

SIMULATION MODEL OF MUHAMADIYAH FOOD PRODUCT BUYING INTEREST AS A SUSTAINABILITY BREAKTHROUGH

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Abstract

This study aims to determine the factors affecting the purchase interest of Muhammadiyah food products in Indonesia. SEM-PLS (Partial Least Squares–Structural Equation Modeling) software was used for data processing to further develop a simulation model of Muhammadiyah food product purchase interest. The hypothesis is that positive purchase interest will result in positive and stable green consumer behavior that can be seen in the next few years. The population of this study is all consumers in Indonesia. In this case, the sample used was 100 respondents. The results show that the developed simulation model can be a valuable reference for predicting stable purchase interest over the next few years. The implementation of this integrated strategy can increase consumer buying interest that not only buys products but also contributes to environmental sustainability and Islamic values. This model allows Muhammadiyah food product entrepreneurs to make the right decisions in effective marketing strategies that continue to provide value.

Keywords: Buying Interest, Green Product, Green Price, Brand Image, Simulation

INTRODUCTION

Sustainability breakthroughs refer to innovations or achievements that can change the way we address long-term environmental and social challenges. The importance of sustainability and the impact of consumed products on the environment (Jamal et al., 2021). Currently, entrepreneurs are maneuvering to process their products to be environmentally friendly, by implementing Green marketing. Green marketing refers to a company's efforts to produce and promote products or services that support environmental sustainability (Jamal et al., 2024). The concept of green marketing has become an innovation in the world of marketing, where companies use it not only to gain profits but also to meet consumer needs for environmentally friendly products (Adhimusandi et al., 2020). Consumers' desire to buy environmentally friendly products tends to increase due to their trust in these products (Dimilna et al., 2023). Muhammadiyah as an Islamic organization in Indonesia has a significant focus on sustainability in various aspects, including food products. Consumers' purchasing interest in environmentally friendly food products increases along with their level of influence and trust in these products (Prakash & Pathak, 2017). In research Chen dan Chang (2012), environmentally friendly food products are more attractive and of higher quality, thus potentially increasing their interest in making purchases. The problem that arises is that some consumers do not feel the urgency to switch to environmentally friendly food products. In this case, Muhammadiyah food products require several supporting factors that can influence buying interest, such as Green Product, Green Price and Brand Image.

In research Sari (2020), Green products significantly influence consumer purchasing intention, with brand image as a mediator. This study involved 450 respondents in Italy and showed that consumers are increasingly aware of environmentally friendly products. Green products are products produced using advanced technology, are environmentally friendly, and do not pollute or damage natural resources (Mauliza, 2020). In Green marketing, a strong brand image can be formed when a company consistently demonstrates a commitment to environmental sustainability. Companies that successfully build a brand image as an environmentally responsible brand tend to gain higher consumer trust and loyalty (Yasmeri & Sutrisna, 2021). In Indonesia, the Muhammadiyah organization has developed various food products as part of its strategy to strengthen community economic independence and food security. One example is MieMu, an instant noodle product made from moca, developed by the Muhammadiyah Economic and Entrepreneurship Council in Surakarta, which began production in early 2022 and was officially launched on January 27, 2022 (Nurhaliza & Sholahuddin, 2024). In addition, there is AirMu, a brand of bottled drinking water that has been developed in various regions, including Ponorogo, as part of Muhammadiyah's efforts to strengthen economic enterprises in the food sector (Putro & Candrakusuma, 2025). Muhammadiyah has also introduced BerasMu, an organic rice product cultivated by the Muhammadiyah Farmers Network (JATAM) (Suara Muhammadiyah, 2024). Another product is GulaMu, a liquid sugar made from cassava developed by the Muhammadiyah Community Empowerment Council (MPM PP Muhammadiyah) as an alternative to imported sugar cane (Muhammadiyah.or.id, 2021). The presence of these food products confirms Muhammadiyah's commitment to providing halal, healthy, and affordable food for the

community, while strengthening the community's economic independence. Currently, Muhammadiyah is trying to realize concern and comfort for the environment through green marketing efforts, especially in promotions.

In research Krisdayanti and Widodo (2022), green products, green prices, and brand image have a positive and significant influence on the interest in purchasing food products. As a determining factor in the interest in purchasing green products among young consumers in Malaysia. Green Products also include the use of raw materials that consider sustainability for future generations, while reducing waste both in the process and in the product life cycle (Mauliza, 2020). Consumer perception greatly influences a person's choice of Green Products, for example, which environmentally friendly products will be chosen (Jamal et al., 2025).

