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The Use of Exploratory Factor Analysis to Identify Determinants of Green Innovation Product Acceptance Among Generation Z

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Abstract

This study aims to identify the factors influencing Gen Z's acceptance of green innovation products in Shuca products, namely perceived value, perceived quality, social influence, green product awareness, and price sensitivity. The method used is a quantitative survey research approach to analyze the determinants of Acceptance of Green Innovation Products, with the Exploratory Factor Analysis (EFA) method employed to determine the number and nature of factors explaining the covariance structure of the data. This research identifies three main factors determining the level of Gen Z's acceptance of green innovation products. First, Perceived Value is a key factor influencing Gen Z's acceptance of green innovation products. Second, Environmental Concern serves as another critical determinant of Gen Z's acceptance of green innovation products. Third, Green Product Awareness significantly affects Gen Z's acceptance of green innovation products. Marketing strategies focusing on quality, perceived benefits, and environmental concern can accelerate market acceptance. Additionally, social and educational campaigns can enhance awareness and preferences for green products. To address price sensitivity, companies need to offer affordable eco-friendly products without compromising quality or sustainability.

Keywords: *Green Innovation, Product Acceptance, Green Product, Generation Z, Exploratory Factor Analysis.*

Introduction

In recent decades, environmental issues have become a global concern due to the significant impacts of climate change, environmental pollution, and excessive exploitation of natural resources (Steer, 2014). To address these challenges, various green innovations have been developed to create more environmentally friendly, energy-efficient, and sustainable products. The aim is not only to protect the environment but also to meet the growing consumer demand for sustainability (Fatma & Haleem, 2023; Guinot *et al.*, 2022). One consumer segment with great potential to influence the green innovation product market is Generation Z (Gen Z).

Gen Z, born between the mid-1990s and early 2010s, has become an increasingly important consumer group in the global landscape (Wandhe, 2024). As a generation that has grown up with advancements in digital technology and broad access to information, Gen Z exhibits higher environmental awareness than previous generations. They are more concerned with global issues, such as climate change, environmental degradation, and sustainability, making them a potential target for green innovation products designed to reduce negative environmental impacts (Dwidienawati *et al.,* 2021).

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Green innovation products combine environmentally friendly technology with sustainability values, offering solutions to support sustainable lifestyles. However, the adoption of these products by Gen Z is not always straightforward. Several factors influence Gen Z's acceptance of these products, such as perceived value, brand trust, ease of access, and education about the benefits of green products (Maccioni *et al.*, 2019; Wijekoon & Sabri, 2021). Research on Gen Z's acceptance of green innovation products is relevant amidst the urgent global challenges of achieving sustainable development. With pressure from environmental regulations, consumer preferences, and the need for technological innovation, businesses must explore how green products can be integrated into this generation's daily lives. This research aims to identify the key factors influencing Gen Z's acceptance of green innovation products, contributing to the development of marketing strategies, product designs, and policies supporting the transition to a greener and more sustainable economy.

Previous research indicates that several variables can influence Gen Z's acceptance of green innovation products. Studies suggest that perceived value affects Gen Z's acceptance. Chen *et al.* (2021) and Jakubowska *et al.* (2024) explain that Gen Z values product sustainability but also expects products to align with personal benefits such as quality, price, and uniqueness. Perceived value related to environmental benefits, combined with product attributes such as durability or aesthetics, can enhance intentions to purchase eco-friendly products. Thus, Gen Z tends to choose products that provide greater value for them. Perceived value includes functional aspects (how well the product meets needs), environmental contributions (the product's sustainability impact), and economic aspects (price-to-benefit ratio).

