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A Study of Intention to Reduce Indonesia's Food Waste

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ABSTRACT

Indonesia has a food waste crisis. Indonesia was the third-largest producer of food waste in May 2023. According to the Ministry of Environment and Forestry in 2023, 40.98% of waste is food. This contradicts the fact that many of its citizens still lack food. Moral norms are important in Indonesia, which can be used to help reduce food waste. This study examines how moral norms and self-efficacy affect Indonesian food waste reduction intentions. SEM-PLS was used in this study, with 157 respondents participating. The results indicate that moral norms and self-efficacy for food waste reduction have a positive effect on food waste reduction intention. In conclusion, Indonesia's moral norms regarding food waste helped reduce food waste. Intention alone is insufficient; substantial incentives are needed to turn intentions into action.

Keywords: Indonesia, food waste, moral norms, self-efficacy

INTRODUCTION

Food waste represents a multifaceted global predicament with adverse ramifications encompassing environmental degradation and scarcity (Bech-Larsen et al., 2019; Dou et al., 2016). Around one-third of the world's consumable food supply, totaling 1.3 billion metric tons every year, is squandered, incurring an annual financial loss exceeding USD 750 billion. Consequently, an international discourse has arisen to curtail food waste and foster a more sustainable global milieu (Mu'azu et al., 2019). In developed countries, food waste ranges from 280 to 300 kilograms annually per person, whereas in developing countries, it ranges from 120 to 170 kilograms per capita yearly (Mumtaz et al., 2022). Presently, Indonesia confronts a crisis of waste accumulation, with food waste constituting the most substantial portion, accounting for 40.98% of the total waste composition, as the Ministry of Environment and Forestry reported in 2023 (The Ministry of Environment and Forestry, 2024). Furthermore, in May 2023, Indonesia assumed the disheartening rank of the third-largest food waste producer, trailing behind Saudi Arabia and the United States (Raharjo, 2023).

Mitigating food waste represents an imperative yet intricate strategy necessitating the active involvement of various stakeholders (Wang et al., 2017). Minimizing food waste within the restaurant sector is significant from both environmental and sustainable perspectives (Godfray et al., 2010). Consumers tend to think that food waste is an unavoidable facet of consumption, while the food industry and vendors employ discounts and special offers to entice impulsive purchases, influencing consumer buying choices and exacerbating waste generation (Grandhi & Appaiah, 2016). Past research in food service management has predominantly centered on operational facets of food waste mitigation and management rather than scrutinizing consumer behavior concerning food waste within dining establishments (Charlebois et al., 2016). Within the ambit of ethical consumption, it is crucial not to neglect consumers' ethical inclinations and tangible actions regarding food waste management in the food service sector, given that food waste poses substantial threats to the sustainability of the environment, social, and economic (Ding, 2022).

While prior studies have delved into the influence of consumers' self-efficacy on the way they treat and produce food waste within household settings (Aschemann-Witzel et al., 2020), there exists a dearth of comprehensive exploration concerning customers' attitudes, intentions, and actions regarding food waste management in restaurant contexts (Li et al., 2021). Specifically, further inquiry is warranted into the relationship between restaurant patrons' self-efficacy for reducing food waste and their inclination to engage in waste-reduction behaviors (Ding, 2022). Moreover, Ding (2022) contends that food sustainability and waste management are intrinsically interconnected with societal advantages and necessitate the active participation of all stakeholders. Generation Z consumers' perspectives and affirmative attitudes are driven by their perception of strong collective efficacy, which compels them to contribute to mitigating food waste (Ding & Jiang, 2023). Therefore, this research was conducted to understand the food waste phenomenon in Indonesia, specifically to probe the influence of moral norms and self-efficacy on an individual's intentions to reduce food waste. The research questions arising from this context are as follows: How do the moral norms for the reduction of food waste affect self-efficacy towards reducing food waste?; How does self-efficacy towards food waste reduction affect food waste reduction intention?; How do the moral norms for food waste reduction affect food waste reduction intention?.

