Binus Business Review, 16(3), November 2025, 303−317
DOI: 10.21512/bbr.v16i3.13388
P-ISSN: 2087-1228
E-ISSN: 2476-9053

Ecolabeling, Green Advertising, and Branding: Drivers of Green Purchasing Behavior Among Generation Z

Amaris Sih Kinanthi[1]*; Damayanti Octavia[2]

[1,2]Department of Business Management, Faculty of Economics and Business, Telkom University
Jawa Barat, Indonesia 40257
[1]maltycube@student.telkomuniversity.ac.id;
[2]damayantioctavia@telkomuniversity.ac.id

Received: 18th April 2025/ **Revised:** 26th August 2025/ **Accepted:** 26th August 2025

How to Cite: Kinanthi, A. S., & Octavia, D. (2025). Ecolabeling, green advertising, and branding: Drivers of green purchasing behavior among Generation Z. *Binus Business Review, 16*(3), 303−317.
https://doi.org/10.21512/bbr.v16i3.13388

ABSTRACT

Generation Z is highly aware of sustainability and environmental issues, yet skepticism toward sustainability claims and the prioritization of product quality and price pose challenges to green marketing effectiveness. The research examined the influence of green marketing strategies on Generation Z's consumer behavior in influencing green purchasing behavior. The research explored three key elements of green marketing: ecolabeling, green advertising, and green branding. It also assessed the mediating roles of environmental knowledge and green consumption in shaping green buying behavior. A quantitative survey was conducted among 400 Generation Z consumers in Indonesia, and the data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings reveal that green marketing strategies significantly impact environmental knowledge, which subsequently influences green consumption and green buying behavior. Transparency in sustainability claims, clear communication of product benefits, and consumer education on environmental issues are essential in fostering trust and engagement. The research offers originality by integrating environmental knowledge and green consumption as mediators in a Generation Z context, providing new empirical insights into how green marketing strategies influence this demographic. It contributes theoretically to consumer behavior literature and offers practical implications for businesses to design marketing strategies that appeal to environmentally conscious consumers. Companies aiming to attract Generation Z must prioritize transparency, consumer education, and engagement to build trust and long-term loyalty. Future research can explore the role of digital marketing and social media in enhancing green consumerism among younger generations.

Keywords: ecolabeling, green advertising, green branding, green purchasing behavior, Generation Z

INTRODUCTION

Green marketing integrates environmental concerns into marketing strategies to encourage consumers to choose eco-friendly products (Ali, 2021). Unlike traditional marketing, which focuses primarily on consumer demand and profit maximization, green marketing seeks to align business practices with sustainability by promoting products that minimize environmental impact (Osiako et al., 2022; Skackauskiene & Vilkaite-Vaitone, 2023). Through strategies such as ecolabeling, green branding, and green advertising, companies aim not only to enhance their corporate image but also to foster environmental awareness and drive responsible consumption.

Generation Z, commonly defined as individuals born between 1995 and 2012 (Barhate & Dirani, 2022; Gabrielova & Buchko, 2021; Gentina, 2020), has emerged as a key target of green marketing efforts because of its strong environmental values and demand for brand transparency. This cohort is more likely to support brands that implement sustainable practices (Geng & Maimaituerxun, 2022). However, it often remains skeptical toward marketing efforts perceived

*Corresponding Author

as disingenuous or profit-driven (Shao et al., 2023). When green claims appear self-serving, they can erode consumer trust and damage brand credibility (Reich & Soule, 2016 in Shao et al., 2023).

Despite their environmental awareness, Generation Z consumers frequently weigh factors such as price, convenience, and product quality more heavily than sustainability in their purchasing decisions. Their willingness to pay a premium price for green products is often limited by cost sensitivity and a perceived lack of quality differentiation (Gomes et al., 2023). A further obstacle lies in limited environmental knowledge, which reduces confidence in eco-friendly claims (Ali, 2021). The scarcity of practical green alternatives, such as the widespread use of paper straws, which are often viewed as inconvenient, also hampers behavior change (MacRae, 2024). Moreover, perceptions and attitudes may influence green purchasing more strongly than factual environmental knowledge (Natakoesoemah & Adiarsi, 2020).

Then, superficial environmental messaging tends to heighten skepticism. Green products are frequently perceived as expensive yet inferior, and marketing campaigns that lack clear value propositions are easily dismissed (Octavia, 2012; Octavia & Sari, 2018). To engage this generation effectively, companies must integrate sustainability with compelling product attributes, including quality, ease of use, and authentic communication.

Beyond shaping attitudes, green marketing plays a critical role in increasing environmental knowledge. When consumers are provided with credible information about the benefits and ecological impact of products, they are more likely to make informed and responsible choices (Geng & Maimaituerxun, 2022; Nguyen-Viet, 2023). Tools such as ecolabelling, green branding, and targeted advertising can function as educational mechanisms that enhance understanding and encourage sustainable consumption behavior.

Based on the foregoing discussion, the research aims to investigate the relationship between green marketing and three critical variables influencing sustainable consumer behavior among Generation Z: environmental knowledge, green consumption, and green buying behavior. The literature suggests that while Generation Z is generally environmentally conscious, their purchasing decisions are often moderated by price sensitivity, perceived product quality, and skepticism toward green marketing claims (Gomes et al., 2023). Therefore, green marketing plays a dual role. It is not only a strategic communication tool but also an educational mechanism that can enhance environmental knowledge and shape sustainable consumption patterns (Ali, 2021; Geng & Maimaituerxun, 2022). However, the extent to which green marketing efforts effectively translate into actual green purchasing behavior remains underexplored, particularly within this demographic cohort. Hence, the research seeks to elucidate how green marketing influences environmental awareness and consumption behavior, offering insights into its effectiveness in fostering genuine behavioral change rather than mere attitudinal shifts. The following hypotheses are proposed:

H1: Green marketing has a positive effect on environmental knowledge,
H1a: Ecolabeling has a positive effect on environmental knowledge,
H1b: Green advertising has a positive effect on environmental knowledge,
H1c: Green branding has a positive effect on environmental knowledge.

According to Ali (2021), green marketing significantly influences consumer green buying behavior by emphasizing the sustainability aspects of products. One of the key elements of green marketing is ecolabeling, which helps consumers identify eco-friendly products through credible certifications, enhancing trust and purchasing decisions (Kabaja et al., 2023). Additionally, green advertising effectively communicates environmental benefits, although its success depends on consumer awareness and skepticism levels (Krstić et al., 2021). Green branding, on the other hand, focuses on building an environmentally responsible brand image, fostering consumer loyalty toward green products (Chen & Chiu, 2016 in Krstić et al., 2021). Previous research by Sembiring (2021) also highlights that green marketing strategies, including promotions, distribution, and green pricing, can increase consumer interest in purchasing eco-friendly products in Indonesia. Therefore, the research proposes the following hypotheses:

H2: Green marketing has a positive effect on green buying behavior,
H2a: Ecolabeling has a positive effect on green buying behavior,
H2b: Green advertising has a positive effect on green buying behavior,
H2c: Green branding has a positive effect on green buying behavior.

