Consumer intentions to reduce food waste in all-you-can-eat restaurants based on personal norm activation

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Research article

Consumer intentions to reduce food waste in *all-you-can-eat* restaurants based on personal norm activation

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ABSTRACT

Norm activation theory (NAT) is a theoretical foundation often used by academics to explain behavioral intention in the context of pro-environmental consumer behavior. This research aimed to analyze the essential role of NAT in ascertaining consumer intentions to reduce food waste based on social marketing. The unit of analysis was an individual, namely consumers who have visited an "all-you-can-eat" restaurant in the last month during the research time and intend to visit again in the future. Primary data was collected using a questionnaire instrument which was created and distributed online. Furthermore, the Likert scaling technique with five answer options was used to measure each item of the latent variable measurement. This research used purposive sampling with a size of 500 respondents, and the validity of the measurement was tested using confirmatory factor analysis. The covariance-based structural equation modeling (SEM) technique was used to test the hypotheses. The results showed that personal norm as the core of NAT can be active when consumers feel they are responsible for the negative impacts of food waste. Active personal norm has a significant effect on behavioral intentions and the formation of consumer intentions to reduce food waste. Contextually, the implementation of NAT to reduce food waste with a focus on the social marketing approach is the essential originality of this research. Further research will be more comprehensive if it involves actual behavioral factors as a translation of intentions.

1. Introduction

The issue of climate change demands a transformation in individual behavior to be more concerned with sustainability in the future at all levels [1]. Climate is always dynamic due to the interactions between its components. Human activity is one of the essential factors, including land use, fossil fuels [2], and the presence of food waste [3]. In landfills, food waste produces enormous amounts of methane [4], and contributes about 6% to global greenhouse gas emissions [5].

Emissions from food waste also have at least three times the impact of those from global aviation [6]. About 1.3 gigatonnes of edible food waste can release 3.3 gigatons of carbon dioxide (CO_2) equivalent, which signifies that every 1 kg of food waste emits more than 2.5 kg of CO_2. When food ends up in a landfill, methane is produced, which is 25 times more potent than CO_2 [6].

Indonesia is one of the countries that contributes significantly to food waste and food loss in the world. This country generates food waste of up to 300 kg per person annually from a total of 1.3 billion tons of food waste in the world. Based on the National Waste

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Management Information System (SIPSN) in 2021, of all types of waste generated in Indonesia, food waste reaches 27.8% [7]. In contrast, this country ranked 73rd out of 116 countries with moderate hunger status (score 18.0) in 2021, according to the Global Hunger Index [8].

Referring to The Food Waste Reduction Alliance from BSR [9] the restaurant sector contributed 37% of existing food waste generation. Food waste produced by restaurants is a significant problem that affects society. This is because the restaurant provides a wide variety of services including fine dining, casual fast service, take away, buffet, smorgasbords, and all-you-can-eat. Each activity can result in a different amount of leftover food, and the main factor that causes food waste is consumer behavior [10]. For example, the food ordered exceeds the ability to eat [11], and food is left on the plate [12]. There is a need for an intervention aimed at reducing the majority of edible food waste in the food service sector [13].

This phenomenon poses a concern for academics in social marketing and other fields of science. Social marketing is a process of applying marketing principles and techniques to create, communicate, and deliver value. Therefore, the behavior of the target group or community to obtain benefits in form of health, safety, and the environment is influenced [14]. Social marketing is also expected to enable people to make positive behavioral changes because they care about the environment [15].

Therefore, it is necessary to have marketing activities that aim not only to gain financial benefits but also to expect changes in attitudes and behavior from consumers [1,14]. The implementation of social marketing in the context of handling food waste problems is essential. Social marketing has an important role to improve the company's image in various operational and functional sectors. Accordingly, the company's active participation will support the formation of a positive reputation in the minds of consumers. Increasing the positive reputation will also have a significant impact on achieving better financial performance [].

Norm activation theory (NAT) is one of the theoretical foundations often used to explain behavioral intention in the context of pro-environmental consumer behavior [16]. De Groot & Steg [17] stated that the application of norm activation has entered the context of pro-environmental behavior, with empirical support increasing. Referring to the NAT, the personal norm is a core factor that shapes an individual's intention to behave altruistically, providing benefits to others [18]. Food waste can be prevented directly at the consumer level through activation of the individual personal norm that stimulates the intentions and behavior to reduce food waste.

