Food Waste Behavior of Young Fast-food Consumers in the Philippines

Safa D. Manala-O* and Patrick Adriel H. Aure
De La Salle University and Mindanao State University-Iligan Institute of Technology, Philippines
*safa.manala-o@g.msuiit.edu.ph

Abstract: The foodservice industry is considered to be one of the largest and most profitable sectors in the Philippine economy. Literature reveals that one of the pressing and urgent concerns of foodservice outlets is food waste. Food waste is defined as any food appropriate and intended for human consumption being discarded, whether or not it is kept beyond its expiry date or left to spoil. Economically speaking, it impacts the cost firms incur in disposing food waste and has serious environmental and social implications. This study investigates the out-of-home food waste behavior of young consumers within the context of the Philippine fast-food industry. Given the local, regional, and global presence of the industry, studying food waste behavior contributes to the call for sustainability. It is beneficial to fast-food management and industry by providing insights on food waste behavior of young consumers. Data from a sample of 145 college students were gathered and analyzed using relevant variables from the consumer food waste model and partial least squares structural equation modeling (PLS-SEM) algorithm. Analyses reveal that awareness and social norms have a significant influence on ordering fast-food as mediated by the consumer's motivation to avoid or reduce food waste. Mainly, the results suggest that management can shape the ordering behavior of young consumers by strengthening their motivation through individual consumer awareness campaigns and peer group behavior. None of the paths leading from attitude, awareness, and social norm to food consumption were significant. It can thus be concluded that, per the results of this study, management intervention at the point of consumption may no longer be useful in mitigating food waste. The final and critical point at which management may intervene to influence consumer behavior is the in-store ordering stage. We recommend that future studies explore additional constructs that improve the prediction power and fit of the model. Future research can expound on the social circle of the consumer and local values, beliefs, and practices that contribute to sustainable food consumption.

Keywords: consumers food waste model, fast-food, food waste behavior, young consumers

The foodservice industry is considered to be one of the largest and most profitable sectors in the Philippine economy. Dining out has become a common practice for Filipinos that caused a shift in resource consumption, from previously eating at home to eating in restaurants (Chakraborty, Sahakian, Rani, Shenoy, & Erkman, 2016). In 2010, the fast-food sector registered a 9% growth, fueled by Filipinos' love for socializing and value-for-money. Figures show that fast-food operators recorded US$6,394.96 million and approximately US$8,220.03 million of revenue in 2010 and 2014 respectively (Agriculture and Agri-Food Canada, 2012). A bulk of the revenue was derived from dine-in customers as this mode of food consumption

represented 63% of the sales (Agriculture and Agri-Food Canada, 2012).

From 83,486 respondents surveyed, 48% and 45% in 2017 and 2018, respectively, admitted that their average fast-food consumption was 1–3 times a week, whereas 12% and 11% in 2017 and 2018, respectively, claimed they consumed fast-food 4–6 times a week (Cint Exchange Institute, 2018). Most of the foodservice industry customers are individuals whose ages range from 0 to 24 years old, are students or young working professionals, and who account for a total of 46% of the entire food consumption market value (Agriculture and Agri-Food Canada, 2012). Students are particularly drawn to fast-food establishments for their wholesomeness, affordability, and menu variety (Patricia & Azanza, 2001).

Literature reveals that one of the pressing and urgent concerns of foodservice outlets is food waste. In the Philippines, food waste is closely linked to hunger incidence and threatened food security. According to the UN agency International Fund for Agricultural Development (IFAD) President, Gilbert Houngbo, the recurrent rise in global hunger and insecurity of food supply chains are results of consumer food waste. He related that if consumers were more educated and careful in food consumption, there would be enough to feed everyone in the world (Khaishgi, 2017). UN report "The State of Food Security and Nutrition in the World 2017" identified Asia as home to the most number of hungry people in the world and the Philippines in the top rank among ASEAN countries (FAO, IFAD, UNICEF, WFP & WHO, 2017). The Global Hunger Index of 2018 also scored the Philippines 69 of 119 countries, with a serious level of hunger incidence (Grebmer et al., 2018). The Food and Nutrition Research Institute of the Department of Science and Technology (FNRI-DOST) estimated that, in 2008, around 3.29 kgs of rice was wasted by every Filipino, for a total of 296,869 metric tons or 12.2% of 2008 rice imports (Rodriguez, 2014). In response to these statistics, the government has developed a number of policies to curb food waste with the most recent one being House Bill 8873, known as "Food Waste Reduction Act." This law aims to cut back on food waste produced by supermarkets, culinary schools, food manufacturers, and food establishments (restaurants, cafes, diners, fastfood chains, or hotels) through redistribution and recycling of food surplus (Dela Cruz, 2019). It provides for a PHP1 to 5 million penalty for selling food donations or neglecting them

to be unfit for human consumption. Though specialized reports on consumer food waste in the Philippines are few, it has been recognized that income and age can be predicting factors. Higher income often leads to a larger quantity of food waste with younger consumers more likely to waste than older ones (Esguerra, del Carmen, & Rolle, 2017).

Food waste is defined as "any food appropriate and intended for human consumption being discarded, whether or not after it is kept beyond its expiry date or left to spoil" (Östergren et al., 2014). It is generated at two levels: the foodservice outlet (known as Kitchen Food Waste or KFW) and the consumer (Client or Consumer Food Waste or CFW; Principato, Pratesi, & Secondi, 2018). Comparing the levels, more food waste is generally produced at the consumption level because of negligent consumer behavior (Ghosh, Sharma, Haigh, Evers, & Ho, 2015). There are also two types of CFW: out-of-home and in-home. Out-of-home CFW refers to waste from food that was prepared, served, and partially consumed outside the individual's home, whereas in-home CFW refers to waste from food that was purchased, prepared, and partially consumed inside the individual's home.

The foodservice sector is a substantial contributor to food waste, be it KFW or CFW. Comparing two companies, it was discovered that company A registered 91.23 grams and company B registered 85.86 grams of waste per meal (Betz, Buchli, Göbel, & Müller, 2015). According to Betz et al. (2015), the annual loss amounted to 10.47 tonnes for company A, and 16.55 tonnes for company B. Respondents cited lack of hunger and large serving sizes as the main reasons for the food wasted (Betz et al., 2015)and they are not justifiable from an ethical point of view. The food service industry was identified by Beretta et al. (2013. These thought-provoking findings were further reinforced in another study that found portion size to be significantly and positively related to the amount of food waste generated, and that vegetables, dressings, and grains constituted most of the waste (Roe, Apolzan, Qi, Allen & Martin, 2018). Women also appear to be associated with more food waste than males (Kuo & Shih, 2016). A similar extensive study that surveyed 195 restaurants in China likewise concluded that vegetables were the most wasted items of the 93 grams of food waste per capita per meal, followed by rice, seafood, wheat, and pork (Wang et al., 2017)

Food waste also has serious managerial implications for foodservice establishments. Economically speaking, it impacts the cost firms incur in disposing food waste. For instance, it is estimated that US$90 million worth of landfill disposal will be saved if only 10% of the food waste is recovered, and US$200 million if that figure increases to 25% (Ghosh et al., 2015). There are also associated increasing costs of a threatened food supply chain, where a decrease in the supply of materials demanded will likely hike product prices (Lipinski et al., 2013). . Food loss and waste is a predicament that touches on the sustainability of the food supply chain, global hunger, and responsible consumption and production (Ghosh et al., 2015).