Factors influencing Gen Z's trust in using green products include perceived quality (Zhuang *et al.*, 2021). Perceived quality encompasses durability, performance, and reliability compared to conventional products. Lopes *et al.* (2024) explain that marketing factors such as willingness to pay for eco-friendly products, environmental awareness of pricing, perceived environmental benefits, and perceived green quality positively correlate with young people's environmental concern and also significantly influence eco-friendly purchasing decisions. Gomes *et al.* (2023a) state that environmental concern, future eco-friendly estimations, and perceived green quality are potential determinants of green product consumption by Gen Z. Gen Z's level of environmental concern plays a crucial role in motivating them to support green innovation products. The higher their environmental concern, the more likely they are to accept and purchase green products.

Social influence is another factor influencing the acceptance of green innovation products (Graça & Kharé, 2023; Le *et al.*, 2024). Sapsanguanboon & Faijaidee (2024) explain that critical factors positively influencing consumers' intentions to buy eco-friendly products include social influence, knowledge of environmental issues, attitudes toward the environment, marketing communication, as well as product design and variety. Gen Z is highly socially connected, both through social media and offline communities. Support or influence from friends, family, or social groups can encourage them to adopt green innovation products (Hidayat & Hidayat, 2021).

Acceptance of green innovation products is also influenced by green product awareness. Maziriri *et al.* (2024) found that awareness of eco-friendly products, social influence, perceived benefits, and attitudes toward eco-friendly appliances significantly positively impact eco-friendly purchasing intentions. Awareness and knowledge about the existence and benefits of green innovation products can influence acceptance. Gen Z, who obtains information about green products through digital media or environmental campaigns, is more likely to accept such products.

Barriers to adopting green products include price factors, particularly if the products are more expensive than conventional ones. Although Gen Z has a high level of environmental awareness, they are often price-sensitive. Mabkhot (2024) supports this claim in his study, indicating that eco-friendly product trust, eco-friendly price sensitivity, and perceived green quality do not significantly affect green purchase behavior. However, Rehman *et al.* (2024) argue that price sensitivity strengthens consumers' intentions to buy eco-friendly products.

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The green innovation product in this study is Shuca, an innovative tissue product made from cassava peel waste. Shuca's advantages include being biodegradable, antibacterial, and travel-friendly. The name Shuca is derived from combining the words "Tissue" and "Cassava," meaning a tissue made from cassava peel. Shuca's tagline, "Safe for the Earth," emphasizes that using Shuca can help save the planet from deforestation. Shuca is made with unique ingredients that effectively clean and kill germs on dining utensils. Its travel-friendly size caters to users engaging in activities such as picnics, nature trips, and mountain climbing, as it saves space and is easy to carry. Shuca is biodegradable, making it an environmentally friendly tissue product. Additionally, Shuca offers various scents, such as lime, betel leaf, peppermint, and green tea.

This research presents a new contribution to understanding Gen Z's acceptance of green innovation products through several approaches that have not been widely explored in previous studies. The study focuses on green product innovations targeting Generation Z. The application of Value-Beliefs-Norms (VBN) Theory in this research identifies that pro-social attitudes and moral norms influence the acceptance of green innovation products. This extends the VBN Theory by integrating consumer behavior insights specific to green products. Additionally, it bridges the gap between environmental psychology and green marketing studies targeting Gen Z. Most previous studies focus on general product acceptance without distinguishing consumer segments by generation. This article specializes in green product innovations and their acceptance by Gen Z, who have unique characteristics regarding environmental values, consumption preferences, and responses to technology. This focus provides specific insights into how this generation views and adopts green innovations.

The use of Exploratory Factor Analysis (EFA) in this research also introduces a novel methodological approach, enabling the identification of latent factors influencing green innovation product acceptance. Its contribution includes offering a validated measurement model that future research can use to assess green product acceptance. Additionally, it identifies new factor combinations specific to Gen Z in Indonesia.

