



Factors influencing Generation Z muslims' purchase decisions of green halal pharmaceutical products

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ABSTRACT

Pharmaceutical products play a significant role in people's lives to overcome disease or maintain health. However, pharmaceutical supply chain has a high proportion of greenhouse gas emissions and contributes to climate change. Green Halal Pharmaceutical (Green HPC) Products are innovative solution for pharmaceutical industry and a primary opportunity for the global Islamic economy. There is limited academic literature discussing the combination of halal and green pharmaceutical products. Therefore, this study aimed to identify consumer characteristics and analyze the factors influencing Generation Z (Gen Z) Muslims' purchasing decisions for Green HPC products in Indonesia. The direct and indirect relationship between halal brand image, health consciousness, environmental knowledge, and religiosity variables on attitudes and halal-green lifestyles, assumed to influence consumer buying interest and purchasing decisions, was also examined. A quantitative approach and purposive nonprobability sampling were used to recruit 300 Muslim Gen Z respondents in Indonesia. Descriptive analysis was adopted to examine respondents' characteristics, while Structural Equation Modeling–Partial Least Squares (SEM-PLS) was conducted using SmartPLS 3. The importance of the role of pharmaceutical products was not in line with the large number of studies in the area. Therefore, this study explained consumer behavior towards Green HPC and focused on Gen Z as entry-level consumers. The results showed that nine out of ten hypotheses were supported. Purchase decisions of Green HPC were primarily influenced by purchase intention, while environmental knowledge affected purchase decisions indirectly through halal-green lifestyle, attitudes, and purchase intention.

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1 Introduction

Indonesia is the 4th most populous country in the world according to Worldometers in 2023. The largest Muslim population was reported to reach 240.62 million in 2023, equivalent to 86.7% of the national population (The Royal Islamic Strategic Studies Center or RISSC 2023). The Pew Research Center (2015) stated that the growth of Islam in the world was faster than that of other religions. This has led to an increase in the need for halal products. The halalness and thayyib or goodness of a product are mandatory for every product consumed or used by Muslims (Asmah & Salamah 2021). This rule is contained in the Qur'an, Surah Al-Baqarah verse 168, "O mankind, eat from the (food) on earth that is lawful and good and do not follow the footsteps of Satan. Indeed, he is an open enemy to you", Al-Maidah verse 88, and Law Number 33 of 2014 concerning Halal Product Assurance (JPH). Based on the law, food and pharmaceuticals must be halal certified.

Pharmaceuticals are substances used to diagnose, prevent the risk of disease, and reduce pain in humans or animals. The classification of human pharmaceuticals based on the regulations updated in Indonesian Minister of Health Regulation Number 949/Menkes/Per/IV/2000 is seven, namely over-the-counter pharmaceuticals, limited over-the-counter pharmaceuticals (OBT), prescription pharmaceuticals, narcotic pharmaceuticals, phytopharmaceutical medicines or original Indonesian modern pharmaceuticals (OMAI), standardized herbal pharmaceuticals (OHT), and herbal pharmaceuticals (jamu).

Halal pharmaceutical (HPC) products come from halal raw materials, and the sector has great potential. State of Global Islamic Economy (SGIE) Report 2023/24 states that Indonesia is in the top three for all aspects of the global Islamic economy and has risen to fifth for HPC industry. The development and opportunities of the industry are indicated by SGIE Report that Muslim consumer spending on pharmaceuticals will reach \$108 billion and \$142 billion in 2022 and 2027, respectively. Meanwhile, halal consumption in pharmaceutical sector in Indonesia was \$5.13 billion and \$6.81 billion in 2020 and 2025, respectively (Pahlevi 2022).

The word "halal" is mentioned 30 times in the Qur'an (Kasri *et al.* 2021) and often accompanied by thayyib. Halal combined with thayyib contains the principles of sustainable development, covering the social, economic, and environmental fields (Azam *et al.* 2019). Pharmaceuticals are a necessity for humans to overcome diseases or maintain health. Therefore, the industry plays an important role in health services in the community. According to Dehipawala *et al.* (2023), the health sector produces 4.4% of carbon emissions, causing greenhouse gas emissions (GHG). The highest emissions of 71% are generated from pharmaceutical supply chain, starting from production, medical equipment, and transportation of pharmaceuticals (Dehipawala *et al.* 2023).

Environmentally polluting pharmaceuticals are a consequence of the manufacture (Wilkinson *et al.* 2022), use, and disposal of pharmaceuticals (Rogowsk & Zimmermann 2022), particularly through excretion and improper disposal of unused pharmaceuticals (Rayan 2023). Wilkinson *et al.* (2022) stated that pharmaceutical pollution in the form of exposure to active pharmaceutical ingredient (API) in the environment was a global threat to human health, ecosystems, and the achievement of SDGs.

