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Beyond Awareness: Revealing Gen Z's Intention to Avoid Food Waste through Theory of Planned Behavior in Indonesia

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Abstract

This research examines the intention of the Indonesian' Generation Z (Gen Z) intention in avoiding food waste that shaped by the role of environmental awareness. It is utilizing the Theory of Planned Behavior (TPB). It analyzes the influence of environmental awareness on attitudes, subjective norms, perceived behavioral control, and the intention to avoid food waste, while also testing the mediating roles of these three TPB constructs. This is quantitative research by using a data collection via an online questionnaire, yielding 154 responses from Gen Z respondents in Indonesia aged 14–28. The data analyzed with Partial Least Squares Structural Equation Modeling (PLS-SEM) especially using SmartPLS software. The research results shows that environmental awareness has a positive and significant influence on attitudes, subjective norms, perceived behavioral control, and the intention to avoid food waste. However, among these three TPB constructs, only attitude significantly influences the intention to avoid food waste and mediates the relationship between environmental awareness and that intention. In contrast, subjective norms and perceived behavioral control show neither a significant direct effect nor a significant mediating effect. The findings of this research showing that environmental awareness is most effectively translated into an intention to avoid food waste through individuals' positive evaluations of food waste reduction efforts, rather than through perceptions of social expectations or perceived behavioral control. Theoretically, this research extends the Theory of Planned Behavior (TPB) by identifying attitude as the primary psychological pathway linking environmental awareness to the intention to avoid food waste among Generation Z in Indonesia. These findings provide new empirical evidence that the relative strength of TPB constructs in explaining behavior can vary across cultural and generational contexts. In practical terms, the research findings underscore the importance of integrating environmental awareness initiatives with strategies

that foster positive attitudes toward reducing food waste specifically through targeted environmental education and digital campaigns aimed at Generation Z.
Keywords: Food Waste, Environmental Awareness, Theory of Planned Behavior, Generation Z, Intention to Avoid Food Waste

Introduction

According to (Diskominfo Jabar, 2026) the largest contributor of food waste (40.76% of its total waste generation in 2025) in SEA is Indonesia. In total, Indonesia generated approximately 20.94 million tons of food waste that year . On a per capita basis, each Indonesian resident is estimated to generate around 115 to 184 kilograms of food waste annually (Kementerian Perencanaan Pembangunan Nasional, 2021). This volume of food waste entails significant 3P which is planet, people and profit or similarly to environmental, economic, and social consequences. The estimated 115 to 184 kilograms of food waste per capita per year is linked to economic losses ranging from 213 to 551 trillion rupiah which is equivalent to USD 11.9–30.7 billion annually. Ironically, total of the wasted food is estimated to be sufficient to feed approximately 61–125 million people, representing nearly half of Indonesia's total population (National Research and Innovation Agency (BRIN), 2025).

One factor affecting to the high volume of food waste in Indonesia is its large population. With a population estimated at 285.7 million, Indonesia ranks as the fourth most populous country in the world (World Bank, 2024). Although population size is not the sole determinant of the volume of food waste generated, a larger population inherently increases total food consumption and, consequently, has the potential to raise the volume of food waste produced. Therefore, reducing food waste at the consumer level is crucial for achieving meaningful and substantial reduction in food waste on a national scale.

According to the National Development Planning Agency (Bappenas, 2021), households are the largest source of food waste in Indonesia. Food waste occur in the household chain is closely linked to consumer habit regarding the purchase food and raw material, consumption, storing the food, and disposal of food. Consequently, understanding the psychological and behavioral factors that shape consumer food-related decisions is crucial for developing effective food waste reduction strategies (Kementerian Perencanaan Pembangunan Nasional, 2021). The consumer-level perspective is becoming increasingly important because effort to reduce food waste ultimately depends not only on waste management systems but also on individual decisions regarding the amount of food purchased, consumed, stored, and discarded.

Generation Z (Gen Z) is a significant demographic group, representing one of the largest generational segments among Indonesian consumers. According to data from Statistics Indonesia (Badan Pusat Statistik), Gen Z numbers are around 27.94% from the Indonesian total population or approximately 74.93 million individuals (Badan Pusat Statistik, 2025). In terms of generational classification, Gen Z refers to individuals born between 1997 and 2012, placing them in the 14–28 age range in 2026 (Seemiller, 2018).Gen Z exhibits consumption characteristics relevant to food waste generation. Compared to previous generations, Gen Z tends to prioritize convenience, social media trends, and experience-based consumption. Gen Z' lifestyle preferences and exposure to digital information also become the factors shaped their purchasing decisions alongside functional considerations (Jakubowska et al., 2024;

Kristia et al., 2023). These characteristics can increase the likelihood of impulse buying, convenience-oriented consumption, and overconsumption, all of which potentially contribute to food waste generation. Conversely, Gen Z is also highly exposed to information regarding sustainability through various digital platforms; consequently, environmental awareness may play important role in shaping their attitudes and behavioral intentions regarding food. Therefore, understanding the psychological factors influencing Gen Z's intention to avoid food waste is essential for developing more targeted food waste reduction interventions.

One framework widely used to explain a single person' behavioral intention is the Theory of Planned Behavior (TPB), developed by (Ajzen, 1991). The TPB explains that behavioral intention is primarily determined by three psychological constructs: attitude, subjective norm, and perceived behavioral control. Attitude reflects a single person' favorable or unfavorable evaluation of a behavior; subjective norm represents a single person' perception of social expectations regarding a behavior; and perceived behavioral control reflects a single person' perception of their ability and control in performing that behavior (Ajzen, 1991). This framework has been extensively applied to explain behaviors related to food and food waste reduction, as these behaviors involve personal evaluations, social influences, and perceptions regarding the ability to perform the behavior.

Previous research on food waste has focused primarily on the predictive roles of the three TPB constructs, while attention to the factors shaping these constructs remains relatively limited. In particular, environmental awareness can serve as a significant antecedent within an extended TPB framework, as awareness of the environmental consequences of food waste can inform the formation of a personal behavioral beliefs, normative perceptions, and beliefs regarding behavioral control.

While research on food waste and the Theory of Planned Behavior (TPB) continues to expand, empirical evidence specifically examining how environmental awareness operates within the TPB framework among Generation Z in Indonesia remains limited. This context is significant because the determinants of behavior can vary based on cultural conditions, demographic characteristics, and consumption environments. As a developing nation, Indonesia offers a distinct context compared to many prior studies conducted in developed countries particularly regarding consumption patterns, institutional conditions, and food waste management practices. Furthermore, the increasingly important role of digital media in Generation Z's consumption decisions provides a relevant context for examining whether environmental awareness translates into behavioral intention through personal evaluations, social expectations, or perceptions of behavioral capability and control.