Green Price is the price consumers pay for environmentally friendly products. The costs incurred by the company in each of its activities as well as additional costs for technological updates, taking into account the impact of technology use, all impact pricing (Anjani & Perdhana, 2021). The findings Joshi and Rahman (2015), Price is considered a barrier and obstacle in obtaining environmentally friendly products before purchasing environmentally friendly products, consumers compare price and value. The higher the price of environmentally friendly clothing, the fewer people buy the product because it is more expensive than conventional clothing.

In research Jamal (2023), there is a combination of green products, pricing strategy, and brand image that influences the purchase of organic food products on purchasing behavior in Pakistan. Consumer assessment of how good a brand is is one aspect of brand image (Armanto et al., 2022). Research conducted Chaudhary and Bisai (2018), in assessing Brand Image, smart consumers usually look for several credible cues when evaluating a product's environmental claims.

Consumer buying interest is a consumer action indicated by the desire to buy or choose a particular product, which is based on their experience in choosing, using, and consuming, or even their desire for the product. Buying interest is a form of consumer behavior characterized by a strong desire to buy a particular item (Ardiana & Rafida, 2023). In research Jamal (2025), it was stated that green marketing has a positive and significant effect in shaping purchasing interest in cosmetic products. The findings Chen dan Chang (2012), stated that green brand image has mediated green marketing and purchase intention can be explained when the company implements this green marketing application to shape consumer perceptions about the brand's commitment to the environment. This positive perception then influences consumer purchasing intention.

This study aims to identify factors influencing buying interest of Muhammadiyah food products in Indonesia. Partial Least Squares–Structural Equation Modeling (SEM-PLS) software was used for data processing, followed by the development of a simulation model for purchase intention of Muhammadiyah food products. The hypothesis is that positive purchase intention will result in positive and stable green consumer behavior, which can be observed over the next few years. The results indicate that the developed simulation model

can be a valuable reference for predicting stable purchase intention over the next ten years. This model enables Muhammadiyah food product entrepreneurs to make informed decisions regarding effective marketing strategies that continue to deliver value. This research supports Sustainable Development Goal (SDG)-9, namely Industry, Innovation, and Infrastructure.

The uniqueness of the research context lies in the limited research on food products associated with organizational identities such as Muhammadiyah compared to general consumer behavior studies. This creates a research gap that can contribute to the marketing and consumer behavior literature.

REVIEW OF LITERATURE

A conceptual model will be created regarding the factors driving buying interest in Muhammadiyah food products. According to research Jamal et al. (2024), green products play a role in energy savings and contribute to environmental conservation by reducing waste that can cause pollution. The more consumers know about environmentally friendly products, the better they understand their functions and environmental properties (Jamal et al., 2025).

Based on the explanation above, it can be hypothesized that green products have a significant positive effect on buying interest in Muhammadiyah food products (H1). Research Yue (2020) found that green prices can increase consumer willingness to purchase environmentally friendly products. According to Bhutto et al. (2020), green prices influence buying interest in environmentally friendly hybrid vehicles.

Based on the explanation above, it can be hypothesized that green prices have a significant positive effect on buying interest in Muhammadiyah food products (H2). According to research Jamal (2023), a strong brand image is an important factor in encouraging consumers to increase purchase interest. Brand image refers to the image formed in consumers' minds regarding a brand, which is based on memories and associations that develop over time (Yasmeri & Sutrisna, 2021).

Based on the explanation above, it can be hypothesized that Brand Image has a significant positive effect on buying interest in Muhammadiyah food products (H3).

From the proposed hypothesis that has been put forward above, Figure 1 is a design of the conceptual research model.

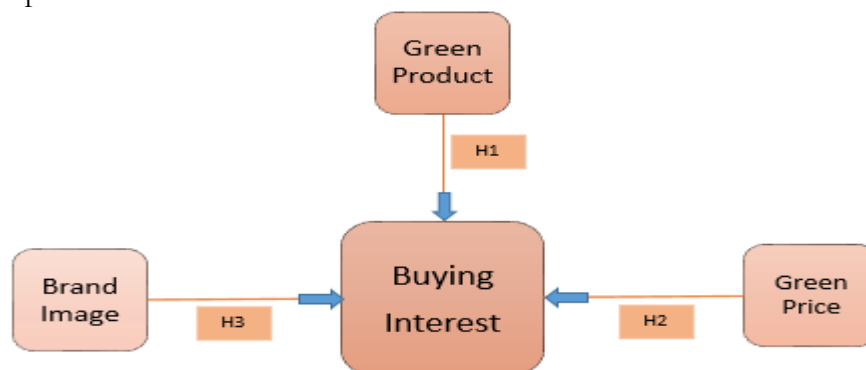


Figure 1. Conceptual Model
Source : Result Analysis Results (2026)