A global study by Wilkinson *et al.* (2022) on API pollution in 258 rivers in 104 countries across continents stated that the highest concentrations of pollution were in Lahore, Pakistan, La Paz, Bolivia, and Addis Ababa, Ethiopia. Rayan (2023) reported that every year in India, there were multidrug-resistant infections due to pharmaceutical pollution, causing around 58 thousand newborns to die. Citarum River in Indonesia is also affected by pharmaceutical pollution (Wilkinson *et al.* 2022), based on data from 10 sample locations in the river flow. Approximately two samples showed paracetamol levels of 1630 ng/L and 1590 ng/L (Fisher 2022). Koagouw *et al.* (2021) reported high concentrations of paracetamol in Jakarta Bay in Muara Angke (610 ng/L) and Ancol (420 ng/L). According to Wilkinson *et al.* (2022), API detected on all continents is over-the-counter API or lifestyle compounds such as paracetamol (analgesic), caffeine, nicotine, and cotinine. Therefore, companies need to clean up production and invest in biodegradable pharmaceuticals to reduce pharmaceutical pollution (Rayan 2023).

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Pharmaceutical sector has a significant impact on the environment, starting from manufacturing, storage, disposal, and the distribution chain, to consumers (Moodley 2021). The industry must be more innovative in overcoming environmental problems. The presence of Green HPC products can be an innovative solution for pharmaceutical industry. Hanapi and Khairuldin (2017) stated that the concept of halal and green considered physical and spiritual values, and had similarities with the concept of halal-halalan-thayyiban impacting humans and nature. Green refers to sustainable and environmentally friendly activities (Dewi 2024). According to the European Commission in 2019, green pharmaceutical design is a means of developing pharmaceutical products that are intrinsically environmentally friendly. The concept of green pharmacy or the renewal of pharmaceutical industry activities, starting from materials to waste processing, was discussed at the 2022 G20 summit in Indonesia. This is an ecological approach from the health industry side in environmental management and efforts to mitigate world disasters caused by climate change. According to DinarStandard (2023), there are 33 key opportunities in the global Islamic economy. A total of 2 opportunities are related to the growth of biopharmaceuticals and environmentally friendly pharmaceutical innovation.

Consumers are increasingly aware of environmental issues, and has an impact on promoting interest in buying green halal products (Dewi 2024) that do not use environmentally damaging materials (Arifin 2022). This is a challenge as well as an opportunity for businesses and the government to support a sustainable economy. HPC products are quite widely available in Indonesia. However, products processed through environmentally friendly industries are limited. Green HPC products are HPC processed in environmentally friendly industries and used for self-medication or purchased freely without a doctor's prescription, such as over-the-counter pharmaceuticals, OTC, and natural pharmaceuticals.

The majority of Indonesian population is Muslim, making the country a potential market for halal product producers. Indonesia also has the potential to become a global producer of halal and thayyib products that contain the concept of sustainability or are environmentally friendly. Consumption of pharmaceuticals to overcome health problems is a form of dharuriyat (primary) affairs in terms of maintaining the soul (hifz al-nafs) in the elements of maqashid sharia (Nasution & Nasution 2020). A survey by Indonesian Internet Service Providers Association (APJII) shows that the most favourite content accessed by Indonesian people in 2023 is health at 36.96

Herbalife Nutrition Asia Pacific in 2022 surveyed personal habits and stated that the majority of consumers in Indonesia live an unhealthy lifestyle. However, Gen Z and Millennials have 79% unhealthy eating and sleeping patterns compared to previous generations. These generations have 19% concern for health services, disease prevention, and mental health. Approximately 21% of Gen Z concerns are related to climate change issues (Deloitte Global Gen Z and Millennial Survey, 2023). In Indonesia, the generation has a priority of 37.33% to live a healthy life physically and mentally (DataIndonesia.id, 2023). This is in contrast to data released by Central Bureau of Statistics (BPS) for the 2016–2022 period that the health conditions of Gen Z are deteriorating due to the high percentage of complaints and morbidity rates. The percentage has decreased, and the health quality has improved in the 2023 period.

There are 69.31% of Gen Z who choose to self-medicate when sick, compared to going to a health facility (BPS 2023). This generation also cares about the sustainability and social responsibility policies of the industry selling the products (Song *et al.* 2020). Based on the 2023 Indonesian Optimism Index Survey, Yonatan (2023) stated that 71% of Gen Z are optimistic about the prevention of environmental damage. The products in this study were selected from environmentally friendly companies by receiving the Company Performance Rating Program in Environmental Management (PROPER) gold award from Indonesian Ministry of Environment and Forestry (KLHK).