This research builds upon the Theory of Planned Behavior (TPB) by introducing environmental awareness as an antecedent to the three TPB constructs and examining its direct and indirect effects on the intention in avoiding the food waste among Indonesian' Gen Z. Beyond applying the TPB to a distinct population, the study seeks to identify the most effective TPB pathways for translating environmental awareness into the intention in avoiding the food waste. Specifically, it investigates whether environmental awareness influences intention either directly or indirectly through attitude, subjective norms, and perceived behavioral control. By focusing on Gen Z in Indonesia, the study provides empirical evidence regarding how the relative roles of TPB constructs may vary across different cultural and generational contexts.

Its primary contribution lies in demonstrating whether environmental awareness translates into the intention to avoid food waste primarily through personal evaluation (attitude), social expectations (subjective norms), or perceptions of capability and behavioral control (perceived behavioral control).

Literature Review

Food Waste and Its Causes

The terms "food loss" and "food waste" are often used interchangeably, yet they refer to distinct stages within the food supply chain. Food waste is generally defined as food intended for human consumption that ultimately goes uneaten, whereas food loss occurs at the early stages of the supply chain specifically during post-harvest, production, and processing. Food can be lost or wasted due to spoilage, damage, disposal, or diversion away from human consumption, as well as failure to meet quality, safety, or aesthetic standards (Spang et al., 2019). Distinguishing between food loss and food waste is crucial because they involve different stages, stakeholders, and reduction strategies (Wang et al., 2021).

Food waste at the consumer level is influenced by various behavioral, social, and environmental factors. Common behavioral causes include excessive food purchasing, inadequate meal planning and storage, misinterpretation of expiration or "best-before" dates, and the preparation or serving of excessive amounts of food (Ntai et al., 2025; Swamilaksita et al., 2025; Veselá et al., 2023). These practices are not solely determined by practical consumer decisions but can also be influenced by attitudes, perceptions of social expectations, perceived behavioral control, and environmental awareness. Consequently, understanding these psychological determinants is crucial for explaining why consumers engage in food-wasting practices and how the intention to avoid food waste can be strengthened. Given the significant contribution of food waste to the total volume of waste generated in Indonesia, identifying the behavioral determinants that influence the intention to avoid food waste is highly relevant to the development of effective food waste reduction strategies. This research focuses on the behavioral determinants influencing the intention of Indonesian' Gen Z in avoiding the food waste (Eitiveni et al., 2025) .

Theory of Planned Behavior (TPB) and Food Waste

This research employs the Theory of Planned Behavior (TPB), proposed by Ajzen (1991), it is offering a framework for understanding Generation Z's intention in avoiding the food waste. TPB is one of the most widely applied behavioral theories for explaining and predicting human behavior across various contexts, including environmental sustainability and food waste reduction. The theory posits that behavioral intention which it's reflecting a personal' willingness and readiness to engage in a specific behavior—is a direct antecedent of actual behavior. Behavioral intention is determined by three key constructs: attitude, subjective norms, and perceived behavioral control (Ajzen, 1991). Within the context of food waste, TPB suggests that every single person might having stronger intention to reduce food waste when they hold a positive attitude toward such reduction, perceive social expectations or support for the behavior, and believe they possess the necessary ability and control to carry it out (Srivastava et al., 2023).

The three TPB constructs represent distinct psychological pathways in the formation of behavioral intention. Attitude reflects a single person' evaluation of food waste reduction

efforts; subjective norm represents a single person perception regarding the expectations of significant others; and perceived behavioral control reflects the perception of the ability and control required to perform the behavior (Ajzen, 1991). In this research, environmental awareness is positioned as an external antecedent rather than an additional construct within the TPB. Environmental awareness can influence the beliefs underlying the three TPB constructs by enhancing a single person' understanding of the environmental consequences of food waste and the importance of reducing it. Extending the TPB through the integration of environmental awareness provides a basis for examining not only whether each persons are aware of the food waste issue but also how that awareness translates into behavioral intention via attitude, subjective norm, and perceived behavioral control. This extended TPB framework serves as the theoretical foundation for analyzing the psychological determinants influencing the intention of Gen Z in Indonesia to avoid food waste.

Attitude About Food Waste

According to the Theory of Planned Behavior (TPB), attitude is a key determinant of behavioral intention. Attitude refers to an each person' overall evaluation—whether positive or negative—of performing a specific behavior (Qi et al., 2025a). In the context of food waste, attitude reflects the extent to which each person evaluates the effort to reduce or avoid food waste as a positive, beneficial, and desirable behavior. Individuals who are aware of the environmental, economic, and social consequences of food waste tend to develop a more positive attitude toward the behavior of avoiding food waste. Specifically, the understanding that food waste represents an unnecessary use of resources can reinforce a person's positive assessment of efforts to reduce food waste.

Attitudes toward food waste avoidance in this research encompass each person' favourable attitudes toward reducing the food waste—such as meal planning, purchasing food according to needs, preparing appropriate portion sizes, and checking food safety before disposal. These practices represent behavioral contexts that enable individuals to form positive evaluations of food waste reduction efforts. Furthermore, attitudes can also involve affective evaluations, such as feelings of guilt when edible food is unnecessarily discarded (Melnyk et al., 2025). Such emotional responses represent the affective component of an attitude and can reinforce a personal negative evaluation of the act of discarding food. Collectively, these cognitive and affective evaluations shape a single person's attitude toward food waste reduction which may subsequently strengthen their intention in minimizing the food waste.

Subjective Norm About Food Waste

Attitudes toward food waste avoidance in this research reflect individuals' positive evaluations of practices such as meal planning, purchasing food in quantities that match needs, preparing appropriate portion sizes, and checking food safety before disposal. These attitudes also encompass affective responses, such as feelings of guilt when edible food is discarded (Melnyk et al., 2025). Such cognitive and affective evaluations shape in general about personal' attitude toward food waste avoidance and can subsequently influence their intention to reduce food waste.

Perceived Behavioral Control About Food Waste

Perceived behavioral control refers to a single person' perception of the capabilities, resources, and opportunities available to perform a specific behavior (Ajzen, 1991). In the

context of food waste, perceived behavioral control reflects a personal belief in their knowledge, skills, and ability to prevent food waste in their daily lives. Individuals who feel they have greater control over food-related decisions tend to have a stronger intention to reduce food waste, as they are confident in their ability to implement and sustain waste-reduction practices despite facing various obstacles (Akhter et al., 2024a).

In this research, the perception of behavioral control is reflected in each person' perceptions regarding their ability to minimize household food waste, plan food purchases effectively, control the amount of food wasted, and overcome social barriers in efforts to reduce food waste (Marek-Andrzejewska & Wielicka-Regulska, 2021).

