia. In *NI PB* (Issue February).

Yadav, R., & Pathak, G. S. (2022). Young consumers' intention towards buying green products in a developing nation: Extending the theory of planned behavior. *Journal of Cleaner Production, 368*, 133012.