The investigation concerning the analysis of consumer behavior in relation to HPC products is limited (Kasri *et al.* 2021). Therefore, this study is expected to increase the determination of manufacturers to innovate Green HPC products and increase consumer purchasing interest. The characteristics of Generation Z (Gen Z) Muslims are analyzed in selecting Green HPC products and the factors that influence the purchasing decisions. The results are expected to provide information on consumer purchasing behavior for determining product innovation strategies, marketing, increasing sales, health awareness, environmental knowledge, and interest in purchasing Green HPC products, becoming references, library literature, as well as references for further study and making policies related to development strategies.

2 Literature Review

2.1 Green Halal Pharmaceutical Products

According to World Health Organization (WHO), pharmaceutical products use ingredients in the form of drugs for the benefit of the recipient. Pharmaceuticals are a necessity for health (Herdiana & Rusdiana 2021). LPPOM MUI (2019) stated that pharmaceuticals in Indonesia were halal

certified, as reported in the hadith "from Abu Darda', he said: The Messenger of Allah SAW said: Indeed, Allah has sent down the disease and a cure for every disease, so seek treatment and do not seek treatment with what is forbidden" (HR. al-Bukhari). This principle is further reinforced by Halal Product Assurance Law and MUI Fatwa Number 30 of 2013 on Pharmaceuticals and Medical Treatment, where ingredients used in pharmaceutical products for medical purposes must be pure and halal.

Kasri *et al.* (2021) stated that halal products were obtained from the teachings of the Qur'an and were applied to pharmaceutical products. According to Islamic law, halal covers all aspects of life, while thayyib (pure) means clean, quality, as well as goodness and health (Aslan 2023). The concept of halal-halalan-thayyiban considers health and environmental protection in fair and ethical business practices (Rozaidah *et al.* 2022).

Herdiana *et al.* (2023) stated that HPC ingredients were obtained from water, plants, animals slaughtered according to Islamic law, soil, marine animals considered halal, and synthetic materials safe for consumers and not contaminated with dirt or impurities. HPC must be thayyib, contain only permitted ingredients, and the production method should follow Islamic provisions (Saha *et al.* 2019). However, around 37.3% of products in the form of halal-certified pharmaceuticals are herbal and are not used for treatment in hospitals (Ningtyas *et al.* 2022). Pharmaceutical industry can take advantage of the opportunity and meet the demand for halal products produced in an environmentally friendly and ethical manner (Herdiana *et al.* 2023). Pharmaceutical products need to meet environmentally friendly standards.

Over the past 20 years, pharmaceuticals for humans and animals have polluted the environment (Kümmerer 2019). Kusturica *et al.* (2022) stated that the ingredients were detected in surface water, groundwater, manure, soil, and drinking water. This exposes humans, fish, plants, dairy products, and meat to pharmaceutical residues. Sustainability issues are increasingly being considered on the global agenda (So & Laforteza 2022). Environmentally friendly pharmaceuticals contribute to SDGs points 3, 6, 9, 11, and 12 (Kümmerer 2019).

2.2 Theory of Planned Behavior (TPB)

TPB is a development of Theory of Reasoned Action (TRA) used to predict and explain human behavior in certain contexts (Ajzen 1991), including consumer behavior. In principle, this theory is open to additional predictors in studies subjected to careful consideration and empirical exploration (Ajzen 2020). The predictors are modifications of TPB based on references to several previous studies.

2.3 Purchase Decision

Purchasing decisions are part of the five stages of the process consumers experience (Kotler 1997). This variable often arises due to external factors, such as intentions, recommendations, and beliefs (Pham *et al.* 2023). The measurement of purchasing decisions can be a reference for knowing actual purchases. Based on TPB, the decisions are influenced by purchasing intentions.

2.3.1 Purchase Intention

Ajzen (1991) assumed that intention captured motivational factors influencing behavior. The intention is a person's plan about behavior in a certain situation based on the readiness of consumer to acquire a product based on specific and clear criteria (Pham *et al.* 2023). The decision-making procedure has a mental stage in the form of intention, namely consumer willingness to act on a product (Aslan 2023).

2.3.2 Gen Z

Gen Z represents the future of society and has a different attitude in selecting environmentally friendly products (Kanchanapibul *et al.* 2014). Globally, the population is indicated to be environmentally conscious (Pradeep & Pradeep 2023). Consumers in each generation have different expectations about the use of environmentally friendly products (Lavuri *et al.* 2021). Kanchanapibul *et al.* (2014) reported that Gen Z aimed to obtain more information before deciding to buy a product. Climate change issues and environmental impacts are major concerns for this group (Hughes 2020). Brands and retailers are expected to be sustainable (Gomes *et al.* 2023) because Gen Z is more environmentally friendly, tech-savvy, and sustainability-oriented (Dabija *et al.* 2019).

