Integrating ESG and Halal Values in Shaping Gen-Z Consumers' Willingness to Pay for Biodegradable Plastic Bags in Malaysia

Mohammad Arije Ulfy[1], Ahasanul Haque[2*], Dzuljastri Bin Abdul Razak[3], Nor Azizan Binti Che Embi[4]

[1,2,4]Department of Business Administration, International Islamic University Malaysia, 53100 Jalan Gombak, Kuala Lumpur, Malaysia, [3]International Institute for Halal Research and Training, International Islamic University Malaysia, 53100 Jalan Gombak, Kuala Lumpur, Malaysia
Corresponding Author Email: ahasanul@iium.edu.my

Abstract
In recent years, biodegradable plastic bags made from renewable resources have gained increasing interest from industries and Gen Z consumers as a solution to environmental problems and in alignment with halal ethics and moral values. Due to the cumulative environmental pollution, new generations are willing to shift towards bio-based polymer bags by preference. The purpose of this study is to investigate the effects of ESG components, i.e., environmental concern, social responsibility, governance sustainability and halal certification trust, on willingness to pay for biodegradable plastic bags among the Generation Z cohort in Malaysia. We collected a total of 367 data points from respondents in the Klang Valley area of Malaysia through an online survey and face-to-face conversations. The data was analysed using partial least squares structural equation modelling (SEM-AMOS). The results show that environmental concern, social responsibility, governance sustainability, and halal certification trust have a significant impact on Generation Z consumers' willingness to pay for biodegradable plastic bags. The findings of this research will be particularly beneficial for both manufacturers, marketers and government authorities to establish effective strategies to meet new generations' expectations. Therefore, the study will improve the researchers' capacity to identify additional variables for examining the integration of ESG factors and halal values, especially regarding consumers' intentions to purchase sustainable plastic bags.
Keywords: ESG Integration, Halal Values, Gen-Z, Biodegradable Plastic Bags, Consumer Willingness to Pay

Introduction
In recent years, consumer and industry awareness of environmental degradation has led to a reconsideration of the use of single-use plastics and the exploration of alternative

biodegradable options. In particular, Malaysia is facing serious challenges with plastic waste (Seifollahi, 2023). For example, in Kuala Lumpur, plastic bags are still used to dispose of household waste. This has led researchers to explore whether consumers are willing to pay for biodegradable plastic bags. Noor et al. (2024) found that the respondents in Kuala Lumpur were willing to pay MYR 0.43 for biodegradable plastic bags, and that age and education influenced the respondents' willingness to accept biodegradable plastic bags in Kuala Lumpur. The younger Generation Z, born between 1997 and 2012, is increasingly talking about sustainability and ethical consumption. About 73 per cent of Gen Z have expressed willingness to pay premiums for sustainable goods worldwide (Aryani et al., 2024). While in Malaysia, environmental concern has been cited as a driver of green consumption (Suki, 2015). Although emerging economies such as Malaysia have recently started importing more sustainable alternatives to single-use plastic, the growing environmental damage caused by single-use plastics has more recently led to the need for alternatives such as biodegradable plastic bags (Syarifah Hudayah et al., 2023). However, Environmental, Social and Governance principles and Halal values have become increasingly influential in consumer expectations, particularly among Gen-Z, who are more environmentally conscious, ethically driven, and values-driven (Putri et al., 2023). Conversely, insufficient empirical study investigates how contextualization of ESG sensitivity with Halal values affects Gen-Z consumers' willingness to pay for biodegradable plastic bags (Hasbullah et al., 2023). This intersection is a place to encourage responsible consumption, promote sustainability improvement, and ensure green products match Malaysia's socio-religious and ethical context.

Businesses generally adopt the ESG, or Environmental, Social, and Governance, view sustainability as something beyond environmental issues. As Al-Kumaim et al. (2021) demonstrate, ESG disclosure and governance have become a crucial aspect of stakeholder and investor perceptions in Malaysian companies. The trust in certification and halal consumption is growing, and product packaging has been growing; consumers trust brands that promote ethical Islamic consumption of halal and Tayyib food. For example, Arshad et al. (2022) argued that effects held the potential to influence the perceptions of trustworthiness and halal shopping behaviour among Malaysian Muslim Gen Z. This new, innovative perspective on consumer behaviour research presents a new and exciting opportunity for research that advocates environmental, social and governance (ESG) principles and the use of halal certifications and trust in this field. The environment in this region is ideal, given that Gen Z is willing to use biodegradable plastic bags in Malaysia (Azizan, Ahmad & Afendi, 2022). This integration is especially relevant when comparing the willingness to pay for biodegradable plastic bags. These bags are eco-friendly and promote social governance, ethical sourcing, corporate transparency, and reduce plastic pollution. Muslims also want to respect their halal values, and they may refer to packaging, ethical disposal, contamination prevention, and overall lifestyle commitment (Zeng & Jalil, 2023).

