Gading Journal for the Social Sciences
Volume 27, Special Issue: Advances in Hospitality and Tourism Research, September 2024, 50-61

Evaluating Food Waste Management Behaviour among Hotel Operators in Shah Alam

Nur Adawiyah Mohd Sa'adi[1], Fadzhiathul Azwa Fudzali[2*], Nor Farawahidah Mohd Khamis[3], Elyssa Maisara Ahmad Russlin[4] & Siti Ida Isnainie Md Mubin[5]

[1,2,3,4,5] Faculty of Hospitality and Tourism, Universiti Teknologi MARA (UiTM), Pulau Pinang, Malaysia.
fadzhiathul@uitm.edu.my
[*]Corresponding Author

https://doi.org/10.24191/gading.v27i0.540

Received: 18 July 2024
Accepted: 29 August 2024
Date Published Online: 15 September 2024

Abstract: This study investigates food waste among hotel operators in Malaysia, focusing on its attitudes, quantities, and environmental impacts. A sample of 177 respondents, specifically kitchen and F&B staff, from four-star and five-star hotels in Shah Alam, Selangor. The survey method was used for data collection to assess attitudes and practices related to food waste. Analysis utilising multiple regression in SPSS 28.0 reveals that hotel operators' behaviours directly correlate with the quantities of food waste generated, thereby influencing global warming potential. The findings underscore hotels' substantial daily contribution to food waste and its environmental implications. This study advances understanding by providing empirical data to inform strategic communications and policies to mitigate food waste's ecological footprint within the hospitality sector. Future research is recommended to develop effective waste management strategies, which are crucial for reducing the disposal of edible food by hotel operators, thereby enhancing sustainability practices in the industry.

Keywords: Attitudes, food waste, global warming, hotel operators' behaviour, quantities

Introduction

According to the Solid Waste Management and Public Cleansing Corporation (SWCorp), Malaysians estimated they produced 17,000 tonnes of food waste daily based on 2024 data. The Star (2024) stated that, on average, approximately 4.09 million kilograms of food are wasted daily. Interestingly, 44.5% of the total solid waste (Bernama, 2024) comprises food. Food waste is a common problem in households and the hotel industry, where hotels produce large quantities of high-quality food (Zainab et al., 2022). Over recent years, nearly 12% of food has been wasted, much of which is in landfills. The high volume of food waste from hotel buffets highlights the high cost of hotel food and its significant environmental impact.

Food that is not consumed is referred to as food loss and waste. Food waste and loss can occur at any point in the food supply chain, including during production, processing, distribution, retail and food service sales, and even during end-users' usage. Most of the food is wasted in the final consuming phase, especially in industrialised countries, and significant amounts of food are lost along the whole food supply chain, negatively affecting the environment, the economy, and society (Second et al., 2015).

This study aimed to evaluate the behaviours of hotel operators in Malaysia who are dealing with food waste and determine the factors, causes, and consequences that contribute to the nation's significant food waste problem. According to Marangon et al. (2014), the food and beverage (F&B) sector alone generates approximately 12.9% of Malaysia's total food waste, with hotels generating an average of 289,700 tons annually. The increase in food waste has a substantial financial impact on

hotels, affecting their total profitability, in addition to having an adverse effect on labour, raw materials and storage. The waste produced by hotel buffets draws attention to the excessive food costs and the consequent harm to environmental impact. Although buffet-style dining can enhance hotel efficiency by increasing guest spending and improving satisfaction while reducing service worker costs, it can also enhance hotel efficiency due to the more significant amounts of food consumed but not eaten (Zainab et al., 2022). Thus, food waste represents a direct loss of the resources invested in its production.

The harmful effects of food loss and waste (FLW) are becoming more widely acknowledged for their detrimental impact on climate change and the resilience of agricultural supply chains. FLW has damaging environmental consequences, including soil erosion, deforestation, water and air pollution, and greenhouse gas emissions, due to ineffective methods used in food production, storage, transportation and disposal (Kim et al., 2013). Food waste increases greenhouse gas emissions, exacerbating the climate change crisis. It represents a squandering of critical resources - land, water, energy, and capital - essential for sustainable food production (The Star, 2022). The urgent need to solve this issue is highlighted by the significant amount of solid waste generated daily in Malaysia, particularly in Shah Alam, a prominent city in food production (The Star, 2022).