2.4 Halal-Green Lifestyle

Lifestyle includes an individual's interests, opinions, and activities (Engriani & Ayyubi 2021). Psychological stress and lifestyle have a significant influence on the development of disease (Herdiana & Rusdiana 2021). Based on an economic perspective, lifestyle describes how consumers prefer products or services with various choices in one product type category and individual income allocation (Lubis & Izzah 2022). A halal lifestyle is constructed from market demands regarding the guarantee of halal products that bring peace of mind to consumers (Rachim & Santoso 2021). Repeated halal consumption activities form a halal lifestyle (Annisa 2021), which is an important variable in making purchasing decisions (Bachri 2023). A halal lifestyle is a way of life in making decisions according

to the perspective of Islamic law (Hasmi *et al.* 2022) and as a standard of healthy living to improve the quality of life (Nur *et al.* 2021). Non-halal consumption causes anxiety, impacting the body, such as a negative impact on the metabolism of the immune system (Herdiana & Rusdiana 2021). A green lifestyle shows health concerns and attracts consumers to organic products (Rakhmawati & Okshanela 2023).

2.5 Halal Brand Image

Brand image is consumer representation of a brand based on information, experience (Syahmidar *et al.* 2022), and consumer trust (Pramanawati & Astuti 2016). Popularity is an important key to forming a brand image in consumers (Septiariini *et al.* 2023), which represents the overall perception (Djunaidi *et al.* 2021). The label on products conveys halal information to consumers (Bachri 2023). In addition, the practice of halal certification on medicinal products guarantees the safety of Muslim consumers in selecting good products (Efendi 2020) and ensures that consumers do not eat non-halal products (Herdiana & Rusdiana 2021).

2.6 Health Consciousness

Health consciousness is the practice of using the senses to identify, avoid unhealthy products, and find ways to deal with health-related threats (Mabkhot 2023). Sulthani *et al.* (2022) reported that health consciousness was formed by individual responsibility, motivation, and awareness, directing individuals to conduct healthy behaviors. This consciousness is individual tendency to focus on health (Kusumaningsih *et al.* 2019).

2.7 Environmental Knowledge

Environmental knowledge is recognized by marketing studies as a factor that influences each phase of the purchasing decision process (Noor *et al.* 2012). This variable is individual perception of knowledge about environmental issues (Irfany *et al.* 2023). The knowledge factor influences consumption patterns (Utami 2023). McDougall (1993) in Noor *et al.* (2012) reported that environmental knowledge was important because green revolution was obtained from consumer motivation.

2.8 Religiosity

Religiosity is an additional predictor variable for TPB (Aslan 2023). Mortimer *et al.* (2020) stated that religion as a precursor to risk perception was previously ignored. The role of religion in consumer behavior is important because the concept has its prohibitions in the doctrine regarding consumption (Mathras *et al.* 2015). In addition, religiosity plays an important role in building positive attitudes towards HPC products (Kasri *et al.* 2021).

2.9 Attitude

Attitude refers to the extent to which an individual has a favorable or unfavorable assessment or evaluation of a behavior (Ajzen 1991). This preference drives the tendency to act and becomes a driving factor in purchase intention (Tedjakusuma *et al.* 2023). Individual intention towards a product is explained through attitude (Aslan 2023). This is influenced by personal experience, family, mass media, and social interaction (Utami 2023). Attitude functions as a determinant of behavioral intention (Sulthani *et al.* 2022). Ogienwonyi *et al.* (2023) reported that individuals with a positive attitude towards green activities showed a positive assessment of the environment. Respondents' attitudes towards consuming HPC products are determined by positive views regarding the benefits of the product (Kasri *et al.* 2021).

2.10 Relationship between research variables

2.10.1 Halal Brand Image with Attitude

A positive product image of a brand allows consumers to easily make purchases (Djunaidi *et al.* 2021). Halal logo, awareness, and brand image influence consumer attitudes and behavioral intentions (Septiariini *et al.* 2023). Brand image is a key factor (Lin & Chuang 2018) and an important determinant of purchase intention (Aziz & Chok 2012). This variable has a positive and significant effect on purchasing decisions (Syahmidar *et al.* 2022; Bachri 2023) and repeat purchase decisions (Pramanawati & Astuti 2016) H1: Halal brand image influences attitude

2.10.2 Health Consciousness with Attitude

Chen (2009) stated that there was a significant relationship between health consciousness and attitudes towards purchasing organic food. This is because organic food is considered healthier, safer, and greener (Irianto 2015). Sulthani *et al.* (2022) stated that health consciousness did not have a significant effect on purchase intention. However, this variable had a significant effect on purchase intention mediated by attitude. There is a positive influence between health consciousness and environmental attitudes (Widyasari & Haryanto 2021). H2: Health consciousness influences attitude