Malaysia ranks among countries where plastic consumption is higher and where single-use plastic waste is harder to digest (Syarifah Hudayah et al., 2023). But adoption and behavioural change continue to differ, particularly among young customers, especially as policy measures include charging for plastic bags, and adoption and changes of behaviour. Chow et al. (2024) found in Kuala Lumpur that 83% of participants had 1 to 3 plastic bags in their shopping expeditions, but only in the context of demographics and education, only willingness to pay for biodegradable replacement bags (MYR 0.43). Gen Z customers who are digital natives and

value-driven are frequent subjects of attention for buying sustainable products worldwide, but information on the use of biodegradable plastic bags is scarce in Malaysia (Chua, 2025). In addition, the majority of research on green consumer behaviour in Malaysia tends to address the generally eco-friendly items commonly identified by Suki (2015) and Tan (2015). Food and packaging are generically addressed by the widespread use, though not the decline of biodegradable plastic bags and willingness to pay among Generation Z. Plus, Malaysia's market is characterised by strong awareness of halal awareness and Islamic ethical principles in consumer behaviour. Although halal values can significantly affect purchasing decisions, Generation Z in Malaysia in Putri et al. (2023); and Hasbullah et al. (2023), shows there is evidence that halal values are far more influential than religion. The conceptualization of the halal concept with ESG factors, such as environmental, social, and governance, is not well studied in the context of biodegradable plastic bags.

The main concern is whether ESG variables and halal values influence Gen Z Malaysian consumers to purchase biodegradable plastic bags. Without understanding this argument, retailers and policymakers will not be able to design prices, marketing or certification that resonate with this segment (Ewe & Tjiptono, 2023). For example, the biodegradable plastic bag that is not packaged in the environment may fail to reflect the halal value messages of ethical sourcing, contamination control, and packaging integrity, a process that can undermine confidence among Muslim Gen Z consumers (Sharaf et al., 2017). So, ESG communication that emphasises corporate governance or social responsibility may not be compatible with deeper identity or religious-ethical motives if they are not standardised to halal values. For this study, both ESG dimension and halal certification trust has been integrated into a consumer willingness-to-pay model for biodegradable plastic bags in Malaysia's Gen Z cohort.

This study intended to examine the effects of environmental concern, social responsibility, governance sustainability, and trust in halal certification on bioplastic bags use in Malaysian Gen Z Based on environmental concerns and social awareness, the perception of halal legitimacy, and the willingness to pay for the use of biodegradable plastic bags. These data can also be used by retailers, lawmakers and operators in the circular economy to better integrate ESG and halal values into products, pricing practices, and communications. The problem statement will then be put forth and the implications of the study will be discussed, followed by a review of the literature of each of the independent variables (environmental concern, social responsibility, governance sustainability, halal certification trust), the dependent variable (willingness to pay for biodegradable plastic bags), the theory behind the study, and a conceptual model.

This article examines how values of ESG and halal certification influence the willingness to pay for biodegradable plastic bags in Malaysia as a proportion of those surveyed with a population of Gen Z. Theoretically, it expands the literature to include insights from green consumer behaviour and halal consumption and provides a new understanding of dual value systems in emerging markets. Practically, the data suggest industry stakeholders' effective strategies for the marketing of biodegradable bags according to Gen Z interests, focusing on halal certification and corporate governance transparency. The study also aligns politically with Malaysia's vision for a circular economy and sustainable packaging, pointing out that willingness to pay (WTP) information can inform subsidies and regulatory incentives,

particularly since costs are not a barrier to green products. This also expands the halal economy discourse by further expanding the use of halal certification across all sectors, significant in Malaysians' ambitions to become a global hub for the halal industry. Overall, this research provides evidence-based findings providing strategic insights for sustainable packaging adoption and consumer segmentation, as well as offering practical findings about how to improve sustainable packaging use and utilization.

This study offers practical insights into the efficacy, credibility, and effectiveness of biodegradable plastic bags, highlighting the synergy between ESG integration and Halal values in enhancing their appeal to Gen-Z consumers. The initiative assists authorities in developing sustainable and waste-reduction plans that embody ethical consumption, while also aiding packaging manufacturers and merchants in the pricing and positioning of more environmentally friendly packaging. These findings are expected to enhance consumer trust and facilitate value-based differentiation for Halal-certified enterprises. This article enhances the consumer behaviour literature by incorporating ESG and Halal values, presenting an inclusive research framework to explain the willingness to pay for sustainable packaging in Muslim-majority countries like Malaysia.

