

FUNCTIONAL VERSUS ENVIRONMENTAL ATTRIBUTES IN SUSTAINABLE FOOD PACKAGING PREFERENCES: EVIDENCE FROM INDONESIAN UNIVERSITY STUDENTS USING ANALYTICAL HIERARCHY PROCESS (AHP)

Norma Ayu Elvina^{1*}, Evi Gravitiani², Sarjiyanto³, Azka Fikriyyah⁴

¹⁴Master Program in Economics and Development Studies, Universitas Sebelas Maret, Indonesia

²³Department of Development Economics Studies, Universitas Sebelas Maret, Indonesia

*Email corresponding author: normaayuelvina14@student.uns.ac.id

Abstract

The increasing use of food packaging has contributed significantly to plastic waste generation and environmental degradation. Environmentally friendly food packaging has emerged as a potential solution to reduce environmental impacts while maintaining the primary functions of packaging. Understanding consumer preferences for eco-friendly food packaging attributes is essential for supporting the development of packaging that aligns with consumer needs and sustainability principles. Therefore, this study aims to determine the priority attributes of environmentally friendly food packaging based on university students' preferences using the Analytical Hierarchy Process (AHP). Data were collected from 12 university students who had experience using food packaging and were aware of environmental sustainability issues. The analysis was conducted using Expert Choice 11 software to determine the priority weights of each criterion and sub-criterion. The results indicate that functionality is the most important attribute in selecting environmentally friendly food packaging, followed by material, price, and appearance. At the sub-attribute level, maintaining food quality was identified as the highest priority, followed by ease of carrying, leak-proof durability, and microwaveability. Regarding material attributes, reusable packaging was the most preferred alternative, while conventional plastic packaging received the lowest preference. These findings suggest that although students value environmental sustainability, functional utility remains the primary consideration in packaging selection. This study contributes to the sustainable consumption literature by highlighting the trade-off between functional and environmental considerations in consumer preferences for eco-friendly food packaging. The findings provide practical insights for packaging developers and food businesses in designing packaging solutions that balance functionality and sustainability.

Keywords: Eco-Friendly Food Packaging, Consumer Preferences, Analytical Hierarchy Process, Sustainable Consumption, University Students

INTRODUCTION

Environmental issues have been among the most pressing challenges worldwide due to the increasing production of plastic waste. The increase in plastic waste production is driven by the growth of a consumption society that generates large amounts of waste plastic (OECD, 2022). This condition is exacerbated by rapid urbanization, population growth, lifestyle changes that prioritize practicality, development and service delivery, and foods that encourage the use of packaging in large amounts. Packaging plays a crucial role in protecting products, maintaining food quality, facilitating transportation, and providing information to consumers. However, the use of single-use packaging has significantly contributed to environmental degradation by accumulating waste in landfills, waterways, and marine ecosystems (Versino et al., 2023a). The persistence of plastic in the environment, its low recycling rate, and its potential to produce microplastics that can harm ecosystems and human health make single-use packaging highly problematic. Plastic packaging is a

serious environmental problem because it is difficult to decompose naturally, has a low recycling rate, and can produce microplastics that pollute the environment and threaten human health and ecosystems (Kadac-Czapska et al., 2023; Ziani et al., 2023).

One sector that contributes significantly to the increase in plastic waste is the food sector (Arijeniwa et al., 2024). The rapid growth of online food delivery services, the rise in ready-to-eat consumption, and the increasing demand for ready-to-eat products have driven the widespread use of single-use packaging (Cruecha-Em et al., 2025). The rapid growth of online food delivery services has made the food sector one of the largest contributors to packaging waste, especially plastic packaging. Several studies have shown that the development of food delivery services has significantly increased the use of single-use containers, thereby increasing the environmental impacts of the production, consumption, and disposal of packaging (Zhuo et al., 2023). The accumulation of this packaging waste has further raised concerns about environmental sustainability and driven various efforts to develop packaging alternatives that are more environmentally friendly, economically viable, and acceptable to the public (Herrmann et al., 2022).