2.10.3 Environmental Knowledge with Attitude

The high consumer attitude in Malaysia towards eco-label products is related to consumer knowledge (Priyayi 2019). Environmental knowledge influences consumer attitudes towards environmentally friendly halal

cosmetics (Irfany *et al.* 2023). Furthermore, increasing public knowledge of environmental issues promotes public awareness of purchasing green products (Utami 2023). H3: Environmental knowledge influences attitude

2.10.4 Environmental Knowledge with Halal-Green Lifestyle

Knowledge of lifestyle factors can be integrated into marketing strategies (Ahmad *et al.* 2010). Positive consumer knowledge promotes positive behavior towards environmental sustainability. Increased environmental knowledge leads to better consumer ecological behavior (Engriani & Ayyubi 2021). Mursid (2023) stated that environmental knowledge had a positive and significant effect on the lifestyle of health and sustainability (LOHAS). In this context, LOHAS has a major impact on the welfare of Muslim consumers. H4: Environmental knowledge influences halal-green lifestyle

2.10.5 Religiosity with Attitude

Religiosity has a positive effect on attitude (Iranmanesh *et al.* 2020) and determines the decision to purchase halal products (Nurfahmiyati *et al.* 2023). Aslan (2023) stated that religiosity had a significant effect on the intention to buy halal food and beverages. Religiosity plays an important role in building a positive attitude towards HPC products (Kasri *et al.* 2021). This variable has a positive effect on purchasing decisions because religious beliefs can be a consideration (Djunaidi *et al.* 2021). H5: Religiosity influences attitude

2.10.6 Religiosity with Halal-Green Lifestyle

Halal lifestyle is influenced by religious aspects. Faizah *et al.* (2023) stated that the addition of education to halal lifestyle and motivation was necessary to increase commitment to implementing religious values in life. Respondents show that fulfilling religious obligations strengthens faith and influences lifestyle (Salsabila & Ihsan 2023). Religious values are important in analyzing green consumption behavior and directly influence concern for the environment (Hassan 2014). H6: Religiosity influences halal-green lifestyle

2.10.7 Halal-Green Lifestyle with Attitude

Kotler (1997) defined lifestyle as a pattern that describes attitudes in interacting with the environment. A healthy lifestyle has a significant effect on attitudes towards eating green products (Tan *et al.* 2022). Arora *et al.* (2006) found that lifestyle had a significant impact on fitness and sports activities. Attitude is a mediator of the influence of lifestyle on purchase intention (Nora and Minarti 2016). H7: Halal-green lifestyle influences attitude

2.10.8 Halal-Green Lifestyle with Purchase Intention

Nur *et al.* (2021) found that halal lifestyle had a significant effect on purchasing interest. Similarly, Mahliza *et al.* (2023) and Sari & Susilo (2023) stated that lifestyle had a positive and significant effect on purchasing decision behavior. Halal lifestyle or trends influence consumer decisions in purchasing halal (Nurfahmiyati *et al.* 2023) and green products (Rakhmawati & Okshanela 2023). H8: Halal-green lifestyle influences purchase intention

2.10.9 Attitude with Purchase Intention

Tedjakusuma *et al.* (2023) stated that attitude had a positive effect on purchase intention and behavior (Mahliza *et al.* 2023). Kasri *et al.* (2021) showed that attitudes towards consuming halal products were determined by consumer positive assessments. Increasing positive attitudes towards environmentally friendly halal products promotes high green purchasing behavior (Utami 2023). Consumers with positive attitudes towards the environment tend to have a positive influence on purchase intention (Widyasari & Haryanto 2021). H9: Attitude influences purchase intention

2.10.10 Purchase Intention with Purchase Decision

Duong *et al.* (2023) emphasized that green purchase intention was a strong predictor of green purchase behavior (Lavuri *et al.* 2021; Abeysekera *et al.* 2022). Therefore, green purchase intention and behavior have a positive and strong relationship (Yadav & Pathak 2017). H10: Purchase intention influences purchase decision

3 Study Methodology

This quantitative study used primary and secondary data. Primary data were obtained based on respondents' responses through questionnaires distributed online to Gen Z Muslim consumers who consume Green HPC Kalbe Farma, Sido Muncul, or both products. Meanwhile, secondary data were gathered through scientific journals, BPS, previous studies, and other library materials.