To address these concerns, restaurant managers must carefully consider how menus are designed and serving size set (von Massow & McAdams, 2015; Heikkilä, Reinikainen, Katajajuuri, Silvennoinen, & Hartikainen, 2016; Principato et al., 2018) be more involved in educating the consumers about food waste and "nudging" them (Lehner, Mont, & Heiskanen, 2016; Sirieix, Lála, & Kocmanová, 2017; Stöckli, Dorn, & Liechti, 2018) and take an active role in measuring food waste as means to monitoring and adjusting operations and production (Sakaguchi, Pak, & Potts, 2018). Such monitoring, according to Sakaguchi et al. (2018), also guides management in how to best dispose of food waste.

CFW is primarily a routinized behavior in which the consumer often engages with little awareness and no intention (Van Geffen, Van Herpen, & Van Trijp, 2016). There is certainly a role that consumers must play in reducing their own waste, but the management of foodservice outlets must also participate by monitoring CFW and avoiding triggers that contribute to the problem. Management needs to understand the thought process that goes into a consumer's wasteful behavior in order to help address it (Block *et al.*, 2016). Doing so identifies cost-saving opportunities to the firm.

At present, there is limited understanding on the extent of food waste problem in the fast-food industry of the Philippines. Most local studies focus on in-home CFW, despite the equal importance of out-of-home CFW and the benefit of its reduction to the consumer, fast-food operators, and food supply chain. Fast-food companies in the Philippines may have their unique waste management systems, but they do not possess an in-depth knowledge of the drivers and predictors of CFW. As a result, the actual source of waste is never addressed nor controlled. The study fills this gap through insights on CFW behavior in order to regulate it and mitigate firm costs associated with food disposal and waste management. It investigates the out-of-home food wastes of young consumers and asks the question—Do consumer attitude, awareness, and social norm significantly influence food waste behavior through motivation? The study focuses on the fast-food industry primarily because of its significant contribution to the economy and its share in the foodservice sector of the Philippines. Young consumers are particularly highlighted because they are the largest market segment contributing to the industry.

Framework

The theoretical framework adopted for this study is the consumer food waste model, developed by van Geffen et al. (2016). The framework was selected because it does not consider CFW as a future, intentional behavior (unlike the theory of planned behavior), rather the result of complex internal and situational factors. It views CFW as a product of past routinized behavior and not a planned behavior to occur in the future (Van Geffen et al., 2016). In comparison to other frameworks, the consumer food waste model is comprehensive and breaks CFW behavior into distinct components. It incorporates factors affecting motivation and projects on how they relate to food management and waste. Furthermore, it categorizes CFW into in-home and out-of-home. Such level of detail is not found in other frameworks, hence, deeming it suitable for use in this study.

The consumers food waste model groups commonly used constructs in food waste research into four categories: motivation, ability, opportunity, and distal factors. Taken together, they influence the consumer food management behavior and ultimately, the amount of food wastage (Van Geffen et al., 2016).

The conceptual framework considers the part of the consumer food waste framework that focuses only on consumer-centered internal factors and their food management behavior. Specifically, it will zero in on the motivation and out-of-home food management behavior.

Because the purpose of this study is to explore consumer behavior that promotes food waste in
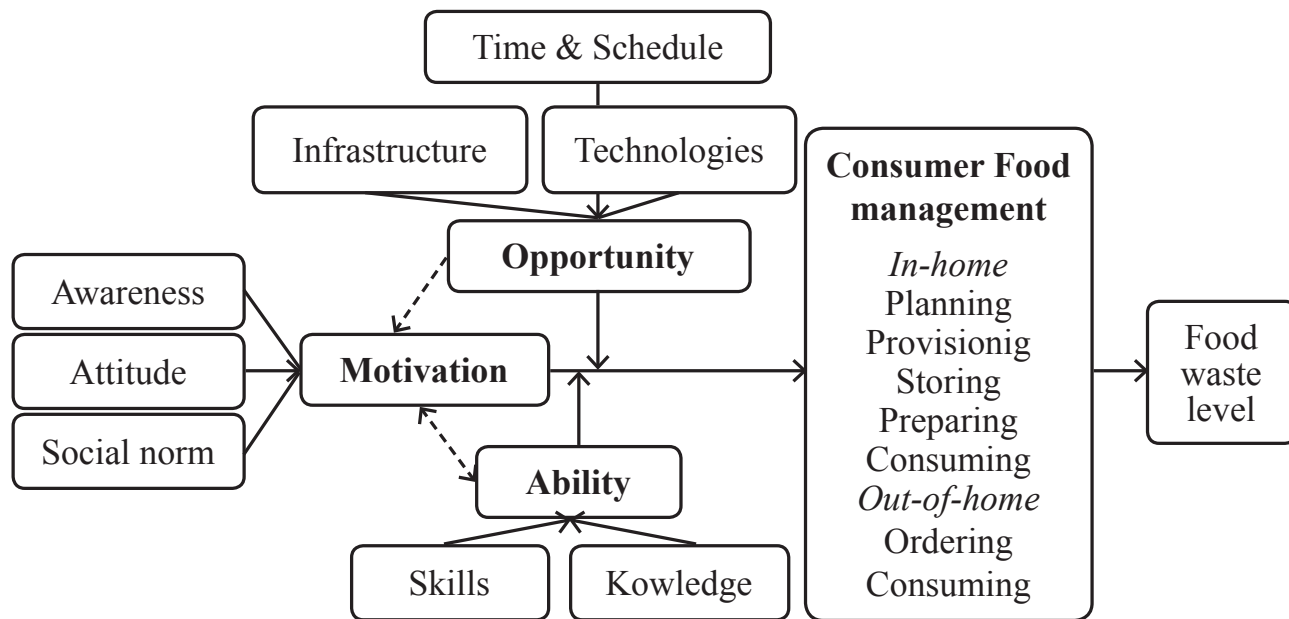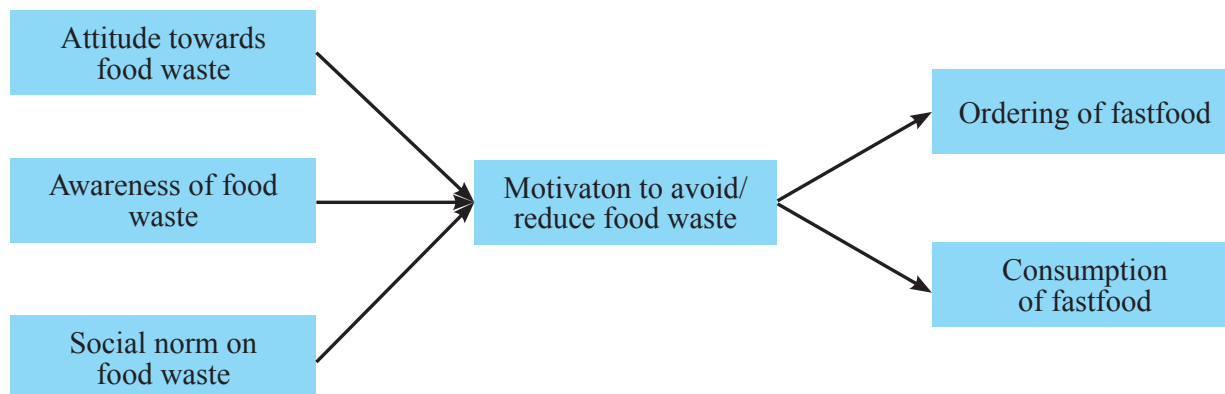
Figure 1. Consumer food waste model.

