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Attitude, intention, and behavior to reduce food waste among generation X

E Purwanto^{1*}, N Biasini², A Yulianto³, T Gunawan⁴ and V O Wati⁵

¹Department of Management & Jaya Launch Pad, Universitas Pembangunan Jaya, South Tangerang, Indonesia

²Department of Communication & Jaya Launch Pad, Universitas Pembangunan Jaya, South Tangerang, Indonesia

³Department of Psychology & Jaya Launch Pad, Universitas Pembangunan Jaya, South Tangerang, Indonesia

⁴Department of Business Administration, Universitas Katolik Parahyangan, Bandung, Indonesia

⁵Department of International Relations, Universitas Katolik Parahyangan, Bandung, Indonesia

edi.purwanto@upj.ac.id

Abstract. Food waste is a global problem that affects food safety and the sustainability of the food supply chain. Unfortunately, food waste is still a big problem for Indonesia. Regarding Bappenas, from 2000 to 2019, Indonesia disposed of 23 to 48 million tons of food waste annually, equivalent to 115 to 184 kilograms per capita per year. In response to this issue, in this study, we try to see how people's attitudes toward food waste will contribute to raising their intentions and actions to cut down on food waste. This study aimed to examine the impact of mindset on Indonesians' desire to and actions to reduce food waste. The study used a convenience sampling technique, with a total sample of 231. Respondents are Generation X, who are currently 41 to 52 years old. Data was gathered from March to May 2022. The study's results prove that attitude positively and significantly affects intention and behavior to cut down on food waste. Additionally, the impact of the intention to reduce food waste also emerged as a key factor. Limitation: This study only looks at how attitudes affect Generation Gen X' intentions and behavior to prevent food waste.. The paper does not include Baby Boomers, Generation Y, and Generation Z in the analysis. Future research and publications can consist of or analyze the impact of attitude on the intention and behaviour of Gen Y or Gen Z members to reduce food waste.

1. Introduction

Indonesia's food security index in 2021 is ranked 69th out of 113 countries [1]. On the one hand, Indonesia's food security index is low. Still, on the other hand, Indonesia's contribution to food waste ranks high, ranked second in the world [2]. This fact is concerning, but anticipating the occurrence of food vulnerability and insecurity, the government, through the Food Security Agency (BKP) of the



Ministry of Agriculture, has compiled a Food Security and Vulnerability Atlas (FSVA). Reducing food waste should also be the primary government's concern for preserving food security. Millions of tons of food are wasted annually by agriculture, retailers, and consumers [2]. Along the food supply chain, 1/3 of the food consumed worldwide, or 1.3 million tonnes annually, is wasted. [3].

Then a significant contributor to household food waste. Research related to household food waste was conducted by Nahman et al. [4] conducted in South Africa by linking household food waste to the wasted economic value, as well as the costs incurred in dealing with waste. Regarding household food waste Umunnakwe [5] in Nigeria also investigated which, according to his explanation, 44 percent and 269,870 food waste came from households. Another study related to household food waste was conducted by Ng et al. [6], Ayob et al. [7], Farr-Wharton et al [8], Silvennoinen et al. [9], Liu dan Nguyen [10], Williams et al. [11], and [3]. This study will focus on the behavior minimizing in households.

Behavior is shaped by will, and will is shaped by attitude. Based on this expression, this study will examine whether behavior decreasing will be influenced by intends to cut down on food waste and how the critical role of attitude to minimize food waste will give birth to act with the purpose of reducing food waste. Aktas et al. [12] tested and proved that a person's positive attitude would affect their high intention to reduce food waste. They also demonstrate that a higher intent to minimize food waste affects their behavior to prevent food waste. Tsai et al. [13] also tested and proved that a positive attitude would raise the intention to reduce food waste among early adulthood consumers in Taiwan. This study examines the model in Figure 1 among Generation X in Indonesia.