Consequently, the main objective of this study is to evaluate the attitudes, quantities, and impacts of global warming on food waste among hotel operators in Shah Alam, Malaysia. Scholarly attention to food waste behaviour among hospitality operators has been comparatively less than that of tourists or hotel guests (Luu, 2020). By examining these factors, the study intends to provide insights into how hotel operators' behaviour affects food waste production and its potential to cause global warming by looking at these variables. This research is essential for developing targeted strategies to reduce food waste within the hospitality sector, promoting sustainability and resource efficiency in local contexts.

Problem Statement

Hotels significantly contribute to food consumers and daily food waste production (Kasavan et al., 2017). According to research by Amicarelli et al. (2021), hotel operators are responsible for about 75% of food waste among all solid waste. This is due to various reasons, including factors ranging from kitchen staff expertise to supplier dynamics and hotel guest behaviours. Hotel operators often dealing with food waste at multiple stages of operations-from purchasing, storing, preparation and serving to cleaning. The attitudes of hotel operators are essential as how there are dealing with the food waste. Daily practices such as over-preparation to make sure customers is satisfied may lead to food waste especially buffet-style dining that led to excess food that is not consumed. This issue underscores the critical sustainability issue posed by food waste in the hotel industry. To reduce the adverse effects of food waste on the environment and operational costs associated with wasted food resources (Sandaruwani & Gnanapala, 2016). There remains a research gap in understanding how specific behaviours and attitudes of hotel operators in Shah Alam, Malaysia, contribute to food waste generation and its implications for global warming. Because of its size and high food product turnover, the hotel business plays a major role in the global food waste issue. For instance, food waste breaks down in landfills to produce methane, a strong greenhouse gas that has the potential to accelerate climate change and global warming.

According to Parfitt et al. (2010), the tourism and hotel industry operates on seasonal cycles, with June to August being the peak months and November to March being the off-peak times when hotel occupancy is expected to be higher. Travelers' decisions are frequently influenced by their preferences for food and culture, with local cuisine being a significant attraction. But despite these advantages, the hospitality sector produces substantial food waste, exacerbated by the industry's growth (Parfitt et al., 2010). This situation presents a critical sustainability challenge due to its environmental and economic implications (Yusof, 2019). It is essential to understand hotel operators' specific behaviours and practices that lead to food waste during peak and off-peak seasons to create effective waste management tailored to the hospitality industry.

This study aims to address this gap by evaluating the attitudes, quantities, and environmental

impacts of food waste produced by hotel operators in Shah Alam; together, the findings will be invaluable in helping to develop focused interventions that will improve sustainability within the hospitality sector. For this reason, additional research is necessary on the attitudes, quantities, and global warming potential of hotel employees' behaviour toward food waste.

Literature Review

Food waste in the hospitality industry

According to Gustavson et al. (2011), an estimated 1.3 billion tonnes, or more than one-third, of the world's food production is wasted or lost annually. In the hospitality sector, large hotels have stringent procedures prohibiting staff and visitors from taking leftover food because of health and safety concerns (Okumus, 2019). This strategy contributes significantly to food waste management challenges despite potential cost savings from reducing buffet leftovers and overproduction (Okumus, 2019).

Research indicates that various internal and external factors influence food waste in commercial kitchens. Internal factors include kitchen operations management, such as staff skills and communication structures with suppliers, customers, and staff (Betz et al., 2015; Katajajuuri et al., 2014). Unexpected increases in attendance might result in increased food waste. Therefore, external factors like fluctuating guest numbers pose additional challenges that can lead to greater food wastage (Hennchen, 2019).

However, the Environmental Protection Agency (2020) emphasises that hotels may be able to reduce trash-related costs by 44%, highlighting the environmental benefits of waste separation and responsible disposal practices. According to EPA estimates, the food retail, food service, and residential sectors generated 66 million tonnes of food waste in 2019, of which about 60% was disposed of in landfills. Manufacturing and processing food and beverages produced 40 million tonnes of food waste, with anaerobic digestion accounting for most of this waste (42.6%). Despite these opportunities, hotel policies often prioritise safety and hygiene over food waste reduction (EPA, 2020).

For the hotel industry, reaching zero food waste remains a major challenge (Sandaruwani & Gnanapala, 2016). However, sustainable food waste management practices throughout hotel operations, from purchasing to disposal, can help minimise waste and optimise resource usage, thereby reducing overall operational costs (Sandaruwani & Gnanapala, 2016).