Figure 2. Operational framework.

a fast-food restaurant, only out-of-home stages will be considered. This pertains to the aspects of fast-food ordering and consumption. Overall, the conceptual framework assesses the influences of consumer awareness of waste generated, consumer attitude towards waste, and social norm on ordering and consuming fast-food as mediated by consumer motivation to avoid or reduce waste.

Methods

A suitable research locale for this study is a school because it hubs the targeted group of respondents, this being young consumers between the ages of 0 to 24. This age group was selected because it is the largest consumer age group for fast-food restaurants in the Philippines (Agriculture and Agri-Food Canada,

2012). Additionally, schools have been shown to have considerable growth in fast-food establishments in the coming years (Agriculture and Agri-Food Canada, 2012).

Students were selected because they fit the description of the largest age group of fast-food consumers in the Philippines. They also drive the demand for fast-food at schools, making schools the second-highest institutional foodservice provider (Agriculture and Agri-Food Canada, 2012).

To calculate the minimum sample size required to run the study, recommendations of Hair, Hult, Ringle, and Sarstedt (2017) were used. With the maximum number of arrows pointing at a construct (in this case, motivation to avoid or reduce food waste) equaling to 3, setting the significance level to .05, a minimum statistical power of 80% (as recommended by Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014), and minimum R2 of .10, the recommended minimum sample size is 103. For this paper, a total of 145 valid responses from the Marketing Department of Mindanao State University-Iligan Institute of Technology (MSU-IIT) were collected.

There were 66 male (45.5%) and 79 female respondents (54.5%). MSU-IIT is located in Iligan City and considered as one of the primary public universities in the country. It is the preferred locale because of its size, diversity of students' backgrounds, and location. MSU-IIT lists a total of 7,335 undergraduate and 711 graduate students, coming from diverse socio-economic backgrounds, ethnicities, religions, and provinces across the Philippines. The diversity of its students' backgrounds makes it an adequate representation of the general market of college students in the Philippines. It is also situated on an avenue heavily populated with several, top fast-food brands.

A self-administered online survey form was used in this study because of its convenience and speed on the part of the respondents (Ilieva, Baron, & Healey, 2001). The survey contained nine sections and had a total of 27 scalar and open-ended questions. The instrument had an overall Cronbach's alpha of 0.79, indicating a good level of consistency and reliability.

The study employed descriptive statistics to have a summarized representation of the data. To test the model, partial least squares structural equation modeling (PLS-SEM) was employed. Descriptive statistics were used to report summaries and frequencies whereas

PLS-SEM was used to measure the relationships between the constructs. This method is a non-parametric significance test that is suitable for data that does not follow a normal distribution (Hair, Ringle, & Sarstedt, 2013). PLS-SEM was conducted using SmartPLS 3.0 (Ringle, Wende, & Becker, 2015). Overall, PLS-SEM is an advisable statistical tool for analyzing latent variables (such as attitudes, perceptions, and behavior) while accounting for measurement and structural models. This addresses the weakness of ordinary least squares (OLS) regression, which has stringent assumptions and assumes observable, continuous, and normally distributed data.

Results

Descriptive Statistics

Attitude towards food waste. Four statements measured the attitude of respondents to food waste. The first statement asked, *"For me, to reduce the amount of food waste the next time I dine at a fastfood restaurant would be…"*. Respondents were instructed to rate on the spectrum of extremely harmful to extremely beneficial. Results show that one respondent selected extremely harmful, nine harmful, 12 neither harmful nor beneficial, 54 beneficial, and 68 extremely beneficial. The most frequently reported answer was extremely beneficial.

The same statement was asked in the next three items, but each item used a different spectrum. In the second question on attitude, respondents were instructed to rate on the spectrum of extremely unenjoyable to extremely enjoyable. Results reveal that no respondent chose extremely unenjoyable, five unenjoyable, 30 neither unenjoyable nor enjoyable, 71 enjoyable, and 39 extremely enjoyable. The most frequently reported answer was enjoyable.

The third statement was rated along the spectrum of extremely foolish to extremely wise. There were four respondents who selected foolish, 15 neither foolish nor wise, 64 wise, and 62 extremely wise. The most frequently reported answer was wise.

A final statement on attitude shows that on the spectrum of extremely bad to extremely good, seven respondents rated bad, nine neither bad nor good, 51 good, and 78 extremely good. The most frequently reported answer was extremely good.

In summary, the general attitude of young consumers towards reducing food waste can be described as

extremely beneficial, enjoyable, wise, and extremely good.

Awareness of food waste. Two statements assessed the respondents' awareness of food waste generated from their fast-food consumption. Both statements were rated on a 5-point Likert scale that ranged from strongly disagree to strongly agree. The results show that for the first statement, "*I am aware of any food, beverages or even condiments I did not fully finish.*", majority of the respondents agree to the statement (57%; see Figure 1). Similarly, for the second statement, "*I think about any food, beverages or even*

condiments I did not fully finish.", 78 respondents (54%) also agree (see Figure 1).

On average, young consumers tend to be aware and think about the fast-food waste they generate.

Social norm on food waste. Social norm on food waste was measured through three statements that were rated on a 5-point Likert scale ranging from strongly disagree to strongly agree. The first statement, "*Most people who are important to me would think that I should reduce my food waste.*", drew agreement from 57 (39%) and strong agreement from 40 (28%) respondents (see Figure 2). The second statement,
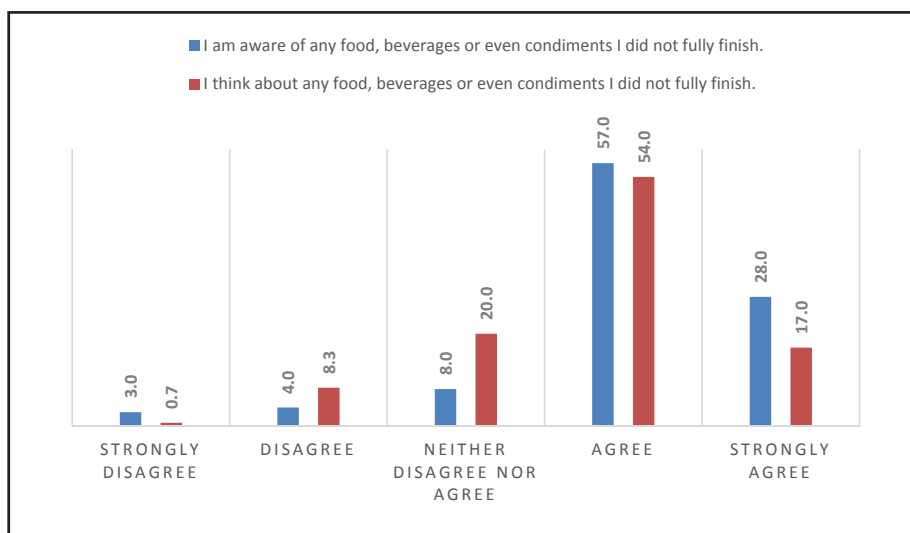