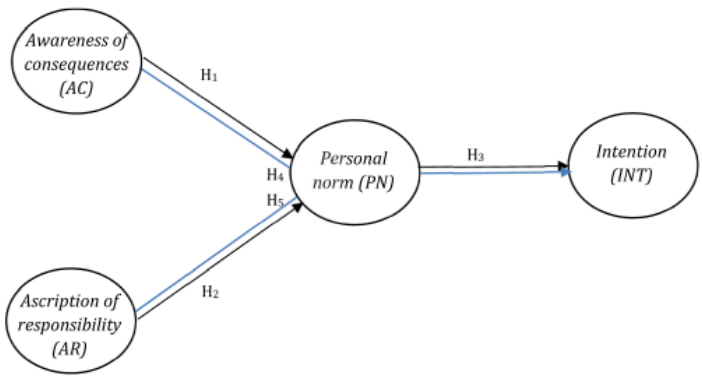
Previous research used the NAT basis to ascertain consumer intentions to reduce food waste when eating in restaurants [19,20]. However, some of the research has not focused on the "all-you-can-eat" type of food menu from restaurants. In this menu, consumers eat as much food as is available, provided it is eaten in the restaurant or not taken home. Consequently, this has the potential to cause food waste because consumers can order food in excess of the required portion. This raises an important research gap that can be filled and completed through further research in the same context.

This paper consists of several sections of discussion which are arranged progressively. The first part explains the rationalization of the importance of conducting research based on the gaps identified. In the second, a literature review is described on the definition of each research construct and the rationalization of the relationship between constructs as the basis for determining the research hypotheses. The third part explains the method used, starting from the sampling technique, to the data analysis used to test the hypotheses. In the fourth section, a discussion of each result that has been successfully revealed from the empirical data analysis is described. Finally, in the last section, the conclusions of the research results are briefly presented.

2. Literature review and hypothesis development

2.1. Norm activation theory

Norm activation theory (NAT) by Schwartz [18] is a theoretical model successfully implemented to predict a person's behavioral intention regarding pro-social altruistic behavior. Therefore, based on NAT, a personal morality intensity determined their pro-social



Where: the black arrow represents the direct effect hypothesis, and the blue arrow represents the indirect effect hypothesis

Fig. 1. Research model.

behavior level. Implementing the NAT in a pro-environmental behavior context is relevant. Pro-environmental behavior is often classified as a part of pro-social behavior because this behavior involves positive consequences from one person to others [16,17,21].

Personal norm is a core factor in NAT, formed by the presence of a person's awareness of consequences caused by not performing the particular behavior and ascribing themselves to be responsible for its negative consequences that possibly happen. Pro-environmental behavior is believed as one specific case of pro-social behavior. Because this behavior implicitly describes a person's behavior in delivering benefit to others, even though there is no direct benefit achieved by performing the behavior [3,16]. Therefore, from the NAT approach, it can substantially adopt an equation model from Setiawan et al. [16] regarding the implementation of NAT in a pro-environmental context. Specifically, in consumer behavior to reduce food waste context based on NAT, the behavior is a shared function of consumers' intentions and personal norms. An active personal norm itself is a shared function of awareness of consequences and ascription of responsibility (see Fig. 1).

2.1.1. *Awareness of consequences and personal norm*

Awareness of consequences is a condition of whether an individual understands the negative consequences when he does not take pro-social or pro-environmental actions [17]. In the context of pro-environmental behavior, awareness of consequences is a personal value of the environment that enables an individual to be aware of the consequences of his behavior on the environment [22]. Additionally, it is defined as a level of belief that an action that he or she does or does not take, can contribute to the worsening of a problem [16,19]. When an individual realizes that certain behavior will have a positive impact on others, it will be accompanied by a personal belief in a real contribution to solving a problem. This aspect involves whether an individual understands the negative consequences when they act in a non-pro-social manner. It is one of the main factors to reduce food waste [23].

The awareness of consequences is an important element in forming a personal norm, namely a feeling of a moral obligation to actively participate in food waste reduction [19,20]. Liobikiene & Juknys [24] focused on the determinants of environmentally friendly behavior and observed that personal norm is significantly influenced by individual awareness of the negative consequences of food waste. Similarly, Zhang et al. [25], and J. Wang et al. [19], discovered that individual awareness of consequences and responsibility is positively related to the personal norm. In the context of food waste, when consumers consider the negative consequences such as serious environmental and social problems, they will find ideas to reduce these negative consequences [19]. Therefore, the first hypothesis is as follows:

H1. The awareness of consequences has a significant effect on consumers' personal norm

2.1.2. *Ascription of responsibility and personal norm*

Ascription of responsibility is a feeling of responsibility for negative consequences if an individual does not act pro-socially or pro-environmentally [17]. This personal value affects the development of beliefs related to the environment. Furthermore, this belief will cause the individual to accept a significant level of responsibility towards the environment. When individuals are aware of the consequences of food waste and also feel responsible for the negative consequences that occur, they tend to form a personal norm [17]. Therefore, when people believe that responsibility comes from themselves, they tend to engage in waste reduction behavior [3,19].