Food waste in hotels

Food waste is primarily produced during food preparation (32%), presentation at buffets (20%), and on consumers' plates (20%) in the hotel business. 15%of the waste, on the other hand, cannot be attributed to any stage of the process; only 11% is the result of overproduction, and 2% is the result of storage. In addition to the hotel management and staff's effort to reduce food production, storage and presentation waste, guests also play a critical part in reducing edible plate waste (Antonschmidt & Durlacher, 2021).

Hotel employees' behaviour

The Theory of Planned Behaviour (TPB) is often used in environmental studies. Its core principle is that human behaviours are based on rational decision-making. TPB recognises that behaviour is influenced by a combination of social and personal influences. According to TPB, behaviours are influenced by attitudes, subjective norms, and perceived behavioural control. Furthermore, TPB claims that these elements together form an individual's intention, which may result in the actual behaviour.

Attitudes of hotel operators

According to the theory of Planned Behaviour, attitude is the extent to which a person holds a favourable or unfavourable evaluation or assessment of a particular behaviour. Two different aspects influence an individual's perspective on food waste. Chawla et al. (2022) describe these factors as the individual's belief about the behaviour (e.g., whether food waste is terrible) and the value placed on the outcome (e.g., whether the effort to prevent waste is considered valuable, reflecting the perceived investment). People with positive or negative attitudes about wasting food will likely dispose of less food (Chawla et al., 2022). Furthermore, studies conducted on Generation Z hospitality employees have shown that they tend to produce less waste if they have positive attitudes toward waste prevention and negative attitudes toward food waste (Goh & Jie, 2019). This is because individuals generally act in behaviours inconsistent with their positive attitudes and avoid actions associated with negative attitudes. Better practices can result from positive attitudes towards training and continuous education about food waste. Therefore, a deep understanding of the factors influencing hotel operators' behaviour, such as attitudes, reasons for waste, and waste quantities, is essential to developing successful strategies.

Hotel operators' behaviour, such as purchasing, cooking, serving and storing food, all contribute to food waste development, an environmental problem. Regarding food waste prevention, the gender of the person responsible for grocery shopping has an impact, but so does the level of aggravation and educational attainment (Koivupuro et al., 2012). Hoteliers should design a food waste management policy with specific objectives, methods, and goals to reduce food waste while maintaining safety and hygienic standards. In other words, hotel food waste reduction policies should target the situations and behaviours that lead to food waste and promote a waste-reduction culture in hotel operations (Kasavan et al., 2017).

H1: *There is a significant impact on the attitudes of hotel operators' behaviour toward food waste*

In summary, hotel operators' behaviour towards food waste has a significant impact on their actions and habits, which in turn affects the total amount of wasted generated. Increased knowledge, improved procedures, and proactive initiatives can result in considerable reductions in food waste when paired with positive attitudes and a supportive work environment.

Quantities of food waste managed by the hotel operators

Food loss is defined by the Food and Agriculture Organization of the United Nations (FAO) (2015a, page 1) as "the decrease in quantity or quality of food intended for human consumption that are ultimately not eaten by people or that have incurred a reduction in quality reflected in their nutritional value, economic value, or food safety." In addition, each stage of the food distribution chain is responsible for the production of significant emissions as well as local and international environmental repercussions (Read et al., 2020)

Amicarelli et al. (2021) suggested appropriate methods to quantify and quality food loss and waste along the food supply chain. These methods include direct measurement, waste composition analysis, volumetric assessment, mass balance, counting/scanning, and diaries. These methods are all appropriate strategies to give understanding, collect information, and identify hotspots in location and time; precise food waste measurement is necessary. In addition, it is essential to keep a record of the factors that lead to food waste production, as well as the quantity of trash produced and the disposal methods associated with it (Amicarelli et al., 2021). Avoidable food waste is hospitality food waste that the food service industry can entirely or partially regulate. Over-portioning or overcooking might result in significant waste if hotel guest doesn't consume it. On the other hand, extra food can be reduced with precise portioning and preparation based on guest counts and preferences. Well-trained employees are more likely to understand food waste practices, such as minimising overproduction or finding initiatives ways to use leftovers creatively (Zainab et al., 2022) for instance, using vegetable scraps for stocks or turn potential waste into valuable food products.