Next, green marketing is also effective in promoting sustainable consumption by encouraging consumers to choose environmentally responsible products as part of their lifestyle (Geng & Maimaituerxun, 2022). One essential element of green marketing is ecolabeling, which provides transparent information about a product's environmental impact, enabling consumers to make informed choices (Kabaja et al., 2023). Green advertising plays a significant role in shaping consumer preferences by highlighting the environmental benefits of products, although its impact depends on consumers' environmental awareness levels (Krstić et al., 2021). Additionally, green branding establishes a sustainability-oriented brand image, which fosters stronger consumer support for eco-friendly products (Chen & Chiu, 2016 in

Krstić et al., 2021). Green marketing plays a critical role in influencing sustainable consumption patterns by promoting values that attract consumers toward eco-friendly products (Ali, 2021). Thus, the research presents the following hypotheses:

H3: Green marketing has a positive effect on green consumption,

H3a: Ecolabeling has a positive effect on green consumption,

H3b: Green advertising has a positive effect on green consumption,

H3c: Green branding has a positive effect on green consumption.

Environmental knowledge is also a key determinant of green buying behavior. According to Dhir et al. (2021), individuals with greater environmental knowledge are more likely to choose green products because they understand their ecological benefits. It is also found that environmental knowledge strengthens consumer intentions and behaviors, particularly among those highly aware of environmental risks and the impact of their consumption choices (Saari et al., 2021). Hence, the following hypothesis is proposed:

H4: Environmental knowledge has a positive effect on green buying behavior.

Green consumption plays a significant role in shaping consumer purchasing decisions. Consumers who adopt green lifestyles are more inclined to purchase eco-friendly products (Reddy et al., 2023). It is also further emphasized that green consumption is a crucial determinant of purchasing behavior, as consumers who engage in sustainable practices are more likely to support environmentally friendly products (Nuryakin & Maryati, 2022). Based on these findings, the following hypothesis is formulated:

H5: Green consumption has a positive effect on green buying behavior.

Environmental knowledge is also expected to mediate the relationship between green marketing and green buying behavior. When consumers gain environmental awareness through green marketing efforts, they are more likely to engage in sustainable purchasing behaviors (Saari et al., 2021). Environmental knowledge strengthens the impact of green marketing on consumer behavior by making consumers more receptive to the benefits of eco-friendly products (Ali, 2021). Therefore, the research hypothesizes:

H6: Environmental knowledge positively mediates the relationship between green marketing and green buying behavior.

Green consumption also mediates the relationship between green marketing and green buying behavior. According to Ali (2021), green marketing fosters sustainable consumption patterns, which in turn influence the adoption of green products. Then, green consumption reinforces the link between green marketing and purchasing behavior by enhancing consumer understanding of eco-friendly products' environmental benefits (Nuryakin & Maryati, 2022). Thus, the final hypothesis proposed is as follows:

H7: Green consumption positively mediates the relationship between green marketing and green buying behavior.

The research aims to contribute to the existing literature by identifying the key drivers of green buying behavior among Generation Z and assessing the effectiveness of green marketing in fostering environmental awareness and sustainable consumption. Specifically, the research examines the direct effects of green marketing through its components, such as ecolabeling, green advertising, and green branding, on environmental knowledge, green consumption, and green buying behavior. It also explores the mediating roles of environmental knowledge and green consumption in the relationship between green marketing and green buying behavior. In doing so, the research seeks to clarify the mechanisms through which green marketing influences not only consumer attitudes but also actual purchasing behavior toward environmentally friendly products. Figure 1 presents the theoretical framework that underpins the research

METHODS

The research employs a quantitative research design with a cross-sectional survey approach to analyze the influence of green marketing strategies on Generation Z's green buying behavior in Indonesia. The research adopts a deductive approach, beginning with the formulation of a theoretical framework and hypotheses based on previous studies, which are then tested through empirical data. The research is conducted under natural (non-contrived) conditions, meaning it takes place in a natural setting without manipulating environmental factors.

The target population consists of Generation Z individuals, defined as those born between 1995 and 2012 (Barhate & Dirani, 2022). They demonstrate environmental awareness and have experience in purchasing eco-friendly products. A total of 400 respondents are selected using purposive sampling. Screening questions are included to ensure that only participants who meet the inclusion criteria are selected, namely those within the specified age range and with sufficient knowledge or experience in green marketing. The sample size is determined using the Bernoulli formula, applying a 95% confidence level and a 5% margin of error. The formula yields a minimum sample size of 384, rounded to 400 to ensure statistical robustness.

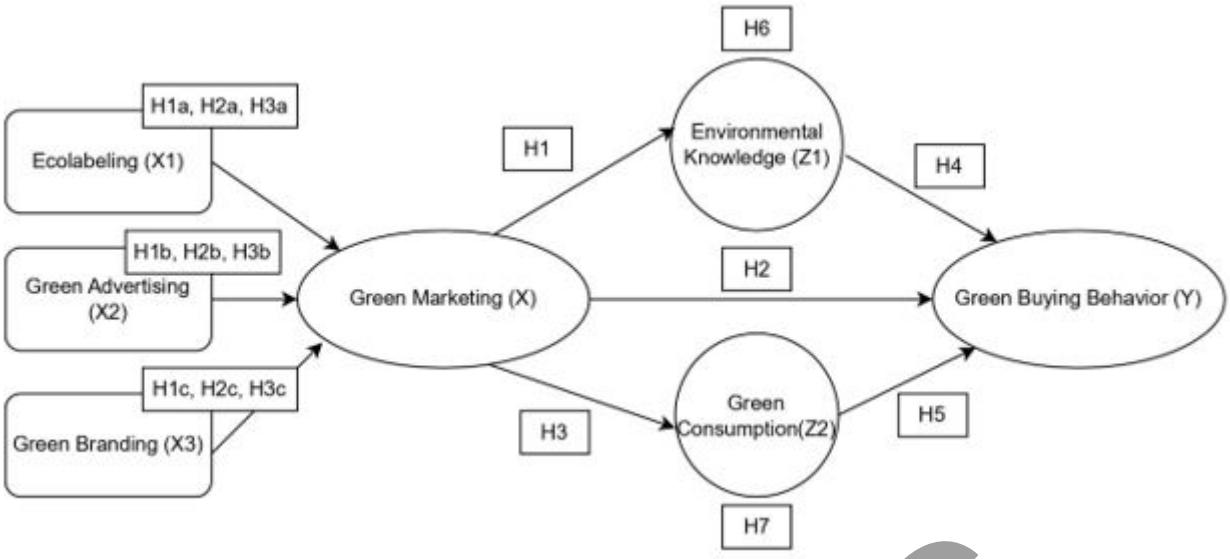

Figure 1 Theoretical Framework

Data are collected using a structured online questionnaire distributed via Google Forms. The instrument measured six main constructs: ecolabeling, green advertising, green branding (as dimensions of green marketing), environmental knowledge, green consumption, and green buying behavior. Each item employs a 5-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Prior to full-scale distribution, the questionnaire is pretested with 30 Generation Z participants to ensure clarity, readability, and contextual relevance. Feedback from the pretest is used to revise the wording and structure of selected items.

The research model positions green marketing as the exogenous variable, environmental knowledge and green consumption as mediating variables, and green buying behavior as the endogenous variable. Instruments are adapted from previous validated studies and tested for accuracy. Validity is assessed through convergent and discriminant validity, and reliability is confirmed using Cronbach's alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) with all indicators exceeding the acceptable thresholds (CR ≥ 0.7; AVE ≥ 0.5), in line with the criteria established by Li and Lay (2025).