Environmental Awareness About Food Waste

Environmental awareness can be describes as a personal's knowledge of environmental issues and concern for environmental protection, which can foster more sustainable and responsible behavior (Li & Shan, 2025a). In the context of food waste, environmental awareness reflects a personal understanding of the environmental impact caused by food waste and the importance of reducing it through sustainable practices. This awareness encompasses an understanding of the environmental consequences of food waste, waste management and disposal, recycling, composting, and the role of individual participation in reducing food waste (Purwanto et al., 2023a).

Behavioral Intention About Food Waste

In the Theory of Planned Behavior (TPB), behavioral intention is a direct predictor of behavior and refers to a personal willingness and commitment to perform a specific behavior (Ajzen, 1991). In the context of food waste, behavioral intention reflects a personal' intention to prevent or reduce food waste (Akhter et al., 2024a).

In this research, behavioral intention is reflected in a single person' intention to avoid food waste, order food in quantities suited to their needs, and take home leftovers when dining out. Individuals with stronger intentions are more likely to adopt food waste reduction practices (Qi et al., 2025).

Hypotheses Development

Environmental awareness is not an original construct within the Theory of Planned Behavior (TPB); however, it can serve as an external antecedent that shapes the beliefs underlying behavioral intentions. According to Ajzen (1991), attitudes, subjective norms, and perceived behavioral control are formed through behavioral beliefs, normative beliefs, and control beliefs. Environmental awareness can reinforce these beliefs by enhancing a personal understanding of the environmental consequences of food waste and the importance of sustainable consumption. Higher levels of environmental awareness can foster more positive attitudes, stronger perceptions of social expectations, and greater confidence in one's ability to reduce food waste (Li & Shan, 2025a).

Environmental Awareness and Attitude

Environmental awareness can serve as an external antecedent influencing the behavioral beliefs that underpin attitude formation within the Theory of Planned Behavior (TPB). According to Ajzen (1991), attitudes are formed through beliefs regarding the consequences

of a behavior and a personal' evaluation of those consequences. In the context of food waste, individuals aware of the environmental impact of food waste are more likely to recognize the negative consequences it entails, such as the unnecessary use of resources and environmental degradation. Such awareness can motivate the single person to view reducing food waste as a beneficial, responsible, and worthwhile behavior.

Environmental awareness can reinforce positive behavioral beliefs and contribute to the formation of a more positive attitude toward avoiding food waste. This relationship is particularly relevant for Gen Z, a demographic frequently exposed to information about the environment and sustainability via digital media. Such exposure can facilitate the translation of environmental knowledge into a positive evaluation of food waste reduction efforts. Previous research has demonstrated a positive relationship between environmental awareness and attitudes toward sustainable consumption and food waste reduction (Li & Shan, 2025a; Liang et al., 2024a). Taken together, it provides a basis for testing the following hypothesis:
H1: Environmental Awareness has a significant positive effect on Attitude

Environmental Awareness and Subjective Norm
In the Theory of Planned Behavior (TPB), subjective norms stem from normative beliefs which is a personal's perception of whether significant others or groups approve of or expect a specific behavior (Ajzen, 1991). Environmental awareness can influence these beliefs by heightening a personal attention to environmental expectations conveyed by family, peers, communities, educational institutions, the media, and public campaigns. Furthermore, a heightened awareness of the environmental consequences of food waste can encourage a single person to view the reduction of food waste as a socially desirable and responsible behavior.

Those with greater environmental awareness tend to perceive that significant others in their social circle support or encouraging them in avoiding the food waste. This relationship does not imply that environmental awareness directly creates social pressure; rather, it suggests that environmental awareness can heighten a personal attention to and interpretation of normative information already present in their social environment. Previous research has demonstrated a positive relationship between environmental awareness and subjective norms (Liang et al., 2024b; Purwanto et al., 2023b). Taken together, it provides a basis for testing the following hypothesis:
H2: Environmental Awareness has a significant positive effect on Subjective Norm

Environmental Awareness and Perceived Behavioral Control
Perceived behavioral control refers to a personal' perception of their ability and the control they possess regarding the performance of a specific behavior (Ajzen, 1991). Within the framework of the Theory of Planned Behavior (TPB), this perception is shaped by control beliefs which means beliefs concerning the various factors that can facilitate or hinder the execution of the behavior. Environmental awareness can reinforce these beliefs by enhancing a personal understanding of practical ways to prevent food waste, such as planning food purchases, managing portion sizes, storing food correctly, and repurposing leftovers.

Greater awareness of practical food waste reduction measures can make such behaviors appear more manageable and attainable, thereby strengthening personal' perceptions of their own capability and control regarding food waste reduction. Environmental awareness not only enhances understanding of the importance of reducing food waste but also helps individuals identify concrete actions within their control. Previous research indicates a positive relationship between environmental awareness and perceived behavioral control in the contexts of sustainable consumption and food waste (Li et al., 2025; Liang et al., 2024a). Taken together, it provides a basis for testing the following hypothesis:
H3: Environmental Awareness has a significant positive effect on Perceived Behavioral Control

Environmental Awareness and Intention to Avoid Food Waste
Environmental awareness can directly influence a single person' intention in avoiding the food waste by enhancing their understanding of the environmental consequences associated with food waste and the importance of responsible consumption. A person with higher levels of environmental awareness tend to give higher consideration to the environmental impact of their food-related decisions and develop a stronger willingness in reducing food waste. Previous research indicates a positive relationship between environmental awareness and the intention to reduce food waste (Liang et al., 2024b; Purwanto et al., 2023b). Taken together, it provides a basis for testing the following hypothesis:
H4: Environmental Awareness has a significant positive direct effect on Intention to Avoid Food Waste.

Attitude and Intention to Avoid Food Waste
According to the Theory of Planned Behavior (TPB), attitude is a key determinant of behavioral intention. A person on who hold a positive evaluation of the behavior in the effort to avoid the food waste tend to view it as beneficial and worthwhile, thereby strengthening their willingness to engage in it. When a single person hold more favourable views towards reducing food waste, the stronger their intention to reduce it. This positive relationship between attitude and the intention to reduce food waste is supported by previous research (Hossain et al., 2022; Jung et al., 2026). Taken together, it provides a basis for testing the following hypothesis:
H5: Attitude has a significant positive effect on Intention to Avoid Food Waste

Subjective Norm and Intention to Avoid Food Waste
Subjective norms refer to someone' self-perception of the social pressure or influence felt to perform or avoid a specific behavior. Those single individual who tend to have more willingness in reducing food waste, when they perceive support and expectations from significant others such as family, friends, and their surrounding community. Such social influence can reinforce the perception that avoiding food waste is a responsible and socially desirable behavior. The stronger the subjective norms perceived by an individual, the stronger the individual's intention in avoiding the food waste. The positive link between subjective norms and the intention in avoiding the food waste has been supported by previous studies (Li et al., 2025; Liang et al., 2024a; Qi et al., 2025b). Taken together, it provides a basis for testing the following hypothesis:
H6: Subjective Norms has a significant positive effect on Intention to Avoid Food Waste

