

Proposed framework for food waste strategies of city restaurants in CALABARZON, Philippines

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Abstract

This study examined the food waste strategies of casual dining restaurants in CALABARZON Region. Specifically, assessed the employees' food waste reduction behavior, investigated the different practices or drivers of food waste and determined the food waste strategies. The paper also tested the significant relationship among the practices of food waste, the employees' food waste reduction behavior, and food waste strategies; developed a framework for effective food waste management strategies and proposed a policy for food waste management. The method used in this study is a quantitative descriptive correlation research design. There were 315 total employees served as the respondents, stratified random sampling technique were employees. Thus, five employees of selected city restaurants in CALABARZON were then sub grouped from each of the province in the region. Specifically, it included three city restaurants from among all cities in CALABARZON that are DTI registered and existing for at least five years already. Results reveals that there was significant relationship exists and implies that the better the food waste behavior, the more observable the practices of food waste; there was significant relationship exists and implies that the better the food waste behavior, the better is the food waste strategies; and there was significant relationship exists and indicates that more that they observed the practices of food waste, the better is the food waste strategies employed. Furthermore, as an output of the study, Framework of Food Waste Management were proposed with theoretical, practical, and managerial implications.

Keywords: food waste management strategies, food waste reduction behavior, food waste practice, restaurants

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1. Introduction

Food waste is a problem not just by a specific establishment, unfortunately it is a problem existing in the global landscape. As cited by Nguyen (2018), one third of the produced food in the world for the consumption of human has been wasted which is measured by almost 1.3 billion tons every year. This large amount of food waste can still be used to feed many people around the world. More so, the hotels and restaurants are contributors of this food waste due to several processes during preparation, overproduction, serving, and consumption (Dhir et al., 2020). More importantly, these food losses and food waste comes from the entire supply chain of the hotels and restaurants. The current socio-environmental problems such as the presence of food waste in most foodservice operations is contributed by the employees behavior in the workplace as discussed by Chawla et al. (2022). This means that the degree of food wastage is depending on the ability of the employees to understand the value of food in the operations. More so, attitude of employees is one of the strongest drivers on the employees' pro-environmental behavior. Furthermore, it has been concluded that the employees with positive attitude towards prevention or negative attitudes towards wasting food tend to throw less food away. This further elaborated that there are less food wastes because employees tended to enact behavior that are consistent with their positive attitudes.

Aside from the employee's behavior as prime tool in measuring its relationship to food waste, one of the important things to consider is the way a restaurant manages its operations. This acted as a big cause of food waste in the environment. The restaurant operations generate tremendous amounts of food waste. One of the main practices is from the kitchen operations that made food waste, in fact, 40 million tons of restaurant food waste were produced in China as discussed by Wen et al. (2018). In some parts of the world, food waste produced by restaurants is considered to be the second source of food waste. Particularly, 682 million Euros have been utilized by United Kingdom to manage the waste from restaurants. In addition, food waste is more prevalent in larger restaurants than in smaller ones. Technically, 45% of restaurant food is wasted at the preparation stage, 34% during the consumption stage when customers leave pieces of food on their plates, and 21% owing to incorrect storage (Chang, 2021). Meanwhile, in the Philippines, according to Manala-O and Aure (2019), the foodservice industry is one of the largest and the most profitable industries which influenced the practice of Filipinos to shift on consumption pattern from eating at home to dining in restaurants. As elaborated by Peña (2021), there are 1,717 metric tons of food that are being wasted each day. More so, there are P23 million worth of rice that are being wasted daily which may be enough to feed the 4.3 million Filipinos. In the UN Report cited by Ordinario (2021), it is stated that the pandemic revealed gaps in food waste management by the supply chain. Restaurants dumped unsold foods directly to garbage cans which poor Filipinos would scavenge for.