Literature Review
Environmental Concern
Environmental concerns reflect the awareness and motivation of those around the world to reduce environmental harm and are a significant component of greener products in Malaysia (Tieman et al., 2013). The results of Suki (2015) suggest that environmental concerns and willingness to pay for green goods are positively associated with Malaysian consumers' desire to reduce carbon use. This is mediated by consumption values such as social, emotional and functional value. Harun et al. (2018) also found that ecological concern, particularly for low-income households in coastal Peninsular Malaysia, could have more significant impacts on the perceptions of green products than eco-literacy, suggesting that these attitudes could impact pay behaviour. The growing awareness that, while prompted by concerns such as plastic pollution and climate change, the demand for sustainable goods expands, increasing willingness to pay premiums (Dunlap & Jones, 2002). In the case of biodegradable plastic bags, there is evidence that Malaysian Gen Z will be more likely to pay for plastic products if they see themselves perceived to cutting down on plastic (Harun et al., 2020). In addition to this, the growing popularity of younger consumers, especially Gen Z, in other packaging supports this relationship (Hasbullah et al., 2022). However, limited research has been done on the relationship between environmental concern and the willingness to pay to purchase biodegradable plastic bags in particular amongst Gen Z from Malaysia, suggesting a gap that this study would seek to address (Tan, 2015). In consequence, environmental issues are the primary factor in the choice of biodegradable products, while Malaysian Gen Z consumers who are more concerned about environmental issues are likely to buy more biodegradable products.
H1: Environmental concern has a significant positive relationship with willingness to pay for biodegradable plastic bags.

Social Responsibility
In ESG, Social responsibility refers to the impact a company or product has on social welfare, ethical labour practices, community engagement, and stakeholder inclusion (Jaapar, 2023).

Social responsibility can indicate that a brand has ethical and socially conscious values for consumers. The research evidence is that social influence and eco-label knowledge are both associated with green purchasing intentions in Malaysians (Kamaludin et al., 2022). For example, the presence of social factors that could affect the intention to purchase green products was found to be associated with the social determinants (family, friends, and online communities) as well as environmental influences (friendships, family and online communities) (Mohd Noor et al., 2025). Using biodegradable plastic bags, ethical material sourcing, fair labour practices, community benefits from disposal strategies, and transparent communication of social impact are important. Gen Z consumers, who value authenticity and corporate ethics, may be more likely to like biodegradable packaging that is both socially conscious and ethical (Noor et al., 2017). Although social responsibility is no specific topic of research with regard to the willingness to pay for biodegradable bags in Malaysia, research on green consumption provides good evidence that SR represents a positive relationship. For example, Tan (2015) showed that attitudes, perceived value, and self-identity of green residential building buyers influenced purchase intentions due to socially responsible product features. The result of this study is that SR is independent, and because consumers' perceptions of the social responsibility of a product increase as consumers see the product's status in society grow so does their willingness to pay for biodegradable plastic bags.

H2: Social responsibility has a significant positive relationship with willingness to pay for biodegradable plastic bags.

Governance Sustainability

Governance sustainability encompasses corporate governance techniques, such as transparency, accountability, ethical leadership, stakeholder engagement and effective board practices reflecting a firm's commitment to sustainability (Putri, Rahim, & Rasool, 2023). Governance is an essential component of ESG, as strong governance is crucial to the integrity of environmental and social projects. In Malaysia, board characteristics like independence, gender diversity, and diligence are strongly predictive of ESG disclosure, namely published in ESG in the boardroom: evidence from the Malaysian market indicates that board independence, female representation, and the frequency of board meetings positively influence the ESG disclosures of Bursa Malaysia companies (Kamaludin et al., 2022). Sustainable governance for consumers fosters brands and validates sustainability claims, especially in biodegradable plastic bags (Rosli & Rosli, 2024). Consumers will also question sustainability claims, suggesting poor governance, with insufficient certification and transparency, which can lead to scepticism about the value of the product. As a result, governance sustainability may be an independent variable. Gen Z consumers who know how well biodegradable bags are managed will be less likely to pay more money (Safian & Hamzah, 2022). While empirical evidence for the causal relationship between governance perceptions and willingness to pay for biodegradable bags in Malaysia is limited, current ESG disclosure literature demonstrates that.

H3: Governance sustainability has a significant positive relationship with willingness to pay for biodegradable plastic bags.

Halal Certification Trust

Halal certification trust is defined as customers' confidence that the products meet halal standards and are approved by authorities, and that they have a dependable supply chain (Azizan, Ahmad, & Afendi, 2022). In Malaysia, where Muslim people live much the same way,

halal certification is significantly influential in consumer behaviour across products. The results of Putri et al. (2023) indicate that factors such as trustworthiness and expertise affect Muslim Gen Z's attitudes and purchasing behaviour on halal food, and attitudes are both mediating. As Jaapar investigated in 2023, "the halal brand and crisis management are an important component in improving consumer confidence in halal certification, particularly for Nestlé Malaysia". Plus, halal certification also increases non-Muslim consumer confidence and willingness to purchase, also in Saleh & Rajandran (2024). Although biodegradable plastic bags have relatively poor packaging, halal certification can refer to the quality of packaging, ethical supply, and Islamic consumption values, as well as related aspects of packaging integrity (Sautova, Amlus, & Suanda, 2024). Muslim Gen Z may consider halal certification of materials, manufacturing methods, disposal practices or brands for biodegradable bags (Sharaf, Isa, & Al-Qasa, 2017). The concept of the halal certification trust is a separate variable that affects consumer willingness to pay. Higher confidence in the halal certification of biodegradable bags has a positive relationship with higher willingness to pay (Shahimi et al., 2024); this gives credence to religion-ethical values that integrate religion-ethical values into an ESG-driven green consumption model.