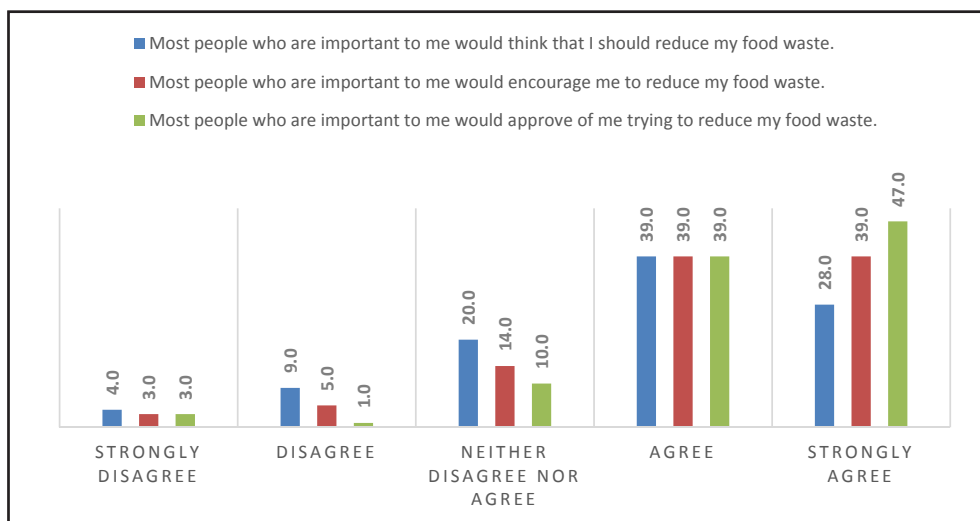***Figure 1.*** Response breakdown of questions on awareness of food waste (%).

Figure 2. Response breakdown of questions on social norm on food waste (%).

"*Most people who are important to me would encourage me to reduce my food waste.*", majority were either agreeing (39%) or strongly agreeing (39%). Figures for the last statement, "*Most people who are important to me would approve of me trying to reduce my food waste.*", 68 respondents (47%) strongly agree. Figure 2 demonstrates that most respondents agree or strongly agree that their closest social circle of family and friends would think, encourage, and approve of them reducing food waste.

Motivation to reduce/avoid food waste. Figure 3 shows the motivation of young consumers to reduce or avoid food waste. In terms of willingness, 82 respondents (56.6%) strongly agree. The same number (82) of respondents strongly agree that they will try to reduce their food waste. Lastly, in terms of conviction to follow through with avoidance or reduction of food waste, majority of the respondents (53.8%) strongly agree.Overall, there is agreement and strong agreement among the majority of respondents on their motivation to avoid or reduce food waste.

Food behavior – ordering. As previously explained, food behavior is divided into ordering and consumption of fast-food. Figure 4 reveals the responses to statements gauging the ordering behavior of young consumers. The first statement, "*When I dine at fastfood restaurants, I usually order food that is just enough for me.*", shows that 48 respondents were (33%) agreeing and 82 respondents (57%) strongly

agreeing. This concurs with the responses to the second statement, "*When I dine at fastfood restaurants, I usually order food that is too much for me.*", where 52 respondents (36%) disagreed.

Food behavior – consumption. Consumption of fast-food was assessed based on different types of fast-food items. The items included main dishes (rice, chicken, beef, pork, seafood, burgers, pizzas, pastas, noodles, bread, fries), accompanying vegetables and fruits, salads, soup, beverages (water, juice, shakes, soda drinks), and condiments (ketchup, soy sauce, gravy, other sauces). The assessing statement is "*I finish all my food every time I order at a fastfood restaurant, including…*"

Salads had the highest number of reported leftover, with seven respondents admitting that they never finish served salad. This was followed by vegetables and fruits, condiments, and soups. Condiment was also reported to be rarely fully consumed by respondents, followed by soups, vegetables and fruits, and salads. On the other hand, the main dishes were reported to be always fully consumed, followed by beverages.

Additional consumer insights. Consumer perceptions of fast-food serving size and its sufficiency were captured through two statements. There were 62 respondents who agreed that the serving size was just enough for them and 57 who disagreed that it was too much for them. Feedback on both statements appears to concur.
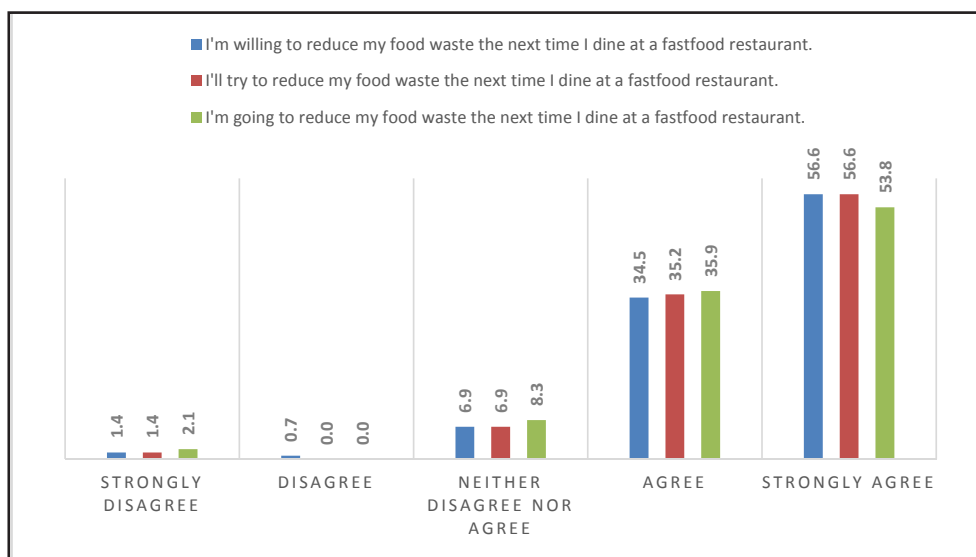