In addition to the discussion, the researcher, as a former manager of university hotel who developed a food service operation, experienced a lot of food waste in a daily basis when they opened a catering and restaurant operations during pandemic as a response to business challenges. The food wastage was directly put into a garbage can after the daily shift. This ensures the cleanliness of the premises yet does not conform to the principle of good food waste management. In the foregoing, the different establishments must be enjoined to develop food waste strategies to reduce the costs and other environmental impacts it may have. Mabaso and Hewson (2018) discussed that there is a need to close the gap in food waste through understanding the food waste behavior of employees. Managing food waste in these establishments can be started through measuring the employees' food waste behavior and incorporating necessary steps towards the reduction and prevention of food waste. Some effects of positive food waste management may include saving on disposal costs, reducing carbon

food prints, and saving resources. Moreover, a common approach to the responsible food waste management entails in the ability of the establishments to reconsider the previous food waste practices and implement necessary and most relevant food waste reduction measures that can result to 600% return on investment (Karakas 2021). More so, the research of Karakas (2021) discussed that several food waste strategies should be further studied to effectively manage the food waste. Thus, a mitigation approach is necessary to augment the needs of all food waste concerns in many establishments.

The food waste is more prevalent in cities than rural areas. Fattibene et al., (2020) discussed that the cities emerged as crucial actors in global food security. In fact, the city restaurants due to urbanization are in fact the biggest source of consumption food waste accounting for more than half of total urban waste. These city restaurants that generate more food waste than somewhere not urban, also creates significant food waste policies. However, in the case of CALABARZON, there are still no authorities yet to formulate effective food waste policies. In addition, according to Niles (2020) majority of the municipalities including those establishments in these places compost food waste. This means that food waste is more rampant in cities than in municipalities. The researcher would like to study the food waste strategies of different city restaurants in CALABARZON Region to better understand how employees or these establishments can better respond on the sustainable development goals under responsible consumption and production. The study would like to emphasize on the employee's behavior, different practices of food waste, and the establishments' food waste strategies towards food waste management. Thus, helping the region to promote sustainable approach in the production and consumption of foods within the respective establishments.

This study adopted a theoretical paradigm that is widely used in the human resource management to understand the relationship of employees in the workplace. This theory is the Ability, Motivation, and Opportunity (AMO) Framework. As discussed by Marin-Garcia and Tomas (2016), this framework is helpful in explaining the linkage between the human resources management and performance. More so, this further elaborated that employees performance is based on the function of training and selection. Thus, revealing the importance of these two aspects in the performance of the employees. In addition, this framework recognizes the fact that motivation is essential in ensuring the employees' performance in the workplace. This means that the employee's personal dimensions affect its workplace performance. In the context of this study, the employee's abilities, motivation, and opportunities have direct relation on how they respond to food waste strategies and the practices of food waste in the restaurant. More so, the employees' behavior as influenced by their abilities, motivation, and opportunities were all functions of capacity and willingness to perform. Conclusively, the three elements must be present for the employees to perform in the workplace. This means that low levels to any of the elements would considerably decrease levels of performance in the restaurant.

Lastly, the result of this study is deemed necessary to provide insights and give an actual practical implication. This study will be beneficial to the city restaurants and other food service establishments in CALABARZON as it will be a guide on the management operations in pursuit of minimizing the food waste and implementing strategies helpful to their operations. The framework can be adopted to formulate managerial planning decisions to respond on the food waste minimization. In addition, this will be beneficial to the Lyceum of the Philippines University because this can be a source of additional research area to be studied on. This will further contribute to the growing body of knowledge which can be a source to academically develop another researches. More so, this will encourage students and academicians to pursue related studies relative to food waste management in respond to the sustainable development goals. Lastly, for the regional department of tourism as this study can be a source to formulate and implement policies regarding the restaurant food waste management in the region. This can be viable through their accreditation processes in which the study can be adopted as a reference to scholarly make technical decisions.

Objectives of the study - This study examined the food waste strategies of casual dining restaurants in CALABARZON Region. Specifically, assessed the employees' food waste reduction behavior, investigated the different practices or drivers of food waste and determined the food waste strategies. The paper also tested the

significant relationship among the practices of food waste, the employees' food waste reduction behavior, and food waste strategies; developed a framework for effective food waste management strategies and proposed a policy for food waste management.

2. Method

Research Design - The method used in this study is a quantitative descriptive correlation research design. In the context of this study, the significant difference was tested among the variables to the demographic profile of the employees. Moreover, significant relationships were tested between the food waste practices and the employees' behavior towards food waste. Moreover, this can uncover the variables that are interacting and the type of interaction that is occurring. This allowed the researcher to make predictions based on the discovered relationships.