Food waste, as stipulated, is the residual outcome arising from the initial production of consumable sustenance for human consumption, subsequently forsaken or left unconsumed by individuals. This encompasses provisions that deteriorated before disposal, as well as those that retained their edibility at the time of discarding (Thyberg & Tonjes, 2016). This phenomenon constitutes a multidimensional and intricate predicament characterized by many causal factors (Gao et al., 2021; Schanes et al., 2018). The continuous accumulation of food waste on a global scale has galvanized the recognition of its urgency among commercial entities, governmental bodies, vested organizations, and the general populace (Schanes et al., 2018). Substantive evidence substantiates a consumerist culture's influence on food waste propagation (Aschemann-Witzel, 2015). Such a culture encourages individuals to procure quantities of sustenance over their actual requirements, particularly in circumstances characterized by elevated income and reduced pricing structures. This practice fosters heightened consumption patterns without consideration for potential waste and its associated repercussions. Furthermore, the prevailing culture of consumption plays a pivotal role in shaping individuals' perceptions regarding which food items merit preservation and

which may be dispensed with (Thyberg & Tonjes, 2016). In contemporary societies, the predicament of food waste is intimately intertwined with overarching consumption paradigms, rendering it a formidable challenge that transcends resolution solely through the reclamation and recycling of food waste materials (Huang et al., 2020).

Moral norms refer to an individual's perception of whether a behavior is morally right or wrong (Ajzen, 1991; Sparks, 1994). Moral norms are "personal feelings of … responsibility to perform, or refuse to perform a certain behavior" (Ajzen, 1991). Moral norms are expectations for certain behaviors that have evolved through socialization (Manstead, 1999). Moral norms embody an individual's moral convictions (Talwar et al., 2022). The presence of moral norms should significantly impact the execution of acts that possess a moral or ethical aspect. Beck and Ajzen (1991) included a measure of moral norms in their analysis of dishonest actions and found that it significantly increased the amount of variance in intention accounted for (3 to 6%) and significantly contributed to the prediction of each intention. In this study, we used the definition of moral norms from Stancu et al. (2016), which are governing principles that aid individuals in making judgments in various situations, including food waste.

As expounded by Bandura et al. (1999), social cognitive theory elucidates the intricate interplay between an individual's self-efficacy and behavioral intentions. This theoretical framework places simultaneous emphasis on both the social and cognitive dimensions of human behavior. Within the social cognitive theory, the social component acknowledges the profound influence of social origins on human thought and actions, encapsulating what individuals acquire through their societal interactions. In contrast, the cognitive component recognizes the pivotal role of cognitive processes in shaping human motivation, attitudes, and conduct (Stajkovic & Luthans, 1998). In essence, Bandura (2012) posits that social cognitive theory perceives an individual's actions as a consequence of the dynamic interplay among intrapersonal factors, their activities, and the external forces exerted upon them. Individual behavior emerges as a product of the amalgamation of self-efficacy beliefs and other personal and contextual factors, given that self-efficacy encapsulates one's perceptions of one's capabilities.

The social cognitive theory provides a comprehensive account of the psychological phenomenon of self-efficacy. It delineates that individuals undertake a process of self-examination and integration of their perceived skills before making judgments and investing effort in a task. Self-efficacy significantly influences an individual's initial coping strategies, exerted efforts, and persistence (Stajkovic & Luthans, 1998). Furthermore, individuals tend to allocate greater effort and commitment to tasks in which they possess competence and confidence (Bandura et al., 1999). Consequently, self-efficacy emerges as a pivotal predictor of goal-setting behaviors and profoundly shapes individuals' perceptions of environmental challenges and opportunities (Pihie & Bagheri, 2013). Ethical self-efficacy shapes individuals' ethical intentions (Pan & Sparks, 2012). Wang et al. (2013) delved into the connection between customers' ethical self-efficacy and their intentions regarding online purchases, revealing that individuals with high ethical self-efficacy are inclined to exhibit disciplined behavior aligned with moral norms when confronted with ethics-related consumption situations, irrespective of the moral intensity of the context. In the context of dining consumption, reducing food waste can be construed as an ethical consumer behavior within restaurants. Ding (2022) precisely defined customers' restaurant food waste reduction intentions to minimize food waste from all food items ordered for consumption in restaurant

settings. If customers believe in their capacity to effectively reduce food waste, they are predisposed to behave ethically when dining out.

Based on the previous literature, we proposed a conceptual framework, as shown in Figure 1.