Figure 3. Response breakdown of questions on motivation to reduce/avoid food waste (%).
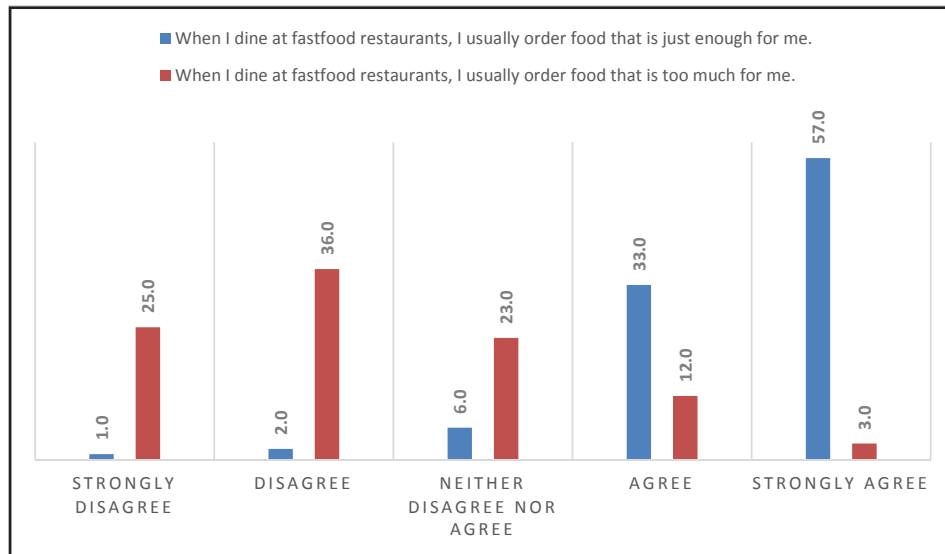
Figure 4. Response breakdown of questions on food behavior – ordering (%).
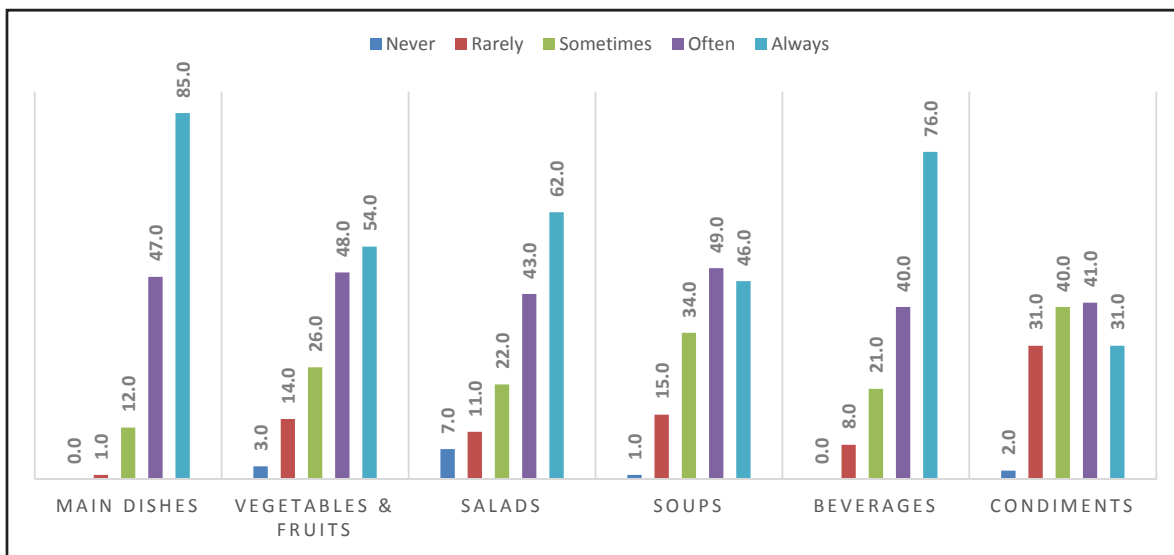

Figure 5. Response breakdown of questions on food behavior – consumption (%).

With regard to consumer practices in handling leftover, 45 respondents disagree that they would leave food on the table, 37 would neither disagree or agree, 36 agreed they would, and 21 strongly disagreed. Most of the respondents, 69 of them for each statement, later agreed that they would take out the food or give it to somebody else to finish. There were also 50 and 35 respondents who strongly agreed to do the same, respectively.

Finally, when asked for reasons why respondents might leave food unfinished, 31% admitted that the food does not taste good, 25% said it was not cooked or prepared properly, 20% found the serving size to be too big for them, 20% ordered too much, and 4% gave various reasons.

Inferential Statistics

PLS-SEM analysis and diagnostics were run using SmartPLS 3.0 program (Ringle et al., 2015). Table 1 displays the results for the test of collinearity among the indicators and constructs. Because there are no Variance Inflation Factor (VIF) values above 10, which is the minimum requirement for the VIF test, the results indicate that there is no inter-collinearity or multicollinearity.

It is apparent from Table 1 that the cross-loadings of the indicators are highest compared to their loadings on other constructs. This establishes the discriminant validity among variables. The succeeding Fornell-Larcker Criterion table shows that the discriminant validity among reflective constructs is also satisfied by the model.

Table 1

Construct Reliability and Validity of Formative Constructs

Constructs	Measures	Outer VIF	Inner VIF	
Attitude towards food waste	Att1	2.447	1.004	Motivation
	Att2	1.925	1.042	Ordering
	Att3	2.872	1.042	Consumption
	Att4	3.065		
Awareness of food waste	Aware1	1.150	1.014	Motivation
	Aware2	1.150	1.045	Ordering
			1.045	Consumption
Food behavior – consumption of fast-food	BehCons1	1.544		Motivation
	BehCons2	1.995		Ordering
	BehCons3	1.856		Consumption
	BehCons4	1.469		
	BehCons5	1.486		
	BehCons6	1.311		
Food behavior – ordering of fast-food	BehOrder1	1.252		Motivation
	BehOrder2	1.252		Ordering
				Consumption
Motivation to avoid/reduce food waste	Motive1	5.928		Motivation
	Motive2	5.293	1.347	Ordering
	Motive3	7.393	1.347	Consumption
Social norm on food waste	SocNorm1	2.620	1.012	Motivation
	SocNorm2	3.683	1.261	Ordering
	SocNorm3	2.149	1.261	Consumption

Table 2

Discriminant Validity

Indicators	Cross-loadings					
	Attitude	**Awareness**	**Behavior Consumption**	**Behavior Ordering**	**Motivation**	**Social Norms**
Att1	**0.788**	0.058	0.049	0.008	0.076	-0.056
Att2	**0.904**	0.059	0.132	0.139	0.225	0.043
Att3	**0.840**	0.079	0.121	-0.021	0.058	-0.028
Att4	**0.888**	0.024	0.040	0.128	0.167	0.060
Aware1	0.178	**0.725**	0.144	0.180	0.166	0.031
Aware2	-0.032	**0.904**	0.270	0.319	0.176	0.122
BehCons1	0.161	0.191	**0.781**	0.238	0.118	0.053
BehCons2	-0.029	0.121	**0.322**	0.235	0.015	0.020
BehCons3	-0.062	0.115	**0.292**	0.273	0.024	0.035
BehCons4	0.116	0.107	**0.501**	0.285	0.097	0.066
BehCons5	0.033	0.232	**0.801**	0.238	0.131	0.050
BehCons6	0.098	0.005	**0.101**	0.173	0.018	-0.043
BehOrder1	0.145	0.261	0.218	**0.894**	0.457	0.227
BehOrder2	0.031	0.287	0.243	**0.801**	0.286	0.196
Motive1	0.207	0.151	0.200	0.444	**0.959**	0.418
Motive2	0.151	0.213	0.101	0.410	**0.953**	0.456
Motive3	0.191	0.230	0.182	0.441	**0.970**	0.426
SocNorm1	-0.034	0.057	0.035	0.227	0.343	**0.863**
SocNorm2	0.060	0.114	0.075	0.182	0.388	**0.930**
SocNorm3	0.047	0.104	0.129	0.255	0.461	**0.888**

Table 3

Fornell-Larcker Criterion

	Attitude	**Awareness**	**Behavior Consumption**	**Behavior Ordering**	**Motivation**	**Social Norms**
Attitude	**0.856**					
Awareness	0.058	**0.819**				
Behavior Consumption	0.105	0.265				
Behavior Ordering	0.112	0.318	0.268	**0.849**		
Motivation	0.191	0.206	0.169	0.450	**0.961**	
Social Norms	0.031	0.104	0.094	0.250	0.451	**0.894**

The diagnostic tests previously presented have so far ensured the robustness of the model by satisfying criteria on reliability, validity, and multicollinearity. The next part of the analysis is examining the structural model's paths and the model's r-squared values.