Literature Review

Consumers of interest in this study are Generation Z, characterized by high environmental awareness, intensive technology use, and preferences for valued brands. To uncover the psychological, social, and environmental elements influencing Gen Z's decision to purchase green innovation products, this research conducts an in-depth literature review. By understanding Gen Z's preferences and consumption behaviors, the study aims to develop better and more relevant marketing strategies. Environmental concern and Perceived Consumer Effectiveness (PCE) positively impact consumers' willingness to purchase eco-friendly products. However, according to product categories, various factors influence purchase intentions (Jørgensen *et al.*, 2024).

Research in the cosmetics field by Bautista *et al.* (2023) found that eco-labels and price sensitivity significantly affect their decision to purchase eco-friendly cosmetics. This indicates that eco-labels and price sensitivity are critical components supporting sustainable innovation in the cosmetics industry. Similarly, Ghouse *et al.* (2024) recognize that Gen Z's understanding and beliefs about environmental issues are essential factors in their decision to purchase eco-friendly products. This includes their level of digital literacy and their environmentally conscious attitudes.

The development of eco-friendly products has emerged as an appealing solution to address the increasingly urgent global environmental crisis. To reduce adverse environmental impacts, these products are designed with their entire life cycle in mind, from production to disposal. The study of eco-friendly products is increasingly urgent because of their significant potential to reduce greenhouse gas emissions, conserve natural resources, and promote sustainable economic growth. By considering various factors influencing acceptance and use of these products, more effective strategies can be designed to drive progress toward a more sustainable society. Gomes *et al.* (2023) identified environmental knowledge and norms as key factors influencing Gen Z's choice to purchase eco-friendly products, as well as their digital literacy and eco-friendly behavior.

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Research related to innovation product acceptance models has often been examined using established theories such as the Innovation Diffusion Theory (IDT) and Theory of Planned Behavior (TPB) (Planing & Britzelmaier, 2014). However, studies using the Value-Beliefs-Norms (VBN) Theory remain scarce. Broadly, the Value-Beliefs-Norms (VBN) Theory posits that pro-social attitudes and personal moral norms are significant predictors of pro-environmental behavior (Stern, 2000). This theory assumes that the influence of values on behavior is mediated by beliefs and personal norms (Stern, 2000). The VBN explains that both general altruistic norms and personal moral norms play an important role in forming green behavior (Dunlap, 1978).

The VBN theory begins with values that shape beliefs, which in turn lead to norms, ultimately influencing behavior. Research findings indicate that an individual's values (altruistic, biospheric, and egoistic) may influence their views in understanding and accepting that their behavior impacts the environment (Ezlika *et al.*, 2019; Yu & Yu, 2017). In the context of green products, sustainability values shape sustainability behavior, including consumers' acceptance of green innovation products.

The adoption of products by Generation Z has unique characteristics that must be considered. Gen Z is known as digital natives with a strong attachment to technology (Prasanna & Priyanka, 2024; Salam *et al.*, 2024). They are accustomed to using technology in daily life, capturing how ease of use influences their adoption of technology. This also affects how Gen Z receives innovative products offered to them.

Gen Z tends to engage with brands reflecting certain characteristics, fulfilling their sense of belonging (Salam *et al.*, 2024). Common practices include their ethical and sustainable practices, especially regarding social and environmental issues (Espejo *et al.*, 2024; Sjahruddin & Adif, 2024). Their interest in these issues influences how they consume products, including innovative ones (Agrawal *et al.*, 2023). Consciously, they will choose innovative product options aligned with their characteristics, especially when familiar with the associated brand (Ewe & Tjiptono, 2023). Thus, businesses need to formulate strategies to attract this generation's attention by emphasizing innovation values tied to their characteristics, ensuring a connection between Gen Z and the market (Salam *et al.*, 2024).

By combining the TPB and VBN Theory (Yang *et al.*, 2024), previous research has identified dimensions used to measure innovation product acceptance, such as perceived value (Yadav *et al.*, 2024), perceived quality (Stylidis *et al.*, 2019), environmental concern (Yadav & Dubey, 2024), social influence (Bagozzi & Lee, 2002), green product awareness (Iriani *et al.*, 2024), and price sensitivity (Suki & Suki, 2015).