Reducing the generation of food waste is a shared responsibility of society, and every individual is responsible for the negative consequences of food waste. This sense of responsibility promotes the active personal norm of individuals to care about reducing food waste. There is adequate empirical evidence that the ascription of responsibility has a positive and significant effect on the individual personal norm [19,26,27]. Therefore, the second hypothesis is as follows:

H2. The ascription of responsibility has a significant effect on consumers' personal norm

2.2. *Personal norm and consumer intention to reduce food waste*

Personal norm is defined as the moral commitment to perform a certain behavior [18]. Specifically, the personal norm is an individual's belief that behaving in a certain way is right or wrong behavior [28]. It is an individual feeling of moral obligation to perform or even refrain from a certain action [16,29,30]. This aspect is comprehensively formed from the individual's awareness of the consequences and the imposition of a sense of responsibility which will result in stronger intentions to perform a behavior [16,31]. Therefore, the personal norm is the main predictor which positively affects behavior intention [16,19,20,30].

Wasting food and disobeying the norm could make consumers feel ashamed or guilty, which would be considered a type of self-sanction. They will be more inclined to reduce food waste by fighting positive emotions and avoiding negative emotions. Furthermore, there is adequate empirical data that supports the effect of a personal norm on the individual intention to reduce food waste [20,26]. Personal norm, which is formed from an awareness of consequences and the ascription of responsibility, is a core factor in forming an intention [18,32]. Therefore, this has an important role as a mediator in the relationship between awareness of consequences and the ascription of responsibility, with consumers' intention to reduce food waste. Referring to the rationalization, the third, fourth, and fifth hypotheses are as follows:

H3. Personal norm has a significant effect on consumers' intention to reduce food waste.

H4. Personal norm mediates the effect of awareness of consequences on consumers' intention to reduce food waste.

H5. Personal norm mediates the effect of the ascription of responsibility on consumers' intention to reduce food waste.

3. Methods

The unit of analysis was the individual, with a sample size of 500 respondents taken through a purposive sampling technique. Primary data was collected using a questionnaire instrument which was created and distributed online. The flow of the online questionnaire started with a brief introduction regarding the study. After reading it, respondents who agree to voluntary participation in this study can consent by clicking the "next" button on the screen. Those can proceed with filling all questions provided, consisting of the main questions regarding the research variables and the questions regarding the respondents' profiles. Respondents who disagree can close the online questionnaire by clicking the "close" button.

Only respondents that fulfilled the criteria participated in filling out the complete survey questionnaire. The criteria included, first, respondents that have visited and consumed food available in restaurants in the past month. Second, the type of food menu ordered and consumed is "*all-you-can-eat*". Third, respondents that intend to visit restaurants with an "*all-you-can-eat*" menu in the future. Fourth, respondents can independently decide where to eat (restaurants) with the type of food menu "*all-you-can-eat*". This study pays attention to some specific ethical considerations in the questionnaire to fulfill the ethical approval. First, this study ensures that all participants agree to take a survey with a full understanding of what the questionnaire is for. Second, this study ensures there is no need to provide respondents' names in the questionnaire (anonymity). Third, all participants can fill in the questionnaire without pressure.

Each measurement item in Table 1 uses a five-point Likert scale, from 1 = strongly disagree to 5 strongly agree. Primary data was collected using a questionnaire created and distributed online through various social media platforms. Respondents who fulfilled the criteria voluntarily participated in filling out research questionnaires. The data analysis technique used structural equation modeling (SEM) analysis with three important stages. First, an analysis of the measurement model was conducted through confirmatory factor analysis (CFA) to test the validity and reliability of the research construct. Second, the goodness of fit test was performed to ensure that the available empirical data matched the established research model. Third, structural equation modeling was completed to test the hypothesized relationship. Furthermore, data analysis was carried out using LISREL 8.8 computer program.

4. Results

4.1. Respondents profile

Respondents are more dominated by females (69.4%) than males (30.6%) with the highest age range of 21–30 years (52.6%). This reflects that the respondents were dominated by consumers in generations Y and Z, one of the age categories with a significant proportion of the Indonesian population. Based on the educational level, most of them were Diploma and Bachelor (47.2%), followed by high school graduates (45.2%), and finally Masters and Doctoral as many as 7.6%. Most of the respondents work as students (35.8%), and also as private employees (29.6%). The complete results regarding the respondent profile are shown in Table 2.

Table 1
Measurement.