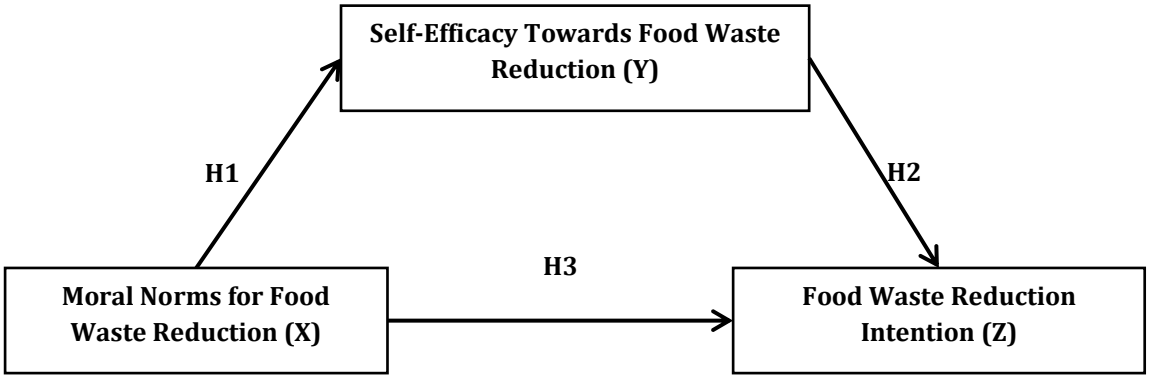

Figure 1. Conceptual Framework
Source: Authors' work, 2023

METHODS

The data from respondents is acquired by distributing online questionnaires on social media platforms such as Facebook and Instagram, as well as via email. The questionnaire consists of statements related to moral norms for food waste reduction, self-efficacy towards food waste reduction, and food waste reduction intention. The moral norms for food waste reduction were measured with four indicators (MN1, MN2, MN3, MN4) by Ding (2022). Self-efficacy towards food waste reduction is measured using six indicators (SE1, SE2, SE3, SE4, SE5, SE6) from Aschemann-Witzel et al. (2020), four indicators (SE7, SE8, SE9, SE10) from Kim et al. (2022), and lastly two indicators (SE11, SE12) from Ding and Jiang (2023). Meanwhile, food waste reduction intention was measured using four indicators (FR1, FR2, FR3, FR4) from Ding (2022). Each indicator used can be seen in Table 3.

All indicators used were measured using a 6-point Likert scale. Point 1 means strongly disagree, while point 6 means strongly agree. There are also several questions related to the demographics of the respondents, including sex, age, education, domicile, occupation, and income. The sample used in this study consisted of respondents aged 17 years or older who were able to make their own decisions and purchase their own food. This sample was collected from various regions in Indonesia with diverse backgrounds.

Furthermore, we used the structural equation model-partial least squares (SEM–PLS) to evaluate the model and test the research hypotheses. Moral norms for food waste reduction will be the independent variable for this study, self-efficacy toward food waste reduction will be the intervening variable, and food waste reduction intention will be the dependent variable. The conceptual framework used in this study is illustrated in Figure 1.

RESULT AND DISCUSSION

This study collected 157 respondents, consisting of 91 women (57.96%) and 66 men (42.04%). The majority of respondents came from groups aged 22 - 26 years (32.48%) and 27 - 31 years (28.66%) and other groups of age categories (38.68%). Meanwhile, respondents came from East Java (25.48%), DKI Jakarta (24.20%), West Java (17.20%), Central Java (11.46%), Banten (8.28%), and other provinces in Indonesia (13.38%). From 157 respondents, the majority of respondents have a monthly income within the range of IDR 2.5 million up to IDR 3.5 million (17.83%), more than IDR 4.5 million up to IDR 5.5 million (15.92%), less than IDR 2.5 million (13.38%), more than IDR 3.5 million up to IDR 4.5 million (12.74%), more than IDR 6.5 million up to IDR 7.5 million (12.10%), and the rest categories of monthly income (28.03%). For further information about respondents' profiles, see Table 1.

Table 1. Respondents' Profile

Categories	Subcategories	N	%
Gender	Female	91	57.96
	Male	66	42.04
	Total	**157**	**100.00**
Group of Age	17 - 21	10	6.37
	22 - 26	51	32.48
	27 - 31	45	28.66
	32 - 36	26	16.56
	37 - 41	12	7.64
	42 - 46	8	5.10
	47 - 51	3	1.91
	52 - 56	2	1.27
	Total	**157**	**100.00**
Monthly Income	< IDR 2,5 million	21	13.38
	> IDR 2,5 million up to IDR 3,5 million	28	17.83
	> IDR 3,5 million up to IDR 4,5 million	20	12.74
	> IDR 4,5 million up to IDR 5,5 million	25	15.92
	> IDR 5,5 million up to IDR 6,5 million	13	8.28
	> IDR 6,5 million up to IDR 7,5 million	19	12.10
	> IDR 7,5 million up to IDR 8,5 million	5	3.18
	> IDR 8,5 million up to IDR 9,5 million	4	2.55
	> IDR 9,5 million up to IDR 10,5 million	12	7.64
	> IDR 10,5 million	10	6.37
	Total	**157**	**100.00**

Source: Data processed, 2023

Table 2. Respondents' Profile (cont'd)