Perceived Value

Consumer purchasing decisions are a complex process influenced by various factors, including perceived value. Before deciding to purchase, consumers evaluate the perceived value of the available products. High perceived value tends to increase the likelihood of consumers choosing a product, as they believe it offers greater benefits compared to others. The benefits gained from a product influence how consumers perceive and evaluate it (Junianta *et al.*, 2024). Therefore, a deep understanding of perceived value becomes a crucial key for marketers in planning effective marketing strategies to attract and retain consumers.

Yadav *et al.* (2024) define perceived value as epistemic, hedonic, and social values, which fall under the category of perceived value, referring to consumers' perceptions of the benefits and costs associated with a product that affect their purchase intentions. These values are essential for achieving dominance in rural markets. Perceived value is defined as the assessment made by consumers of the benefits and costs of a particular product or service, influenced by subjective factors and information asymmetry. Its direct impact on purchasing behavior is vital for companies in creating value (He, 2024). Similarly, Pratama & Sya'roni (2023) state that perceived value refers to how consumers view the benefits and costs related to goods or services, influenced by subjective factors and information asymmetry. This directly affects purchasing behavior and is crucial for companies in creating value.

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Perceived Quality

Perceived quality, also known as "perceived quality," is defined as consumers' perceptions of the overall quality of a product or service based on their experience, knowledge, and expectations rather than the objective attributes or technical characteristics of the product. This idea is critical when making purchasing decisions, as consumers tend to rely on their subjective perceptions to determine whether a product meets their needs and desires. Direct factors such as design, functionality, and durability influence perceived quality and external factors like price, brand, and social experiences or recommendations. Many businesses focus on building a strong and consistent brand image, as this can enhance perceived quality and foster consumer loyalty.

Understanding perceived quality is essential for marketing strategies, product development, and customer relationship management because it can influence consumer decisions, customer retention, and purchasing decisions. It is closely related to the concept of perceived value, where consumers evaluate products based on the comparison between the benefits received and the costs incurred. Perceived quality (PQ) is defined as a quality impression depending on quality cues under conditions of limited product knowledge. PQ highlights subjective and objective aspects amidst information asymmetry (Solin & Curry, 2023). Stylidis *et al.* (2019) explain that perceived quality (PQ) refers to the subjective assessment of product quality based on human sensory experiences, encompassing features such as smell, taste, touch, hearing, and visual. This assessment affects how customers perceive and select products when designing and evaluating them.

Environmental Concern

Environmental concern refers to awareness and consideration of environmental issues at individual, social, and institutional levels. It encompasses various aspects, such as the effects of ongoing environmental issues, with the goal of environmental concern being to develop strategies to address these issues effectively (G. Yadav & Dubey, 2024).

According to Batool *et al.* (2021), an individual's values and views on environmental issues, including how they perceive their own and others' behavior toward the environment, impact their intentions and actions to improve environmental quality. This aligns with Nugraha & Maryono (2018), who state that environmental concern refers to awareness and thoughts about how human actions affect the environment. It emphasizes the importance of sustainable development, considering ecological, social, and economic aspects. In recent decades, the concept of perceived quality has been a subject of research. This study aims to understand Indonesian consumers' perceptions of the quality of organic food products. By understanding these perceptions, the research is expected to help develop effective marketing approaches to promote organic food products and encourage people to adopt healthier lifestyles.

Social Influence

Social influence is critical to consumer behavior. Opinions, preferences, and behaviors of those around consumers often influence them. These individuals include family members, friends, colleagues, and acquaintances. Consumers' decisions to purchase goods or services, the brands they choose, and their perceptions of these brands can be influenced by social factors. Some mechanisms underlying social influence in consumption include social norms, social identity, and the need for belongingness. Social influence refers to the impact that individuals or groups have on someone's attitudes, beliefs, or behaviors. This often occurs through interactions such as mentions and retweets on social media, leading users to become radicalized (Fernandez *et al.*, 2019).