Perceived Behavioral Control and Intention to Avoid Food Waste

Perceived behavioral control reflects to someone' self-perception of their ability and control regarding the performance of a specific behavior. A person who believe they are capable of effectively managing food-related decisions and practices are more likely express greater willingness in reducing food waste. A greater sense of control over activities such as planning food purchases, managing portion sizes, and utilizing leftovers can reinforce a someone' self-willingness to adopt food waste reduction practices. Thus, the higher a single person' perceived behavioral control, the stronger their intention to avoid food waste. The positive relationship between perceived behavioral control and the intention to avoid food waste has been supported by previous research (Akhter et al., 2024b; Li & Shan, 2025b),

Taken together, it provides a basis for testing the following hypothesis:

H7: Perceived Behavioral Control has a significant positive effect on Intention to Avoid Food Waste

Mediating Role of Theory of Planned Behavior Constructs

The Theory of Planned Behavior (TPB) posits that external factors, such as environmental awareness, can influence behavioral intention through its three core constructs: attitude, subjective norms, and perceived behavioral control. A person with higher levels of environmental awareness may perceive food waste reduction more positively, perceive stronger social expectations to reduce food waste, and possess a greater sense of control over engaging in food waste reduction practices. Ultimately, these three factors are expected to strengthen a person self-intention to avoid food waste. Previous research has also demonstrated that TPB constructs may mediate relationship between environmental awareness and the intention in reducing the food waste . (Li & Shan, 2025c; Liang et al., 2024b) Taken together, it provides a basis for testing the following hypothesis:

H8: Environmental Awareness has a significant positive indirect effect on Intention to Avoid Food Waste through Attitude

H9: Environmental Awareness has a significant positive indirect effect on Intention to Avoid Food Waste through Subjective Norms.

H10: Environmental Awareness has a significant positive indirect effect on Intention to Avoid Food Waste through Perceived Behavioral Control.

Research Framework

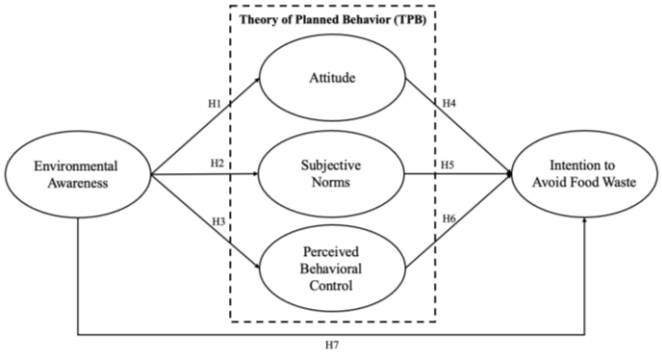

Figure 1 Conceptual Framework

Method

Data Collection

This research employs a quantitative research seeks to assess the factors that influence Generation Z's intention to avoid food waste in Indonesia. A non-probability sampling technique specifically purposive sampling was used, as the study targets respondents with specific characteristics aligned with the research objectives. The target population for this research consists of Generation Z individuals in Indonesia born between 1997 and 2012.

Respondents were deemed to meet the criteria if they: (1) belonged to Generation Z, (2) currently resided in Indonesia, and (3) possessed sufficient knowledge or experience regarding food waste to provide relevant answers to the research questions. These criteria were established to ensure the alignment of respondent characteristics with the research context.

A total of 154 valid responses were collected from respondents residing in 19 cities across Indonesia, encompassing both metropolitan and non-metropolitan areas. Data collection was conducted via an online questionnaire using a purposive sampling technique. As the study employed a non-probability sampling approach, the findings cannot be interpreted as a statistical representation of the entire Generation Z population in Indonesia. Furthermore, online data collection carries the potential for sampling bias, as it is more likely to reach the respondent with internet access and higher levels of online engagement.

Measures

Data were collected using a structured online questionnaire developed via Google Forms. The online format was selected as an efficient means to reach Generation Z respondents across various regions of Indonesia. Participation in the study was voluntary, and only responses from participants meeting the pre-established eligibility criteria were included in the analysis. All constructs were measured using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Measurement items were adapted from prior research to ensure the relevance and validity of the established constructs. This research encompasses five constructs: Environmental Awareness, Attitude, Subjective Norm, Perceived Behavioral Control, and Behavioral Intention. In total, the study employs 25 measurement items, as presented in Table 1.

Table 1
Measurement items and references

Variable	Item	Measurement Item	References
Environmental Awareness	EA 1	I am aware that food waste has negative impact to the environment.	(Purwanto et al., 2023a)
	EA 2	I recognize that we need food waste control mechanism	
	EA 3	I recognize that we need a policy for final disposal.	
	EA 4	I realize that in Indonesia we need for a recycling policy.	
	EA 5	I realize that food waste may be reduced by using biotechnology.	
	EA 6	I am aware that food waste should be reduced with citizen participation.	
	EA 7	I realized that food waste can be turned into compost.	
Attitude	ATT 1	I believe that planning meals carefully is an effective way to avoid food waste.	(Melnyk et al., 2025)
	ATT 2	I believe that buying only the amount of perishable food I need is a good way to prevent food waste.	
	ATT 3	I feel guilty when edible food is wasted.	
	ATT 4	I believe that preparing appropriate portion sizes is important to avoid food waste.	
	ATT 5	I believe it is better to check whether food is still safe to eat before throwing it away.	
Subjective Norms	SN 1	People around me are not wasting food, Therefore I should not waste food	(Li et al., 2025)
	SN 2	My friends would encourage me not to waste food.	
	SN 3	Public campaigns encourage me to avoid food waste.	
	SN 4	My family has taught me that reducing food waste is important.	
	SN 5	Knowing that lot of people still experience hunger encourages me to avoid wasting food.	
Perceived Behavioral Control	PBC 1	I am able to prepare new meals using leftover food.	(Marek-Andrzejewska & Wielicka-Regulska, 2021)
	PBC 2	I have capacity to keep the amount of food discarded in my household to a minimum.	
	PBC 3	I am able to create food shopping planning so that most of the food I buy is consumed.	
	PBC 4	I am able to take actions to reduce food waste within my house.	
	PBC 5	I still able to reduce food waste even when other household members have different capability	
Behavioral Intention	BI 1	I intend to avoid wasting food, daily	(Qi et al., 2025a)
	BI 2	I intend to order only the amount of food I can finish to avoid food waste.	
	BI 3	I intend to pack my leftover food instead of leaving it behind.	