For data analysis, Partial Least Squares - Structural Equation Modeling (PLS-SEM) is used via SmartPLS 4.0. PLS-SEM is selected due to its ability to estimate complex structural models, accommodate both reflective and formative measurement models, and perform reliably with small to medium sample sizes, making it especially suitable for exploratory research and theory development (Subhaktiyasa, 2024). The analysis is conducted in two stages. The first stage involves evaluating the measurement model to verify the validity and reliability of constructs. The second stage examines the structural model to test the hypothesized relationships and potential mediation effects between variables. Bootstrapping with 5,000 resamples is used to estimate the statistical significance of the path coefficients and mediation effects. In addition to inferential analysis, descriptive statistics are used to summarize demographic characteristics and response distributions.

Data are analyzed using descriptive and inferential techniques. Descriptive statistics summarize respondents' perceptions using a five-point Likert scale, with percentage scores interpreted using a continuum category such as Fairly Good, Good, and Very Good. Inferential analysis is conducted using PLS-SEM via SmartPLS version 4.1.0.9. The measurement model is evaluated through convergent validity (AVE ≥ 0.5), discriminant validity using the Heterotrait-Monotrait Ratio (HTMT < 0.90), and reliability (Cronbach's alpha and CR ≥ 0.7), in accordance with Li and Lay (2025). The structural model tests hypotheses and mediation paths using bootstrapping with 5,000 resamples, applying a significance threshold of $t \geq 1.96$ and $p < 0.05$.

RESULTS AND DISCUSSION

A total of 400 respondents have participated in the research after successfully completing a two-stage screening process designed to confirm their membership in Generation Z and their exposure to green marketing. The gender distribution is relatively balanced, with 57% identifying as female and 43% as male. In terms of educational background, the majority of participants (63%) are undergraduate or diploma-level students, followed by 29% who are senior high school students. A smaller proportion comprises junior high school, postgraduate, and other educational levels. The age distribution is consistent with the core demographic of Generation Z, with 71% of respondents falling within the 18–23 age range.

Geographically, a significant portion of the participants reside in Pontianak (30%) and Bandung (18%), while the remainder are spread across various cities in Indonesia. Social media platforms are reported as the most common channels through which respondents encounter green advertising, with food and beverage products being the most frequently associated with green marketing campaigns.

Following the analysis of the respondents' demographic profile, the next step involves evaluating the measurement model to ensure that the constructs used are valid and reliable. This process begins with assessing the indicators to confirm their accuracy in representing the latent variables. SmartPLS version 4.1.0.9 (Full Version) is used to conduct the analysis, given its suitability for PLS-SEM in complex models. The outer model assessment includes tests for convergent validity, discriminant validity, and reliability, using metrics such as composite reliability and AVE. The configuration of the measurement model is illustrated in Figure 2. It shows the relationships between the constructs and their indicators.

The calculation of the outer model is followed by construct validity analysis for all variables, ensuring that the indicators forming each construct are valid. Based on the data collected through questionnaires, validity and reliability tests are conducted. Validity testing assesses the effectiveness of research instruments and measurement scales. Each indicator's outer loading value must be examined prior to conducting validity testing. When the outer loading value is ≥ 0.70 and the AVE value is ≥ 0.50, the indicator is considered to have high validity and to meet the requirements for convergent (Li & Lay, 2025).

The ecolabeling includes five indicators (EL1 to EL5), where EL1 reflects the respondent's awareness of ecolabels, EL2 measures understanding of ecolabel meanings, EL3 captures perceptions of ecolabel credibility, EL4 reflects attention given to ecolabels during purchase decisions, and EL5 assesses the belief that ecolabels influence environmentally responsible choices. For the green advertising, GA1 through GA4 measure the perceived clarity, appeal, and relevance of eco-focused advertising content. The green branding comprises GB1 to GB5. They evaluate brand associations with environmental values and green positioning. The environmental knowledge uses EK1 to EK5, with EK1 measuring general environmental awareness, and the remaining indicators assessing deeper knowledge of sustainable practices. The green consumption includes GC1 to GC3. They reflect behaviors aligned with eco-conscious consumption. Lastly, the green buying behavior is represented by GBB1 to GBB5, capturing patterns of environmentally responsible purchasing behavior, including frequency, intention, and consistency. These indicators and their outer loading values, as reported in Table 1, form the basis for further testing of the measurement model.

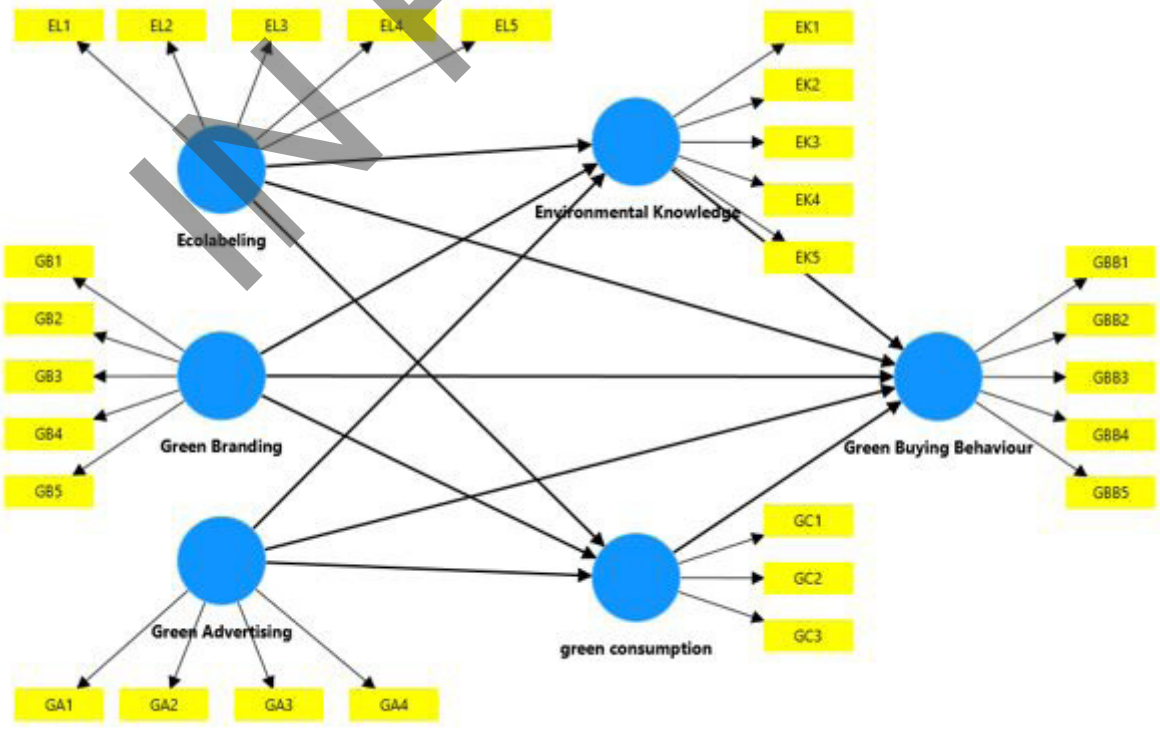

Figure 2 Outer Model

Table 1 Outer Loading Result

Variables	Indicators	Outer Loading Score
Ecolabeling	EL1	0.754
	EL2	0.808
	EL3	0.760
	EL4	0.663
	EL5	0.838
Green Advertising	GA1	0.710
	GA2	0.874
	GA3	0.821
	GA4	0.800
Green Branding	GB1	0.678
	GB2	0.782
	GB3	0.741
	GB4	0.760
	GB5	0.770
Environmental Knowledge	EK1	0.664
	EK2	0.806
	EK3	0.813
	EK4	0.804
	EK5	0.785
Green Consumption	GC1	0.853
	GC2	0.856
	GC3	0.813
Green Buying Behavior	GBB1	0.681
	GBB2	0.720
	GBB3	0.785
	GBB4	0.755
	GBB5	0.747