H2: *There is significant impact between hotel operators' behaviour towards quantities of food waste.*

In summary, hotel operators' behaviour has a direct impact on the quantity of food waste produces. These actions ranging from food preparation, storing, operation and serving to hotel guest directly. Hotels may greatly minimise food waste by cultivating a culture of awareness, offering appropriate training, and implementing efficient practice on waste-reduction strategies.

Global warming effects

One of the problems with wasting food is the impact it has on the surrounding environment. For decades, researchers have been interested in trying to get to the bottom of what's causing the rise in global warming effect. According to Adhikari et al. (2006), food waste can be a source of greenhouse gas emissions, just one of the numerous factors contributing to global warming. It's a well-known fact that food waste is biodegradable, making it a major source of methane, a strong greenhouse gas contributing significantly to global warming. Large quantities of food resulting from the over-portioning or overcooking also increases methane emission from organic matter decomposing in landfills. Considering these concerns, evaluating the food waste streams across the supply chain and the environmental impacts, including Global Warming Potential (GWP), wastewater, and land use, is imperative. This is because most of the research that is now accessible has only evaluated these three impact categories (Tonini et al., 2018)

To reduce food waste, more attention must be taken into consideration where preventative measures are indicated in the waste system. This underlines the significance of the quantity of food waste and the potential values for global warming. Given that food production has the most significant potential to contribute to global warming, an effect such as this may only be considered "food waste-related". It falls under "food production-related" and is consequently included in another scientific study (Amicarelli et al., 2021). Different food waste disposal techniques on GWP have varying impacts. Food waste can be sent to compost instead of landfills, which can be more environmentally friendly because compositing will lower the methane emissions. However, improperly composting practices might still result in GWP issues if not managed well.

There are two ways that food waste affects the environment: the first is when it is produced, and the second is when it is thrown out. Because primary food production, which occurs upstream in the supply chain, has the most significant environmental impact, and because surplus food donation is an excellent alternative to food waste prevention at the production stage, one solution to avoid food waste having a double effect is related to donation and an efficient food diversion system (i.e., not landfill, but composting).

H3: *Hotel operators' behaviour towards food waste has a significant impact on global warming potential.*

In summary, reducing food waste will results in resource conservation as well as a reduction in greenhouse gas emissions related to food production, transportation, and disposal. In order to mitigate the environmental impact and lowering global warming effect, hotels can make a substantial contribution by raising awareness and implementing effective waste management strategies in the workplace.

Methodology

To evaluate hotel operators' behaviour regarding food waste management, this study utilised a quantitative research methodology focusing on hotel operators of the four and five hotels at the Back of the House of Shah Alam. Purposive sampling was employed to guarantee the data's authenticity and applicability. This method was chosen because it can select participants based on specific criteria that align with the research objectives. The selection focused on kitchen staff and food and beverage personnel who were actively involved in food handling, including preparation, cleaning, and storage, where the main focus of the selection process was ensuring that participants had a significant amount of exposure to an experience with food waste management.

The sampling frame was constructed with the assistance of the Ministry of Tourism, Arts, and Culture (MoTAC), which provided a comprehensive list of four- and five-star hotels in Shah Alam. According to MoTAC, the total workforce in these hotels was approximately 320 individuals as of 2022. Krejcie and Morgans's (1970) table was used to calculate the sample size for a population this size; 177 respondents were the recommended sample size.

The research utilised self-administered questionnaires as the primary data collection tool. These surveys were designed to measure various aspects related to food waste, including attitudes, quantities of waste, global warming potentials, and hotel operators' behaviors. The Likert scale used in the questionnaires, which had five possible points, was verified through previous studies. Participants were sent a link to a Google Form with the questionnaire. Detailed instructions were provided, and screening questions were asked to ensure only eligible respondents could access and complete the survey.

Data collection

Development of questionnaire

The survey questions were modified and adapted from (Flanagan & Priyadarshini 2021). Respondents were asked to indicate their agreement on 5-point Likert scales ranging from (1) "strongly disagree" to (5) "strongly agree" instead of 7-point or 10-point Likert scales; 5-point scales are more straightforward to answer and require less time. A web-based questionnaire contains five sections. It includes attitudes, quantities, global warming potential, and the hotel operators' behaviour towards food waste. The questionnaire was condensed by eliminating unnecessary questions to increase the response rate.