Categories	Subcategories	N	%
Highest Education Level	Primary School	3	1.91
	Junior High School	2	1.27
	Senior High School	73	46.50
	Diploma Degree	15	9.55
	Bachelor Degree	59	37.58
	Master Degree	5	3.18
	Total	**157**	**100.00**
Province of Residence	Central Kalimantan	1	0.64
	East Kalimantan	1	0.64
	North Kalimantan	1	0.64
	North Maluku	1	0.64
	West Nusa Tenggara	1	0.64
	East Nusa Tenggara	2	1.27
	Riau	2	1.27
	South Sulawesi	3	1.91
	Southeast Sulawesi	1	0.64
	Yogyakarta	1	0.64
	Total	**157**	**100.00**

Source: Data processed, 2023

Table 3 indicates each indicator's mean, standard deviation, and factor loading, as well as Cronbach's alpha, composite reliability, and average variance extracted (AVE) from each variable. As we can see from Table 3, the mean value from respondents is generally relatively high, as seen in moral norms for food waste reduction (5.526), self-efficacy towards food waste reduction (5.239), and also food waste reduction intention (5.518). From these results, it can be concluded that Indonesian respondents have high moral norms and self-efficacy for food waste reduction, and have a high intention to reduce food waste too. The highest mean is from MN3 (5.669), whereas the smallest is from indicator SE7 (5.064).

This study used partial least square structural equation modeling (PLS-SEM). The data was analyzed using SmartPLS version 4.1.0.2. For the first run, the outer loading result of SE4 (0.614) is lower than 0.70. According to Hair et al. (2021), if certain condition is met (it increases the internal consistency reliability or convergent validity), then it is possible to remove outer loading between 0.40 and 0.70. For the second run, after removing SE4, the internal consistency reliability or convergent validity have increased. The result from the second run shows that all outer loading from each indicator is above 0.70. For internal consistency reliability in exploratory research, Cronbach's alpha should be higher than 0.60 (Hair et al., 2021). In this study, all variables have Cronbach's alpha results above 0.60. Meanwhile, AVE was used for convergent validity, which must be higher than 0,50 (Hair et al., 2021). The AVE result from three variables is higher than 0.50. This study used heterotrait–monotrait ratio (HTMT) for discriminant validity. The HTMT must be lower than 0.90 (Hair et al., 2021); from Table 4, all HTMT values are lower than 0.90. It can be concluded that the model measurement of this study has been proven valid and reliable.

Table 3. List of Indicators, Variables Used

Variables and Indicators	Means	SD	OL
Moral Norms for Food Waste Reduction (CA= 0.817; CR= 0.821; AVE= 0.647)			
MN1. I regret leaving leftover food, considering the plight of poor people.	5.529	0.841	0.808
MN2. Having leftover food makes me feel guilty.	5.503	0.762	0.854
MN3. I have been taught to consume all the food I have taken.	5.669	0.612	0.813
MN4. Discarding food goes against my morals.	5.401	1.021	0.738
Self-Efficacy Towards Food Waste Reduction (CA= 0.945; CR= 0.946; AVE= 0.646)			
SE1. Regardless of the dish I intend to cook, I am typically efficient in its preparation, ensuring it is prepared well and in the appropriate amount.	5.344	0.819	0.741
SE2. I am confident in efficiently determining which food and ingredients to purchase and when to utilize it.	5.344	0.819	0.786
SE3. I am keenly aware of the foods or ingredients that I have or lack in my household.	5.299	0.863	0.798
SE4. I possess the ability to know whether a food is still edible or not.*	5.554	0.642	-
SE5. I am confident in generating ideas for cooking with my available ingredients.	5.127	1.033	0.833
SE6. I know how to store my purchased foods or ingredients appropriately.	5.140	0.993	0.770
SE7. There are straightforward measures I can take to mitigate the adverse effects of food waste.	5.064	1.051	0.814
SE8. I can modify my regular habits to mitigate the issue stemming from food waste.	5.178	0.927	0.823
SE9. My personal efforts will contribute to resolving the issue stemming from food waste.	5.076	0.921	0.845
SE10. Modifying my everyday habits will aid in mitigating the adverse effects of food waste.	5.401	0.764	0.762
SE11. I can proactively take measures to mitigate food waste in my daily routines.	5.17	0.897	0.838
SE12. I have solutions when I have to deal with food waste.	5.166	0.950	0.821
Food Waste Reduction Intention (CA= 0.821; CR= 0.829; AVE= 0.650)			
FR1. I will try to consume all the food I order at the restaurant.	5.548	0.681	0.779
FR2. I will try to consume all the food cooked or prepared at home.	5.439	0.743	0.833
FR3. I plan to refrain from wasting food at home or in restaurants.	5.535	0.753	0.812
FR4. I will endeavor to minimize the amount of food I leave uneaten.	5.548	0.672	0.801

Notes: *Item is removed during validation process CA: Cronbach's alpha; CR: composite reliability; AVE: average variance extracted; SD: standard deviation; OL: outer loading.