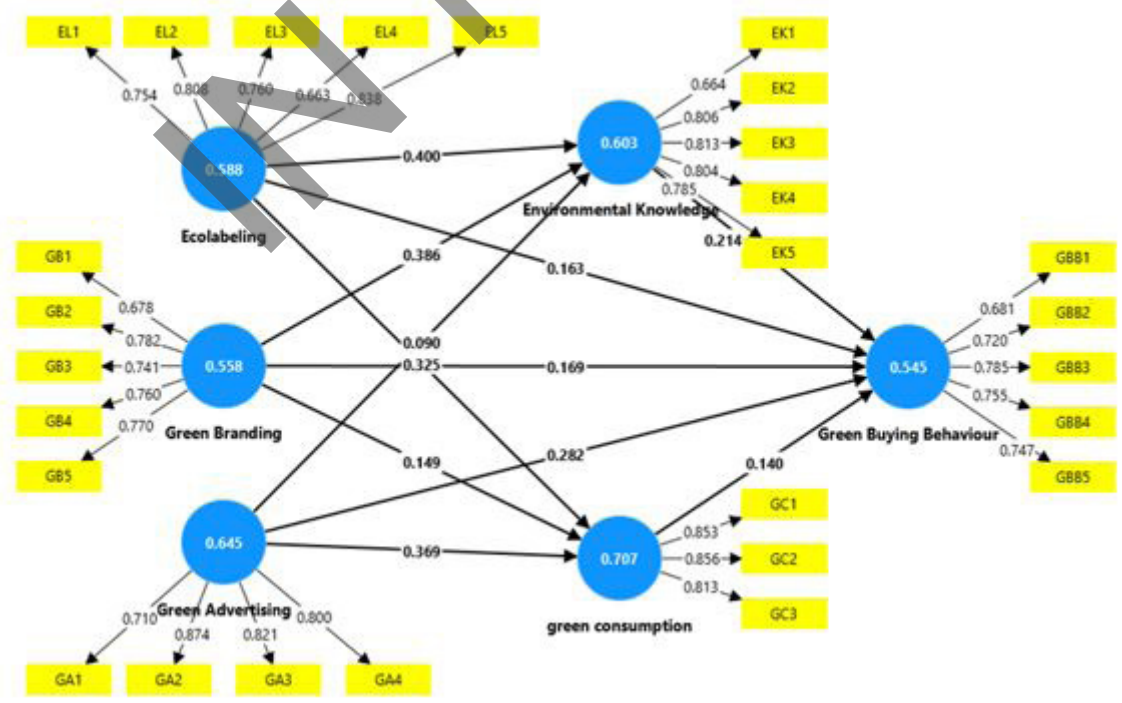

Figure 3 Outer Model After Running the Test

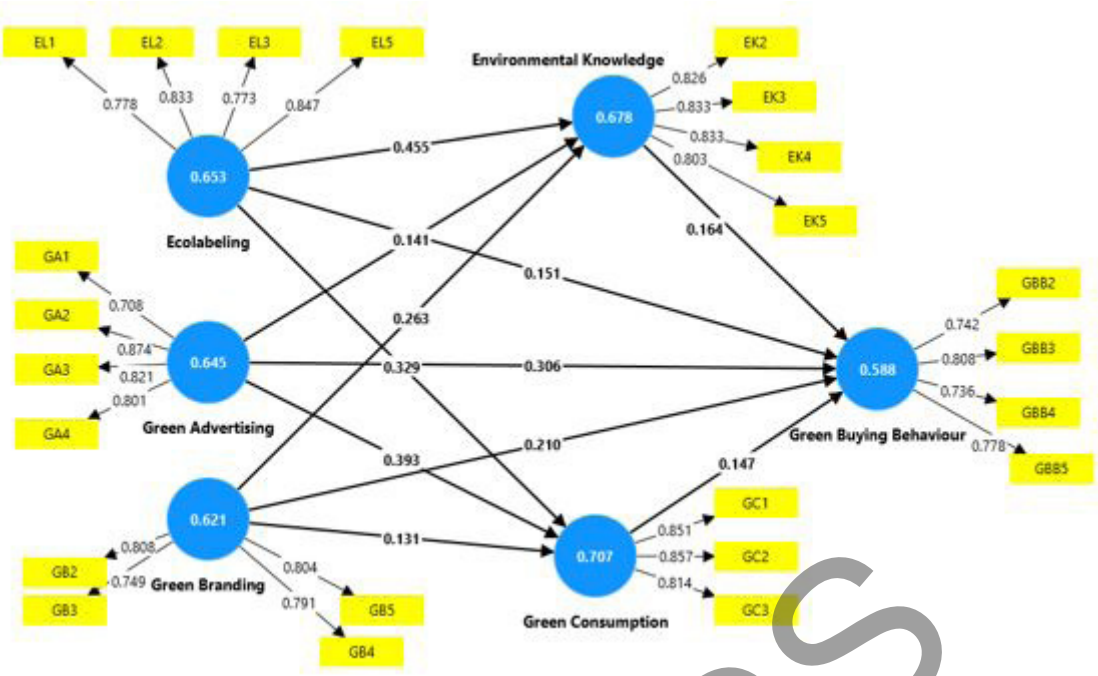

Figure 4 Outer Model Result After Removing Several Indicators

Table 2 Convergent Validity Test Result

Variable	AVE	Critical Score	Model Evaluation Result
Ecolabeling	0.653	> 0.5	Valid
Green Advertising	0.678		Valid
Green Branding	0.645		Valid
Environmental Knowledge	0.621		Valid
Green Consumption	0.588		Valid
Green Buying Behavior	0.707		Valid

According to the data analysis results presented in Figure 3 and Table 1, several indicators are identified with outer loading values below the recommended threshold of 0.7. Specifically, the indicators EL4, GB1, EK1, and GBB1 do not meet the acceptable criteria for indicator reliability, suggesting that these items may not adequately reflect their respective latent constructs. Retaining indicators with low outer loadings can compromise the validity of the measurement model, as they may introduce measurement error or weaken the overall construct representation. As a result, these indicators are systematically removed to improve the model's reliability and validity. A revised measurement model is then developed, excluding the aforementioned indicators. This updated model, which is expected to exhibit stronger psychometric properties, is presented in Figure 4. It illustrates the refined structure and relationships among the remaining indicators and constructs.

Figure 4 presents the revised outer model after removing indicators with outer loading values below 0.70, specifically EL4, GB1, EK1, and GBB1. The revised model shows improved measurement quality, as all remaining indicators meet the minimum threshold for convergent validity. The constructs now display outer loading values above 0.70, indicating that each item adequately represents its corresponding latent variable. The construct reliability is also maintained, as evidenced by consistent indicator values across ecolabeling, green advertising, green branding, environmental knowledge, green consumption, and green buying behavior. This refinement ensures that the model achieves better validity and reliability in further structural analysis. The model presented in Figure 4 is used for subsequent hypothesis testing and path analysis.