Variable	Item	Source
Awareness of consequences (AC)	Reducing food waste will benefit everyone (AC1) Reducing food waste will help improve everyone's quality of life (AC2) Reducing food waste will create a better environment for me and my family (AC3) Damage to the environment due to food waste has a direct impact on my health (AC4) Food waste generated in my country will have a negative impact on people in other countries (AC5)	Chun T'ing et al. [26]
Ascription of responsibility (AR)	Everyone is responsible for reducing food waste (AR1) All communities have a responsibility to reduce the amount of food waste (AR2) Willingness to reduce food waste even though others do not do the same (AR3) Feeling responsible for the negative consequences of the resulting food waste (AR4) Feeling shared responsibility for the problem of environmental pollution and ecological damage caused by food waste (AR5)	Chun T'ing et al. [26] and J. Wang et al. [19]
Personal norm (PN)	Feeling guilty when throwing food away because some other people can't get food (PN1) I will be a better individual if I don't waste food or become an individual who doesn't litter (PN2) I am disturbed by the amount of waste food because food processing requires a lot of resources to grow, process, package, and transport (PN3) I feel obligated to reduce food waste, hence it becomes a consideration when I select food or groceries (PN4) If I buy food, I feel morally obligated not to waste it (PN5) I feel morally obligated to reduce food waste regardless of what other people think (PN6)	Chun T'ing et al. [26]
Intention to reduce food waste (INT)	I want to finish all the food I ordered in the restaurant (INT1) I will order as much food as I can eat (INT2) When I eat at a restaurant, I intend to finish all the food on my plate (INT3) I intend to produce as few leftovers as possible (INT4) I intend not to throw away the food I ordered at the restaurant (INT5)	Coşkun & Yetkin Özbük [4]

4.2. Confirmatory factor analysis (CFA)

Referring to the CFA test (Table 3), all measurement items in each latent variable had a standardized loading factor (SLF) value > 0.5. Therefore, all measurement items fulfilled the elements of good construct validity. The construct reliability (CR) and average variance extracted (AVE) coefficients on each latent variable met the specified minimum limits, namely CR 0.6 and AVE 0.5. In conclusion, all research variables were declared to have good construct reliability and can be used for the next testing stage.

4.3. Goodness of fit

The next stage is the goodness of fit (GoF) test to assess the degree of conformity between the model and the available empirical data. Referring to Table 4, the research model fully met the goodness of fit index parameter elements. Therefore, the availability of empirical data follows the research model formed.

Based on the hypothesis test (Table 5), the unavailability of adequate empirical data support affects awareness of consequences on personal norm (b = −0.12; S.E. = 0.095; t-value = −1.27). Therefore, the consumer personal norm has not been successfully activated through the awareness of consequences approach. Consumer personal norm is more capable of being activated through ascription of consumer responsibility (b = 0.93; S.E. = 0.11; t-value = 8.71). The personal norm formed from the ascription of consumer responsibility is proven to sufficiently foster consumer intentions to reduce food waste (b = 0.57; S.E. = 0.051; t-value = 11.17).

After testing the hypothesis of the direct effect between the variables from each path, then the mediation test on the indirect effect was carried out. Based on the results, PN is more supported by empirical data, mediating the effect of the ascription of responsibility on consumer intentions to reduce food waste (b = 0.53; S.E. = 0.07; t-value = 7.43). Accordingly, the ascription of responsibility has an indirect effect on consumer intentions to reduce food waste through the personal norm.

As presented in Table 6, awareness of consequences and ascription of responsibility explains the diversity of data in the personal norm by 68%. Compared to awareness of consequences, the ascription of responsibility has a more dominant role in explaining the diversity of data from the personal norm. The hypothesis test indicates that adequate empirical data support the relationship between the ascription of responsibility and the personal norm. Meanwhile, the relationship between awareness of consequences and the personal norm does not yet have adequate empirical support. In the end, an active personal norm will be able to explain the diversity of data from consumer intentions to reduce food waste by 57%.

5. Discussion

This research examined the effect of awareness of the consequences of food waste and the ascription of responsibility for the environment on the personal norm to enhance consumers' intention to reduce food waste. From the perspective of social marketing, a given offer process aims to change the behavior of the target individual, into behavior that is beneficial to society. Furthermore, the personal norm was shown to have a significant effect. Consumers with high personal norm have a sense of moral obligation to care for the environment. This concern is manifested in a strong intention to reduce food waste, with a serious intention to not leave food behind when eating at restaurants with an "all-you-can-eat" menu.

Table 2
Respondents profile.