The collected data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with the aid of SmartPLS software. This method is suitable for analyzing complex relationships between latent variables and enables the simultaneous testing of the measurement model and the structural model (J. F. Hair et al., 2019).

Findings

Profile of the Respondents

Table 2 bellow summarises this research' respondents' demographic characteristic. This research included 154 useable responses who were obtained from Generation Z as the respondents residing in 19 cities across Indonesia. Based on the city classification by population size proposed by Sihombing and Utami (2023), cities with a population exceeding 1.5 million are categorized as metropolitan cities, while those with a population of less than 1.5 million are categorized as non-metropolitan cities. The metropolitan cities represented in this research include Jakarta, Bandung, Surabaya, Semarang, Denpasar, and Makassar, whereas the non-metropolitan cities include Singaraja, Sidoarjo, Bojonegoro, Tuban, Bogor, Bekasi, Waingapu, Biak, Jember, Surakarta, Purwokerto, and Batang. Overall, 72.73% of the respondents resided in metropolitan cities, while 27.27% resided in non-metropolitan cities. By gender, 60.39% of the respondents were female and 39.61% were male. The majority of respondents fell into the 19–23 age group (81.17%), followed by the 24–28 age group (12.99%) and the 14–18 age group (5.84%). Regarding occupation, students constituted the largest group at 80.52%, followed by entrepreneurs (11.69%), corporate employees (5.19%), and other occupations (2.60%).

Based on monthly disposable income, 42.86% of respondents reported an income of IDR 3–3.9 million, followed by the group earning IDR 5–7.9 million (24.03%) and those earning less than IDR 3 million (22.08%). Meanwhile, 4.54% of respondents had an income of IDR 8–10 million, whereas 6.49% reported an income of more than IDR 10 million per month.

Table 2
Demographic characteristic of the sample (n = 154)

Variable	Sort	Number	Percentage
Gender	Male	61	39.61%
	Female	93	60.39%
Age	14-18	9	5.84%
	19-23	125	81.17%
	24-28	20	12.99%
Location	Metropolitan City	112	72.73%
	Non-metropolitan City	42	27.27%
Occupation	Student	124	80.52%
	Entrepreneur	18	11.69%
	Corporate Worker	8	5.19%
	Others	4	2.60%
Monthly Income	< 3 million	34	22.08%
	3 - 3,9 million	66	42.86%
	5 - 7,9 million	37	24.03%
	8 - 10 million	7	4.54%
	>10 million	10	6.49%

Reliability and Validity Testing

The measurement model was evaluated based on indicator reliability, convergent validity, and internal consistency reliability. The initial questionnaire comprised 25 indicators covering five constructs: Environmental Awareness, Attitude, Subjective Norm, Perceived Behavioral Control, and Intention to Avoid Food Waste. During the initial evaluation stage, eight indicators were removed because their outer loading values fell below the recommended threshold of 0.70. These indicators included EA1 and EA6 (Environmental Awareness construct), ATT1 and ATT2 (Attitude construct), SN2 and SN3 (Subjective Norm construct), PBC1 (Perceived Behavioral Control construct), and BI3 (Behavioral Intention construct).

Indicators were removed based on low outer loading values during the measurement model evaluation, rather than the significance of structural relationships between variables. Following the removal, the remaining 17 indicators were re-evaluated. All retained indicators exhibited outer loading values above 0.70—ranging from 0.716 to 0.922 indicating adequate indicator reliability. Indicator BI1 recorded the highest outer loading value (0.922), while SN1 recorded the lowest among the retained indicators (0.716).

Furthermore, convergent validity and internal consistency reliability were evaluated using Average Variance Extracted (AVE), Cronbach's Alpha, and Composite Reliability (CR). All AVE values exceeded the recommended threshold of 0.50, while all Cronbach's Alpha and Composite Reliability values surpassed 0.70. These results indicate that the measurement model met the criteria for adequate convergent validity and internal consistency reliability.

Convergent Validity

Convergent validity refers to the extent to which indicators adequately represent the latent construct they measure. In this research, convergent validity is evaluated using outer loading values and the Average Variance Extracted (AVE). According to (J. Hair & Alamer, 2022a), outer loading values above 0.70 and AVE values above 0.50 indicate adequate convergent validity.

As shown in Table 3, all 17 retained indicators have outer loading values ranging from 0.716 to 0.922, all of which exceed the recommended threshold of 0.70. Indicator BI1 has the highest outer loading value at 0.922, while SN1 has the lowest at 0.716. Despite having the lowest outer loading value, indicator SN1 was retained because its value remained above the recommended threshold. These results indicate that all retained indicators possess adequate indicator reliability in representing their respective constructs.

Table 3
Outer Loading

Construct	Indicator	Outer Loading
Environmental Awareness	EA2	0.791
	EA3	0.794
	EA4	0.848
	EA5	0.826
	EA7	0.717
Attitude	ATT3	0.792
	ATT4	0.785
	ATT5	0.847
Subjective Norms	SN1	0.716
	SN4	0.870
	SN5	0.811
Perceived Behavioral Control	PBC2	0.772
	PBC3	0.803
	PBC4	0.824
	PBC5	0.795
Intention to Avoid Food Waste	BI1	0.922
	BI2	0.889

Convergent validity was further evaluated using the Average Variance Extracted (AVE). As presented in Table 4, the AVE values ranged from 0.620 to 0.820, all exceeding the recommended threshold of 0.50. This indicates that each construct explains more than 50% of the variance in its constituent indicators; thus, it can be concluded that all constructs meet the criteria for adequate convergent validity (J. Hair & Alamer, 2022a). The AVE results in Table 4 further confirm that the retained indicators adequately represent their respective latent constructs.

Table 4
Construct Reliability and Validity

Construct	AVE	Cronbach's Alpha	Composite Reliability
Environmental Awareness	0.620	0.846	0.890
Attitude	0.646	0.726	0.845
Subjective Norms	0.643	0.724	0.843
Perceived Behavioral Control	0.634	0.809	0.874
Intention to Avoid Food Waste	0.820	0.781	0.901

Overall, all constructs have AVE values above 0.50, indicating that the measurement model meets the criteria for adequate convergent validity.

Discriminant Validity

Discriminant validity was evaluated using the Fornell–Larcker criterion by comparing the square root of the Average Variance Extracted (AVE) for each construct with its correlation values with other constructs. As shown in Table 5, the square root of the AVE for each construct exceeds its correlation values with all other constructs; thus, the measurement model satisfies the Fornell–Larcker criterion.