H4: Halal certification trust has a significant positive relationship with willingness to pay for biodegradable plastic bags.

Willingness to Pay for Biodegradable Plastic Bags
Willingness to pay represents the maximum price a consumer would pay for products in exchange for alternatives, particularly for biodegradable plastic bags versus conventional ones. In Malaysia, Noor et al. (2024) reported that willingness to pay was 0.43 for these bags according to the age and education rates in Bandar Baru Bangi. While 91% of Malaysian consumers are willing to buy sustainable products, most are free of a premium of less than 10% (Chua, 2025). Internationally, Gen Z consumers have more favourable motives to pay more for sustainable alternatives (Plastic Regeneration, 2024). In this study, willingness to pay for biodegradable plastic bags is dependent on four independent factors: environmental concern, social responsibility, governance sustainability and trust in and halal certification. Willingness to pay assessment is not only a measure of intention to use such products but also informs pricing and marketing strategies of biodegradable packaging providers.

Research Framework
The present study examines how the intention to use biodegradable bags can be influenced by several factors: environmental concern, social responsibility, governance sustainability, and trust in halal certification. These factors characterize customer assessments of how biodegradable bags are perceived and whether they are better for the environment or sustainable packaging. A conceptual framework was constructed, suggesting that these four independent variables positively impact Gen Z's willingness to pay for biodegradable plastic bags, and attitudes influence them.

Social responsibility makes assertions about the ethical practices of products and brands, which further enhances the willingness to pay of consumers. To illustrate this topic more specifically in Malaysia, trust in halal certification has a fundamental role in Muslim Gen Z consumers, incorporating ethical and eco-friendly values and thus increasing their willingness to pay. In essence, the model frames willingness to pay as an outcome influenced by combined value frameworks ranging from Environmental, Social, and Governance (ESG)

criteria and halal trust, to clarify the factors that influence Gen Z's attitudes toward sustainable packaging (Kamaludin et al., 2022). This suggests that biodegradable bags companies should be focused on high-quality ESG credentials and halal certification for willingness to pay growth in Malaysia for Generation Z consumers. This research recommends the use of established survey instruments to measure constructs and suggests using PLS-AMOS for studying path coefficients to build upon these concepts into a comprehensive model for understanding sustainable consumer behaviour.
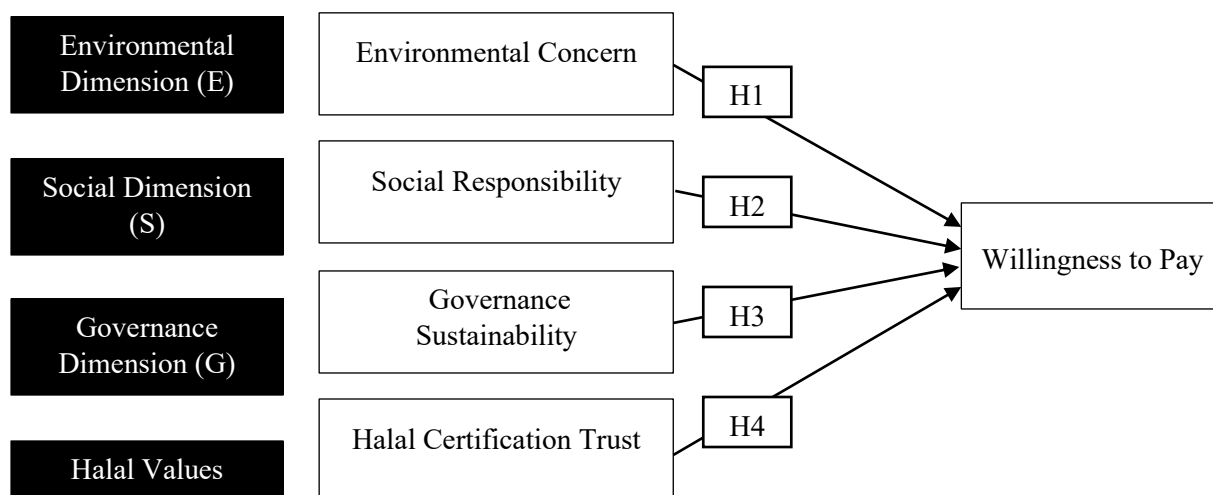

Figure 1: Research Framework

Research Methodology

Construct Measurement

Environmental concern, social responsibility, governance sustainability, and trust in halal certification are the five constructs that comprise up the research model. To ascertain the reliability of these constructs, all of the instrumentation items were adapted from previously conducted research. According to Harun et al. (2018), Arshad et al. (2022), Kamaludin et al. (2022), and Jaapar (2023), the initial four points concerning environmental responsibility, social duty, and governance sustainability were utilised sequentially. Noor et al. (2024) was used as the basis for one more variable's items. The items that were tested were all assessed using a five-point Likert scale, where 1 indicates a strong disagreement and 5 indicates a strong agreement.