This research presents a state-of-the-art model of consumer behavior simulations related to Muhammadiyah product buying interest, which will be evident in the coming years. The simulated consumer behavior model for Muhammadiyah products offers various strategic benefits that can provide valuable insights for long-term development. This research's novel contribution is the integration of green marketing dimensions and Islamic brand image to increase green product purchase intentions.

Based on previous research, research linking food products to organizational identity, such as Muhammadiyah, is still rare. Previous research rarely focuses specifically on large Islamic community organizations like Muhammadiyah, Nahdatul Ulama, or similar organizations. Yet, these organizations possess extensive networks, complex charitable endeavors, and significant influence on society. Given that Muhammadiyah is the largest Islamic organization in Indonesia with millions of members, understanding their consumption patterns has significant theoretical and business implications. This creates a research gap that could make new contributions to the marketing and consumer behavior literature.

RESEARCH METHOD

Population, Sampling and Data Collection

The population of this study is all consumers in Indonesia. In this case, the sample used was 100 respondents. The sampling technique used in this study was purposive sampling. Purposive sampling is a sampling technique in research conducted by selecting subjects based on certain criteria that have been determined by the researcher (Sugiyono, 2021). Sampling locations were spread throughout Indonesia. The selection of these locations was based on the desire to determine of buying interest in Muhamadiyah food products in Indonesia, which according to the researcher has a high consumption rate and a fairly large population.

In this study, the method used is a questionnaire. The questionnaire used has a list of statements related to the research and is arranged with answer choices in the form of a Likert scale. To validate the data, three expert judges provided assessments, namely from academics, Environmental Organizations, and entrepreneurs. Data obtained from expert judgements were processed using the Geomean function in Microsoft Excel. There is a geomean data table connected to Microsoft Excel that will display input data along with relevant variables and indicator values. This type of quantitative research includes data collection, analysis, and interpretation, as well as documentation.

Variable and indicators

Based on the conceptual design of the model, Table 1 will show the variables and indicators used in this study.

Table 1.
Variables and indicators

No	Variable and Indicator	Code Item
1	Brand Image	BI
	easy to recognize	BI1
	creator image	BI2
	product image	BI3
2	Green Product	GP
	product safety	GP1
	product provision	GP2
	product supply environment	GP3
3	Green Price	GR
	willingness to pay	GR1
	value perception	GR2
	price reasonableness	GR3
4	Buying Interest	MB
	desire	MB1
	positive traits	MB2

Source: Result Analysis Results (2026)

Data Analysis Technique

The analysis method used in this study is quantitative. The data analysis process includes data preparation, initial exploration, selection of two analysis techniques using SEM-PLS (Partial Least Squares–Structural Equation Modeling) and Simulation (dynamic systems), followed by analysis implementation, interpretation of results, and concluding. The two data analysis methods are as follows:

1. Partial Least Squares–Structural Equation Modeling (SEM-PLS).

SEM is a field of statistical research that allows testing a range of relationships that are relatively difficult to measure simultaneously. PLS is a structural equation model based on components or variance (Ghozali, 2021). SEM-PLS software version 4.0 to analyze data. This method includes the following stages: (1) Outer Model Analysis, (2) Inner Model Analysis, and (3) Hypothesis Testing.

2. Simulation

System dynamics is a widely used method for predicting systems and developing new strategies based on the predictions (Barati et al., 2019). The first step is to create a causal loop diagram (CLD) based on the conceptual model and continue to create diagrams for simulations. The input for constructing the CLD comes from the SEM-PLS variables. a simulation model is developed using Powersim software to obtain the exact values of each variable over a range of years (Grigsby, 2017). Researchers conducted simulations using Powersim 9 software for system dynamics. This study required approximately three expert assessments through questionnaires to validate the data. These included experts from environmental organizations (R1), entrepreneurs (R2), and academics (R3). The data obtained from the expert assessments were processed using the GEOMEAN data.