Next, convergent validity is assessed to determine the extent to which indicators of a specific construct are correlated and measure the same underlying concept. In the research, convergent validity is evaluated using the AVE, which represents the average amount of variance that a latent construct explains in its indicators. An AVE value of 0.5 or higher is generally considered acceptable, indicating that the

construct accounts for at least 50% of the variance in its associated indicators. This threshold is widely supported in the literature as a minimum criterion for establishing adequate convergent validity. Values below 0.5 may suggest that the indicators fail to capture the construct effectively, potentially compromising the measurement model (Chin & Todd, 1995 in Veraya & Kuswati, 2023). In this analysis, each construct's AVE is carefully examined to ensure compliance with this standard, thereby confirming the internal consistency and explanatory power of the measurement items. The AVE results for each construct are presented in Table 2.

Then, discriminant validity is examined to ensure that each construct in the research is empirically distinct and captures a unique dimension of the theoretical framework. Establishing discriminant validity is crucial because it confirms that the indicators used to measure one construct are not unintentionally reflecting another. This criterion ensures that each construct is measured distinctly, avoiding conceptual overlap. In previous research by Saragih et al. (2022), this approach in brand loyalty emphasizes that valid discriminant results are achieved when the highest loading of each indicator appears on its corresponding variable. According to Moussa and El Arbi (2020), discriminant validity is achieved when theoretically distinct constructs are empirically distinct as well. In the research, all indicators demonstrate higher loading values on their respective constructs compared to others, satisfying the required criteria for discriminant validity. These results are summarized in Table 3, confirming that the measurement model appropriately distinguishes between the latent variables.

The yellow-highlighted numbers in Table 3 represent the highest cross-loading values of each indicator on its intended latent construct. In discriminant validity testing, an indicator should load more strongly on its own construct than on any other constructs. It indicates that the item effectively measures the specific construct it is designed to represent, confirming that the constructs are empirically distinct. For example, EK2 has a loading of 0.826 on environmental knowledge, which is higher than its loadings on all other constructs. Similarly, EL2 loads 0.833 on ecolabeling, and GA2 loads 0.874 on green advertising. These results demonstrate that each indicator is valid in measuring its respective construct based on the cross-loading criterion.

In addition, discriminant validity is assessed using the Heterotrait-Monotrait Ratio (HTMT), which evaluates the extent to which constructs are truly

Table 3 Discriminant Validity (Cross-Loading) Results

	Ecolabeling	Environmental Knowledge	Green Advertising	Green Branding	Green Buying Behavior	Green Consumption
EK2	0.550	0.826	0.279	0.441	0.484	0.463
EK3	0.507	0.833	0.268	0.396	0.467	0.395
EK4	0.512	0.833	0.443	0.471	0.464	0.495
EK5	0.431	0.803	0.437	0.469	0.511	0.504
EL1	0.778	0.504	0.288	0.359	0.400	0.398
EL2	0.833	0.459	0.250	0.355	0.435	0.398
EL3	0.773	0.436	0.087	0.258	0.328	0.321
EL5	0.847	0.552	0.299	0.377	0.448	0.481
GA1	0.367	0.436	0.708	0.436	0.463	0.446
GA2	0.200	0.321	0.874	0.531	0.575	0.476
GA3	0.245	0.345	0.821	0.524	0.491	0.465
GA4	0.133	0.292	0.801	0.458	0.499	0.440
GB2	0.267	0.391	0.555	0.808	0.518	0.426
GB3	0.461	0.510	0.346	0.749	0.488	0.392
GB4	0.364	0.453	0.428	0.791	0.468	0.376
GB5	0.225	0.338	0.600	0.804	0.487	0.408
GBB2	0.221	0.319	0.571	0.435	0.742	0.414
GBB3	0.438	0.454	0.456	0.504	0.808	0.490
GBB4	0.545	0.556	0.354	0.393	0.736	0.445
GBB5	0.335	0.460	0.559	0.565	0.778	0.475
GC1	0.370	0.456	0.524	0.460	0.544	0.851
GC2	0.383	0.452	0.475	0.416	0.476	0.857
GC3	0.510	0.518	0.437	0.405	0.481	0.814

distinct from one another. According to Hair et al. (2021), an HTMT value below 0.90 generally confirms that discriminant validity between two reflective constructs has been established. This threshold helps to ensure that each construct captures a unique conceptual domain without significant overlap. In the research, all HTMT values fall below the recommended limit, indicating that the constructs are empirically distinct and do not exhibit multicollinearity. These results support the adequacy of the measurement model in terms of discriminant validity. The complete HTMT results are presented in Table 4.

Table 4 shows that all HTMT values among the six constructs are below the threshold of 0.90. Hence, each construct is empirically distinct and does not share excessive variance with others. The highest HTMT value is 0.800, observed between green advertising and green buying behavior, while the lowest is 0.414 between green advertising and ecolabeling. These findings confirm that there is no significant issue of discriminant validity violation, and the constructs used in the research meet the statistical requirement for being conceptually different. Therefore, the measurement model demonstrates satisfactory discriminant validity based on the HTMT criterion.

Reliability testing is conducted to evaluate the internal consistency of the measurement instruments used. According to Hair et al. (2020), a measurement is considered reliable when it consistently and accurately reflects the latent construct it is intended to measure. This assessment typically involves two key indicators, such as CR and Cronbach's alpha. The CR provides a more accurate estimate of reliability in structural equation modeling, as it accounts for the actual factor loadings of each item. A CR value above 0.70 is generally regarded as acceptable, indicating that the indicators within a construct are highly interrelated and measure the same underlying concept consistently. Similarly, Cronbach's alpha values exceeding 0.60 further support the presence of internal consistency. In the research, all constructs meet or exceed the recommended thresholds for both reliability measures, confirming the robustness and consistency of the measurement model. The detailed results of the reliability analysis are summarized in Table 5.

Table 5 presents the CR and Cronbach's alpha values for all latent variables in the research. All constructs meet the required thresholds, confirming strong internal consistency and measurement accuracy. The highest CR value is found in environmental knowledge (0.833), followed by Ecolabeling (0.831), while GREEN CONSUMPTION shows the lowest (0.795), yet remains within the acceptable range. As shown in Table 5, the composite reliability values for each variable exceed 0.70, and the Cronbach's alpha values for each variable are greater than 0.60. Based on these results, it can be concluded that each dataset is reliable and can be used as a valid measurement instrument for the variables. These findings indicate that each construct is measured consistently and accurately by its indicators. Overall, the measurement model demonstrates strong internal consistency and robust statistical reliability. Once the measurement model (outer model) has been tested, the structural model is then evaluated. The structural model consists of the path coefficients estimation test and the R-square test.

Table 4 Discriminant Validity (Heterotrait-Monotrait Ratio) Test Result

	Ecolabeling	Environmental Knowledge	Green Advertising	Green Branding	Green Buying Behavior	Green Consumption
Ecolabeling						
Environmental Knowledge	0.724					
Green Advertising	0.414	0.523				
Green Branding	0.606	0.654	0.759			
Green Buying Behavior	0.673	0.726	0.800	0.791		
Green Consumption	0.643	0.690	0.708	0.638	0.761	

Table 5 Composite Reliability Test Result

	Composite Reliability	Critical Score	Cronbach's alpha	Critical Score	Evaluasi model
Ecolabeling	0.831	>0.7	0.823	>0.6	Reliable
Environmental Knowledge	0.833		0.833		Reliable
Green Advertising	0.816		0.814		Reliable
Green Branding	0.801		0.801		Reliable
Green Buying Behavior	0.797		0.791		Reliable
Green Consumption	0.795		0.793		Reliable

Table 6 R-Square Test Result

	R-square	R-square adjusted
Environmental Knowledge	0.479	0.475
Green Buying Behavior	0.583	0.578
Green Consumption	0.455	0.451