Before being translated into English, all of the questionnaire's items were crafted in Bhasa Malayu. In order to gather comments and input, 30 sets of questionnaires were delivered to Gen-Z customers in Klang Valley for the test run. The questionnaire underwent additional revisions to enhance clarity and simplicity in response to comments and suggestions provided by respondents.

Data Collection

During September and October 2025, data for this study were gathered through the use of both online and paper-based questionnaires. Respondents were asked to indicate the frequency with which they have shopped throughout their lives. The researchers used a purposive sample technique to find people who had shopped at least once, either in a

physical store or online. No one will ever know who filled out this survey. By sharing the link to the Google form and having in-person discussions, we were able to get 400 responses via WhatsApp and Facebook. Due to survey form incompleteness, 12 of the responses were eliminated. The qualifying questions were not met by 21 respondents, so they were removed. They were questioned if they were born between 1980 and 2010 and if they had ever shopped alone. This allowed for the collection of 367 usable data points for further analysis.

Data Analysis and Findings
Tools Used
To analyse the demographic profile, SPSS version 25.0 was used. To begin with, descriptive analysis was conducted to form the demographic profile of the respondents. Then Smart PLS software version 3.0 was employed for this study to validate the measurement model as well as the structural model to test the hypothesis.

Demographic Profile
Table 1 presents the demographic information collected from Generation Z consumers who have made at least one purchase, either online or offline. A total of 400 questionnaires were sent; however, only 367 were preserved for further study after excluding 12 with incomplete information. Furthermore, 21 individuals failed to satisfy the study's criteria. Table 1 indicates a higher number of male responses compared to female responses. Of the respondents to the study, 112 (30.5%) identified as female and 255 (69.5%) identified as male. The predominant age categories were 18 to 20 years (46.3%), 20 to 25 years (41.7%), and under 18 years (12%). The participants indicated the following educational attainment: primary (6.5%), secondary (22.3%), and tertiary (71.1%). Students constituted 70.8% of the respondents, followed by individuals employed in private services at 21.8%, businesspersons at 1.1%, government employees at 3.5%, and others at 2.5%. Most respondents, at 66.8% of the total, are daily shoppers. Weekly constitutes the second-highest category, comprising 25.5%. 91% of respondents indicated that they are knowledgeable about biodegradable plastic bags, while 9% are not. Many respondents, comprising 82.6%, lack experience in purchasing biodegradable plastic bags. Conversely, the majority of respondents (355) expressed a willingness to pay for biodegradable plastic bags, representing 96.7%.

Table 1
Demographic Profile

Measures	Item	Frequency	Percentage
Gender	Male	255	69.5
	Female	112	30.5
Age	Below 18	44	12.0
	Between 18-20	170	46.3
	Between 20-25	153	41.7
Respondents Profession	Student	260	70.8
	Private Service	80	21.8
	Government Job	13	3.5
	Business	5	1.4
	Others	9	2.5
Education Level	Primary	24	6.5
	Secondary	82	22.3
	Tertiary	261	71.1

Shopping Frequency	Daily	245	66.8
	Weekly	101	27.5
	Monthly	21	5.7
Awareness of Bioplastic Bags	Yes	334	91.0
	No	33	9.0
Bioplastic Bags Purchase Experience	Yes	64	17.4
	No	303	82.6
Willingness to Pay for Bioplastic Packaging	Yes	355	96.7
	No	8	2.2
	Maybe	4	1.1

Exploratory Factor Analysis (EFA)
The preliminary step in executing effective Structural Equation Modelling (SEM) is Exploratory Factor Analysis (EFA). Exploratory Factor Analysis (EFA) is a methodology extensively employed in social science research. This analysis allows researchers to identify pertinent observations from a given data set for a specific element or factor (Hair et al., 2014). Furthermore, Hair et al. (2012) assert that exploratory factor analysis (EFA) is a crucial method because it facilitates the compression and categorisation of numerous variables into more manageable clusters. Kline (2018) posits that exploratory factor analysis (EFA) is a widely utilised statistical tool for data analysis, mostly employed to simplify data by elucidating the interrelationships among a collection of variables based on their significant connections. The primary component extraction approach with varimax rotation has been employed to identify the fundamental components. The primary objective of EFA is to condense extensive data sets into many variables, encompassing factor loadings, covariance, and correlation estimates. The general aim of doing EFA is to assess the necessary quantity of items for each element, necessitating a thorough process.

Table 2
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**.924**
Bartlett's Test of Sphericity	Approx. Chi-Square	**5641.618**
	df	**435**
	Sig.	**.000**

In the beginning, the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity were conducted, as shown in Table 2. Tabachnick and Fidell (2007) indicate that the Kaiser-Meyer-Olkin (KMO) value should range from 0 to 1, with an acceptable threshold of 0.60 and a substantial p-value ($p < .05$) required. The current investigation reveals a Kaiser-Meyer-Olkin (KMO) value of 0.924, indicating that the sample sufficiency criterion has been satisfied. The presence of adequate connection among variables was indicated by a significant result from Bartlett's test of Sphericity. The favourable findings for both KMO and Bartlett's Test of Sphericity show that the researcher is able to do factor analysis accurately, as presented in Table 3 hereunder.