RESULTS AND DISCUSSION

Structural Equation Model with the PLS

Measurement Model (Outer Model)

Outer model testing is conducted to determine the validity and reliability values of each indicator in each variable. In validity testing, there are two tests, namely, convergent validity and discriminant validity.

1. Validity test

Table 2 demonstrates the results of validity tests on key research variables used in the study. Some indicators for each variable have been eliminated since their loading factor value is less than 0.7.

Table 2.
Validity Test Result

	BI	GP	GR	MB
BI1	0.867			
BI2	0.831			
BI1	0.868			
GP1		0.831		
GP2		0.840		
GP3		0.867		
GR1			0.932	
GR2			0.909	
GR3			0.865	
MB1				0.819
MB2				0.889

Source: Result Analysis Results (2026)

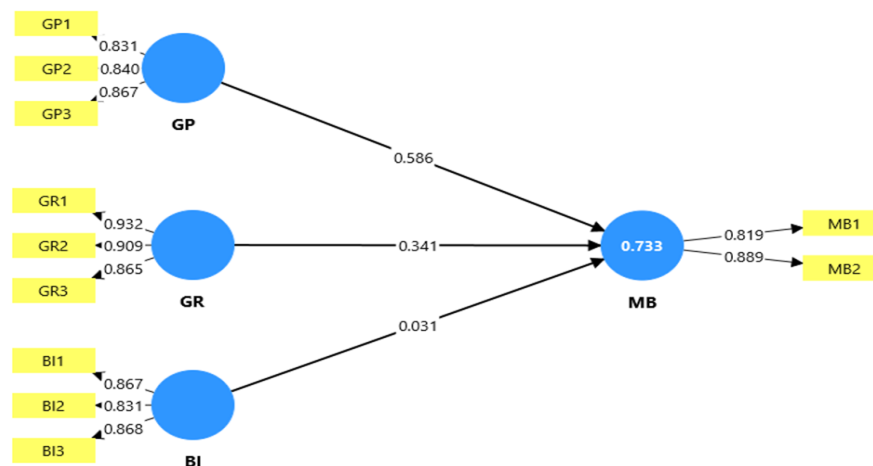


Figure 2. Outer Model

Source: Result Analysis Results (2026)

Table 1 and Figure 2 demonstrate the results of validity tests on key research in this study. Each variable is valid when its loading factor value exceeds 0.7.

2. Reliability test

The PLS algorithm can be evaluated as a reliability value based on output calculation. An instrument is considered dependable if the Cronbach's alpha value exceeds 0.6 and the composite reliability is more than 0.7. Based on this value, they were displayed table 3 below shows that all data in this study are reliable.

Table 3.
Reliability Test Result

	Cronbach's alpha	Composite Reliability (rho_c)	Average variance extracted (AVE)
BI	0.821	0.891	0.732
GP	0.816	0.883	0.716
GR	0.886	0.929	0.815
MB	0.635	0.844	0.731

Source: Result Analysis Results (2026)

Structural Model (Inner Model)

Evaluation of the inner model structural model can be evaluated using the R-square test for the dependent variable and the t-test, as well as the significance of the structural path coefficients (parameters).

1. R-Square

The coefficient of determination can be seen from the R-squared value. Table 4 shows the R-square results.

Table 4.
R-Square

	R-square	Adjusted R-square
MB	0.733	0.725

Source: Result Analysis Results (2026)

The R-square value is used to assess the predictive power of the structural model in SEM-PLS analysis. R-square values of 0.25, 0.50, and 0.75 indicate that the model has weaknesses and strengths. The higher the R2 value, the better the prediction model and research model proposed. Based on Table 2, it is known that the R-square value of the Green Behavior variable is 0.902. This value shows that the variables Green Product, Green Price, and Brand Image. Environmental Awareness, Decisions of 73 %, and the remaining 27% are influenced by other

variables outside this research.

2. Hypothesis test

Based on PLS Bootstrapping output calculations using a standard T-statistic > 1.96 or P-value > 0.5 P-value, each hypothesis can be evaluated.

Table 5.
Hypothesis Test Result

	Original Sample (O)	Standard deviation (STDEV)	T statistic ($ O/STDEV $)	Nilai P (P values)
BI -> MB	0.031	0.071	0.438	0.662
GP -> MB	0.586	0.059	9.893	0.000
GR -> MB	0.341	0.093	3.677	0.000

Source: Result Analysis Results (2026)

The hypothesis testing results are presented in Table 5. First, Brand Image has a positive but insignificant effect statistically significant effect on buying interest ($p = 0.662 > 0.05$). Moreover, Green product shows a positive and statistically significant effect ($p = 0.000 < 0.05$). Furthermore, Green price has a positive and statistically significant ($p = 0.000 < 0.05$).