Category	N (500)	%
Gender		
Male	153	30.6
Female	347	69.4
Age (years old)		
18–20	94	18.8
21–30	263	52.6
31–40	86	17.2
41–50	33	6.6
> 50	24	4.8
Formal education		
High school	226	45.2
Undergraduate (Diploma III and Bachelor)	236	47.2
Graduate (Master and Doctor)	38	7.6
Profession		
Entrepreneur	33	6.6
Private employee	148	29.6
Civil Servants/Indonesian Army and Police	9	1.8
Regionally/State Owned Enterprises employees	18	3.6
Teacher/Lecturer	37	7.4
Medical personnel	8	1.6
Student	179	35.8
Freelance Daily Worker	9	1.8
Housewife	36	7.2
Etc.	23	4.6

Table 3
Results of the confirmatory factor analysis.

Latent variable	Item	*Standardized loading factor (SLF)*	Error measurement	Construct reliability (CR)	Average variance extracted (AVE)
Awareness of consequences	AC1	0.90	0.19	0.94	0.75
	AC2	0.90	0.19		
	AC3	0.89	0.21		
	AC4	0.84	0.29		
	AC5	0.81	0.34		
Ascription of responsibility	AR1	0.88	0.23	0.91	0.68
	AR2	0.87	0.24		
	AR3	0.83	0.31		
	AR4	0.79	0.38		
		0.75	0.44		
Personal Norm	PN1	0.75	0.44	0.89	0.62
	PN2	0.75	0.44		
	PN3	0.80	0.36		
	PN4	0.75	0.44		
	PN5	0.88	0.23		
	PN6	0.88	0.23		
Intention	INT1	0.88	0.23	0.88	0.60
	INT2	0.70	0.51		
	INT3	0.88	0.21		
	INT4	0.57	0.68		
	INT5	0.79	0.38		

Table 4
Goodness-of-fit statistics.

	Fit size	Parameter	Coefficient
1	square (X^2)	P-value ≥0.05	0.00
2	Goodness of fit index (GFI)	GFI ≥0,90	0.90
3	dardized Root Mean Square Residual (SRMR)	R ≤0.1	
4	Root Mean Square Error of Approximation (RMSEA)	RMSEA ≤0.08	0.079
5	Root Mean Square Residual (RMR)	RMR ≤0.05	0.97
6	Non-Normed Fit Index (NNFI)	NNFI ≥0.90	0.97
7	Normed fit index (NFI)	NFI ≥0.90	0.98
8	Relative fit index (RFI)	RFI ≥0.90	0.97
9	Incremental fit index (IFI)	IFI ≥0.90	0.98
10	Comparative fit index (CFI)	CFI ≥0,90	0.98

Hypothesis testing.

Table 5
Hypothesis test results.

Path	Direct effect	Indirect effect	Total effect	Standard error	t-value	Conclusion
AC→ PN	−0.12	–		0.095	−1.27	Not supported
AR→PN	0.93	–		0.11	8.71	Supported
PN → IN	0.57	–		0.051	11.17	Supported
AC→ PN→IN	–	−0.07	0.17	0.05	−1.26	Not supported
AR→PN→IN	–	0.53	1.06	0.07	7.43	Supported

Table 6
Coefficient of determination.

No	Endogenous	R^2
1	PN	0.68
2	IN	0.57

The personal norm will be active when the consumers feel they are responsible for the bad effects that occur from the leftovers that are consumed and constitute food waste. Similarly, J. Wang et al. [19], and Chun T'ing et al. [26], observed that the ascription of responsibility has a significant effect in shaping personal norm. Consumers feel that the behavior of reducing food waste is everyone's responsibility, therefore, this is an important moral obligation to implement. Although other people may not do the same, as individuals, consumers still have a responsibility to finish the food they order in restaurants. Food waste will have a negative impact, and

creates a sense of responsibility from consumers. The availability of empirical data supports these statements. Therefore, the ascription of consumer responsibility has a significant effect in shaping consumer personal norms. Unfortunately, awareness of the negative consequences of not finishing food does not yet have adequate empirical data to support forming personal norm. In this context, consumers' personal norm can be activated more through the ascription of responsibility than through awareness of consequences.

Personal norm promotes consumers' intentions to reduce food waste. As observed by J. Wang et al. [19], and Chun T'ing et al. [26], personal norm has a significant effect on consumer behavior intentions. When going to a restaurant and ordering an "all-you-can-eat" menu, consumers desire to behave pro-environmentally. A reflection of this behavior is the desire to finish the food ordered, only take as much food as can be consumed, and try not to throw away the excess. These activities are an operational reflection of consumers' intentions to reduce food waste. This intention is actually formed from a feeling of moral obligation, through the formation of the personal norm in consumers. The "all-you-can-eat" menu is a selling system in restaurants, where consumers only pay once to enjoy all the available menus with a buffet concept. On the "all-you-can-eat" menu, all food can be eaten as much as desired in one payment. This has the potential to make consumers take food with portions more than capacity that can be accepted by the stomach, leading to food waste. Therefore, this research found that the presence of an active personal norm of the ascription of responsibility stimulus promotes consumer intentions to reduce food waste.