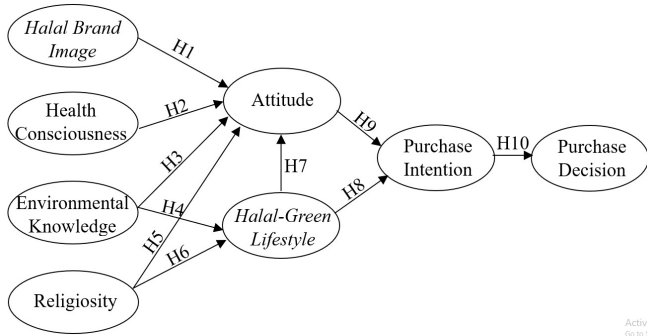


Figure 1: Conceptual framework

The data collection method was through filling out a questionnaire. Nonprobability sampling was used with a purposive sampling type based on certain criteria. Therefore, the sample is in accordance with the study objectives (Campbell *et al.* 2020). These criteria include Indonesian people, 17–27 years (Gen Z) with Muslim characteristics who have purchased and consumed Green HPC products. The number of samples in the study should be 100 or more, with a minimum of five times the number of questions used for analysis (Hair *et al.* 2014). In this context, a total of 300 respondents were recruited for the analysis.

The data were examined using descriptive analysis and Structural Equation Model - Partial Least Squares (SEM-PLS). PLS offers the advantage of accommodating data without requiring a normal distribution (Hair *et al.* 2014) while enabling the examination of relationships among latent variables (Irwan & Adam 2015). The data processing and analysis tools used are Microsoft Excel 2019, SPSS 26, and SmartPLS 3.

4 Results

4.1 Descriptive analysis

The characteristics of Gen Z Muslim consumers towards Green HPC products are shown in Table 1. Based on gender, the majority of respondents were female and aged 17–22 years (234, 78%). These

Table 1: Demographic characteristics of the sample (n=300) in percentage

Characteristics	Category	Amount	%
Gender	Female	234	78
	Male	66	22
Age	17–22	234	78
	23–27	66	22
Last/Current Education	Graduate	9	3
	Undergraduate	223	74
	High School	65	22
	Junior High School	3	1
Length of study	> 16 years	15	5
	13–16 years	253	84.3
	1–12 years	32	10.7
Marital status	Unmarried	296	98.7
	Married	4	1.3
Employment	Student	239	79.7
	Civil Servant/BUMN	6	2
	Private employee	26	8.7
	Entrepreneur	5	1.7
	Housewife	2	0.7
	Freelancer	4	1.3
	Others	18	6
Income	< Rp1,500,000	183	61
	Rp1,500,000–Rp2,500,000	78	26
	Rp2,500,001–Rp3,500,000	13	4.3
	Rp3,500,001–Rp5,000,000	16	5.3
	Rp5,000,001–Rp10,000,000	9	3
	> Rp10,000,000	1	0.3
Average spending for pharmaceuticals	< Rp50,000	207	69
	Rp50,000–Rp100,000	79	26.3
	Rp100,001–Rp500,000	13	4.3
	> Rp500,000	1	0.3
	Kalbe Farma	20	6.7
Pharmaceutical brands respondents have purchased	Sido Muncul	40	13.3
	Both	240	80

individuals had completed or were undergoing diploma/bachelor's level education (223, 74%) and 13–16 years of education (253, 84.3%). Furthermore, the majority of respondents were unmarried (296, 98.7%) and were students (239 people, 79.7%). A total of 207 (69%) spent less than IDR 50,000.00 per month to buy Green HPC products, while 240 (80%) had purchased both Green HPC products produced by Kalbe Farma and Sido Muncul.

4.2 Structural equation modelling analysis–partial least squares structural

4.2.1 Evaluation of Measurement Model (Outer Model)

Based on the convergent validity test, 31 indicators were declared valid, with loading factor values ranging from 0.643 to 0.918 (Table 2). Most indicators had loading factor values above 0.70, while those below 0.70 were considered acceptable because the values remained above the minimum threshold of 0.50–0.60 (Chin 1998). The loading factor reflects the strength of the correlation between each indicator and the latent variable measured.

The results of the discriminant validity test showed that the loading value of each indicator on the respective latent variable was higher than that of the others. Therefore, all indicators met the discriminant validity criteria. The reliability of the latent variables was assessed using composite reliability to measure the internal consistency of each construct (Ghozali 2014). A latent variable is considered reliable when the composite reliability value exceeds 0.70. All latent variables in this study met this criterion and were considered reliable.

4.2.2 Evaluation of Structural Model (Inner Model)

The R-square value is used to determine the influence of independent latent variables (exogenous) on dependent latent variables (endogenous) (Ghozali 2014), as reported in Table 3. All endogenous variables in the study are moderate to strong models. Q-square test shows that exogenous variables can predict endogenous variables. The criteria have been met because the Q-square value of all endogenous variables is > 0. The subsequent stage is bootstrapping testing by analyzing the output on SmartPLS in Table 4.