Table 4 exhibits the path estimates and their corresponding p-values produced after running the PLS algorithm and bootstrapping (*J=10,000*). The paths from awareness and social norms to motivation tested significant, with awareness-motivation and social norms-motivation paths proving to be highly significant (*p<0.01*). Motivation's influence on food

waste behavior was likewise noted, but only for the ordering behavior component. There were also no direct and significant paths leading from attitude, awareness, or social norms to behavior consumption. From this finding, it can be inferred that, per the results of this study, consumption is disconnected from the rest of the model. It seems that attitude, awareness, social norms, and motivation do not have any influence on the consumption patterns of young fast-food consumers and hence may not be the appropriate factors to study when attempting to alter the consumption behavior of customers.

Table 4

Results of the PLS Algorithm and Bootstrapping

Paths	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Attitude -> Behavior Consumption	0.088	0.101	0.233	0.379	0.352
Attitude -> Behavior Ordering	0.089	0.075	0.097	0.913	0.181
Attitude -> Motivation	0.169	0.161	0.078	2.162	**0.015****
Awareness -> Behavior Consumption	0.253	0.226	0.180	1.409	0.079
Awareness -> Behavior Ordering	0.290	0.298	0.072	4.056	**0.000*****
Awareness -> Motivation	0.152	0.163	0.078	1.935	**0.027****
Social Norms -> Behavior Consumption	0.065	0.045	0.127	0.513	0.304
Social Norms -> Behavior Ordering	0.217	0.219	0.095	2.284	**0.011****
Social Norms -> Motivation	0.430	0.433	0.110	3.916	**0.000*****
Motivation -> Behavior Consumption	0.094	0.073	0.127	0.741	0.229
Motivation -> Behavior Ordering	0.370	0.375	0.099	3.720	**0.000*****
Attitude -> Motivation -> Behavior Consumption	0.016	0.014	0.026	0.616	0.269
Awareness -> Motivation -> Behavior Consumption	0.014	0.011	0.024	0.586	0.279
Social Norms -> Motivation -> Behavior Consumption	0.041	0.034	0.063	0.648	0.259
Attitude -> Motivation -> Behavior Ordering	0.062	0.063	0.038	1.631	0.051
Awareness -> Motivation -> Behavior Ordering	0.056	0.060	0.033	1.693	**0.045****
Social Norms -> Motivation -> Behavior Ordering	0.159	0.167	0.074	2.146	**0.016****

Although motivation emerged as a mediator in some paths, there were also direct effects reported. In Table 4, it can be seen that both awareness (p<.05) and social norms (p<.05) have direct effects on ordering behavior. Reversely, the results further suggest that these paths could also be mediated by motivation, and this is evident in the significant p-values exhibited for the awareness-motivation-ordering and social norms-motivation-ordering paths. This underlines the strong relevance of awareness and social norms to the ordering behavior patterns of young consumers. For management, it is indicative of the power of "nudging" or activating consumer awareness on triggers that may lead to food waste generation and peer group influence on consumer ordering behavior.

Adjusted r-squared values expose that only 6.3% of the variance in consumption, 23.7% of the variance in ordering, and 24.1% of the variance in motivation may be explained by the model.

To examine the effect size of the endogenous variables on ordering and consumption, the f-squared values were calculated. As shown in Table 5 and the criteria of Lowry and Gaskin (2014) that sets 0.10 as the minimum value to demonstrate significant effect size, the results show that social norms had the most significant effect size on motivation and motivation had the most significant effect size on ordering.

Lastly, in analyzing the model fit, the standardized root mean square residual (SRMR) (<.10), normed fit index (NFI) (>.90), and root mean squared residual covariance matrix of the outer model residuals (RMS Theta) (<.12) should be considered. Hence, the values of the saturated model are: SRMR=.07, NFI=.771, and RMS Theta=.201. The model fit values suggest that the model could be improved, although it should be noted that PLS-SEM's objectives are more inclined towards within-sample prediction. Model fit measures computed for PLS-SEM are to be taken with extreme caution (Hair et al., 2017).

Discussion

Although the focus of this paper has been on food waste generated by consumers, the challenge to reduce food waste still requires the participation of all stakeholders, including suppliers, management, and the dining public. A holistic approach is perhaps the most viable solution to effectively close the food waste loop among fast-food outlets (Heikkilä et al., 2016; Papargyropoulou et al., 2016)

The PLS-SEM algorithm has uncovered valuable insights on the influence of attitude, awareness, and social norms on ordering and consuming fast-food, as mediated by motivation. The results are a contradiction to the a priori beliefs that assume attitude impacts consumer behavior through motivation and that consumption is vital in determining the overall food management behavior of consumers. On the other hand, awareness and social norms have a significant influence on the ordering of fast-food as mediated by the consumer's motivation to avoid or reduce food waste. Direct effects were also exposed in the same paths, suggesting that awareness and social norms may directly influence the ordering behavior of young consumers regardless of their motivation to avoid or reduce food waste. Diagnostic tests illustrate the relative robustness of the model, although reliability could be improved for awareness.

The significant influence of awareness and social norms on the ordering behavior of young consumers

Table 5

f-Squared Values

	Behavior Consumption	Behavior Ordering	Motivation
Attitude	0.006	0.001	0.038
Awareness	0.060	0.071	0.031
Motivation	0.007	**0.137**	
Social Norms	0.001	0.004	**0.246**

draws critical implications for management. Mainly, the results suggest that the management can shape the ordering behavior of young consumers through individual consumer awareness campaigns and encouraging appropriate peer group behavior. Qualitative responses uncover that family upbringing and sympathy for other people who do not have access to sufficient food greatly contributes to young consumers' awareness of food waste. Accordingly, numerous respondents stated that their families had raised them to finish what is on their plates and thus trained them to be aware of any food leftover. There is also a good number of responses that point to food waste as an undesirable action linked to global warming, famine, loss of natural resources, irresponsible consumption, and even irresponsible use of money. The most meaningful qualitative response can be attributed to young consumers' frugality as the primary driver of food waste awareness.

Social norms emerge as another crucial determinant of young CFW behavior. Qualitative responses confirm the substantial impact of peers on young consumer's food waste behavior. This seems to be reasonable as previous studies have noted the effect of social customs on the food consumption patterns, pointing how it may prompt a customer to over-order and produce more food waste or ask to take leftovers home while dining with others (Papargyropoulou et al., 2016; Hamerman, Rudell, & Martins, 2018)perceived likelihood of taking home leftovers was greater when the server proactively offered to wrap the leftovers (vs. when the customer had to initiate the request. When asked if it is easy to consume food fully in the presence of other people, majority of the respondents concurred and explained that there is a social stigma attached to food leftover as it negatively reflects on the individual's upbringing and education. They stated that "*it is in the Pinoy culture to remind one another to finish all food*" and that helps lessen food waste. Feelings of regret and guilt among consumers arise when food is wasted (Sirieix et al., 2017). Interestingly, there are respondents who admit that dining with peers they like and are comfortable with increases the likelihood of leaving little to no leftovers.