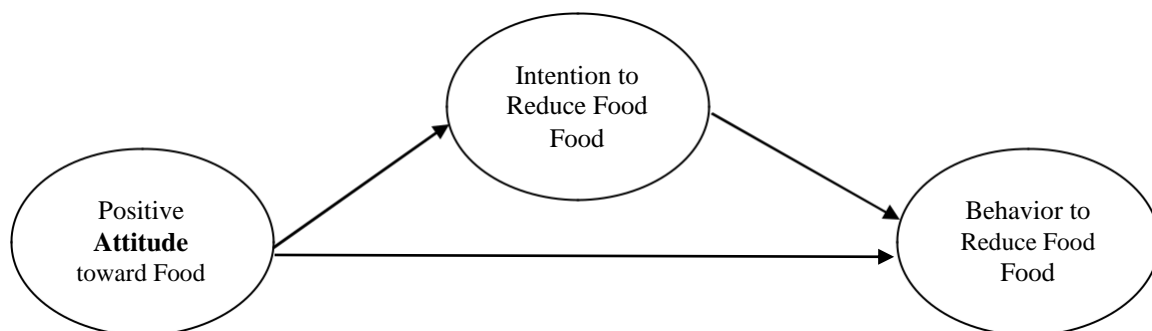


Figure 1. Conceptual Framework

2. Methodology

This research takes the sample from Generation X Indonesia. Samples were collected from major cities, such as Jakarta, Tangerang, South Tangerang, Bekasi, Depok, Bogor, Bandung, Yogyakarta, Semarang, and Surabaya. Sampling used convenience sampling, in which the sample collected from Generation X respondents was 232. They consisted of 100 males and 132 females. Demographics can be seen in Table 1.

Table 1. Demographics

	Frequency	%
<i>Gender</i>		
Male	100	43
Female	132	57

<i>Qualification</i>		
High school	32	14
Diploma	46	20
Bachelor	107	46
Master	34	15
Doctor	12	5
<i>Domicile</i>		
Jabodetabek	90	39
Bandung	107	46
Semarang	2	1
Yogyakarta	4	2
Surabaya	13	6
Other	15	7

Data analysis uses PLS-SEM by testing the outer and inner models. The SmartPLS version 3 software assists the PLS-SEM analysis for running the data.

3. Findings

Threshold more than 0.70 for outer loading [14], and Table 2 demonstrates that the outer loading value for all items is more than 0.70; thus, the reliability indicator has been met. Likewise, internal consistency reliability has been met, as shown in Table 2 by the composite reliability value of all variables greater than 0.70. In addition, the Average Variance Extracted (AVE) value for all variables is more than 0.50, indicating that all variables in this study are valid (see Table 2).

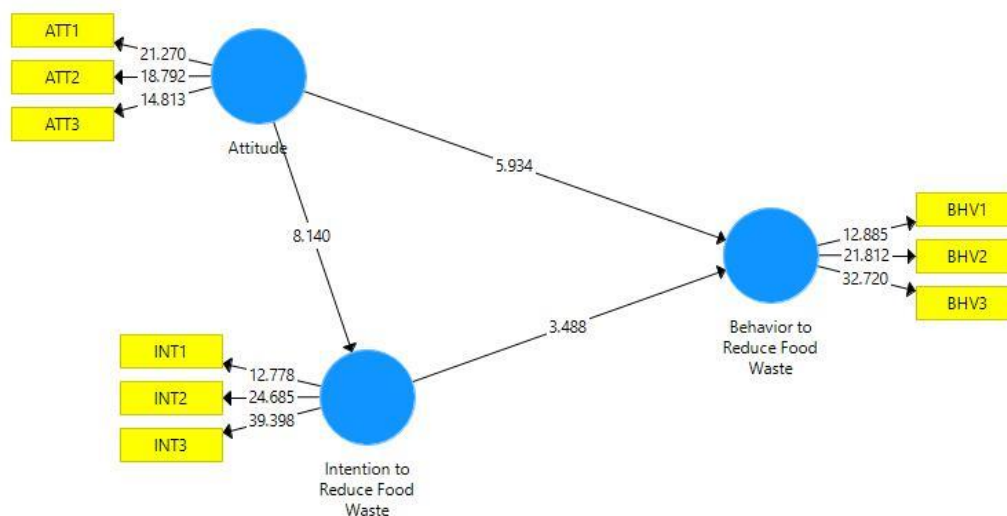
Table 2. Outer Loadings

	Outer Loading	Composite Reliability	Average Variance Extracted (AVE)
Attitude		0,800	0,572
ATT1	0,779		
ATT2	0,763		
ATT3	0,725		
Intention		0,843	0,643
INT1	0,740		
INT2	0,808		
INT3	0,854		
Behavior		0,855	0,664
BHV1	0,776		
BHV2	0,813		
BHV3	0,853		

The validity of all variables is also proven by the AVE value for each variable is greater than the correlation value (Table 3). Thus, all variables have met discriminant validity.