Confirmation Factor Analysis (CFA)

Measurement Model

Before testing the hypotheses, the measurement model was evaluated for appropriate factor loadings and goodness-of-fit indices. The AMOS software was used to evaluate the proposed measurement model (Figure 2).

Figure 2: Measurement Model

The AMOS-based confirmatory factor analysis (CFA) was used to examine the 30-item scale's structural integrity. It was presumed that the five latent constructs were correlated. Three indicators were eliminated from the measurement model due to loadings below 0.5, as per the modification indices provided by AMOS. According to Hair et al. (2012), a loading value below 0.5 is deemed unimportant. To guarantee a successful model fit, Table 2 shows the overall fit model. We looked at the nine goodness-of-fit indices. In order to understand well-fit, Hair et al. (2014) recommend that RMSEA be less than 0.05 and that GFI and CFI values be greater than 0.90. Table 3 was deemed appropriate and had a satisfactory value for k^2/df. It is recommended that TLI be greater than 0.90. As a whole, the 27-item scale demonstrates an acceptable level of model fit.
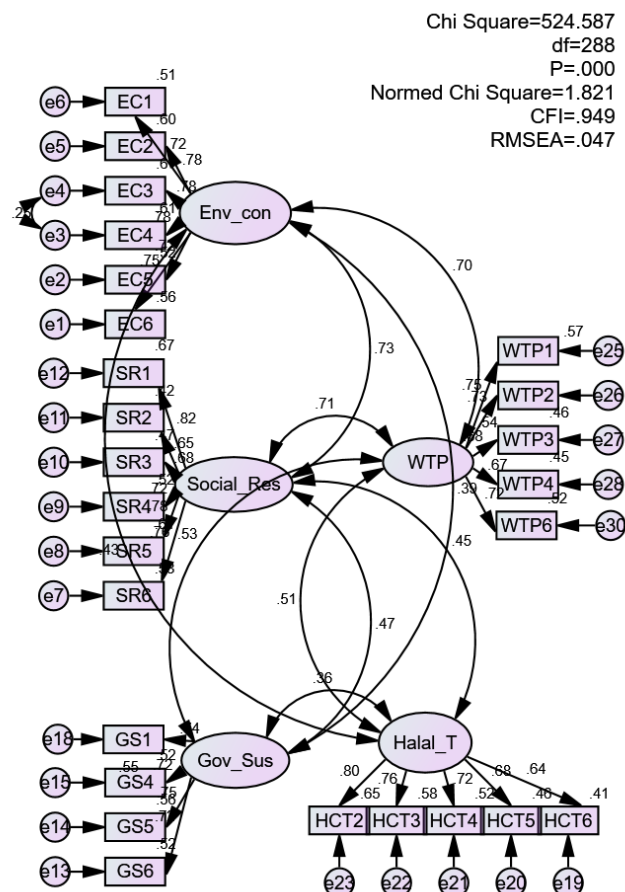

Figure 2: Measurement Model

Table 3
Model Fit

x^2	df	x^2/df	GFI	RMSEA	NFI	CFI	IFI	TLI
524.587	288	1.821	.904	.047	.895	.949	.950	.943

Both discriminant and convergent validity were evaluated to evaluate the measurement model. The evaluation of convergent validity was done by calculating composite reliability. Following Chin's (1988) recommendation, a minimum acceptable value of 0.7 was proposed for the aim of achieving good composite reliability. Furthermore, according to Babin et al. (2008), the AVE value needs to be 0.5 or higher for optimal results. A positive sign is shown by the current study's AVE calculation. The average valid estimate (AVE) was determined by squaring the standardised loadings (Figure 2) of each construct item, adding all of the construct items together, and then dividing the total by the indicator count. The AVE values were all higher than 0.5, with the lowest being 0.507 and the highest being 0.569. Results indicate that CR ranges from 0.824 to 0.888, which is higher than the recommended cutoff of 0.7. Accordingly, we can say that all of the construct items had good reliability based on the results of the present empirical tests.

Table 4
Confirmation Factor Analysis (CFA) Report

	CR	AVE	MSV	MaxR(H)	Env_con	Social_Res	Gov_Sus	Halal_T	WTP
Env_con	0.888	0.569	0.527	0.889	0.754				
Social_Res	0.877	0.544	0.527	0.884	0.726***	0.738			
Gov_Sus	0.824	0.539	0.282	0.824	0.391***	0.473***	0.734		
Halal_T	0.844	0.522	0.257	0.853	0.434***	0.454***	0.357***	0.723	
WTP	0.837	0.507	0.500	0.839	0.699***	0.707***	0.531***	0.507***	0.712

Note. No Validity Concerns

Discriminant validity cannot be established until it is proven that no relationship between measurements ought to exist (Hair et al., 2014). Indeed, the Fornell-Larcker test and the Heterotrait-Monotrait correlation ratio (HTMT) can be used to quantify discriminant validity by assessing cross-loads between buildings. The square root of the AVE values compared to the correlations of the latent variables is another way to determine discriminating construct validity (Fornell & Larcker, 1981). The discriminant validity is excellent because the square AVE of each component exceeds the sum of all its correlations with the other components, as shown in Table 4.