The use of sustainable food packaging is gaining attention as a solution to reduce environmental impacts without compromising packaging's primary function, in an effort to address plastic packaging waste (Cruecha-Em et al., 2025). Sustainable packaging is a packaging system designed to minimize negative environmental impacts throughout its life cycle, from production to use and disposal (Mudgal et al., 2024). This concept emphasizes efficient use of resources, waste reduction, packaging reuse, recycling processes, and the use of renewable or biodegradable materials (Gavrilescu et al., 2023). In addition, sustainable packaging aligns with the principles of a circular economy, which encourages sustainable resource utilization through reuse, recycling, and material recovery, thereby reducing dependence on a linear economic model that currently generates substantial waste (Fiałkowska-Filipek et al., 2026). Various studies have shown that the application of sustainable packaging not only contributes to reducing environmental pollution but also supports more responsible production and consumption patterns as reflected in the Sustainable Development Goals (SDGs), especially Goal 12 on responsible consumption and production (Kumar et al., 2025).

Despite the growing development of sustainable packaging, consumer acceptance remains a critical factor in its successful implementation. Packaging attributes influence consumer purchasing decisions and determine consumers' willingness to adopt environmentally friendly alternatives. Therefore, understanding consumer preferences toward eco-friendly food packaging is essential for developing packaging solutions that meet both sustainability objectives and consumer expectations.

Previous studies have examined sustainable packaging from various perspectives, including environmental awareness, green purchasing behaviour, and consumer acceptance of sustainable products. However, limited studies have investigated how consumers prioritize eco-friendly packaging attributes when functional and environmental considerations must be evaluated simultaneously. In particular, there remains limited understanding of the trade-off between functional and environmental utility in consumer decision-making regarding sustainable packaging. Therefore, this study aims to identify the priority attributes of eco-friendly food packaging among university students using the Analytic Hierarchy Process (AHP).

This study contributes to the sustainable packaging literature by examining the relative priority of eco-friendly food packaging attributes and identifying the trade-off between functional utility and environmental utility in consumer decision-making. Unlike previous studies that primarily focused on environmental awareness, purchase intention, or consumer acceptance of sustainable products, this study applies the Analytic Hierarchy Process (AHP) to evaluate the relative importance of packaging attributes from the perspective of university students. The findings are expected to enrich understanding of consumer preferences in sustainable consumption research and provide practical insights for packaging developers and food businesses to design eco-friendly packaging solutions that effectively balance functionality and sustainability.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Consumer Preference Theory

Consumer decision-making can be explained through Consumer Preference Theory. This theory suggests that consumers tend to choose products that provide the greatest utility or value according to their perceptions and preferences (Lancaster, 1966). Rather than evaluating products as a whole, consumers assess the attributes attached to a product and make decisions based on the perceived benefits of those attributes. In the context of eco-friendly food packaging, consumers may evaluate various attributes, including packaging functionality, material characteristics, durability, ease of use, visual appearance, environmental friendliness, and price. Each attribute may have varying levels of importance depending on consumer needs and preferences (Cruecha-Em et al., 2025; Larranaga & Valor, 2022). Therefore, consumer preferences are largely influenced by the attributes that are perceived as most capable of fulfilling their expectations. The higher the perceived value of an attribute, the greater the likelihood that it becomes a primary consideration in purchasing decisions.

Functional Utility and Environmental Utility

Based on Consumer Preference Theory and Sustainable Consumption Theory, consumer decisions regarding eco-friendly food packaging can be explained through two main mechanisms: functional utility and environmental utility. Functional utility refers to the ability of packaging to maintain food quality, protect products, ensure food safety, and provide convenience during use. Environmental utility refers to the ability of packaging to reduce environmental impacts through recyclability, reusability, biodegradability, or composability (Granato et al., 2022). Consumers may place different levels of importance on these two forms of utility, resulting in varying preferences toward packaging alternatives. Therefore, understanding the relative importance of functional and environmental utility is essential for evaluating consumer preferences for sustainable packaging (Herrmann et al., 2022).