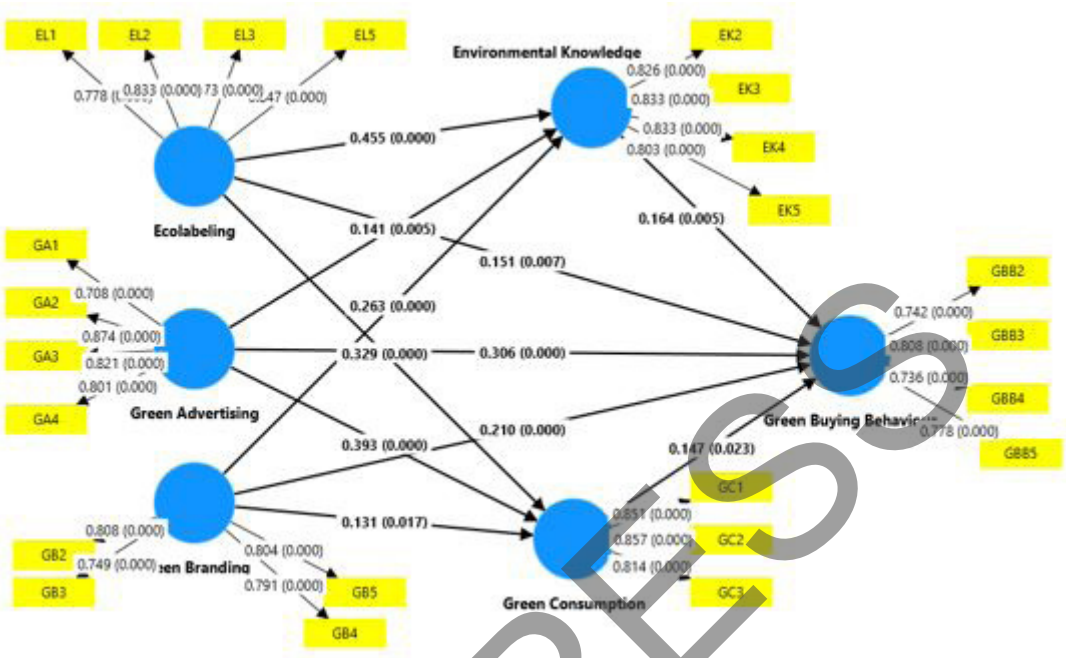

Figure 5 Bootstrapping Results

The R-square values resulting from the SmartPLS analysis are presented in Table 6 and provide insights into the explanatory power of the model for each endogenous variable. The R-square value for environmental knowledge is 0.475, indicating that 47.5% of the variance in environmental knowledge is explained by the green marketing constructs, including ecolabeling, green buying behavior, and green consumption. The remaining 52.5% of the variance is attributed to other factors not explored within the research scope. For the green buying behavior, the R-square value is 0.578, suggesting that 57.8% of its variation is explained by ecolabeling, environmental knowledge, and green consumption. The residual 42.2% is likely influenced by other external variables not included in the current model. Meanwhile, the green consumption model shows an R-square of 0.451, indicating that 45.1% of its variance is accounted for by ecolabeling, green buying behavior, and environmental knowledge. In comparison, 54.9% remains unexplained by the model. According to the classification proposed by Sarwono and Narimawati (2015) in Romadhon and Khatimah (2025), R-square values of 0.67 or above indicate strong predictive power, values around 0.33 are considered moderate, and values near 0.19 are deemed weak. Based on this framework, the R-square values for environmental knowledge, green buying behavior, and green consumption fall within the moderate to strong category, indicating that the model has a substantial ability to explain the variance in these key constructs.

The estimation of path coefficients is conducted to examine the significance of the hypothesized relationships among the constructs in the model. According to Abdilah and Hartono (2015) in Suryanto (2022), while R-square values are used to evaluate the explanatory power of dependent constructs, path coefficients are essential for testing hypotheses and identifying the strength and direction of relationships between variables. The significance of each path is assessed using the t-statistic, which must exceed 1.96 in a two-tailed test for the relationship to be considered statistically significant. The bootstrapping method is applied to ensure the robustness and accuracy of the estimates. This procedure generates the inner model results, which are visualized in Figure 5 and detailed in Table 7.

Figure 5 presents the inner model results obtained through bootstrapping, showing the path coefficients, t-statistics, and p-values for each hypothesized relationship. The numbers beside the

Table 7 Results of Path Coefficients and Hypothesis Test

Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T-Statistics (O/STDEV)	P-Values	Result
Ecolabeling → Environmental Knowledge	0.455	0.457	0.049	9.195	0.000	H1a accepted
Green Advertising → Environmental Knowledge	0.141	0.141	0.050	2.824	0.005	H1b accepted
Green Branding → Environmental Knowledge	0.263	0.262	0.060	4.361	0.000	H1c accepted
Ecolabeling → Green Buying Behavior	0.151	0.149	0.056	2.713	0.007	H2a accepted
Green Advertising → Green Buying Behavior	0.306	0.308	0.049	6.239	0.000	H2b accepted
Green Branding → Green Buying Behavior	0.210	0.210	0.052	4.032	0.000	H2c accepted
Ecolabeling → Green Consumption	0.329	0.328	0.047	6.936	0.000	H3a accepted
Green Advertising → Green Consumption	0.393	0.395	0.046	8.467	0.000	H3b accepted
Green Branding → Green Consumption	0.131	0.132	0.055	2.379	0.017	H3c accepted
Environmental Knowledge → Green Buying Behavior	0.164	0.163	0.058	2.825	0.005	H4 accepted
Green Consumption → Green Buying Behavior	0.147	0.148	0.064	2.278	0.023	H5 accepted
Ecolabeling → Environmental Knowledge → Green Buying Behavior	0.074	0.075	0.028	2.648	0.008	H6a accepted
Green Advertising → Environmental Knowledge → Green Buying Behavior	0.023	0.023	0.011	2.032	0.042	H6b accepted
Green Branding → Environmental Knowledge → Green Buying Behavior	0.043	0.043	0.019	2.295	0.022	H6c accepted
Ecolabeling → Green Consumption → Green Buying Behavior	0.048	0.049	0.024	2.050	0.040	H7a accepted
Green Advertising → Green Consumption → Green Buying Behavior	0.058	0.058	0.026	2.192	0.028	H7b accepted
Green Branding → Green Consumption → Green Buying Behavior	0.019	0.020	0.012	1.545	0.122	H7c rejected

arrows represent the path coefficient, followed by the t-statistic in parentheses, and the p-value. According to Hair et al. (2021), the significance of PLS-SEM path relationships is evaluated using bootstrapping, where the critical t-value for a two-tailed test at the 5% level is 1.96. Paths with t-statistics above this threshold are considered statistically significant. As shown, all proposed paths demonstrate significant relationships. These results confirm the direct and mediating effects among the variables, supporting the hypotheses. The results of the SmartPLS data analysis for path coefficients and hypothesis testing in this study are presented in Table 7.

Based on the results of the hypothesis testing in Table 7, most of the relationships proposed in the research model are found to be statistically significant. The following explanation summarizes and interprets the findings. Green marketing, including green advertising, green branding, and ecolabeling, is found to influence environmental knowledge significantly. The respective t-statistics are 5.460, 9.195, 2.824, and 4.361, with all p-values below 0.05. Therefore, H1 is supported. This result supports the findings of Geng and Maimaituerxun (2022) that green marketing activities, particularly advertising, serve as an effective educational tool to improve environmental knowledge. The strong effect of green branding is also consistent with the study by Skackauskiene and Vilkaite-Vaitone (2023), emphasizing the role of green brand identity in raising consumer awareness. These

findings extend previous research by confirming that each green marketing element contributes to consumer knowledge development, reinforcing the educational function of green messaging among Generation Z consumers.