Participants of the Study - The respondents of this study were selected using stratified random sampling technique. They are employees from the different departments who have been working for at least three years already and have worked from selected restaurants in the city. The list of the employees from all restaurants were gathered from the latest data requested from the Department of Trade and Industry through email. Sharma (2017) explained that this sampling technique involves the division of a population into smaller groups which are called strata. The strata in stratified random sampling are constructed based on shared features or characteristics among members. When compared to the population, a random sample from each stratum is taken in a number proportional to the stratum's size. These stratum subgroups are then pooled in a random order. The stratified random sample is intended to limit the possibility of human bias in the selection of cases for inclusion in the sample. As a result, the stratified random number generator sample gives a highly representative sample of the population. In this case, Raosoft Calculator determined that 315 total employees were collected. Thus, five employees of selected city restaurants in CALABARZON were then sub grouped from each of the province in the region. Specifically, it included three city restaurants from among all cities in CALABARZON that are DTI registered and existing for at least five years already.

Data Collection Instrument - The main instrument used in gathering and collecting the data was a survey questionnaire. The researcher adopted set of questions from a reputable and relevant published journal article. Since there are three major variables being studied, specifically, for part 1 with Employees Food Waste Reduction Behavior, the researcher adapted the results of the study of Zeinstra et al., (2021). Meanwhile, for the part 2 with food practices and food drivers, the questions were adapted from the results of the study of Okumus et al., (2020). More so, the part 3 which includes the food waste strategies were adapted from the results of the study Filimonau and Delysia (2019). The reliability and validity of the instrument was tested using SPSS. For the employees' food waste behavior, the results for motivation and opportunity were both acceptable with Cronbach's Alpha of 0.82 and 0.70 respectively. Whereas, for the abilities, the result is good with a Cronbach's Alpha of 0.865. More so, for the employees' practices on food waste, under management operations, the result showed excellent with a Cronbach's Alpha of 0.919 while the kitchen operations showed 0.784 that fell in the category of acceptable. On the other hand, for the food waste management strategies, the results showed good in the consumer-awareness raising programs, redistribution of unsold food, and use of technology with a Cronbach's Alpha of 0.826, 0.886, and 0.883 respectively. Meanwhile, for the recycling or composting, it showed excellent with a Cronbach's Alpha of 0.928. The instrument that was tested with reliability and consistency showed only one variable that was unacceptable. This is the redesigning of kitchen processes under the food waste strategies with 0.458 rating. All of the items in this variable were not included in the actual instrument.

Data Gathering Procedure - The development and construction of the questionnaire was started with the preparation of its initial draft, consultation with experts in the field of the study. The three experts who validated the instrument includes; an owner of restaurant in Lucban, Quezon who has doctorate degree in hospitality management; an assistant professor in hospitality management department of a state university who is currently on her dissertation writing in compliance with the doctorate degree in hospitality management; and a restaurant owner

in Tayabas City who also possessed a master degree in international hospitality management. After completing and consolidation of the validated comments, the instrument was submitted to the research adviser for comments and suggestions, correction, and re-submission for final approval. To determine the validity and reliability of the questionnaire, was submitted to an English critic to attain correctness of the terms and grammar usage. Afterwards, questionnaire was submitted to a statistician to determine its reliability for statistical treatments. To find out if the questionnaire is understandable to the employees, it was subjected to a pilot-testing among selected respondents. After it passed the reliability test, a letter to the participants with the data-gathering instruments was personally distributed by the researcher to the respondents. Upon retrieval of the accomplished instruments, the data collected were tallied, processed, and interpreted.

Data Analysis - The researcher sought the assistance of a statistician using SPSS to encode the data and for the analysis of results using the following statistical methods to answer the research questions: Weighted Mean was used to portray the average responses of employees in regard to their assessment to their food waste behavior, food waste management practices, and food waste strategies. Spearman rho was used to test the relationship among the variables such as food waste behavior, food waste practices, and food waste.