Eco-Friendly Food Packaging Attributes

Eco-friendly food packaging refers to packaging designed to minimize environmental impacts throughout its life cycle while maintaining its primary functions (Kumar et al., 2025). Previous studies have identified several packaging attributes that influence consumer evaluations. Functionality is associated with the ability of packaging to protect food quality, ensure safety, and provide convenience during use (Sonck-Rautio et al., 2024). Material characteristics relate to environmental performance, including recyclability, reusability, and biodegradability. Price reflects affordability considerations, while appearance represents the visual attractiveness of packaging. Together, these attributes influence consumer preferences and purchasing decisions regarding sustainable packaging alternatives (Herrmann et al., 2022).

Research Gap

Several studies have examined sustainable packaging from different perspectives, including packaging material selection, circular economy implementation, adoption of sustainable packaging, and environmentally responsible consumer behaviour. A study by Cruecha-Em et al. (2025) investigated consumer and restaurant preferences for sustainable food packaging based on cost and functionality, while Ramadhanti et al. (2024) examined circular packaging purchasing behaviour among young Indonesian consumers using an SEM approach. A study by Rajendran & Ranjitharamasamy. (2024) focused on selecting the most sustainable circular packaging model, whereas Sabry et al. (2026) emphasized the selection of biodegradable materials for food packaging. In addition, Mudgal et al. (2024) and Versino et al. (2023) discussed sustainable packaging innovations and material selection strategies.

Although previous studies have provided valuable insights into sustainable packaging, most have focused on purchase intentions, consumer acceptance, environmental awareness, and packaging material selection. Limited attention has been given to understanding how consumers prioritize packaging attributes when functional and environmental considerations must be evaluated simultaneously. Consequently, there remains a gap in understanding the relative importance of packaging attributes and the trade-off between functional utility and environmental utility in consumer decision-making regarding eco-friendly food packaging. Understanding these priorities is essential for supporting businesses and policymakers in designing packaging solutions that are both environmentally sustainable and aligned with consumer preferences.

RESEARCH METHODS

This study employs a quantitative approach based on the Analytic Hierarchy Process (AHP) to prioritize sustainable food packaging attributes among university students. AHP was chosen because it is a multi-criteria decision-making (MCDM) method capable of systematically evaluating interests against multiple criteria through pairwise comparisons (Sabry et al., 2026; Stofkova et al., 2022). This method has been implemented in studies taking decisions because it can change the subjective evaluation into a weighted quantitative priority, allowing researchers to identify the most influential criteria in the decision-making process. Decision-making is done using AHP to evaluate the preferences of consumers who engage a number of attributes that simultaneously influence decision-making (Canco et al., 2021; Vaidya & Kumar, 2006; Yushila et al., 2026).

This study was conducted among university students in Surakarta, Indonesia. Students were selected because they represent a young consumer group that frequently uses food packaging in their daily activities and is increasingly exposed to environmental sustainability issues. Furthermore, students are considered future consumers who can influence sustainable consumption patterns and encourage the adoption of environmentally friendly products. (Barrera-Verdugo & Durán-Sandoval, 2024) Respondents were selected using purposive sampling based on several criteria: being active students, having experience purchasing packaged food products, and being aware of environmental issues related to sustainable food packaging.

A total of 12 respondents participated in this study. Use respondents as students in the study. This is based on the characteristics they share as a group of active consumers who use food service and ready-made food services. In addition, the group is a relatively new generation, more exposed to environmental sustainability issues, so it is relevant to evaluate preferences for environmentally friendly food packaging. AHP emphasizes the quality, expertise, and consistency of judgments rather than a large sample size. Unlike conventional statistical methods that require large sample sizes for generalization to the population, AHP focuses on obtaining reliable evaluations from knowledgeable respondents who understand the decision-making problem under analysis (Ishizaka & Labib, 2011; Saaty, 2008; Vaidya & Kumar, 2006; Wątróbski et al., 2023). Therefore, a relatively small number of respondents is considered acceptable, provided they can make consistent judgments (Ishizaka & Labib, 2011; Saaty, 2008). The selected students can be categorized as knowledgeable respondents because they frequently interact with food packaging in their daily consumption activities and have sufficient awareness of environmental sustainability issues. Furthermore, the purpose of this study was not to statistically generalize the findings to the entire student population, but to identify the relative importance of sustainable food packaging attributes based on consistent evaluations from respondents familiar with the research topic. This approach is consistent with previous AHP studies, which prioritized the quality of judgments over the quantity of respondents.