Green marketing also significantly affects green buying behavior. The t-statistic values are 2.713 for green advertising, 6.239 for green branding, and 4.032 for ecolabeling, all with p-values less than 0.05. Hence, H2 is accepted. These findings are consistent with research by Kabaja et al. (2023), finding that ecolabels enhance consumer trust and increase the likelihood of purchasing eco-friendly products. Similarly, according to Chen and Chiu (2016) in Krstić et al. (2021), green branding influences not only purchase intention but also loyalty toward environmentally responsible brands. The research builds on those insights by demonstrating that Generation Z responds more strongly to branding than to advertising or ecolabels in the context of purchase decisions, suggesting the importance of brand identity as an emotional anchor.

In terms of green consumption, all components of green marketing demonstrate significant influence, with t-statistics of 6.936, 8.467, and 2.379, respectively. The p-values are below 0.05, supporting H3. This result aligns with the arguments of Ali (2021) and Krstić et al. (2021), finding that green marketing is a critical factor in promoting sustainable consumption practices. The strong influence of green branding on green consumption also supports the view that brand image is a key driver of consistent eco-friendly behavior. Compared to prior studies, this research highlights that Generation Z's green consumption is shaped not only by informational cues but also by value alignment with brands, underscoring the dual role of branding as both a rational and an emotional stimulus.

Environmental knowledge is shown to significantly impact green buying behavior, with a t-statistic of 2.825 and a p-value of 0.005. Thus, H4 is accepted. This result confirms the findings of Dhir et al. (2021), demonstrating that consumers with better environmental knowledge are more likely to make environmentally responsible purchasing decisions. This result supports the notion that knowledge serves as a cognitive foundation for green decision-making, bridging awareness and action in sustainability-related choices.

Green consumption also significantly affects green buying behavior, as indicated by a t-statistic of 2.278 and a p-value of 0.023, supporting H5. The result supports the findings of Nuryakin and Maryati (2022) that consumers who adopt green consumption patterns are more likely to purchase eco-friendly products consistently. It further suggests that behavioral habits influence actual purchasing decisions. This result reinforces the view that sustainable lifestyle choices are not only aspirational but predictive of repeated eco-friendly purchasing behavior, particularly among Generation Z.

Environmental knowledge is found to mediate the relationship between green marketing and green buying behavior. The mediation effect is statistically significant, with a t-statistic of 2.325 and a p-value of 0.024. Therefore, H6 is supported. This result supports the framework proposed by Saari et al. (2021) that green marketing enhances consumer awareness, and this awareness leads to green behavior. The result highlights the role of green marketing not only in promotion but also in consumer education. This finding extends prior research by empirically confirming that knowledge serves as a key pathway through which marketing strategies translate into behavioral outcomes.

Green consumption partially mediates the relationship between green marketing and green buying behavior. Mediation is supported for ecolabeling ($t = 2.050$, $p < 0.05$) and green advertising ($t = 2.192$, $p < 0.05$). However, the mediation effect for green branding is not significant ($t = 1.545$, $p = 0.122$). Thus, H7 is only supported for ecolabeling and green advertising. This partial mediation pattern suggests that while advertising and ecolabeling encourage green behavior through sustainable consumption, branding alone may not translate into consistent behavioral outcomes. One possible explanation is that although Generation Z responds positively to environmental branding, lingering skepticism about the actual quality of green products weakens behavioral follow-through. This observation echoes the concern raised by Octavia (2012), noting that green products are often seen as less effective or overpriced.

In summary, the statistical results confirm the hypothesized pathways and provide evidence-based insights into how green marketing strategies operate through both cognitive and behavioral mediators to influence green buying decisions among Generation Z. The research enriches current literature by confirming the mediating roles of knowledge and consumption. It also highlights that emotional trust from branding and rational cues from ecolabels may influence different stages of Generation Z's decision-making process, pointing to the need for authenticity to overcome trust barriers in green marketing. These findings contribute to the growing literature on sustainable consumer behavior by offering empirical support for the mediating roles of knowledge and consumption in the green marketing process.

CONCLUSIONS

The analysis results indicate that green marketing, comprising green advertising, green branding, and ecolabeling, has a significant impact on enhancing environmental knowledge, green buying behavior, and green consumption. Notably, green advertising emerges as the most influential component, reinforcing Generation Z's responsiveness to campaigns that align with their values. The effective implementation of green marketing strategies can

promote greater environmental awareness, encourage the purchase of environmentally friendly products, and stimulate sustainable consumption behavior. Furthermore, environmental knowledge is shown to strengthen the relationship between green marketing and green buying behavior, while green consumption only partially mediates this relationship.

Interestingly, green branding does not significantly mediate the relationship between green marketing and green buying behavior. It may suggest that Generation Z remains sceptical toward brand-driven sustainability claims, perceiving them as potentially inauthentic or performative. This insight underscores the need for brands to build genuine, transparent, and verifiable green brand identities to foster trust and engagement from young consumers.

Based on these findings, it is recommended that companies place greater emphasis on the value of ecolabels to encourage the purchase of green products. In addition, consumer education on recycling should be improved to enhance environmental knowledge. Brands targeting Generation Z should focus on transparent, informative, and value-driven green marketing strategies. Educating consumers about environmental benefits and making sustainability claims verifiable can improve trust, increase engagement, and positively influence purchasing decisions. These findings contribute to marketing and consumer behavior research by offering practical implications for firms aiming to strengthen Generation Z's engagement with sustainability.

The research also presents several limitations. First, it is geographically restricted to Indonesia, which may limit the applicability of the findings to other regions with different socio-economic or cultural contexts. Second, the use of a cross-sectional design prevents the assessment of behavioral changes over time. Third, the reliance on self-reported data raises the possibility of bias, such as social desirability influencing responses. Moreover, the limited mediating role of green consumption suggests that other psychological or contextual variables can have a more substantial influence on green buying behavior.

Future research is encouraged to explore psychological frameworks such as the Theory of Planned Behavior (TPB) and the Stimulus–Organism–Response (S–O–R) model to understand the mechanisms behind sustainable consumption decisions better. These models offer deeper insight into how environmental attitudes, perceived behavioral control, emotional responses, and brand trust shape green buying behavior. Future studies should also examine the influence of digital marketing, social media engagement, and peer influence in shaping sustainable behavior. Comparing generational differences in green consumerism may provide further valuable insights. Last, broadening the scope of inquiry will contribute to a more comprehensive understanding of the drivers behind Generation Z's sustainable consumption patterns.

AUTHOR CONTRIBUTIONS

Conceived and designed the analysis, A. S. K. and D. O.; Collected the data, A. S. K.; Contributed data or analysis tools, A. S. K. and D. O.; Performed the analysis, A. S. K. and D. O.; and Wrote the paper, A. S. K.

DATA AVAILABILITY

The data that support the findings of the research are available from the corresponding author upon reasonable request. The dataset, which contains individual responses from 400 Generation Z participants collected via a Google Forms survey and analyzed using SmartPLS version 4.1.0.9, is not publicly shared to ensure participants' confidentiality and compliance with data privacy considerations.