For instance, the square root of the AVE for the "Intention to Avoid Food Waste" construct is 0.905, which is higher than its correlations with "Attitude" (0.563), "Environmental

Awareness" (0.534), "Subjective Norm" (0.493), and "Perceived Behavioral Control" (0.428). A similar pattern was observed for the other constructs, where the square root of the AVE for each construct exceeded its correlations with the other constructs. These results indicate that each construct possesses distinct empirical characteristics and does not measure the same concept; thus, it can be concluded that the measurement model meets the criteria for adequate discriminant validity.

Table 5
Fornell-Larcker Criterion

Construct	EA	ATT	SN	PBC	BI
Environmental Awareness	**0.787**				
Attitude	0.564	**0.804**			
Subjective Norms	0.521	0.498	**0.802**		
Perceived Behavioral Control	0.487	0.421	0.466	**0.796**	
Intention to Avoid Food Waste	0.534	0.563	0.493	0.428	**0.905**

Note: Diagonal values in bold represent the square root of AVE..

Construct Reliability

Table 4 above presents the reliability results for all constructs. Construct reliability was evaluated using Cronbach's Alpha and Composite Reliability (CR). Cronbach's Alpha values ranged from 0.724 to 0.846, while Composite Reliability values ranged from 0.843 to 0.901. The results showed that none of the values fell below the recommended 0.70 (J. Hair & Alamer, 2022a), indicating adequate internal consistency and construct reliability. Thus, it can be concluded that the measurement model met the reliability criteria and is suitable for proceeding to the structural model analysis.

Hypothesis Testing

Hypothesis testing was conducted using the bootstrapping procedure in SmartPLS with a significance level of 5%. A hypothesis is considered supported if the t-statistic value is greater than 1.96 and the p-value is less than 0.05 (J. Hair & Alamer, 2022b). Of the ten hypotheses proposed, six were supported (H1, H2, H3, H4, H5, and H8), while four were not supported (H6, H7, H9, and H10).

The research results indicate that Attitude is the only TPB construct that directly and significantly affects the intention to avoid food waste. Furthermore, Attitude demonstrates a significant mediating effect on the relationship between environmental awareness and the intention to avoid food waste. Conversely, Subjective Norm and Perceived Behavioral Control do not have a significant direct influence on the intention, nor do they show a significant mediating effect on the relationship between environmental awareness and the intention to avoid food waste. Detailed hypothesis testing results are presented in Table 6.

Direct Effect

The results of the direct effect analysis are presented in Table 6. Environmental Awareness has a positive and significant effect on Attitude ($\beta = 0.675$; $p < 0.001$); thus, H1 is supported. These results indicate that the higher a person' environmental awareness, the more positive their attitude toward efforts to avoid food waste. This finding is consistent with Li & Shan (2025b), who reported a positive relationship between environmental awareness and attitudes toward sustainable consumption and food waste reduction.

Environmental awareness also has a positive and significant influence on subjective norms (β = 0.473; p < 0.001); thus, H2 is supported. These results indicate that the person with the higher levels of environmental awareness tend to better perceive the existence of social expectations and support regarding efforts to reduce food waste. This finding is consistent with Purwanto et al. (2023), who found a positive relationship between environmental awareness and subjective norms.

Furthermore, environmental awareness has a positive and significant effect on perceived behavioral control (β = 0.397; p < 0.001); thus, H3 is supported. These results indicate that the higher an individual's environmental awareness, the stronger their perception of their ability and control regarding food waste reduction behavior. This finding aligns with the results of the previous research by Liang et al. (2024)

Environmental awareness also has a direct, positive, and significant influence on the intention to avoid food waste (β = 0.202; p = 0.046); thus, H4 is supported. These findings indicate that a higher level of environmental awareness is directly associated with a stronger intention to avoid food waste. This result is consistent with Purwanto et al. (2023), who found a positive relationship between environmental awareness and the intention to reduce food waste. Attitude significantly strengthen a single self-intention to reduce food waste (β = 0.272; p = 0.034); thus, H5 is supported. This finding aligns with the fundamental principle of the TPB, which states that a more positive evaluation of a behavior results in a stronger behavioral intention (Ajzen, 1991). Conversely, Subjective Norm did not have a significant influence on the Intention to Avoid Food Waste (β = 0.178; p = 0.064); thus, H6 was not supported. Similarly, Perceived Behavioral Control did not significantly affect the Intention to Avoid Food Waste (β = 0.161; p = 0.110); thus, H7 was not supported. These results indicate that although Environmental Awareness significantly strengthened Subjective Norm and Perceived Behavioral Control, these two constructs did not translate that enhancement into a stronger intention to avoid food waste within the study's sample.

Overall, the results of the direct effect analysis indicate that Environmental Awareness significantly influences the three TPB constructs and has a direct positive effect on the Intention to Avoid Food Waste. However, among the three TPB constructs, only Attitude demonstrates a significant direct effect on intention. The complete results of the direct effect analysis are presented in Table 6.

Table 6
Result of Direct Effect Testing

H	Path	β	t	p	Decision
H1	Environmental Awareness → Attitude	**0.675**	**8.187**	**0.000**	**Accepted**
H2	Environmental Awareness → Subjective Norms	**0.473**	**4.324**	**0.000**	**Accepted**
H3	Environmental Awareness → Perceived Behavioral Control	**0.397**	**4.871**	**0.000**	**Accepted**
H4	Environmental Awareness → Intention to Avoid Food Waste	**0.202**	**1.998**	**0.046**	**Accepted**
H5	Attitude → Intention to Avoid Food Waste	**0.272**	**2.125**	**0.034**	**Accepted**
H6	Subjective Norms → Intention to Avoid Food Waste	0.178	1.860	0.064	Rejected
H7	Perceived Behavioral Control → Intention to Avoid Food Waste	0.161	1.601	0.110	Rejected

Note: A hypothesis is supported when $p < 0.05$.

Indirect Effect

An analysis of the indirect effect was conducted to examine whether the TPB constructs act as mediators in the relationship between Environmental Awareness and Intention to Avoid Food Waste. The results of this analysis are presented in Table 7.

Table 7
Result of Indirect Effect Testing

Hypothesis	Path	β	t	p	Decision
H8	EA → Attitude → Intention	**0.184**	**2.140**	**0.033**	**Accepted**
H9	EA → Subjective Norms → Intention	0.084	1.546	0.123	Rejected
H10	EA → Perceived Behavioral Control → Intention	0.064	1.576	0.116	Rejected

The research results indicate that attitude significantly mediates the relationship between environmental awareness and the intention to avoid food waste (β = 0.184; p = 0.033); thus, H8 is supported. These findings demonstrate that higher environmental awareness helps shape a more favourable attitude toward reducing food waste, which in turn strengthens behavioral intention. These results are consistent with the Theory of Planned Behavior (TPB), which positions attitude as a key mechanism linking behavioral beliefs to behavioral intention (Ajzen, 1991). Conversely, Subjective Norm does not significantly mediate the relationship between Environmental Awareness and Intention to Avoid Food Waste (β = 0.084; p = 0.123); thus, H9 is not supported. Although Environmental Awareness has a significant effect on Subjective Norm, the latter construct does not exert a significant influence on intention. Consequently, the indirect effect via Subjective Norm is not significant.