Moreover, only important demographic information was obtained. In addition, the English questionnaire was translated semantically into Bahasa Malaysia with the assistance of a lecturer from the Academy of Language Studies on the UiTM Penang campus. The final questionnaire was delivered in bilingual format (English and Malay versions).

Table 2. Questionnaire Items

Variables	Item
Attitudes	I have a bad conscious when I waste food.
	There is often food I waste which could have been avoided
	I try to avoid wasting food, but I often catch myself doing so.
	I feel guilty when I waste food because others don't have enough to eat.
Quantities	During food preparation I take care to use everything possible.
	If something remains after cooking, I freeze it for a later use.
	I always prepare more food than needed.
	I am worried about the cost of food that I throw away.
	I keep leftovers food for the next day.
Global warming potential	I do not think of the environmental impact when wasting food.
	Food-waste is not an environmental problem because its biodegradable.
	I feel disturbed by the amount of food being wasted since it takes a lot of resources to grow, process, package and transport food.
	Food packaging is a bigger environmental issue than food waste.

Pilot test

A pilot study involving 30 respondents from Shah Alam Hotel was conducted to assess the study instruments' clarity, comprehension, validity, and reliability. According to Johanson and Brooks (2010), an initial study must have a minimum sample size of 30 participants to be considered valid and reliable.

Reliability analysis

Cronbach's alpha values were computed for the survey's four sections based on the pilot sample of 30 respondents. The results indicate high reliability, with attitudes scoring 0.79, quantities scoring 0.76, global warming potential influence scoring 0.63, and hotel operators' behaviour towards food waste scoring 0.70.

Table 1. Cronbach's Alpha Value

Variables	Cronbach's Alpha	No. of Items	Number of Cases
Attitudes	0.79	5	30
Quantities	0.76	4	30
Global Warming Potential	0.63	5	30
Hotel Operators' Behaviour	0.70	5	30
N=30			

Findings

SPSS version 28.0 was used in this study's statistical analysis. This analysis evaluated the relationships among variables and tested the hypotheses. The significance level for hypothesis testing was set at 0.05, and findings were used to support or refute the hypotheses. The study received ethical approval from the Research Ethics Committee at Universiti Teknologi MARA, with reference number BERC/11/2022 (UG/MR/130).

Multiple Regression Test

To analyse the relationship between the independent variables and dependent variable, multiple regression analysis was performed. The purpose of this study is to evaluate the following hypotheses: H1, H2, and H3, which are the attitudes, quantities, and global warming effects of food waste produced by hotel operators in Shah Alam.

Table 3. Multiple regression analysis

	Beta	*t*	*Sig.*
Attitudes (E)	-0.166	2.514	.013
Quantities (ET)	0.339	5.540	.001
Global Warming Effects (ID)	0.380	5.714	.001
$p < 0.05$ R Square = 0.835F = 291.627			

The multiple regression analysis investigated the relationship between independent variables—Attitudes, Quantities, and Global Warming Effects—and the dependent variable, hotel operators' behaviour towards food waste.

Attitudes (E): The Beta coefficient ($\beta = -0.166$, $p > 0.05$) suggests that hotel operators' attitudes towards food waste are not significantly related to their behaviour. This indicates that the strength of attitudes does not influence an increase in food waste among hotel operators (H1 not accepted). Quantities (ET): The Beta coefficient ($\beta = 0.339$, $p < 0.05$) indicates a significant positive relationship between the quantities of food waste and hotel operators' behaviour. A stronger emphasis on managing quantities effectively correlates with increased efforts in food waste reduction (H2 accepted). Global Warming Effects (ID): The Beta coefficient ($\beta = 0.380$, $p < 0.05$) shows a significant positive association between hotel operators' behaviour towards food waste and its affecting global warming potential. This suggests that the behaviour of hotel operators toward food waste contributes significantly to the environmental impact, particularly regarding global warming (H3 accepted).

Overall, the regression model (R Square = 0.835, F = 291.627, $p < 0.05$) demonstrates that only quantities and global warming effects influence hotel operators' behaviour towards food waste. Effective strategies to improve these factors can lead to more sustainable practices within the hospitality industry.

Discussion

The primary focus of this study was to evaluate how hotel operators' behaviour toward food waste affects attitudes, quantities, and global warming.