Ethical Consideration - In adherence to the Data Privacy Act of 2012 in which all data must be protected be it private, personal, or sensitive, the researcher followed this. Moreover, an ethical manner with regard to the respondent's background information that the researcher will get from the respondents will be observed. The researcher asked for consent first for the survey that will be conducted to the respondents, and the researcher did not force the respondents upon answering the survey and they willingly volunteered to answer it. Further, the researcher assured that the respondents' answers will be kept with confidentiality and for academic purposes only. To wit, the clause of the Data Privacy Act of 2012 that was included in the instrument presents that the research is committed to safeguarding personal data collected within the course of carrying out its purpose. The voluntary submission of the personal and other data requested in the instrument will only be handled and used for research. Instead, the researcher will have access to the collected personal data; no one else will receive it unless they have given their express written approval. Lastly, a statement giving consent to the researcher of collecting data was gathered.

3. Results and discussion

Table 1

Relationship Between the Food Waste Behavior at Work and Practices of Food Waste

Motivation	rho	p-value	Interpretation
Management Operations	.404**	0.000	Highly Significant
Kitchen Operations	.360**	0.000	Highly Significant
Opportunities			
Management Operations	.393**	0.000	Highly Significant
Kitchen Operations	.442**	0.000	Highly Significant
Abilities			
Management Operations	.420**	0.000	Highly Significant
Kitchen Operations	.433**	0.000	Highly Significant

Table 1 displays the association between food waste behavior and practices of food waste. The computed rho values indicate a moderate direct correlation and the resulted p-values were all less than the alpha level. This means that there was significant relationship exists and implies that the better the food waste behavior, the more observable the practices of food waste. Result confirms that employees reduction behavior determined the

practices of food waste. This means that employees must be engaged on the food waste management strategies to lessen the food waste. This is through discussion of food waste and its implication to environment. Management can influence the employees through training, daily meetings, and other onboarding activities. Furthermore, Mattson and Williams (2022) stated that one of the general practices of food waste appears to be influenced by the employee's behavior due to their frequent practices such as incorrect date labeling and poor handling.

Table 2 presents the association between food waste behavior and food waste strategies. The computed rho values indicate a moderate direct correlation and the resulted p-values were all less than the alpha level. This means that there was significant relationship exists and implies that the better the food waste behavior, the better is the food waste strategies.

Table 2

Relationship Between the Food Waste Behavior at Work and Food Waste Strategies

Motivation	rho	p-value	Interpretation
Consumer Awareness raising programs	.295**	0.000	Highly Significant
Redistribution of unsold food	.347**	0.000	Highly Significant
Use of Technology	.339**	0.000	Highly Significant
Recycling/Composting	.389**	0.000	Highly Significant
Opportunities			
Consumer Awareness raising programs	.319**	0.000	Highly Significant
Redistribution of unsold food	.394**	0.000	Highly Significant
Use of Technology	.352**	0.000	Highly Significant
Recycling/Composting	.367**	0.000	Highly Significant
Abilities			
Consumer Awareness raising programs	.389**	0.000	Highly Significant
Redistribution of unsold food	.361**	0.000	Highly Significant
Use of Technology	.304**	0.000	Highly Significant
Recycling/Composting	.323**	0.000	Highly Significant

Result confirms that when introducing food waste management strategies to employees, the achievement of the operation will frequently rely on the team work effort. It is important that the food waste management strategies are communicated to the employees to boost productivity in the workplace. In the restaurant industry, every waste reduction effort must involve the entire workforce for it to be a success. Thus, associated to the food waste management strategies. Furthermore, Saeed et al., (2019) discusses that employees pro-environment behaviors have significant relationship to the food waste management strategies. This means that when employees are aware of the negative effects of food waste to the environment, they are more likely to perform the food waste management strategies.

Table 3 shows the association between practices of food waste and food waste strategies. The computed rho values indicate a moderate direct correlation and the resulted p-values were all less than the alpha level. This means that there was significant relationship exists and indicates that more that they observed the practices of food waste, the better is the food waste strategies employed. Result confirms that when the restaurant has identified the practices of food waste such as in the management or kitchen operations, the restaurant can implement policies to effectively manage the waste. Furthermore, Teigiserova et al. (2020) discuss that when the restaurant already assessed the sources of food waste, formulation and implementation of policies can be

effective to manage the food waste. Thus, any rule or procedure can be followed in the workplace to lessen the generated food waste.