Structural Equation Model (SEM)
To examine the causal pathways, this study tests four hypotheses. Table 5 presents the hypothesised structural model-based outcomes of the hypothesis testing. Every one of the four hypotheses that were tested had a significant statistical value ($p < 0.05$). The value of R^2 was calculated. As a result, 31.1% of the variance was explained by environmental concern ($R^2=0.311$), 26.9% by social responsibility ($R^2=0.269$), and 18.3% by governance sustainability

(R²=0.183). In the meantime, Gen Z consumers' belief in halal certification explained 15.4% of the variation (R²=0.154) in their propensity to pay more for biobased plastic bags.
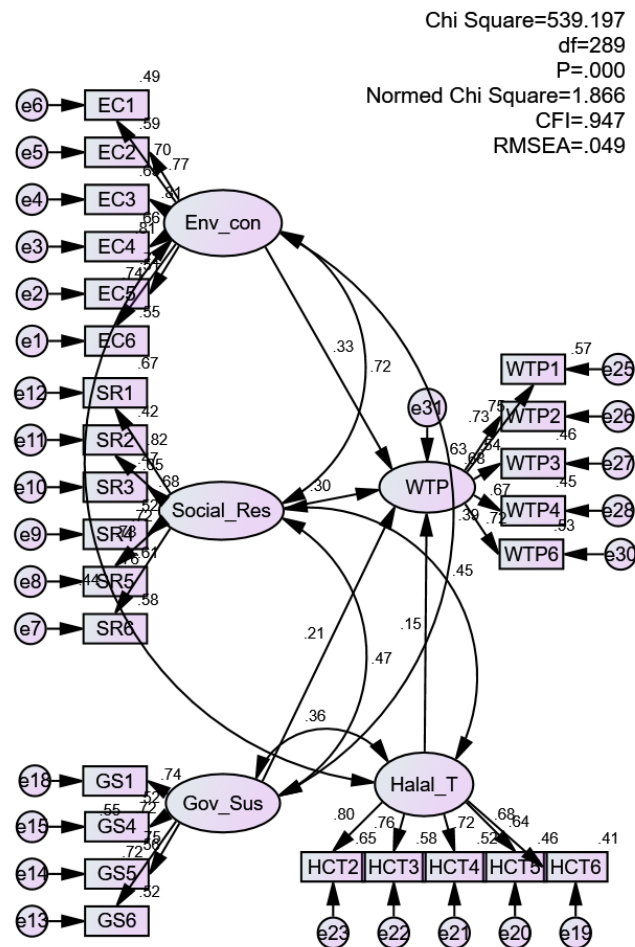

Figure 3: Structural Model

Hypotheses Testing
The findings of the hypotheses indicate that H1, which posits a substantial positive correlation between environmental concern and the willingness to pay for biodegradable plastic bags, is substantiated with β = 0.311; SE = 0.068; CR = 4.596. Correspondingly, H2 and H3 are endorsed according to the β value, which is 0.296 for H2 and 0.183 for H3, respectively. H2 displays an SE of 0.068, a CR of 3.975, and a substantial P value, demonstrating that social responsibility positively and significantly influences the willingness to pay. A comparable situation is seen for H3, with SE=0.49 and CR=3.709.

Table 5
Regression Weights

			Estimate	**S.E.**	**C.R.**	**P**	**Label**
WTP	<---	Env_con	.311	.068	4.596	***	Minimum was achieved Chi-square = 539.197 Degrees of freedom = 289 Probability level = .000
WTP	<---	Social_Res	.269	.068	3.975	***	
WTP	<---	Gov_Sus	.183	.049	3.709	***	
WTP	<---	Halal_T	.154	.055	2.780	.005	

Consequently, H3 is corroborated by elucidating that a positive correlation exists between governance sustainability and the willingness to pay. Similarly, H4, representing halal certification trust, exhibits a substantial positive correlation with the willingness to pay for biodegradable plastic bags, as evidenced by β = 0.154; SE = 0.055; CR = 2.780.