Primary data were collected through a structured questionnaire using paired comparisons based on a nine-point scale Saaty (2008). Respondents were asked to compare the relative importance of each attribute of sustainable food packaging, ranging from equal importance (1) to very important importance (9). The decision hierarchy developed in this study consists of three

levels. The first level represents the overall objective, which is to prioritize sustainable food packaging attributes. The second level consists of four evaluation criteria: functionality, material, price, and appearance. Functionality refers to the packaging's ability to protect food products and provide ease of use. Material refers to the packaging's environmental characteristics, including recyclability, biodegradability, and reusability. Price reflects consumers' perceptions of affordability and cost considerations, while appearance refers to the packaging's visual appeal and aesthetic characteristics. Structure hierarchy used in study This presented in Figure 1.

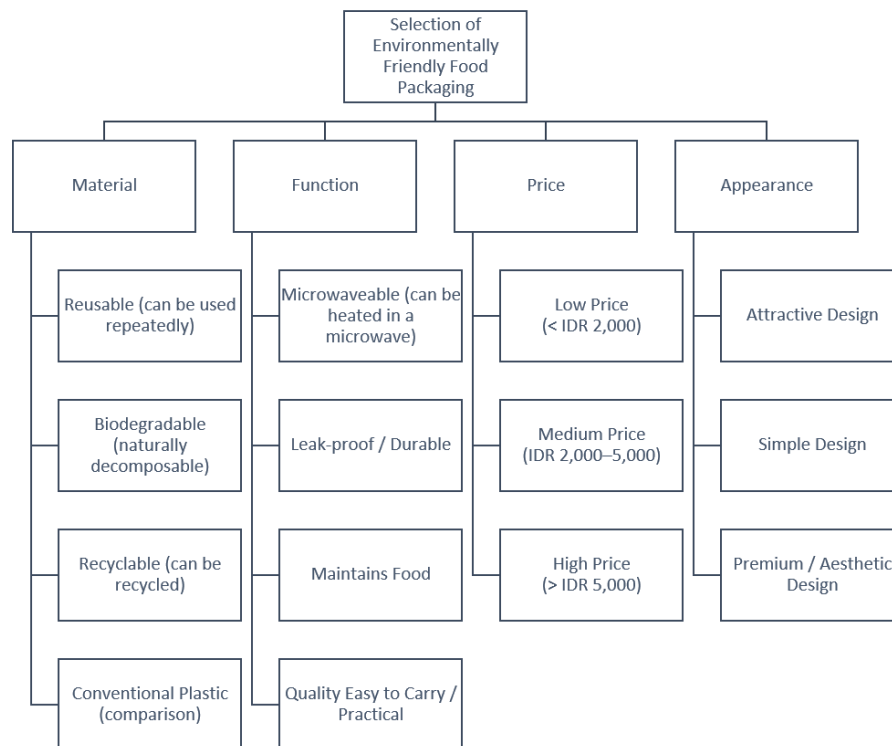


Figure 1. Structure Hierarchy

Source: Data Processed by the Author, 2026

Hierarchical Process Analytic implemented through a number of stages. First, the problem decision structured be a hierarchical model consisting of from objective research and criteria evaluation. Second, the matrix comparison in pairs built based on evaluation respondents about interest relatively from every criterion. Third, assessment individual combined use geometric mean method for produce matrix decision group. Geometric mean approach generally implemented in group AHP study Because in a way effective combine preference individual to in evaluation collective while maintain reciprocal nature from matrix comparison pairs. Next, the matrix combination normalized for count weight priority every criterion. Weight This represent interest relatively attribute packaging food sustainable from perspective students. For ensure reliability evaluation respondents, testing consistency done use Index Consistency (CI) and Consistency Ratio (CR). Index Consistency counted based on maximum eigenvalue from matrix comparison, whereas Ratio Consistency obtained with share Index Consistency with ratio consistency.