In the creative context, social influence refers to the impact individuals or groups have on one another's thoughts, feelings, and behaviors; this includes cognitive, social, and motivational processes that drive creativity and innovation within groups and teams (Paulus & Dzindolet, 2008).

Generation Z is significantly influenced by social factors that shape how they think, behave, and interact with society. Social influence can encourage positive behaviors, such as raising awareness of social issues,

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participating in community activities, and appreciating diversity. For instance, Generation Z has utilized social media as a tool for organizing social movements and raising awareness about global issues. However, on the other hand, social influence can also lead to negative behaviors such as social anxiety, online bullying, and the formation of unrealistic self-images. Generation Z may experience mental health issues due to pressure to conform to strict social norms and seek recognition on social media.

Green Product Awareness

In recent decades, awareness of environmentally friendly or green products has increased. Consumers increasingly seek products with a lower environmental impact as awareness of climate change and environmental degradation grows. Green product awareness encompasses understanding the environmentally friendly features of products, such as sustainable production processes or the use of recycled materials, as well as the overall impact of consumption.

In other words, awareness of green products includes understanding the overall impact of consumption on the environment. Green products have the potential to ensure environmental protection and do not deplete resources or damage the environment (Ansu-Mensah, 2021).

Generation Z, born between the late 1990s and early 2010s, is considered the most environmentally conscious generation. This is reflected in Gen Z's acceptance of green product concepts. This is because they have easier access to information through the internet and social media, allowing them a better understanding of environmental issues and the effects of consumption on the environment.

They are more inclined to purchase environmentally friendly, sustainable, and ethical goods and prefer buying from brands committed to sustainability. The current societal behavior that places greater emphasis on sustainability issues is especially significant for younger generations (Ottman, 2017). Products that can demonstrate their identity as green products can attract consumers interested in environmental issues (Iriani, Nuswantara, *et al.*, 2024).

Price Sensitivity

Consumers' perceptions of a product's price lead to varying responses. Consumers evaluate the price of a product presented, and price levels influence whether they are attracted to the product (Suki & Suki, 2015). Determining appropriate prices based on market characteristics can be a strategy for businesses to attract consumer interest (Iriani, Susilowati, *et al.*, 2024). Actual market forms can appear in various ways and influence consumer perceptions (Coelho *et al.*, 2013). Price sensitivity can emerge from how consumers respond to price differences in a product (Iriani, Susilowati, *et al.*, 2024). Thus, in this study, price sensitivity refers to the extent to which product prices influence consumer purchasing decisions (Ansu-Mensah, 2021).

Research Method

This study employs a quantitative survey research approach to analyze the determinants of the Acceptance of Green Innovation Product. The research was conducted among Gen Z in Yogyakarta. The unit of analysis is individuals, and data collection was carried out at a single point in time (cross-sectional) from July to December 2024.

The population of this study comprises Gen Z individuals born between 1997 and 2012. A total sample of 408 respondents was selected using the purposive random sampling technique. The criteria include Gen Z individuals aged 17–25 years who already have knowledge about the Shuca product. Data collection was carried out using a questionnaire, with distribution conducted both offline and online. This study uses an exploratory factor analysis approach to analyze the factors formed in answering this research question. (Hair et al., 2019) The analysis was carried out using SPSS 25

The research utilizes a questionnaire consisting of 29 questions for EFA analysis. The constructs consist of six dimensions, as follows: 1)Perceived Value: Measured using five indicators related to emotional,

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functional, and economic value, adopted from (Ansu-Mensah, 2021); 2)Perceived Quality: Measured using five indicators related to the SERVQUAL dimensions proposed by Parasuraman, adopted from (Ansu-Mensah, 2021); 3) Environmental Concern: Measured using seven items related to an individual's commitment to the environment, adopted from (Maisaroh *et al.*, 2024); 4) Social Influence: Measured using two indicators of subjective norms, adopted from (Bagozzi & Lee, 2002); 5) Green Product Awareness: Measured using five items**,** adopted from (Ansu-Mensah, 2021); 6) Price Sensitivity: Measured using five items, adopted from (Ansu-Mensah, 2021).