Table 6
Hypothesis Testing

Hypothesis	Result
H1: Environmental concern has a significant positive relationship with willingness to pay for biodegradable plastic bags.	**Accepted**
H2: Social responsibility has a significant positive relationship with willingness to pay for biodegradable plastic bags.	**Accepted**
H3: Governance sustainability has a significant positive relationship with willingness to pay for biodegradable plastic bags.	**Accepted**
H4: Halal certification trust has a significant positive relationship with willingness to pay for biodegradable plastic bags.	**Accepted**

Discussion
The present research examines the willingness to pay for biodegradable plastic bags influenced by Environmental-Social-Governance (ESG) and Halal values among Generation Z customers in Malaysia. This study not only investigates the legitimacy of integrating ESG and halal values from the Malaysian perspective but also analyses the impact of environmental concern, social responsibility, governance sustainability, and trust in halal certification on the willingness to pay for biodegradable plastic bags. The study's results unequivocally indicate that Gen-Z consumers' environmental concerns will enhance their readiness to pay for biodegradable plastic bags in Malaysia (H1 is supported). The outcome aligns with prior research conducted by Harun et al. (2018) and Dunlap & Jones (2002). Secondly, social responsibility has been identified as a substantial factor influencing willingness to pay (H2 is supported). Increased social responsibility correlates with a greater propensity to pay for biobased plastic bags in Malaysia. Consumers from Generation Z in the Kuala Lumpur region believe that social responsibility is vital for all consumers. Arshad et al. (2022) and Mohr et al. (2001)'s prior research confirm the outcome. Governance sustainability is also determined to be significant in influencing preference to pay (H3 is supported). The outcome was determined to be consistent with the previous research conducted by Kamaludin et al. (2022) and Eccles et al. (2014). Conversely, the trust in halal certification was found to have a substantial effect on consumers' willingness to pay for biodegradable plastic bags (H4

supported). The study contradicts previous research by Putri et al. (2023), Jaapar, (2023) and Tieman et al. (2013). It is evident that ESG indices, such as environmental concern, social responsibility, and governance sustainability, are highly correlated with the purchasing intentions of Generation Z consumers. The same applies to the halal values component, such as trust in halal certification.

Limitations and Recommendations

The research presented here highlights particular limits that need additional inquiry. This study was conducted solely in the Klang Valley region of Malaysia, indicating that future researchers could improve the generalisability of their findings by including data from other regions of the country, such as Johor Bahru, Penang, Kedah, Ipoh, and Terengganu. Secondly, another issue is the omission of the effects of mediating and moderating factors. Future research may investigate the impact of mediating and moderating variables on the proposed model to address these challenges. Relevant researchers may additionally incorporate customer demographic variables such as gender, age, and ethnicity. This study has focused solely on one generation; future research may encompass more generations, such as Generation X, Y, or the millennial group. This study focused on a limited number of aspects under ESG components; however, subsequent research should investigate additional variables like climate change, resource efficiency, biodiversity, community engagement, customer welfare, transparency, and ethical conduct. Conversely, halal values can encompass ethical sourcing, fair trade, and similar principles. Future researchers may investigate particular biodegradable packaging and sustainable packaging, as this study solely analysed general biodegradable plastic bags. This quantitative poll employs a standardised questionnaire that prevents respondents from articulating their views on certain issues. Future researchers may employ qualitative and quantitative approaches, or only qualitative analysis, to examine contemporary events. Comparing consumer data from two nations or many generations would validate the study's methods across diverse cultures and contexts, perhaps aiding future research.

Implications

The article presents a series of recommendations for the regulatory bodies governing the biodegradable plastic packaging industry in Malaysia. The study revealed that ESG factors, such as environmental awareness, social responsibility, and governance sustainability, influence the younger generation's preference for biobased packing bags. Consequently, stakeholders in bio-based packaging should prioritise the younger generation when formulating an operating plan. Consequently, governments and relevant agencies should prioritise societal awareness to enhance the propensity to purchase biodegradable bags, as the sustainability of governance and trust in halal certification also influence the desire to pay. The research revealed that social responsibility and appropriate halal certification enable packaging authorities to devise strategies that entice Gen Z customers to use biodegradable plastic bags.

Conclusion

In conclusion, ethical, sustainable, and faith-based values are increasingly important to Malaysian Gen-Z consumers' attitudes towards biodegradable plastic bags. Using SPSS to test demographics and SEM-AMOS for hypothesis testing, all hypotheses were supported by evidence that various features were associated with Gen Z consumer willingness to pay for

bio-based polymer bags. The primary reason for this increased awareness is the fact that more awareness makes it more enticing for people to pay to do something greener. Willingness to pay for biodegradable plastic bags emphasized the role of social responsibility and sustainability in improving consumer trust, because the transparency of the business's practices made it more obvious that consumer trust was stronger, as well as social responsibility and governance sustainability. Also, Halal certification in itself was found to enhance Gen Z consumers' confidence, as it connected Islamic ethical norms to heightened willingness to pay. It accomplishes that linking ESG principles with Halal values provides a holistic way of achieving sustainable consumption, and policymakers and businesses should use this balance in their marketing and educational endeavours to promote biodegradable plastic bags and advance Malaysia's sustainable future.

Data Availability
The survey data were obtained confidentially and are carefully maintained in accordance with ethical requirements. Hence, study data is not confessable publicly.

AI Usage Declaration
A research framework for the study has been developed by the author. The authors of this study made considerable use of Quill Bot, a program that fixes grammar and spelling mistakes, to make the content easier to read and understand. The authors have taken full responsibility for the publication's content after using this tool/service, having reviewed and amended it as necessary.

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