RESULTS AND DISCUSSION

Analysis priority factor done for identify attribute packaging food friendly the environment that is most considered by students in the process of taking decision. Based on Analytical Hierarchy Process (AHP) method, each factor compared to in a way in pairs for get level interest relatively to

objective research. The results of data processing produce weight priority for each factor consisting of on function, material, price, and appearance. Weight and order values priority every factor presented in Table 1.

Table 1. Priority Factors for Selecting Environmentally Friendly Food Packaging

Factor	Weight	Ranking
Function	0.636	1
Material	0.153	2
Price	0.121	3
Appearance	0.090	4
Consistency Ratio (CR) = 0.00569		

Source: AHP processed results, 2026.

Based on Table 1, the factors function is attributes that are most prioritized by students in choose packaging food friendly environment with weight of 0.636. This value Far taller compared to material factors (0.153), price (0.121), and appearance (0.090). Findings This show that although issue sustainability the more get attention, students still put aspect utility packaging as consideration main in taking decision.

Function packaging becomes priority main Because packaging No only play a role as wrapping, but also must capably protect food care quality, as well as give convenience in usage. In addition, the Consistency Ratio value obtained not enough from 0.10 shows that evaluation respondents nature consistency and results analysis can accepted. With thus, it can conclude that factor function is factor dominant influencing preference consumer in choose packaging food friendly environment.

Research result This in line with Consumer Preference Theory which states that consumer tend choose product based on attributes that provide benefit the biggest in accordance need They. Food packaging attributes have benefits reflected in the packaging's ability to protect food, maintain product quality, and provide ease of use. These findings also support research Cruecha-Em et al. (2025) showing that functional attributes remain a key consideration for consumers when choosing sustainable food packaging.

After identifying the priority of the main factors, the analysis continued at the subfactor level to identify the specific attributes that most influence students' preferences for environmentally friendly food packaging. Results of the global synthesis of subfactors presented in Table 2.

Table 2. Global Priorities of Subfactors

Subfactors	Global Weight	Ranking
Guard quality food	0.262	1
Easy brought	0.160	2
Leak-proof/ strong	0.137	3
Microwaveable	0.108	4
Reusable	0.063	5
Moderate price	0.050	6
Biodegradable	0.045	7
Cheap price	0.043	8
Premium/ aesthetic design	0.037	9
Recyclable	0.031	10
Attractive design	0.026	11
Simple design	0.017	12
High price	0.012	13
Conventional plastic	0.010	14
Consistency Ratio (CR) = 0.01		

Source: AHP processed results, 2026.

Based on Table 2, the subfactors guard quality food owns highest global weight of 0.262, followed by easy carried (0.160), leakproof or strong (0.137), and microwaveable (0.108). All subfactors the originate from factor function, which shows that aspect utility packaging becomes

consideration main student in choose packaging food friendly environment. Meanwhile that, plastic conventional own lowest global weight of 0.010 which indicates low preference respondents to potential packaging cause impact negative for environment. The Consistency Ratio value of 0.01 indicates that level consistency evaluation respondents is in the category can accepted Because still is below the maximum limit of 0.10. Forget greater understanding details about preference respondents, analysis furthermore done at the level subfactors in each factor main. Analysis This aim for identify the most prioritized attribute in the factor function, material, price, and appearance. Calculation results weight local subfactors use The AHP method is presented in Table 3.

Table 3. Priorities Sub-Factors Criteria Function

Sub-Factors	Weight
Guard quality food	0.393
Easy brought	0.240
Leak-proof/ strong	0.206
Microwaveable	0.162
Consistency Ratio (CR) = 0.01	

Source: AHP processed results, 2026.