Similarly, Perceived Behavioral Control does not significantly mediate the relationship between Environmental Awareness and Intention to Avoid Food Waste (β = 0.064; p = 0.116); thus, H10 is not supported. Although Environmental Awareness has a significant effect on Perceived Behavioral Control, the non-significant effect of Perceived Behavioral Control on intention means that the indirect effect through this construct is also non-significant.

Overall, the analysis results indicate that among the three TPB constructs, only Attitude significantly mediates the relationship between Environmental Awareness and the Intention to Avoid Food Waste. These findings suggest that for the Gen Z respondents in this research, environmental awareness is more effectively translated into an intention in avoiding the food waste through the formation of a positive personal evaluation or attitude, rather than through perceptions of social expectations or perceived behavioral control.

Discussion

Key Findings and Discussion

These research findings offer important insights into the application of the Theory of Planned Behavior (TPB) in explaining the intention to avoid food waste among Generation Z in Indonesia. Environmental awareness was found to significantly influence all three TPB constructs: attitude, subjective norms, and perceived behavioral control. However, only attitude had a significant impact on the intention to avoid food waste and significantly

mediated the relationship between environmental awareness and that intention. This indicates that the three TPB constructs do not contribute equally to the formation of the intention to avoid food waste in the context of this research. These findings generally align with previous research showing that the relative contributions of TPB constructs can vary across different food waste contexts. A systematic review and meta-analysis on household food resulting with attitude as the most influential TPB factor in explaining intention, whereas subjective norms and perceived behavioral control showed comparatively weaker contributions. Meanwhile, a more recent meta-analysis indicates significant heterogeneity in the influence of TPB constructs across various studies and population contexts (Srivastava et al., 2023).

Attitude emerges as the strongest predictor within the TPB framework and the only one with a significant influence on intention. These findings indicate that environmental awareness becomes behaviorally relevant only when translated into a positive personal evaluation of food waste reduction. In other words, merely knowing that food waste has negative environmental consequences may be insufficient; individuals must also perceive the act of avoiding food waste as beneficial, valuable, and personally meaningful. This interpretation aligns with the fundamental logic of the TPB, which posits that behavioral intention is shaped by a person self-evaluation of the expected consequences of a behavior. Empirically, research on food waste has consistently identified attitude as a key determinant of the intention to reduce food waste. For instance, a meta-analysis of 26 studies identified attitude as the strongest TPB correlate of intention in the context of household food waste (Srivastava et al., 2023). Similarly, studies employing an extended TPB framework have found that environmental concern can strengthen attitudes, thereby contributing to the intention to reduce food waste (Schrank et al., 2023).

The significant mediating effect of attitude further reinforces this interpretation. These results indicate that environmental awareness does not merely serve as a direct informational factor; rather, its relevance to behavior emerges when such awareness is transformed into a positive evaluation of food waste reduction. These findings align with research integrating environmental values, beliefs, and norms with the Theory of Planned Behavior (TPB), demonstrating that environment-related psychological factors can contribute to attitude formation and subsequently influence behavioral intentions regarding food waste reduction (Al Mamun et al., 2024). The study's findings suggest that efforts to raise environmental awareness among Indonesian Gen Z would likely be more effective if accompanied by initiatives to strengthen positive attitudes toward specific food waste avoidance practices.

The finding regarding the non-significant influence of subjective norms is intriguing. Although environmental awareness significantly boosts subjective norms, the subjective norms themselves do not exert a significant effect on the intention to avoid food waste. This indicates that heightened awareness of environmental issues does not automatically lead Indonesian Gen Z to base their food waste-related decisions on perceived expectations from family, friends, or other social groups. However, this finding should not be interpreted as evidence that social influence is generally irrelevant to food waste-related behavior. Instead, it suggests that the influence of subjective norms may be context-dependent. Recent meta-analytic evidence indicates that the relationship between subjective norms and food waste-

related intentions remains inconsistent across studies; some contexts show a significant influence, while others reveal a weak or non-significant relationship (Malau et al., 2025).

One possible explanation relates to the characteristics of Generation Z as a digitally hyper-connected generation. Previous research specifically examining Generation Z indicates that attitudes, routines, skills, and consumption practices regarding food waste are shaped by a combination of personal, social, and environmental factors (Kymäläinen et al., 2021). Furthermore, studies on Generation Z consumers show that social media activity can influence intentions and behaviors regarding food waste reduction, suggesting that the digital environment is a significant source of behavioral influence for this generation (Attiq et al., 2024). Indonesian Gen Z are likely exposed to a variety of sometimes competing social influences, meaning they do not rely solely on the expectations of their immediate reference groups.

This interpretation is highly relevant to the context of food consumption in Indonesia. Research on Indonesian Gen Z indicates that food delivery platforms, promotions, knowledge, and subjective norms are relevant factors in understanding sustainable food waste management behavior among young consumers (Kristia et al., 2023). At the same time, the growing role of online food delivery services and digitally driven food consumption can expose Gen Z consumers to various social and commercial stimuli that encourage consumption patterns oriented toward convenience and trends. Although respondents may be aware of social expectations regarding environmental responsibility, these expectations can compete with other influences stemming from digital consumption. This situation may weaken the extent to which subjective norms translate into an intention to avoid food waste.

The insignificant influence of subjective norms aligns with recent empirical evidence. A 2026 study applying an extended TPB model to food waste reduction found that attitude and perceived behavioral control significantly influenced the intention to reduce food waste, whereas subjective norms did not show a significant effect (Jung et al., 2026). These findings indicate that subjective norms cannot automatically be assumed to be a significant predictor of food waste-related intentions across all populations. Instead, their influence may depend on the social environment, cultural context, the specific type of food waste-related behavior, and the characteristics of the study population.

Perceived behavioral control (PBC) also did not have a significant effect on the intention to avoid food waste. This finding is interesting because environmental awareness significantly enhances perceived behavioral control, indicating that respondents with higher environmental awareness generally feel more capable of reducing food waste. However, this increased perception of capability did not translate into a statistically significant increase in intention. These results differ from several previous studies that identified perceived behavioral control as a key predictor of the intention to reduce food waste. For instance, a recent meta-analysis reported that PBC is a significant predictor of food waste-related intentions, while other studies have also identified PBC as a crucial determinant within the extended TPB model (Malau et al., 2025).