Source: Data processed, 2023

Table 4. Heterotrait–Monotrait Ratio (HTMT) Results

	Food Waste Reduction Intention	Moral Norm	Self-Efficacy Towards Food Waste Reduction
Food Waste Reduction Intention			
Moral Norm	0.744		
Self-Efficacy Towards Food Waste Reduction	0.709	0.827	

Source: Data processed, 2023

The results from the evaluation of the structural model are presented in Table 4; all the hypotheses (H1, H2, H3) are supported. Moral norms for food waste reduction positively and significantly affect self-efficacy towards food waste reduction (β = 0.730; t= 12.354; p= 0.022). Self-efficacy towards food waste reduction significantly and positively affects food waste reduction intention (β = 0.402; t= 3.132; p= 0.000). Moral norms for food waste reduction positively and significantly affect food waste reduction intention (β = 0.325, t= 2.287, p= 0.002).

Table 5. Results of The Structural Model Assessment

Hypothesis	β values	T statistics	p values	Result
H1. Moral Norms for Food Waste Reduction → Self-Efficacy Towards Food Waste Reduction	0.730	12.354	0.022	Supported
H2. Self-Efficacy Towards Food Waste Reduction → Food Waste Reduction Intention	0.402	3.132	0.000	Supported
H3. Moral Norms for Food Waste Reduction → Food Waste Reduction Intention	0.325	2.287	0.002	Supported

Source: Data processed, 2023

This study found that moral norms for food waste reduction have a positive and significant influence on self-efficacy towards food waste reduction (H1). This result aligns with the findings from studies by Ding (2022) and Ding and Jiang (2023), which articulate that self-efficacy acts as a mediator between ethical judgment and food waste reduction intentions, indicating that moral assessments enhance perceptions of individual capability in reducing food waste. This interaction suggests that when individuals recognize their moral duty towards sustainability, their self-efficacy increases, allowing them to feel more empowered to engage in effective food waste management.

Furthermore, this study found that self-efficacy towards food waste reduction has a positive and significant influence on food waste reduction intention (H2). This result aligns with Ding and Jiang (2023), who highlight the positive relationship between self-efficacy and food waste reduction intentions, asserting that enhancing customers' self-efficacy can lead to increased engagement in food waste reduction practices within the hospitality sector. Their findings suggest that consumers who believe in their abilities to reduce food waste are more likely to express intentions to do so, underscoring self-efficacy as a critical psychological factor in behavioral decision-making processes related to food waste. Further supporting this result, Blešić et al. (2021) demonstrate that intentions to reduce food waste directly correlate with self-efficacy, emphasizing that the perception of personal capability to change behaviors significantly impacts the actual food waste behaviors reported by individuals.

Lastly, moral norms for food waste reduction have a positive and significant influence on food waste reduction intention (H3). This result is supported by a previous study by Wang et al. (2022), which affirms that an enhanced sense of personal responsibility triggers moral norms that can lead to proactive food waste reduction actions. They reveal that awareness of the negative consequences of food waste cultivates a personal norm that motivates individuals to take action against wastage (Wang et al., 2022). This result is echoed in the study by Huang and Tseng (2020), which establishes a causal framework linking social norms, attitudes, and moral considerations to intentions and subsequent behaviors in food waste management.

CONCLUSIONS

The results of this study indicate that moral norms for food waste reduction have a positive and significant effect on self-efficacy toward food waste reduction. In addition, self-efficacy toward food waste reduction also has a positive and significant effect on food waste reduction intention. Finally, moral norms for food waste reduction also positively and significantly affect food waste reduction intention. The limitation of this study is the number of samples, which is only 157 respondents; future research can increase the number of respondents. In addition, it can also be a consideration for further research to consider gender and income as moderating variables that affect the intention to reduce food waste. Moreover, it is crucial to recognize that consumer behavior is also significantly shaped by contextual and structural factors in the food service industry, which may not have been fully explored in this study. An overarching consumerist culture can impact food waste behaviors considerably, and the complexity of these interactions necessitates a broader investigation beyond individual attitudes. To address these limitations, future research should employ a mixed-methods approach to gain both qualitative and quantitative insights into consumer behaviors. Incorporating in-depth interviews or focus groups could provide richer contextual data that complements the quantitative findings.

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