Table 2: Evaluation of Measurement Model

Variable	Indicator	Standardized loading estimate	Composite reliability
Halal Brand Image	HBI2	0.736	0.752
	HBI3	0.666	
	HBI5	0.643	
Health Consciousness	KS1	0.782	0.859
	KS2	0.796	
	KS3	0.717	
	KS4	0.810	
Environmental Knowledge	PL1	0.837	0.905
	PL2	0.843	
	PL3	0.860	
	PL4	0.819	
Religiosity	R1	0.867	0.895
	R2	0.882	
	R3	0.840	
	R4	0.701	
Halal-Green Lifestyle	LS1	0.794	0.818
	LS2	0.722	
	LS4	0.747	
	LS3	0.790	
Attitude	S1	0.828	0.909
	S2	0.826	
	S3	0.890	
	S4	0.835	
Purchase Intention	MB1	0.902	0.949
	MB2	0.906	
	MB3	0.904	
	MB4	0.918	
Purchase Decision	KP1	0.780	0.905
	KP2	0.777	
	KP3	0.832	
	KP4	0.862	
	KP5	0.798	

Table 3: R-square

Variable	R-square	R-square adjusted	Description
Halal-Green Lifestyle	0.412	0.408	Moderate
Attitude	0.621	0.614	Moderate
Purchase Intention	0.461	0.458	Moderate
Purchase Decision	0.506	0.504	Moderate

Table 4: Bootstrapping test results

Hypothesis	Path Coefficients	Original Sample (O)	T-statistic (O/STDEV)	P-values	Hypothesis (accepted/rejected)
H1	Halal Brand Image → Attitude	0.102	2.291	0.022	Accepted
H2	Health Consciousness → Attitude	0.161	3.214	0.001	Accepted
H3	Environmental Knowledge → Attitude	-0.030*	0.728*	0.467*	Rejected
H4	Environmental Knowledge → Halal-Green Lifestyle	0.226	4.002	0.000	Accepted
H5	Religiosity → Attitude	0.261	4.859	0.000	Accepted
H6	Religiosity → Halal-Green Lifestyle	0.527	10.783	0.000	Accepted
H7	Halal-Green Lifestyle → Attitude	0.450	8.127	0.000	Accepted
H8	Halal-Green Lifestyle → Purchase Intention	0.292	4.258	0.000	Accepted
H9	Attitude → Purchase Intention	0.438	6.046	0.000	Accepted
H10	Purchase Intention → Purchase Decision	0.711	16.131	0.000	Accepted
<i>Specific indirect effects</i>					
	Environmental Knowledge → Halal-Green Lifestyle → Purchase Intention → Purchase Decision	0.047	2.874	0.004	Accepted
	Halal-Green Lifestyle → Purchase Intention → Purchase Decision	0.207	4.239	0.000	Accepted
	Religiosity → Halal-Green Lifestyle → Purchase Intention → Purchase Decision	0.109	3.738	0.000	Accepted
	Halal Brand Image → Attitude → Purchase Intention → Purchase Decision	0.032	2.116	0.035	Accepted
	Environmental Knowledge → Halal-Green Lifestyle → Attitude → Purchase Intention → Purchase Decision	0.032	2.939	0.003	Accepted
	Religiosity → Halal-Green Lifestyle → Attitude → Purchase Intention → Purchase Decision	0.074	3.887	0.000	Accepted
	Halal-Green Lifestyle → Attitude → Purchase Intention	0.197	4.786	0.000	Accepted
	Religiosity → Attitude → Purchase Intention	0.114	3.591	0.000	Accepted

Note: * Not significant

5 Discussion

Based on the results, nine out of ten hypotheses have t-statistics > 1.96 and p-values < 0.05. The result of H1 showed that halal brand image positively and significantly affected attitude towards purchasing Green HPC products. A strong halal brand image reduces consumer concerns regarding the ingredients, production processes, and religious permissibility of pharmaceutical products. Data from the questionnaire distribution report that most consumers consider the brand when purchasing HPC products. A significant increase in brand image improves consumer attitudes towards Green HPC products. This result is in line with Wijaya & Briliana (2022), Huthasuhut *et al.* (2022), Letsoin & Riorini (2023), Septiarini *et al.* (2023), and Handriana *et al.* (2020), where there is an influence between brand image and attitude.

H2 is supported since health consciousness has a positive and significant effect on attitudes. Most consumers reported being careful when selecting pharmaceutical products and preferring products with the capacity to maintain health and strengthen immunity. The greater consumer health consciousness and awareness of health-related issues, the more positive the attitudes toward Green HPC products. The results are in line with Hoque *et al.* (2018), Lin & Kuo (2019), Widayarsi & Haryanto (2021), and Xu *et al.* (2020).

H3 is not supported because consumer attitudes towards Green HPC products are not influenced by environmental knowledge. This result suggests that knowledge of environmental issues may be insufficient to shape favorable attitudes toward the products. Consumers may understand the environmental consequences of consumption but may not necessarily translate the knowledge into product evaluations or preferences. The results indicate that environmental knowledge influences attitudes indirectly through the adoption of a halal-green lifestyle. Therefore, this variable may affect attitudes only when internalized into consumer everyday values and consumption practices. The result differs from Liu *et al.* (2020) and Putri *et al.* (2021), where attitudes mediate the influence of environmental knowledge on intentions. However, Patwary *et al.* (2022) stated that environmental knowledge did not affect anthropocentric attitudes. Qotrunnada *et al.* (2023) reported that the variable did not affect the intention to purchase green products.