On the factor function, subfactor guard quality food own mark priority highest of 0.393. Next followed by subfactors easy brought of 0.240, leak -proof or strong of 0.206, and microwaveable of 0.162. This indicates that consumers are very concerned about the packaging's ability to maintain food quality. In addition, the Consistency Ratio value of 0.01 indicates that the level of consistency of respondents' assessments is acceptable because it is below the maximum limit of 0.10. This finding is in line with Consumer Preference Theory which explains that consumers tend to give higher priority to attributes that can provide direct benefits according to their needs. In the context of food packaging, the ability to maintain food quality is the attribute that provides the greatest benefits and thus receives the highest priority level.

Table 4. Priorities Sub-Factors Material Criteria

Sub-Factors	Weight
Reusable	0.421
Biodegradable	0.300
Recyclable	0.210
Conventional plastic	0.069
Consistency Ratio (CR) = 0.00974	

Source: AHP processed results, 2026.

In the material factor, the reusable subfactor has mark priority highest of 0.421, followed by biodegradable (0.300), recyclable (0.210), and plastic conventional (0.069). This result show that student own trend for choose packaging that can used return compared to packaging very use. In addition, the Consistency Ratio value of 0.00974 indicates that evaluation respondents have fulfil level consistency that can accepted. Findings the support the concept of Sustainable Consumption Theory which explains that consumer start consider impact environment in activity consumption they. Preferences to reusable packaging shows existence awareness for reduce embossed waste and support practice more consumption sustainable.

Table 5. Priorities Sub-Factors Price Criteria

Sub-Factors	Weight
Currently	0.473
Cheap	0.410
Expensive	0.117
Consistency Ratio (CR) = 0.00411	

Source: AHP processed results, 2026.

On the factor price, category price currently becomes choice main with weight of 0.473, followed by price cheap (0.410) and expensive (0.117). These results show that student No always choose alternative with price lowest, but more consider balance between benefits obtained and

costs incurred issued. The Consistency Ratio value of 0.00411 indicates that results comparison paired on factors price nature consistent. Findings This in accordance with theory preference consumers who explain that consumer make an effort maximize utilities with consider the benefits and sacrifices provided by a product.

Table 6. Priorities Sub-Factors Criteria Appearance

Sub-Factors	Weight
Premium/ Aesthetic Design	0.464
Attractive Design	0.322
Simple Design	0.214
Consistency Ratio (CR) = 0.00616	

Source: AHP processed results, 2026.

Temporary that, on the factor appearance, premium design or aesthetic get mark priority highest of 0.464, followed by design interesting own value 0.322 and design simple own value of 0.214. Although factor appearance own lowest weight compared to factor others, results This show that fixed visual aspect's own role in form perception consumer to product. Packaging with more design interesting can increase Power pull product, although no become consideration main in election packaging food friendly environment. In addition, the Consistency Ratio value of 0.00616 indicates that evaluation respondents on factors the display also meets criteria consistency in AHP method.

Research result show that utilities functional own higher priority tall compared to utilities environment in the process of taking decision student related packaging food friendly environment. Findings This indicates that consumer No only notice aspect sustainability, but also prioritize ability packaging in protect food, care quality products, as well as give convenience use. Findings the in line with Consumer Preference Theory which states that consumer tend choose capable attributes give utilities the biggest in accordance need in the context of food packaging, this utility is reflected in the packaging's ability to maintain the safety and quality of food during storage, distribution, and consumption.

This research finding is supported by Cruecha-Em et al. (2025) findings that functional attributes are a key consideration for consumers and restaurants when choosing sustainable food packaging. The study showed that consumers still expect packaging that is practical, safe, and able to protect the product, even if it has environmentally friendly characteristics. Furthermore, a study on consumer preferences for innovative food packaging also showed that function, safety, and ease of use are the attributes consumers consider most when evaluating food packaging.

At the subfactor level, the dominant attribute of maintaining food quality indicates that students prioritize product safety and quality. This finding aligns with studies conducted by Versino et al. (2023) and Geueke et al. (2018) This article discusses the basic concepts of food packaging, emphasizing that the primary function of packaging is to protect the product from physical, biological, and chemical damage during distribution and consumption. Therefore, the application of environmentally friendly packaging cannot ignore its fundamental function as product protection.