Result

In this research, exploratory factor analysis (EFA) was carried out to form factors relevant to the issues raised in the study. From several previously analyzed approaches, a total of 29 items were included in the EFA analysis. These items were then analyzed to determine the variables that emerged from the grouping of the analyzed items. EFA analysis was conducted using SPSS 22**.**

Table 1. KMO and Barlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.946
Bartlett's Test of Sphericity	Approx. Chi-Square	4654.515
	df	406
	Sig.	.000

EFA analysis needs to meet several criteria in order to conduct factor analysis. Kaiser Meyer Oikin Measure of Sampling Adequacy (KMO-MSA) is one of the indicators that must be met before conducting factor analysis. In table 1, it can be seen that the KMO-MSA value in this study is 0.946. With a sample size of 408 respondents, the study can be continued if the KMO-MSA value is greater than 0.3. With the results shown above, namely the KMO-MSA value of 0.946>0.3, the analysis can be carried out.

Table 2. Recapitulation of Output Anti-Image Correlation

Item	AIC	Item	AIC	Item	AIC
PV1	.959[a]	EC1	.924[a]	PS2	.959[a]
PV2	.946[a]	EC2	.932[a]	PS3	.930[a]
PV3	.957[a]	EC3	.909[a]	PS4	.924[a]
PV4	.952[a]	EC4	.972[a]	PS5	.946[a]
PV5	.957[a]	EC5	.919[a]	GPA1	.955[a]
PQ1	.951[a]	EC6	.952[a]	GPA2	.946[a]
PQ2	.946[a]	EC7	.960[a]	GPA3	.949[a]
PQ3	.944[a]	SI1	.927[a]	GPA4	.948[a]
PQ4	.956[a]	SI2	.946[a]	GPA5	.938[a]
PQ5	.957[a]	PS1	.955[a]		

Analysis of the anti-image correlation value is one of the steps that need to be taken to determine whether the Assumption of measuring sampling adequacy (MSA) has been met and whether factor analysis can be carried out. The assumption is that the MSA value has been met if the Anti-Image Correlation value is greater than 0.3. Based on the values in Table 2, each item has an Anti-Image Correlation value above 0.3. These results can be concluded that in this study the MSA assumption has been met.

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Table 3. Communalities

Item	Initial	Extraction	Item	Initial	Extraction	Item	Initial	Extraction
PV1	1.000	.481	EC1	1.000	.565	PS2	1.000	.571
PV2	1.000	.477	EC2	1.000	.640	PS3	1.000	.700
PV3	1.000	.480	EC3	1.000	.658	PS4	1.000	.605
PV4	1.000	.425	EC4	1.000	.433	PS5	1.000	.509
PV5	1.000	.461	EC5	1.000	.588	GPA1	1.000	.494
PQ1	1.000	.546	EC6	1.000	.556	GPA2	1.000	.593
PQ2	1.000	.547	EC7	1.000	.405	GPA3	1.000	.547
PQ3	1.000	.588	SI1	1.000	.607	GPA4	1.000	.575
PQ4	1.000	.545	SI2	1.000	.511	GPA5	1.000	.493
PQ5	1.000	.545	PS1	1.000	.487			

Analysis of the commonalities results can show whether each item can explain the factors that will be formed in the factor analysis. The testing criteria for commonalities analysis is if the value is more than 0.3. Based on the results in Table 3, it can be seen that each extraction value of each item has a result above 0.3. These results indicate that each item used in this study has a strong relationship and can explain the factors that will be formed in this research.