A possible explanation is that avoiding food waste may be perceived by Indonesian Gen Z as a relatively easy and low-cost behavior. Practices such as ordering appropriate portion sizes,

storing food properly, consuming leftovers, or avoiding unnecessary purchases do not require significant financial resources, specialized skills, or assistance from others. When a behavior is perceived as relatively easy to perform, differences in perceived behavioral control may have limited additional explanatory power regarding intention. Under such conditions, a personal evaluation of whether the behavior is considered desirable or valuable may become more important than a personal' belief in their ability to perform that behavior.

However, this interpretation requires caution because perceived behavioral control may operate differently depending on the specific food waste-related behavior being examined. Food waste encompasses a range of behaviors—including purchasing, meal planning, portioning, storage, consumption, and disposal—and the level of control required can vary across these behaviors. A systematic review of food waste research highlights that TPB constructs interact with behavioral and contextual factors; consequently, no single psychological determinant can fully explain all food waste-related behaviors (Etim et al., 2025). The non-significant finding regarding PBC in this research may reflect the relatively general nature of the intention measurement, rather than indicating that perceived behavioral control plays no role in food waste-related behavior more broadly.

The inconsistency between the findings of this research and previous research further supports the argument that the explanatory contribution of each TPB construct is context-dependent. Recent meta-analytic evidence indicates that the influence of attitude, subjective norms, and perceived behavioral control can vary based on country, terminology used, respondent characteristics, and other contextual factors (Malau et al., 2025). This is particularly significant for the present study, as it focuses specifically on Indonesian Gen Z, whereas the majority of existing TPB literature on food waste has examined household consumers in a more general sense. A systematic review covering 42 studies across 17 countries also highlights the importance of demographic, socioeconomic, and contextual differences in understanding household food waste behavior (Etim et al., 2025).

The findings regarding subjective norms and perceived behavioral control also hold theoretical implications for the TPB. These results do not invalidate the TPB framework; rather, they indicate that the relative strength of the psychological determinants within the TPB can vary across behavioral contexts. This interpretation aligns with recent research on food waste, which demonstrates that the three TPB constructs do not consistently exhibit the same predictive power across different populations and contexts (Srivastava et al., 2023). Among Indonesian Gen Z, environmental awareness appears to translate into intention primarily through personal evaluation represented by attitude rather than through perceptions of social expectations or perceived capability to perform the behavior.

Overall, the study identifies attitude as the primary psychological mechanism within the extended TPB model. Environmental awareness significantly reinforces all three TPB constructs, yet only attitude effectively translates this awareness into a stronger intention to avoid food waste. These findings hold theoretical significance by demonstrating that extending the TPB to include environmental awareness cannot be viewed merely as the addition of a new predictor variable to the model. Instead, environmental awareness functions as an upstream factor whose behavioral influence depends on the specific TPB pathway mediating the process. In the context of Indonesian Gen Z participants in this

research, empirical evidence indicates that the environmental awareness → attitude → intention pathway is the most influential mechanism. These findings extend prior research on food waste which has largely focused on the direct predictive roles of traditional TPB constructs while also fostering a deeper understanding of how environmental awareness translates into the intention to avoid food waste (Al Mamun et al., 2024).

Research Implication

This research offers both theoretical and practical contributions to the understanding of food waste avoidance behavior among Generation Z in Indonesia. Theoretically, it extends the application of the Theory of Planned Behavior (TPB) by demonstrating that environmental awareness influences the intention to avoid food waste, both directly and indirectly through attitude. The findings reveal that attitude is the only TPB construct that significantly affects behavioral intention while also mediating the relationship between environmental awareness and that intention. Conversely, subjective norms and perceived behavioral control neither significantly influence intention nor mediate the relationship. These findings indicate that the explanatory power of TPB constructs can vary across cultural and generational contexts, particularly regarding Generation Z in Indonesia.

In practical terms, the research findings offer implications for the government, educators, and food industry stakeholders. The Indonesian government needs to strengthen environmental awareness through targeted food waste reduction campaigns that highlight the environmental consequences of food waste and the benefits of avoiding it. Given Gen Z's high level of engagement with digital media, social media campaigns featuring influencers and content creators could serve as an effective means to translate environmental awareness into positive attitudes toward reducing food waste. Educational programs should also provide practical guidance on food waste reduction, covering meal planning, appropriate portion control, the use of leftovers, composting, and the donation of surplus food that remains fit for consumption. Furthermore, food and beverage businesses could offer smaller or customizable portion sizes to accommodate consumer preferences while simultaneously reducing potential, unnecessary food waste.

Research Limitation & Future Research Direction

This research has several limitations. First, it employed a non-probability sampling approach—specifically purposive sampling—using online questionnaires distributed via social media platforms. This approach carries a potential risk of sampling bias, as it may disproportionately reach respondents with higher levels of digital activity or greater environmental concern. Consequently, the findings may not fully represent the entire Generation Z population in Indonesia, particularly respondents with limited internet access or lower levels of online participation. Therefore, caution should be exercised when generalizing the findings beyond the population represented by the study sample.

Secondly, this research relies on self-reported data, which entails a potential risk of social desirability bias. Respondents might report a stronger intention to avoid food waste than the behavior they actually exhibit in real-life situations. The study's findings should be understood as a representation of behavioral intentions reported by respondents, rather than a measure of actual behavior regarding food waste reduction.

Finally, the research model was limited to environmental awareness and the main constructs of the Theory of Planned Behavior (TPB). Other factors potentially influencing the intention to avoid food waste were not examined in this research. Future research could employ larger and more diverse samples and consider using probability sampling, where feasible, to enhance the generalizability of the findings. Future studies could also expand the model by incorporating variables such as environmental knowledge, moral norms, food literacy, household practices, and financial considerations to gain a more comprehensive understanding of the intention to avoid food waste among Generation Z. Furthermore, longitudinal or behavior-based approaches could be utilized to further examine whether individuals' intentions actually translate into actual food waste reduction behavior.

Conclusion

This research assesses how environmental awareness shapes Indonesian Generation Z's intention in avoiding food waste by extending the Theory of Planned Behavior (TPB) framework. The results indicate that environmental awareness positively influences attitude, subjective norms, perceived behavioral control, and the intention to avoid food waste. However, among the three TPB constructs, only attitude significantly influences the intention to avoid food waste and mediates the relationship between environmental awareness and that intention. Meanwhile, subjective norms and perceived behavioral control neither significantly influence the intention nor mediate the relationship.

These findings indicate that environmental awareness becomes behaviorally relevant when translated into a positive personal evaluation of food waste reduction. Forming a positive attitude toward the behavior of avoiding food waste is crucial for strengthening Generation Z's intention to reduce food waste. Overall, this research contributes to the food waste literature by extending the application of the Theory of Planned Behavior (TPB) to the Indonesian context and providing practical insights for developing more targeted food waste reduction initiatives for Generation Z.

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