Personal norm is also proven to mediate the indirect effect of the ascription of responsibility on consumers' intentions to reduce food waste. Apart from being able to shape consumer intentions, personal norm also has an important mediating role. The ascription of responsibility is indirectly able to shape consumer intentions to reduce food waste through the formation of the personal norm. Unfortunately, the personal norm is not supported by adequate empirical data in mediating the indirect effect of awareness of consequences on intentions. This shows that the ascription of responsibility is an essential factor in shaping the personal norm, which ultimately has an essential mediating role.

Awareness of consequences failed to activate the personal norm of consumers. This result is contrary to previous studies conducted by Liobikiene & Juknys [24], J. Wang et al. [19], and Kim et al. [3]. This research focuses on the consumers' behavioral intention to reduce food waste, particularly when consumers eat out in an all-you-can-eat restaurant. Therefore, in this particular context, the personal norm of consumers will be more powerfully activated through consumers' ascription of responsibility than awareness of consequences. Previous studies did not specifically focus on all-you-can-eat restaurants. These substantial research context differences will likely cause different results from various researchers.

Otherwise, the ascription of responsibility succeeded in forming the personal norm of consumers, which is in line with previous studies. From the perspective of social marketing, consumers' intention to reduce food waste is one part of individual altruistic behavior that can be studied using a normative component. Consumers with the authority to finish or not finish the food they consume in restaurants can be an important starting point in efforts to reduce food waste. Furthermore, consumers with adequate personal norm will be moved to only take food with portions that are suitable for their capacity. This is driven by the feeling of being responsible for all the negative impacts of food waste. It is very important to make them aware of their responsibility in reducing the negative impacts of environmental pollution. When consumers are aware of the environmental damage caused by the food service industry, they are more likely to feel a shared responsibility for the negative consequences of their food waste. This enhances a moral obligation to reduce food waste. When consumers believe that they are capable of behaving in the manner necessary to reduce food waste, their personal norm will urge them more strongly to form food waste reduction intentions. Therefore, consumers will be motivated to engage in pro-environmental behavior when they develop high personal norm. The target of changing consumer behavior that benefits the community through the reduction of food waste can be achieved using a personal norm activation approach.

6. Conclusion

This research analyzed the essential role of norm activation theory (NAT) in explaining consumer intentions to reduce food waste based on social marketing. NAT acts as a strong theoretical framework in explaining the personal norm of restaurant consumers and their intentions to reduce food waste. The results showed that the personal norm becomes active when formed by the ascription of responsibility rather than by the awareness of consequences. This active personal norm has been proven to sufficiently shape consumer intentions to reduce food waste. These findings contribute to the existing literature, particularly social marketing literature, that emphasizes the exchange of offers of social ideas to form individual target behaviors that benefit society. To promote reducing food waste behavior, social marketers need to activate consumers' norms as a feeling of a moral obligation by focusing on the ascription of responsibility. Various negative impact caused by food waste is a joint responsibility. Therefore, when consumers ascribe to moral responsibility, it will stimulate their norm, effectively proven in forming consumers' intention to reduce food waste.

To establish pro-environmental community behavior, this research shows the essential role of the personal norm in shaping consumers' intentions to reduce food waste. Personal norm is not only able to form intentions directly but also has an important role in mediating the effect of the ascription of responsibility on intentions. These findings contribute to the existing literature, empirically strengthening the essential role of the personal norm in the NAT in stimulating consumers' intention to reduce food waste while eating in a restaurant. When a consumer is ascribed to have a responsibility to reduce food waste, it will successfully activate consumers' norms and then be followed by a robust intention to reduce food waste. Therefore, efforts to minimize food waste can be started with the activation of consumer personal norm, through the feeling of responsibility for the negative impacts of food waste. This will stimulate their intentions to behave more wisely in consuming food according to the maximum capacity.

The results of this research also raise several important managerial implications. Restaurant managers are expected to not only try to attract consumers to select their restaurant through an "all-you-can-eat" menu offer but also implement social marketing by

providing information that wasting food is not a pro-environmental behavior. To support the implementation of social marketing, restaurant managers need to build integrated communication regarding the consumers' moral obligation not to throw away food. This is a manifestation of the active personal norm of being responsible for various environmental problems due to food waste. Moreover, to increase consumers' intention to reduce food waste by using a personal norm approach, restaurants can help customers to take food according to portions that they can afford to spend.