Raising awareness of the food waste challenge is necessary to begin a behavioral change among consumers (Ghosh et al., 2015). For instance, young consumers are more likely to cut back on their food waste when their awareness is heightened (Principato,

Secondi, & Pratesi, 2015). Moreover, engaging the consumer through appealing messages is one essential managerial action that mitigates food waste in food service outlets (Radzymińska, Jakubowska, & Staniewska, 2016; Filimonau & De Coteau, 2019).

With these insights in mind, management can capitalize on awareness by introducing cues at the ordering point to reduce food waste. These cues remind consumers to avoid over-ordering or inform them of the portion size so they can evaluate their adequacy. Other tactics include placing strategic posts near the food counters to call consumers' attention to the negative environmental and social consequences of food waste. Based on the qualitative insights provided, reminding young consumers of impoverished people who do not have enough food to eat effectively appeals to their emotional and altruistic side and thus can be a compelling tool to mitigate food waste. Moreover, out-of-store measures can include online and offline campaigns. Reminders at the end of television advertisements on the urgency of the global food waste problem can be a good springboard to kickstart a more open and large-scale social discussion on CFW. Respondents proposed that fast-food companies can hold events at public spaces such as malls or schools to raise awareness for the cause. Online, fast-food companies can regularly post infographics and catchy images to highlight the dilemma of food waste and what consumers can do to help when ordering and consuming fast-food. The same rationale can be applied to dining groups of young consumers. Such reminders boost their shared sense of frugality and cultural sensibility to ensure that no food is left behind.

Another equally advantageous method to reduce CFW is nudging and decreasing the portion size. Portion size is positively linked to plate waste, hence decreasing it is highly likely to curtail plate waste (Freedman & Brochado, 2009; von Massow & McAdams, 2015). Furthermore, nudging towards responsible food consumption has been revealed to reduce environmental impact (Lehner et al., 2016).

Interestingly, none of the paths leading to food consumption were significant. This concludes that, per the results of this study, management intervention at the point of consumption may no longer be useful in mitigating food waste. Furthermore, the final and critical point at which management may intervene to influence consumer behavior is the in-store ordering stage. Any managerial attempts to divert

consumer behavior to food waste reduction should be implemented prior to this stage to render them effective.

Conclusion

In summary, this study sought to examine the drivers and predictors of out-of-home CFW among young consumers to guide fast-food companies on regulating CFW behavior and mitigating firm costs associated with food waste disposal. It analyzed consumer attitude, awareness, social norms, and how they relate to motivation and food waste behavior (ordering and consumption). Findings reveal that awareness and social norms have significant effects on ordering behavior through motivation. Attitude was not found to influence ordering behavior; however, it does affect motivation to reduce food waste. This further implies that not all consumers who have a positive attitude to reduce food waste will actually produce less waste. Fast-food companies may have to explore other measures, such as tapping into consumer awareness and social norms. The findings are interesting in that most efforts towards sustainable food consumption are directed to changing consumer attitudes but, based on the results of the study, social norms and awareness of young Filipino fast-food consumers may be better predictors to control food waste regardless of whether they possess a positive attitude towards reducing food waste or not. For fast-food companies, the results imply that they need to take steps at store-level to nudge consumers to sustainable behavior.

Although sustainability advertising may be helpful, the results show that it needs to be complemented with operational adjustments to ensure that the consumer is not ordering more than what he or she can consume. Additional consumer insights reveal that one of the main reasons consumers leave food is due to a large portion size. This is one aspect of meal preparation that perhaps needs to be revisited by fast-food operators. For the industry, the findings suggest that industry-wide associations must take steps to standardize sustainable measures across the country, particularly if they are to comply with House Bill 8873. This will not only ensure the longevity of their operations, but most importantly, the sustainability of the food supply chain in the long run.

We recommend that future studies explore additional constructs to improve the predicting power of the model. For instance, future researchers can expound on the social circle of the consumer to identify groups of people that have the most influence on CFW behavior. They can also take a closer look at the Filipino values, beliefs, and practices that contribute to sustainable food consumption. Currently, most studies explore inner personal drives. However, few have examined external cultural factors that either support or inhibit food waste. Additionally, researchers could work on measuring the average amount of KFW and CFW produced by Filipino fast-food operators to gauge the severity of the problem in the industry. Such information is highly needed for consumers and companies to take appropriate action against rising food waste levels.

Declaration of ownership:

This report is our original work.

Conflict of Interest

None.

Ethical Clearance

The study was approved by the institution.

References

Agriculture and Agri-Food Canada. (2012). *Foodservice Profile of the Philippines*. Ottawa, Ontario. Retrieved from http://publications.gc.ca/collections/collection_2012/agr/A74-1-83-2012-eng.pdf

Chakraborty, B., Sahakian, M., Rani, U., Shenoy, M., & Erkman, S. (2016). Urban food consumption in Metro Manila: Interdisciplinary approaches towards apprehending practices, patterns and impacts. *Journal of Industrial Ecology, 20*(3), 559–570.

Cint Insight Exchange. (2018). *Philippines – average fast food consumption per week in 2017-2018*. Retrieved from https://0-www-statista-com.lib1000.dlsu.edu.ph/statistics/921367/philippines-average-fast-food-consumption-per-week/

Betz, A., Buchli, J., Göbel, C., & Müller, C. (2015). Food waste in the Swiss food service industry–Magnitude and potential for reduction. *Waste Management, 35*, 218–226. doi: 10.1016/j.wasman.2014.09.015

Block, L. G., Keller, P. A., Vallen, B., Williamson, S., Birau, M. M., Grinstein, A., Haws, K., LaBarge, M., Lamberton, C., Moore, E., Moscato, E., Reczek, W. & Tangari, A. (2016). The squander sequence: understanding food waste at each stage of the consumer decision-making process. *Journal of Public Policy & Marketing*, *35*(2), 292-304.

Dela Cruz, J. (2019, February 6). House endorses food waste reduction measure to senate. *Pressreader*. Retrieved from https://pressreader.com/@nickname12917585/csb_ZALvEpACt5jAodxSZo1BvC4r KhzPfr2X6caicg Bj4gGTwEbS2sJtq6mNK5vrWfc

Esguerra, E., del Carmen, D., & Rolle, R. (2017). Purchasing patterns and consumer level waste of fruits and vegetables in urban and peri-urban centers in the Philippines. *Food and Ntrition Sciences, 8*, 961–977.