REFERENCES

Ali, M. (2021). A social practice theory perspective on green marketing initiatives and green purchase behavior. *Cross Cultural & Strategic Management*, *28*(4), 815–838. https://doi.org/10.1108/CCSM-12-2020-0241

Barhate, B., & Dirani, K. M. (2022). Career aspirations of generation Z: A systematic literature review. *European Journal of Training and Development*, *46*(1–2), 139–157. https://doi.org/10.1108/EJTD-07-2020-0124

Dhir, A., Sadiq, M., Talwar, S., Sakashita, M., & Kaur, P. (2021). Why do retail consumers buy green apparel? A knowledge-attitude-behaviour-context perspective. *Journal of Retailing and Consumer Services*, *59,* 1–11. https://doi.org/10.1016/j.jretconser.2020.102398

Gabrielova, K., & Buchko, A. A. (2021). Here comes Generation Z: Millennials as managers. *Business Horizons*, *64*(4), 489–499. https://doi.org/10.1016/j.bushor.2021.02.013

Geng, Y., & Maimaituerxun, M. (2022). Research progress of green marketing in sustainable consumption based on CiteSpace analysis. *SAGE Open*, *12*(3), 1–19. https://doi.org/10.1177/21582440221119835

Gentina, E. (2020). Chapter 1: Generation Z in Asia: A research agenda. In *The new Generation Z in Asia: dynamics, differences, digitalization*. Emerald Publishing Limited. https://doi.org/10.1108/978-1-80043-220-820201002

Gomes, S., Lopes, J. M., & Nogueira, S. (2023). Willingness to pay more for green products: A critical challenge for Gen Z. *Journal of Cleaner Production*, *390,* 1–8. https://doi.org/10.1016/j.jclepro.2023.136092

Hair Jr., J. F., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research*, *109*, 101–110. https://doi.org/10.1016/j.

jbusres.2019.11.069

Hair Jr., J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Partial Least Squares Structural Equation Modeling (PLS-SEM) using R*. Springer. https://doi.org/10.1007/978-3-030-80519-7

Kabaja, B., Wojnarowska, M., Ćwiklicki, M., Buffagni, S. C., & Varese, E. (2023). Does Environmental Labelling Still Matter? Generation Z's purchasing decisions. *Sustainability, 15*(18), 1–19. https://doi.org/10.3390/su151813751

Krstić, J., Kostić-Stanković, M., & Cvijović, J. (2021). Green advertising and its impact on environmentally friendly consumption choices - A review. *Industrija*, *49*(1), 93–110. https://doi.org/10.5937/industrija49-31692

Li, J., & Lay, Y. F. (2025). Examining the reliability and validity of self-efficacy beliefs, stress, perceived teachers' support and academic burnout scales using the PLS-SEM approach. *Humanities and Social Sciences Letters*, *13*(1), 56–68.

MacRae, M. J. (2024). *Understanding the impact of Single-Use-Plastics (SUP) regulations on consumer behaviour and sustainable practices in the Netherlands* [Master thesis, Utrecht University]. Utrecht University Student Theses Repository.

Moussa, N. B., & El Arbi, R. (2020). The impact of human resources information systems on individual innovation capability in Tunisian companies: The moderating role of affective commitment. *European Research on Management and Business Economics*, *26*(1), 18–25. https://doi.org/10.1016/j.iedeen.2019.12.001

Natakoesoemah, S., & Adiarsi, G. R. (2020). The Indonesian millenials consumer behaviour on buying eco-friendly products: The relationship between environmental knowledge and perceived consumer effectiveness. *International Journal of Multicultural and Multireligious Understanding, 7*(9), 292–302.

Nguyen-Viet, B. (2023). The impact of green marketing mix elements on green customer based brand equity in an emerging market. *Asia-Pacific Journal of Business Administration*, *15*(1), 96–116. https://doi.org/10.1108/APJBA-08-2021-0398

Nuryakin, & Maryati, T. (2022). Do green innovation and green competitive advantage mediate the effect of green marketing orientation on SMEs' green marketing performance? *Cogent Business & Management*, *9*(1), 1–19. https://doi.org/10.1080/23311975.2022.2065948

Octavia, D. (2012). Analisa lingkungan makro, perilaku konsumen serta peluang dan strategi bisnis hijau di Indonesia. In *Proceedings of Conference in Business Accounting and Management 2012, CBAM* (pp. 165–174).

Octavia, D., & Sari, D. P. (2018). Analysis the value of green advertising and environmental management in the garment and textile industries. In *Proceedings of the 1st International Conference on Islamic Economics, Business, and Philanthropy (ICIEBP 2017) - Transforming Islamic Economy and Societies* (pp. 458–463). SCITEPRESS – Science and Technology Publications, Lda.

Osiako, P. O., Wikurendra, E. A., & Abdeljawad, N. S. (2022). Concept of green marketing in environment conservation: A Literature review. *Environmental and Toxicology Management*, *2*(2), 8–13. https://doi.org/10.33086/etm.v2i2.3335

Reddy, K. P., Chandu, V., Srilakshmi, S., Thagaram, E., Sahyaja, C., & Osei, B. (2023). Consumers perception on green marketing towards eco-friendly fast moving consumer goods. *International Journal of Engineering Business Management*, *15,* 1–14. https://doi.org/10.1177/18479790231170962

Romadhon, S. W. N., & Khatimah, H. (2025). Pengaruh corporate social responsibility dan reputasi perusahaan terahadap minat melamar kerja Generasi Z di Kabupaten Bekasi. *Media Riset Bisnis Ekonomi Sains dan Terapan*, *3*(2), 115–131. https://doi.org/10.71312/mrbest.v3i2.388

Saari, U. A., Damberg, S., Frömbling, L., & Ringle, C. M. (2021). Sustainable consumption behavior of Europeans: The influence of environmental knowledge and risk perception on environmental concern and behavioral intention. *Ecological Economics, 189*, 1–14. https://doi.org/10.1016/j.ecolecon.2021.107155

Saragih, R., Liu, R., Putri, C. A., Fakhri, M., & Pradana, M. (2022). The role of loyalty and satisfaction in forming word-of-mouth influence in a B2B environment: Evidence from the knitting industry of Indonesia. *Journal of Eastern European and Central Asian Research*, *9*(3), 543–553. https://doi.org/10.15549/jeecar.v9i3.889

Sembiring, R. J. (2021). The effect green marketing mix on corporate image as well as implication for purchase intention of food and beverages companies in Indonesia. *Journal of Social Science, 2*(2), 210–222.

Shao, X., Jeong, E., Zhang, X., & Jang, S. (2023). Green marketing versus demarketing: The impact of individual characteristics on consumers' evaluations of green messages. *Journal of Hospitality & Tourism Research, 49*(1), 29–44. https://doi.org/10.1177/10963480221147054

Skackauskiene, I., & Vilkaite-Vaitone, N. (2023). Green marketing and customers' purchasing behavior: A systematic literature review for future research agenda. *Energies, 46*(1), 1–20. https://doi.org/10.3390/en16010456

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), 353–365. https://doi.org/10.35877/454ri.eduline2861

Suryanto, D. (2022). The effect of leadership and motivation on employee performance at PT. Selago Makmur Plantation Palm Factory Unit Incari Raya Group.

INVEST : Jurnal Inovasi Bisnis dan Akuntansi, 3(1), 108–118.

Veraya, & Kuswati, R. (2023). The roles of brand love in predicting brand loyalty. In *Proceedings of the International Conference on Economics and Business Studies (ICOEBS-22-2)* (pp. 1063–1076). Atlantis Press. https://doi.org/10.2991/978-94-6463-204-0_87