The results for H4 suggest that environmental knowledge has a positive and significant effect on consumer halal-green lifestyle. This happens because consumer knowledge concerning green products not being harmful to the environment is consistent with lifestyle. Consumer knowledge of environmental issues increases with concern and awareness, as reported by Mursid (2023).

H5 is supported since religiosity has a positive and significant effect on consumer attitudes. Gen Z Muslim consumers avoid buying syubhat products with unclear halal and haram. In this context, halal-certified and green pharmaceutical products are preferred. These products are good in line with consumer religious beliefs. The higher the level of consumer religiosity, the more positive the attitude towards green halal products. This is in line with Suhartanto *et al.* (2022), Chai & Chen (2021), and Kasri *et al.* (2021).

H6 shows that religiosity has a positive and significant effect on halal-green lifestyle. Religious beliefs influence consumer decisions to purchase products bearing a halal label. The higher the level of consumer religiosity, the more the halal and green lifestyle increases among consumers. This is consistent with Berhanu & Shiferaw (2023) and Hope & Jones (2014).

H7 is supported since a halal-green lifestyle has a positive and significant effect on consumer attitudes. Gen Z Muslim consumers prefer to select halal-labeled pharmaceutical products and environmentally friendly industries. Attitudes towards green halal products become more positive when consumers adopt a halal-green lifestyle. This is in line with Tan *et al.* (2022), Nora & Minarti (2016), Utama *et al.* (2021), and Engriani & Ayyubi (2021).

H8 suggests that a halal-green lifestyle has a positive and significant effect on consumer intention to purchase Green HPC products. Consumers who adopt a halal-green lifestyle fulfil needs by purchasing the products for consumption. Improving consumer halal-green lifestyle increases the intention to purchase green halal products. This finding is in line with Yusniar *et al.* (2020), Nur *et al.* (2021), and Mahliza & (2023).

H9 is supported since attitude has a positive and significant effect on purchase intention. Consumers who consider halal certification and green products important tend to select green halal products to fulfil needs. The more positive the consumer attitude, the greater the intention to purchase green halal products. This is in line with Syahputra & Yeni (2021), Lan *et al.* (2023), Sulthani *et al.* (2022), Kusumaningsih *et al.* (2019), and Kasri *et al.* (2021).

H10 is supported, indicating that purchase intention has a positive and significant effect on purchase decisions. This is in line with Shanbhag *et al.* (2023), Abeysekera *et al.* (2022), Pasharibu *et al.* (2020), and Hidayat *et al.* (2023). The higher the consumer's intention to purchase green halal products, the greater the purchase of products.

Gen Z Muslims' purchase decisions regarding Green HPC products are formed through a sequential process including personal values, lifestyle orientation, product evaluations, and behavioural intentions. Halal brand image, health consciousness, religiosity, and halal-green lifestyle contribute to the formation of positive consumer attitudes. Environmental knowledge plays an important role in promoting the adoption of a halal-green lifestyle, which shapes purchase intentions and attitudes. Purchase intention serves as the most immediate determinant of consumer purchase decisions.

6 Conclusion

In conclusion, Gen Z Muslims' decisions to purchase Green HPC products are mainly influenced by purchase intention. This intention is strengthened by positive consumer attitudes and the adoption of a halal-green lifestyle. Halal brand image, health consciousness, religiosity, and a halal-green lifestyle significantly contribute to the formation of positive attitudes toward the products. Environmental knowledge does not directly affect consumer attitudes. However, the variable allows consumers to adopt a halal-green lifestyle, which improves attitudes, strengthens purchase intention, and influences purchase decisions. Therefore, higher levels of

environmental knowledge and stronger adherence to a halal-green lifestyle are associated with a greater likelihood of purchasing Green HPC products among Gen Z Muslim consumers. Green HPC producers should implement attractive promotional strategies while providing consumer education to enhance environmental knowledge and health consciousness, allowing consumers to adopt a halal-green lifestyle. Producers improve the quality, halal brand image, and ease of access to obtain products that can increase purchase intention and consumer decision to buy Green HPC products.

Further study should be developed by analyzing the characteristics of non-Muslim consumers or a combination of Muslims and non-Muslims, as well as consumers of other generations. In addition, studies should be conducted in other Muslim-majority countries, as well as in non-Muslim countries. Variables can be added, such as trust, perceived value, price, and green marketing.

Conflict of Interest

The authors declare no conflict of interest.

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