Table 4. Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.164	35.050	35.050	10.164	35.050	35.050	4.577	15.784	15.784
2	2.023	6.975	42.025	2.023	6.975	42.025	3.366	11.608	27.391
3	1.333	4.596	46.621	1.333	4.596	46.621	3.318	11.440	38.832
4	1.085	3.741	50.362	1.085	3.741	50.362	2.315	7.983	46.815
5	1.029	3.547	53.910	1.029	3.547	53.910	2.058	7.095	53.910
6	.919	3.168	57.077						
7	.848	2.923	60.001						
8	.798	2.753	62.754						
…	…	…	…						
29	.294	1.013	100.000						

The factors formed in the results of this research analysis can be seen in Table 4. The values shown in the Eigenvalues can indicate the number of factors formed, with the criteria of values above 1. Based on the components of the items used, there are 5 factors formed with different values. Factor 1 has an Eigenvalue value of 10,164 and is able to explain 35.00% of the variation. Factor 2 has an Eigenvalue value of 2,023 and is able to explain 6.98% of the variation. Factor 3 has an Eigenvalue value of 1,333 and is able to explain 4.6% of the variation. Factor 4 has an Eigenvalue value of 1,085 and is able to explain 3.74% of the variation. Factor 5 has an Eigenvalue value of 1,029 and is able to explain 3.55% of the variation.

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Tabel 5. Rotated Component Matrix

	Component				
	1	2	3	4	5
PQ5	.641				
PQ3	.640				
PQ1	.621				
PQ2	.621				
PV3	.618				
PV5	.581				
PV4	.574				
PQ4	.571				
PV1	.563				
PV2	.547				
EC4	.340				
GPA2		.667			
GPA3		.644			
SI1		.639			
GPA4		.564			
GPA1		.563			
PS1		.538			
SI2		.504			
EC5			.685		
EC6			.668		
EC1			.643		
GPA5			.555		
EC7			.498		
PS5			.465		
EC2				.734	
EC3				.724	
PS3					.756
PS4					.653
PS2					.609

It was found that there were factors formed with each item that formed the factor, for each item that forms each factor can be seen in Table 5. If the value of the item that forms a factor is greater than 0.3, it can be called an item that can play a role in forming the factor. The results in Table 5 show that each item has a value above 0.3. Factor 1 has 11 items that form the factor, namely in items PQ5, PQ3, PQ1, PQ2, PV3, PV5, PV4, PQ4, PV1, PV2, and EC4. Factor 2 has 7 items that form the factor, namely in items GPA2, GPA3, SI1, GPA4, GPA1, PS1, and SI2. Factor 3 has 6 items that form the factor, namely in items EC5, EC6, EC1, GPA5, EC7, and PS5. Factor 4 has 2 items that form the factor, namely in items EC2 and EC3. Factor 5 has 3 items that form the factor, namely items PS2, PS3, and PS4.

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Table 6. Component Transformation Matrix

Component	1	2	3	4	5
1	.603	.483	.450	.314	.318
2	-.263	.358	-.615	.614	.217
3	-.714	.442	.453	-.191	.229
4	-.042	-.524	.016	.003	.851
5	-.235	-.410	.462	.698	-.275

Analysis of the component transformation matrix was conducted to determine which factors are able to explain the items used in this study. The results of this analysis are the basis for determining which factors can explain the 29 items used in this study. Based on Table 6, it can be seen that component 1 has a correlation of 0.603, component 2 has a correlation of 0.358, component 3 has a correlation of 0.453, component 4 has a correlation of 0.003, and component 5 has a correlation of -0.275. Of the five components, there are 3 components that have values above 0.3, so it can be concluded that of the 5 factors that appear, 3 factors are able to explain the 29 items analyzed.

Discussion

This study aims to analyze the factors influencing the acceptance of green products among Generation Z. From previous literature, this research adopted a questionnaire containing 39 items representing green product acceptance. The results of this study show that out of 29 items, only 24 items influence the acceptance of green products among Generation Z, grouped into 3 factors (as shown in Table 7). These three factors, identified through the study, play a role in influencing the adoption of green products, particularly among Generation Z, namely: 1) Perceived Value, 2) Environmental Concern, and 3) Green Product Awareness.