In terms of material, the high preference for reusable packaging indicates a tendency among students to support more sustainable consumption practices. This finding supports the Sustainable Consumption Theory, which explains that consumers are starting to consider the environmental impact of their consumption activities. The preference for reusable packaging indicates that students not only consider personal benefits but also pay attention to the environmental consequences of using single-use packaging (Pani & Pathak, 2021). This result is in line with research Ramadhanti et al. (2024) showing that young Indonesian consumers have a higher tendency to accept the concept of circular packaging and support sustainability-oriented consumption practices.

The low preference for conventional plastics indicates students' increasing awareness of the environmental impact of packaging waste. This finding is consistent with research Bócoli et al.

(2025) dan Ziani et al. (2023) which shows that increasing awareness of plastic pollution and sustainability is encouraging consumers to switch to reusable, recyclable or biodegradable packaging alternatives.

Regarding price, students tend to choose packaging with a moderate price compared to cheap or expensive prices. This finding shows that consumer decisions are not always oriented towards the lowest price, but rather consider the balance between costs and benefits obtained (Cruecha-Em et al., 2025). These results support the theory of consumer preferences which explains that consumers seek to maximize utility through a combination of attributes that are considered most profitable. Similar findings were also found Prakash & Pathak. (2017) regarding sustainable packaging, which shows that consumers are willing to accept a slightly higher price if the packaging is able to provide clear functional and environmental benefits.

Temporary that, factor appearance gets higher priority low compared to function and material. Although thus, preferences to premium design or aesthetic show that fixed visual aspects play a role in form perception consumer to quality product. This result show that packaging food friendly an ideal environment for student No only must functioning with kind and friendly environment, but also has attractive design so that capable increase mark products in the eyes consumers. Findings This in line with study Herbes et al. (2024) And Silayoi & Speece. (2007) that state that design packaging contributes to perception quality and power pull product, although no become consideration main compared to function and security product.

In a way overall, research This find that preference student to packaging food friendly environment formed by a combination between consideration utility and sustainability. Students No only expect friendly packaging environment, but also want capable packaging operate function basically optimally. Findings This give implications that development packaging food sustainable need integrate aspect functional, environmental, economic, and aesthetic in a way balanced so that it can accepted by consumers young.

CONCLUSION

This study aimed to determine the priority attributes of eco-friendly food packaging based on university students' preferences using the Analytical Hierarchy Process (AHP). The results indicate that functionality is the most important attribute in the selection of eco-friendly food packaging, followed by material, price, and appearance. At the sub-attribute level, maintaining food quality emerged as the highest priority, while conventional plastic packaging received the lowest preference. In terms of material characteristics, reusable packaging was identified as the most preferred alternative. These findings suggest that students prioritize packaging that effectively performs its primary functions, such as protecting food, maintaining product quality, and providing convenience during use. At the same time, the preference for reusable materials indicates growing environmental awareness among young consumers.

The findings reveal a trade-off between functional and environmental considerations in the selection of eco-friendly food packaging. Although respondents demonstrated a preference for sustainable materials, attributes that directly influence functional utility remained the dominant consideration in the decision-making process. These findings support Consumer Preference Theory and Sustainable Consumption Theory by demonstrating that environmental concerns are important but do not replace the need for practical benefits and product functionality.

Practically, the findings provide useful insights for food businesses, packaging manufacturers, and service providers in designing environmentally friendly packaging solutions. Packaging development strategies should not only emphasize sustainability characteristics but also ensure that packaging maintains food quality, provides convenience, and satisfies consumer expectations regarding functionality. Therefore, balancing environmental performance and functional utility is essential for increasing consumer acceptance of sustainable packaging.

This study has several limitations. First, the number of respondents was relatively limited and consisted only of university students, which may restrict the generalizability of the findings to broader consumer groups. Second, the study relied on the AHP method, which focuses on priority assessment based on respondents' subjective judgments. Future research may involve more diverse respondent groups, including consumers from different age categories, occupations, and geographical regions. In addition, future studies could combine AHP with other approaches, such as SEM, conjoint analysis, or choice experiments, to provide a more comprehensive understanding of consumer preferences toward eco-friendly food packaging.

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