This research used a personal norm activation approach to shape consumer behavioral intentions to reduce food waste. It is an important research limitation that explicitly comes up. This research only involves a single norm that acts as internal pressure on the consumer to behave. Involving a normative factor in predicting a consumer's behavioral intention in a pro-environmental context, it should be complete from the internal and external side of consumers' psychologies. Further research fills the gap that is still open and requires further investigation. In forming norm-based behavioral intentions, it is necessary to have a personal norm that comes from within the individual and a social norm such as social pressure. Additionally, further research can involve factors of the social norm or subjective norm alongside personal norm, in explaining consumer behavior intentions to reduce food waste.

Author contribution statement

Iriyadi, I. and Puspitasari, R.: Conceived and designed the experiments; Performed the experiments; Contributed reagents, materials, analysis tools or data

Setiawan, B.: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper

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Data availability statement

Data will be made available on request.

Declaration of interest's statement

The authors declare no competing interests.

Appendix A. Supplementary data

Supplementary data to this article can be found online at 10.1016/j.heliyon.2023.e13399.

References

[1] M.B. Akbar, L. Foote, A. Lawson, J. French, S. Deshpande, N.R. Lee, The social marketing paradox: challenges and opportunities for the discipline, Int. Rev. Pub. Nonprof. Market. 19 (2) (Jun. 2022) 367–389, https://doi.org/10.1007/s12208-021-00308-0.
[2] Knowledge Centre, "Mengenai Perubahan Iklim, Direktorat Jenderal Pengendalian Perubahan Iklim - Kementerian Lingkungan Hidup Dan Kehutanan, 2017. http://ditjenppi.menlhk.go.id/kcpi/index.php/info-iklim/perubahan-iklim. accessed Dec. 05, 2022.
[3] W. Kim, C. Che, C. Jeong, Food waste reduction from customers' plates: applying the norm activation model in south Korean context, Land 11 (1) (Jan. 2022) 109, https://doi.org/10.3390/land11010109.
[4] A. Coşkun, R.M. Yetkin Özbük, What influences consumer food waste behavior in restaurants? An application of the extended theory of planned behavior, Waste Manag. 117 (Nov. 2020) 170–178, https://doi.org/10.1016/j.wasman.2020.08.011.
[5] H. Ritchie, M. Roser, Environmental Impacts of Food Production," *Our World in Data*, 2021 accessed Dec. 01, 2022, https://ourworldindata.org/environmental-impacts-of-food.
[6] S. Brownlow, Food waste: digesting the impact on climate, Newfoodmag. 28 (2021) accessed Nov. 27, 2022), https://www.newfoodmagazine.com/article/153960/food-waste-climate/.
[7] Sistem Informasi Pengelolaan Sampah Nasional (SIPSN), Capaian Kinerja Pengelolaan Sampah," *Ministry Of Environment And Forestry Of the Republic of Indonesia*, 2021 accessed Nov. 27, 2022, https://sipsn.menlhk.go.id/sipsn/.
[8] Global Hunger Index, Indonesia, 2021 accessed Nov. 27, 2022, https://www.globalhungerindex.org/indonesia.html, https://www.globalhungerindex.org/indonesia.html.
[9] BSR, "Analysis of U.S., Food Waste Among Food Manufacturers, Retailers, and Restaurants, 2014.
[10] C. Martin-Rios, C. Demen-Meier, S. Gössling, C. Cornuz, Food waste management innovations in the foodservice industry, Waste Manag. 79 (Sep. 2018) 196–206, https://doi.org/10.1016/j.wasman.2018.07.033.
[11] E. Papargyropoulou, N. Wright, R. Lozano, J. Steinberger, R. Padfield, Z. Ujang, Conceptual framework for the study of food waste generation and prevention in the hospitality sector, Waste Manag. 49 (Mar. 2016) 326–336, https://doi.org/10.1016/j.wasman.2016.01.017.
[12] J. Bharucha, Tackling the challenges of reducing and managing food waste in Mumbai restaurants, Mar, Br. Food J. 120 (3) (2018) 639–649, https://doi.org/10.1108/BFJ-06-2017-0324.
[13] V. Filimonau, V.N. Nghiem, L. Wang, Food waste management in ethnic food restaurants, Jan, Int. J. Hospit. Manag. 92 (2021), 102731, https://doi.org/10.1016/j.ijhm.2020.102731.