Table 3

Relationship Between the Practices of Food Waste and Food Waste Strategies

Management Operation	rho	p-value	Interpretation
Consumer Awareness raising programs	.465**	0.000	Highly Significant
Redistribution of unsold food	.467**	0.000	Highly Significant
Use of Technology	.457**	0.000	Highly Significant
Recycling/Composting	.413**	0.000	Highly Significant
Kitchen Operation			
Consumer Awareness raising programs	.551**	0.000	Highly Significant
Redistribution of unsold food	.583**	0.000	Highly Significant
Use of Technology	.555**	0.000	Highly Significant
Recycling/Composting	.445**	0.000	Highly Significant

The figure 1 presents the correlation analysis of the different explanatory variables with respect to food waste management strategies towards the food waste reduction behavior and practices of food waste.

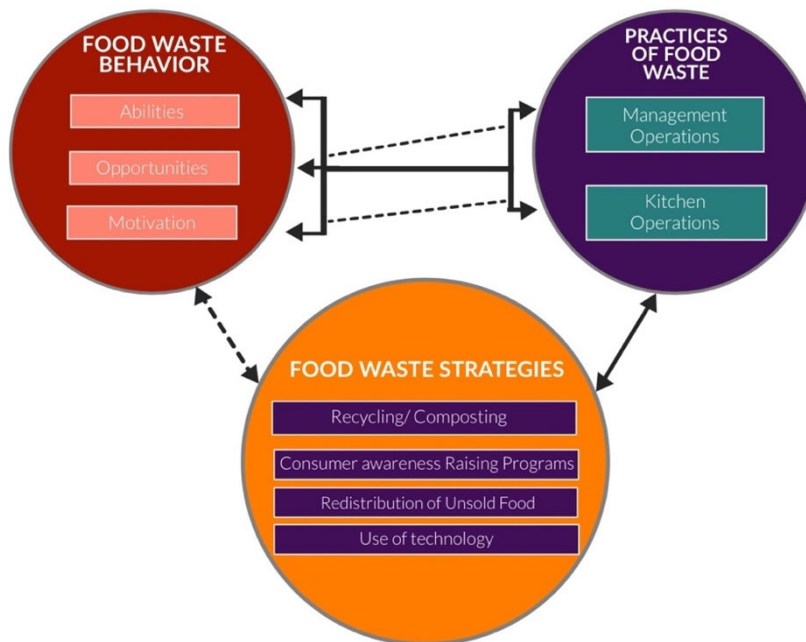


Figure 1. Proposed Framework of Food Waste Management

Through the correlation analysis, connection between the variables were determined according to its effect. The consumer awareness raising programs, use of technology, redistribution of unsold food, and recycling or composting have different relationship to both the practices of food waste and food waste reduction behavior. This means that the food waste management strategies have moderate influence or moderate association on the practices of food waste in the restaurant. However, the framework also reveals the weak association or weak influence of food waste management strategies to the food waste reduction behavior of employees.

The framework reveals interesting findings. The straight double-arrow line reveals a strong association between indicators while the dotted straight double arrow line reveals moderate association between the indicators being studied on. This means that the indicators of food waste reduction behavior and indicators of food waste strategies have moderate association. Likewise, it reveals the moderate association between the opportunities and management operations and the motivation and kitchen operations. This indicated that the results still have association based on the calculated data. Hence, when employees are motivated, they tend to practice food waste reduction and food waste strategies. However, this contradicts to the result of the study being examined by Attiq et al., (2021) which stated that significant intentions have no associations to food waste reduction behavior. Nonetheless, the association of food waste reduction behavior and food waste strategies have been established since emotions and cognitive behavior are factors that influence the food waste practices. This is in lieu of the moderate association between the food waste reduction behavior as to the indicators of food waste practices and food waste strategies.

4. Conclusion and recommendation

There are significant moderate relationships established among the food waste management strategies indicators, food waste reduction behavior, and practices of food waste indicators. However, weak association and relationship is determined between the indicators of food waste management strategies and food waste reduction behavior. Fellow academicians may develop instructional materials for food waste management strategies and further include in their learning outcomes to effectively educate the students toward sustainable production and consumption. Future researchers may conduct similar study directed toward other variables in the food waste management strategies and may create a strategic plan to implement the food waste management strategies and relevant food waste management programs in the restaurants.

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