Table 3. Discriminant Validity

	Attitude	Behavior to Reduce Food Waste	Intention to Reduce Food Waste
Attitude	0,756		
Behavior to Reduce Food Waste	0,478	0,815	
Intention to Reduce Food Waste	0,465	0,392	0,802

**Figure 2.** Bootstrapping result

The threshold t-statistic for PLS analysis is higher than 1.96 [15]. It denotes that 95% of a normal curve's area fits within 1.96 standard deviations of the mean. Table 4 Figure 2 show that H1 is accepted because it has a T-Statistics value of 8.140 > 1.96 and P-values 0.000 < 0.05, thus, positive and strong impact of attitude on intention to reduce food waste. H2 is also accepted because it has a T-Statistics value of 5.934 > 1.96 and P-values of 0.000 < 0.05, thus, the effect of attitude on behavior to reduce food waste is also positive and significant. The effect of intention on behavior to reduce food waste also proved positive and significant, as evidenced by the T-Statistics value of 3,488 > 1.96 and P-values 0.000 < 0.05; thus, H3 is accepted.

Table 4. Path Coefficients

Hipotesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ((O/STDEV))	P Values	Status
H1 Attitude -> Intention	0,465	0,472	0,057	8,140	0,000	Accepted
H2 Attitude -> Behavior	0,377	0,380	0,064	5,934	0,000	Accepted
H3 Intention -> Behavior	0,217	0,220	0,062	3,488	0,000	Accepted

Table 5 shows that besides attitude directly influencing behaviors that decrease food waste, attitude also indirectly has a positive and substantial behavioral change to cut down on food waste by mediating

intends to cut down on food waste. Table 5 shows the T-Statistics value of $3.057 > 1.96$ and P-values $0.002 < 0.05$.

Table 5. Total Indirect Effects

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Attitude -> Behavior to Reduce Food Waste	0,101	0,104	0,033	3,057	0,002

The results of this study show that attitude effects intention and behavior to reduce food waste significantly and favorably. Although Teoh et al. [16] did not prove the effect of attitude on the intention to reduce food waste, the results of our study confirmed the results of previous studies by Luu [17], Wang et al. [18], and Ng et al. [6].

4. Conclusions

The findings of the study demonstrate that attitude significantly and favorably influences intention and behavior to reduce food waste. Additionally, the link between intention and behavior to prevent food waste was strong. Therefore, in a Food Security and Vulnerability Atlas (FSVA) implementation to overcome food security and vulnerability, the Food Security Agency (BKP) of the Ministry of Agriculture need to pay attention to how people's behavior in utilizing food and their perspective on food waste. The high food waste produced by the Indonesian people will further aggravate food security. This study, which was mainly carried out in big cities, such as Jakarta, Tangerang, South Tangerang, Depok, Bekasi, Bogor, Bandung, Semarang, Yogyakarta, and Surabaya, proves that people's positive attitude toward food will be able to arouse their intention and build their behavior to reduce food waste. Therefore, education related to the problems that are the impact of food waste needs to be given to the community.

Limitations of this paper are: (1) this paper focuses on analyzing how attitudes affect on intention and behavior to prevent food waste among Generation X but does not include Baby Boomers, Generation Y, and Generation Z in the analysis. (2) The sample was only collected from cities on the island of Java. Although the population on the island of Java reaches 55 percent (about 151.6 million) of the total population of Indonesia (about 273.5 million), profiling Indonesian food waste behavior will be complete if lots of additional samples are taken from other islands in Indonesia.

Based on the above limitation, future research and publications can consist of or test the effect of attitude on intention and behavior to reduce food waste among Baby Boomers, Generation Y, and Generation Z. Then, additional samples will be taken from various areas of the islands in Indonesia other than Java.

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