[14] P. Kotler, N.R. Lee, Social Marketing: Influencing Behaviors for Good, fourth ed., Sage Publications, 2011.
[15] M. Wood, Marketing social marketing, Jul, J. Soc. Market. 2 (2) (2012) 94–102, https://doi.org/10.1108/20426761211243937.
[16] B. Setiawan, A.Z. Afiff, I. Heruwasto, Integrating the theory of planned behavior with norm activation in a pro-environmental context, Soc. Market. Q. 26 (3) (Sep. 2020) 244–258, https://doi.org/10.1177/1524500420949220.
[17] J.I.M. de Groot, L. Steg, Morality and prosocial behavior: the role of awareness, responsibility, and norms in the norm activation model, J. Soc. Psychol. 149 (4) (Aug. 2009) 425–449, https://doi.org/10.3200/SOCP.149.4.425-449.
[18] S.H. Schwartz, Normative Influences on Altruism, 1977, pp. 221–279, https://doi.org/10.1016/S0065-2601(08)60358-5.
[19] J. Wang, M. Li, S. Li, K. Chen, Understanding consumers' food waste reduction behavior—a study based on extended norm activation theory, Apr, Int. J. Environ. Res. Publ. Health 19 (7) (2022) 4187, https://doi.org/10.3390/ijerph19074187.
[20] C.-C. Teng, Y.-C. Wang, C.-J. Chuang, Food choice motives and dining-out leftover prevention behavior: integrated perspectives of planned behavior and norm activation, Oct, Int. J. Hospit. Manag. 107 (2022), 103309, https://doi.org/10.1016/j.ijhm.2022.103309.
[21] L. Steg, C. Vlek, Encouraging pro-environmental behaviour: an integrative review and research agenda, J. Environ. Psychol. (2009), https://doi.org/10.1016/j.jenvp.2008.10.004.
[22] N. Bronfman, P. Cisternas, E. López-Vázquez, C. Maza, J. Oyanedel, Understanding attitudes and pro-environmental behaviors in a Chilean community, Oct, Sustainability 7 (10) (2015) 14133–14152, https://doi.org/10.3390/su71014133.
[23] E. Aktas, et al., A consumer behavioural approach to food waste, Aug, J. Enterprise Inf. Manag. 31 (5) (2018) 658–673, https://doi.org/10.1108/JEIM-03-2018-0051.
[24] G. Liobikienė, R. Juknys, The role of values, environmental risk perception, awareness of consequences, and willingness to assume responsibility for environmentally-friendly behaviour: the Lithuanian case, J. Clean. Prod. 112 (2016) 3413–3422, Jan, https://doi.org/10.1016/j.jclepro.2015.10.049.
[25] L. Zhang, D. Li, C. Cao, S. Huang, The influence of greenwashing perception on green purchasing intentions: the mediating role of green word-of-mouth and moderating role of green concern, J. Clean. Prod. 187 (Jun. 2018) 740–750, https://doi.org/10.1016/j.jclepro.2018.03.201.
[26] L. Chun T'ing, et al., Intention to reduce food waste: a study among Malaysians, J. Air Waste Manage. Assoc. 71 (7) (Jul. 2021) 890–905, https://doi.org/10.1080/10962247.2021.1900001.
[27] S. Wang, J. Wang, S. Zhao, S. Yang, Information publicity and resident's waste separation behavior: an empirical study based on the norm activation model, Waste Manag. 87 (Mar. 2019) 33–42, https://doi.org/10.1016/j.wasman.2019.01.038.
[28] S. Bamberg, M. Hunecke, A. Blöbaum, Social context, personal norms and the use of public transportation: two field studies, J. Environ. Psychol. 27 (3) (Sep. 2007) 190–203, https://doi.org/10.1016/j.jenvp.2007.04.001.
[29] A.A. Stukas, E.G. Clary, Altruism and helping behavior, in: Encyclopedia of Human Behavior, Elsevier, 2012, pp. 100–107, https://doi.org/10.1016/B978-0-12-375000-6.00019-7.
[30] B. Setiawan, A.Z. Afiff, I. Heruwasto, The role of norms in predicting waste sorting behavior, Jul, J. Soc. Market. 11 (3) (2021) 224–239, https://doi.org/10.1108/JSOCM-05-2020-0088.
[31] L.E. Olsson, J. Huck, M. Friman, Intention for car use reduction: applying a stage-based model, Int. J. Environ. Res. Publ. Health 15 (2) (Jan. 2018) 216, https://doi.org/10.3390/ijerph15020216.
[32] D. Schwartz, G. Loewenstein, The chill of the moment: emotions and pro-environmental behavior, J. Publ. Pol. Market. (2017), https://doi.org/10.1509/jppm.16.132.

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