Simulation

The simulation design was created based on selecting significant indicators for the three variables. The design is in the form of a model for buying interest obtained from analysis using SEM-PLS. A CLD was constructed based on the findings of the research model described above. The flow diagram for the buying interest Model in a System Dynamics framework is presented in Figure 3, while the input values for this flow diagram are detailed in Table 6.

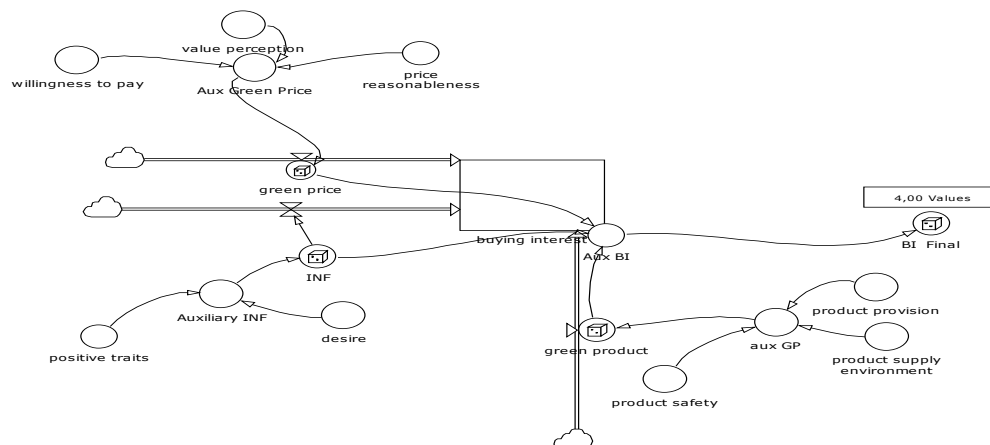


Figure 3. Flow Diagram

Source: Result Analysis Results (2026)

Table 6.
Data of Expert Judgement Result and Geomean

No	Variable	R1	R2	R3	Geomean
1	Brand Image	2	3	3	3
2	easy to recognize	2	3	3	3
3	creator image	3	2	3	3
4	product image	3	2	3	3
5	Green Product	2	3	3	3
6	product safety	2	3	3	2
7	product provision	3	3	3	3
8	product supply environment	3	2	2	2
9	Green Price	2	3	3	3
10	willingness to pay	3	3	2	3
11	value perception	3	3	3	3
12	price reasonableness	3	2	2	2
13	Buying interest	2	3	2	2
14	desire	2	3	3	3
15	positive traits	2	3	3	3

Source: Result Analysis Results (2026)

Simulation result

The simulation results were obtained from models that were run over a period of 10 years. These results, as outlined below, are illustrated in Figure 4.

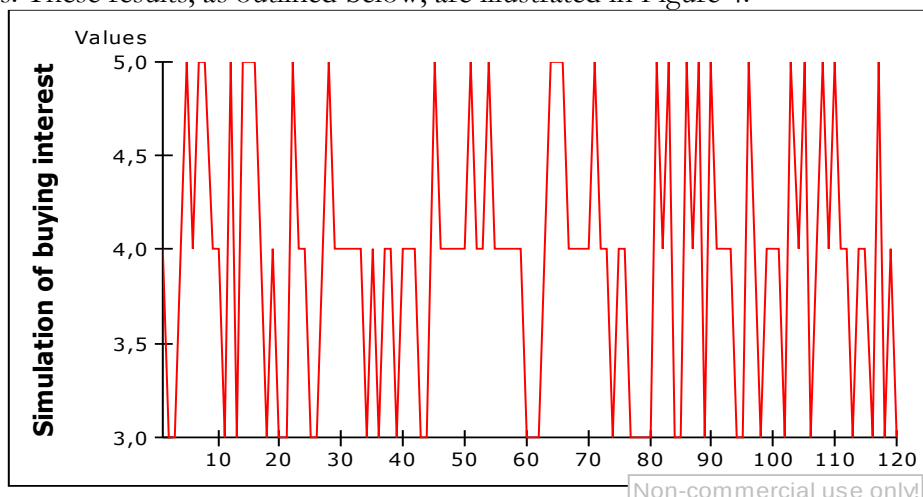


Figure 4. Simulation Result

Source : Result Analysis Results (2026)

Simulation Model of Muhammadiyah ...