FAO, IFAD, UNICEF, WFP & WHO. (2017). *The state of food security and nutrition in the world 2017. Building resilience for peace and food security*. Rome. Retrieved from http://www.fao.org/3/a-i7695e.pdf

Filimonau, V., & De Coteau, D. (2019). Food waste management in hospitality operations: A critical review. *Tourism Management, 71*, 234-245. doi:10.1016/j.tourman.2018.10.009Freedman, M. R., & Brochado, C. (2009). Reducing portion size reduces food intake and plate waste. *Obesity,18*(9), 1864–1866. doi:10.1038/oby.2009.480

Ghosh, P. R., Sharma, S. B., Haigh, Y. T., Evers, A. B., & Ho, G. (2015). An overview of food loss and waste: Why does it matter? *Cosmos, 11*(01), 89–103. doi:10.1142/s0219607715500068

Grebmer, K., Bernstein, J., Patterson, F., Sonntag, A., Klaus, L., Fahlbusch, J., Towey, O., Folley, C., Gitter, S., Ekstrom, K. & Fritschel, H. (2018). *2018 Global hunger index. Forced migration and hunger*. Dublin. Retrieved from https://www.globalhungerindex.org/pdf/en/2018.pdf

Hair, J. F., Jr., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)*. California, USA: Sage Publications.

Hair, J. F., Jr., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modelling (PLS-SEM): An emerging tool in business research. *European Business Review, 26*(2), 106–121. https://doi.org/10.1108/EBR-10-2013-0128

Hair, J. F., Jr., Ringle, C. M., & Sarstedt, M. (2013). Partial least squares structural equation modeling: Rigorous applications, better results and higher acceptance. *Long Range Planning, 46*(1-2), 1–12. doi:10.1016/j.lrp.2013.08.016

Hamerman, E. J., Rudell, F., & Martins, C. M. (2018). Factors that predict taking restaurant leftovers: Strategies for reducing food waste. *Journal of Consumer Behaviour, 17*(1), 94–104. doi:10.1002/cb.1700

Heikkilä, L., Reinikainen, A., Katajajuuri, J. M., Silvennoinen, K., & Hartikainen, H. (2016). Elements affecting food waste in the food service sector. *Waste Management, 56*, 446–453. doi:10.1016/j.wasman.2016.06.019

Ilieva, J., Baron, S., & Healey, N. M. (2001). *On-line surveys in international marketing research: Pros and cons* (Working Paper WP01/10). U.K.: Business School of the Manchester Metropolitan University. Retrieved from https://e-space.mmu.ac.uk/1640/1/ilieva%20wp01_10.pdf

Khaishgi, A.E. (2017, September 17). Food waste is main cause of global hunger, says UN agency official. *Arab News*. Retrieved from http://www.arabnews.com/node/1162476/world

Kuo, C., & Shih, Y. (2016). Gender differences in the effects of education and coercion on reducing buffet plate waste. *Journal of Foodservice Business Research, 19*(3), 223–235. doi:10.1080/15378020.2016.1175896

Lehner, M., Mont, O., & Heiskanen, E. (2016). Nudging–A promising tool for sustainable consumption behaviour? *Journal of Cleaner Production, 134*, 166–177. doi:10.1016/j.jclepro.2015.11.086

Lipinski, B., Hanson, C., Waite, R., Searchinger, T., Lomax, J., & Kitinoja, L. (2013). Reducing food loss and waste. Creating a sustainable food future, Installment 2. *World Resources Institute, Washington, DC*. Retrieved from http://www. wri. org/publication/reducing-food-loss-and-waste.

Lowry, P. B., & Gaskin, J. (2014). Partial Least Squares (PLS) Structural Equation Modeling (SEM) for Building and Testing Behavioral Causal Theory: When to Choose It and How to Use It. *IEEE Transactions on Professional Communication*, *57*(2).

Östergren, K., Gustavsson, J., Bos-Brouwers, H., Timmermans, T., Hansen, O. J., Møller, H., ... Easteal, S. (2014). *FUSIONS definitional framework for food waste*. Retrieved from https://www.eu-fusions.org/phocadownload/Publications/FUSIONS%20Definitional%20Framework%20for%20Food%20Waste%202014.pdf

Patricia, M. & Azanza, M. (2001). Food consumption and buying patterns of students from a Philippine university

fastfood mall. *International Journal of Food Sciences and Nutrition, 52*(6), 515–520.

Papargyropoulou, E., Wright, N., Lozano, R., Steinberger, J., Padfield, R., & Ujang, Z. (2016). Conceptual framework for the study of food waste generation and prevention in the hospitality sector. *Waste Management, 49*, 326–336. doi:10.1016/j.wasman.2016.01.017

Principato, L., Pratesi, C. A., & Secondi, L. (2018). Towards zero waste: An exploratory study on restaurant managers. *International Journal of Hospitality Management, 74*, 130–137. doi:10.1016/j.ijhm.2018.02.022

Principato, L., Secondi, L., & Pratesi, C. A. (2015). Reducing food waste: An investigation on the behaviour of Italian youths. *British Food Journal, 117*(2), 731–748. doi:10.1108/bfj-10-2013-0314

Radzyminska, M., Jakubowska, D., & Staniewska, K. (2016). Consumer attitude and behaviour towards food waste. *Journal of Agribusiness and Rural Development, 1*(39), 175–181. doi:10.17306/JARD.2016.20

Ringle, C. M., Wende, S., & Becker, J. M. (2015). *SmartPLS 3*. Boenningstedt: SmartPLS GmbH. Retrieved from http://www. smartpls. com

Rodriguez, F. (2014, March 20). PH food wastage: Think twice before wasting your meal. *Rappler*. Retrieved from https://www.rappler.com/move-ph/issues/hunger/53419-food-wastage-ph

Roe, B. E., Apolzan, J. W., Qi, D., Allen, H. R., & Martin, C. K. (2018). Plate waste of adults in the United States measured in free-living conditions. *PloS one, 13*(2). doi:10.1371/journal.pone.0191813

Sakaguchi, L., Pak, N., & Potts, M. D. (2018). Tackling the issue of food waste in restaurants: Options for measurement method, reduction and behavioral change. *Journal of Cleaner Production, 180*, 430–436. doi:10.1016/j.jclepro.2017.12.136

Sirieix, L., Lála, J., & Kocmanová, K. (2017). Understanding the antecedents of consumers' attitudes towards doggy bags in restaurants: Concern about food waste, culture, norms and emotions. *Journal of Retailing and Consumer Services, 34*, 153–158. doi:10.1016/j.jretconser.2016.10.004

Stöckli, S., Dorn, M., & Liechti, S. (2018). Normative prompts reduce consumer food waste in restaurants. *Waste Management, 77*, 532–536. doi:10.1016/j.wasman.2018.04.047

Van Geffen, L. E. J., Van Herpen, E., & van Trijp, J. C. M. (2016). *Causes and determinants of consumers food waste: A theoretical framework* (Project Report, EU Horizon, 2020). Retrieved from https://eu-refresh.org/sites/default/files/Causes%20%26%20Determinants%20of%20Consumers%20Food%20Waste_0.pdf

Von Massow, M., & McAdams, B. (2015). Table scraps: An evaluation of plate waste in restaurants. *Journal of Foodservice Business Research, 18*(5), 437–453. doi:10.1080/15378020.2015.1093451

Wang, L. E., Liu, G., Liu, X., Liu, Y., Gao, J., Zhou, B., ... Cheng, S. (2017). The weight of unfinished plate: A survey based characterization of restaurant food waste in Chinese cities. *Waste Management, 66*, 3–12. doi:10.1016/j.wasman.2017.04.007