Table 7. Factors Influencing Green Product Adoption Among Generation Z

Factor	Component	Factor Name
1	EC4, PQ1, PQ2, PQ3, PQ4, PQ5, PV1, PV2, PV3, PV4, PV5	Perceived Value
2	GPA1, GPA2, GPA3, GPA4, PS1, SI1, SI2	Green Product Awareness
3	EC1, EC5, EC6, EC7, GPA5, PS5	Environmental Concern

The results of this study identify three main factors that determine the level of Generation Z's acceptance of green product innovation. First, Perceived Value, factor significantly determines Generation Z's acceptance of green product innovations. The value perceived by Generation Z, both functionally and emotionally, plays a crucial role. Generation Z tends to choose green products if the benefits offered are deemed superior to conventional products, particularly concerning sustainability. This aligns with the Value-Beliefs-Norms Theory, which explains that a person's values influence their attitudes and behaviors toward the environment, including the acceptance of green products.

Second, Environmental Concern is another critical factor influencing Generation Z's acceptance of green product innovation. Generation Z's concern for environmental issues motivates them to choose products that support environmental preservation. Living in an era where environmental issues such as climate change, pollution, and ecosystem damage are at the forefront, Generation Z's exposure to information about the negative impacts of human activities has shaped pro-environmental values and attitudes that influence their decisions in various aspects of life. This finding aligns with the Value-Beliefs-Norms Theory, which asserts that pro-environmental values drive individuals to act according to environmental norms.

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Third, Green Product Awareness, awareness about green products, including their benefits and positive impacts, significantly influences Generation Z's acceptance of green product innovation. These results highlight the importance of effective education and marketing campaigns to enhance public understanding of the value of green products. Awareness of green products includes knowledge about their characteristics, benefits, and the positive impacts they offer. This aspect plays a crucial role in driving the acceptance of green products, as Generation Z with sufficient information tends to trust and support sustainability-based innovations.

Overall, this study underscores the need for an integrated approach to understanding the acceptance of green product innovations, considering the interconnected psychological, social, and economic factors. These findings provide valuable insights for companies and policymakers to enhance the adoption of green products. Marketing strategies focusing on quality, perceived benefits, and environmental concern can accelerate market acceptance. Furthermore, social and education-based campaigns can raise awareness and preference for green products. Addressing price sensitivity, companies must offer affordable environmentally-friendly products without compromising quality or sustainability.

Conclusion

Based on the EFA analysis results, this study identifies three primary factors influencing Generation Z's acceptance of green product innovation through the lens of VBN Theory: Perceived Value, Environment Concern, and Green Product Awareness. The acceptance of green product innovation indicates that Gen Z is more likely to embrace green products if they align with their lifestyle and reflect social and sustainability values. Perceived value emerges as a key determinant, wherein the functional and emotional benefits derived from green products surpass those of conventional products. Environmental concern underscores Gen Z's commitment to environmental issues, driving them to choose environmentally-friendly products. Green product awareness highlights the importance of education and marketing campaigns in raising awareness of the benefits of green products.

Overall, this study confirms that interrelated psychological, social, and economic factors influence Gen Z's acceptance of green product innovation. Marketing strategies focusing on product quality, perceived benefits, and environmental concern, accompanied by educational and socially-driven awareness campaigns, can enhance the adoption of green products. Moreover, companies need to offer environmentally-friendly products at affordable prices without compromising quality or sustainability. Practical Contribution: These findings provide essential guidelines for businesses and policymakers to promote green product innovation among Gen Z. Theoretical Contribution: This research provides a validated measurement model that can be utilized in future studies to assess green product acceptance, specifically by identifying factor combinations relevant to Indonesian Gen Z.

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