The study simulated the time required to model a buying interest over 10 years. From the simulation results, the researchers can conclude that the value does not always rise or fall. The calculation results have a minimum value of three and a maximum value of five. The buying interest reaches a stable level at a value of three to five, which is carried out in a stable state for the next 10 years. A stable state is a state in which the system is in equilibrium, no longer changing over time, or stable (Grigsby, 2017). Scenario design can provide companies with actionable advice to make the right buying interest.

Discussion

Based on various tests resulting from the data presentation and researcher discussions, the following conclusions that green product and green price influence purchase intention for environmentally friendly products. The t-statistic for this variable relationship is greater than 1.96, and the p-value is less than 0.05. Consumers in general, especially those affiliated with Muhammadiyah, will consider not only the environmentally friendly aspect but also the product's halal assurance. The perception that environmentally friendly products align with Islamic values (such as the concept of maqashid sharia and preserving the earth as a mandate) can strengthen buying interest. Consumer perceptions significantly influence a person's choice of green products, for example, which environmentally friendly products they choose (Jamal et al., 2025).

Research shows that green prices have a positive influence on consumer willingness to purchase Muhammadiyah environmentally friendly food products. Consumers are willing to pay a premium price for environmentally friendly food products, provided they understand the added value gained in terms of sustainability and health. Research Yue et al. (2020) found that green prices can increase consumer willingness to purchase environmentally friendly products. Muhammadiyah food products can utilize a green pricing strategy by communicating environmental benefits, halal and thayyib certification, and social contributions to increase perceived value. Educate consumers about higher production costs but positive environmental impacts.

While the insignificant results for brand image do not necessarily mean this study is a failure. The lack of a significant effect could be due to the indicators used not reflecting the actual situation. Therefore, retesting is necessary in future research. The insignificant variable is brand image. Consumers of Muhammadiyah food products may prioritize other factors such as price, taste, halal certification, or ease of access over environmental friendliness. There is still a need to explicitly integrate environmental values into their brand image. Brand image refers to the image formed in consumers' minds regarding a brand, which is based on memories and associations built over time (Yasmeri & Sutrisna, 2021).

Companies must be equipped to provide consumers with knowledge about environmentally friendly products so they can easily understand the purpose of the company's environmentally friendly products. From the simulation results, the calculation results have a minimum value of three and a maximum value of five. The decision to purchase environmentally friendly products reaches a stable level at a value of three to five,

then the predicted value of the decision buying interest environmentally friendly products is collected annually and reaches a stable point over the next 10 years. The simulation results can be a guideline for companies implementing marketing strategies in the form of positioning muahamadiyah food products as premium products with added value (halal, environmentally friendly, blessings) justifying slightly higher prices while remaining affordable.

CONCLUSION

In examining the factors related to the buying interest of Muhammadiyah Food Products in Indonesia, a simulation model of Muhammadiyah food product purchase intention was developed. It can be seen that positive purchase intention will result in good and stable green consumer behavior and can be seen in the next few years. The results show that the developed Simulation Model can be a valuable reference for predicting stable purchase intention over the next ten years. The implementation of this integrated strategy can increase consumer of buying interest that not only buys products but also contributes to environmental sustainability and Islamic values. This model allows Muhammadiyah food product entrepreneurs to make the right decisions in effective marketing strategies that continue to provide value. This research supports Sustainable Development Goals (SDGs) in the form of Industry, Innovation and Infrastructure. This research contributes to the scientific foundation by providing knowledge to scientists to develop and utilize. Further research can integrate other supporting factors and suggest improvements to this model. Consumption behavior is more influenced by social, psychological, and sustainability values than by economic capabilities.

Theoretically, the research results strengthen the Theory of Planned Behavior and Value-Belief-Norm Theory by demonstrating the important role of attitudes and beliefs in bridging knowledge and sustainable behavior. Practically, this research has implications for green industry players. skincare to emphasize consumer education, brand transparency, and marketing strategies through social media. The limitations of this study lie in the use of online survey methods and the focus on Generation Z in Indonesia. Therefore, future studies are recommended to expand the sample across generations or use a mixed approach methods to gain a deeper understanding of sustainable consumption behavior.

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