Attitudes (H1)

Hypothesis one (H1) was not supported by the findings, indicating any significant relationship between respondents' attitudes and hotel operators' behaviour towards food waste. The relationship between environmental values and attitudes toward food waste has been the subject of conflicting research in the past (Secondi et al., 2015). Research indicates that attitudes alone will not significantly reduce waste, despite attempts to raise awareness of food waste's negative effects on the environment (Principato et al., 2015). This suggests that while environmentally conscious individuals tend to waste less food, attitudes alone may not significantly influence hotel operators' behaviour towards food waste.

The findings from this study highlight the intricate relationship between organisational policies and hotel operators' behaviour toward food waste management in the corporate hospitality sector. Prior studies have indicated that hotel operators may not fully engage with positive attitudes at work if they perceive their choices are limited by strict organisational policies (such as those established by management) (Chawla et al., 2022). This is particularly relevant in the hospitality industry, where management usually sets operational guidelines through training, rules and standard operating procedures. For instance, many corporate hotel chains and commercial restaurants follow set menus and recipes decided by management teams that may be distant from daily operations. This top-down approach may limit the operational staff's flexibility and capacity to take proactive measures to reduce food waste. As a result, employees might feel constrained in their efforts to reduce food waste despite their commitment to sustainability.

Furthermore, the study is consistent with previous research suggesting that food waste prevention is often perceived as challenging. Strategies for reducing waste effectively need a lot of time, additional effort, and intentional behavioural changes (Chawla et al., 2022). These results highlight the need for more adaptable and encouraging organisational practices that empower staff to participate more actively in waste reduction efforts. By addressing the limitations imposed by stringent policies and providing employees with greater autonomy and resources, hospitality organisations can enhance their food waste management practices and foster a more positive attitude toward waste reduction.

Quantities (H2)

The investigation discovered a significant and favourable correlation between the amount of food waste and hotel operators' behaviour. This supports the notion that food waste practices are influenced by operational priorities, where food waste prevention may not be a top concern (Revilla & Salet, 2018). Despite efforts, a substantial portion of food waste occurs at the consumption level (Shabanali et al., 2019).

Food wastage typically occurs in two main areas: the Back of House (BoH) and the Front of House (FoH). Waste can be controlled in the BoH by using appropriate preparation methods, which cover procedures like trimming, peeling, deboning, and packaging. Additionally, minimising ingredient waste before preparation is advised, highlighting the need for hotel operators to be vigilant (Zainab et al., 2022). In the FoH, plate waste can be reduced by adjusting portion sizes. This calls for precise estimation of the correct portion sizes and organisational knowledge to minimise waste. While using modern waste management equipment is possible, it is frequently more economical to concentrate on employee training and implementing robust supervision to ensure everyone has the same goal of reducing food waste. This approach, supported by various researchers, proves effective and emphasises the role of consistent practices and staff involvement in achieving waste reduction.

Global Warming Potential (H3)

The study's findings supported hypothesis three (H3), revealing a significant relationship between global warming potential and hotel operators' behaviour towards food waste. Food waste volumes and their environmental impact can illustrate to consumers and organisations how important it is to reduce food waste (Djekic et al., 2019). This emphasises the importance of integrating environmental considerations into waste management practices within the hospitality sector.

Practical implications

The research's conclusion has several applications, especially in the Malaysian context, for improving food waste management techniques. These implications provide valuable guidelines for food service operators to refine their workplace waste management practices. Food waste, for instance, has an impact on the social, economic, and environmental elements of many industrial sectors, leading to higher expenses and lower earnings. Thus, a strategic strategy is required to guarantee that firms can save costs and boost overall economic efficiency by minimising food waste. Regarding the environmental impact, we may reduce methane emissions and preserve natural resources. Furthermore, businesses that efficiently handle and minimise food waste are perceived as more ethical and responsible, which can improve their reputation as a brand and increase consumer loyalty.

Conclusion

The findings provide insightful information into hotel operators' attitudes toward food waste, its quantitative impact, and its effects on global warming in Shah Alam. The study emphasises the importance of hotel operators' behaviours in affecting food waste production and its environmental impact. While the research did not find a significant link between attitudes and hotel operators' behaviours towards food waste, it highlights the importance of practical measures and operational priorities in waste management.

The current study has also explored ways to deal with issues in food waste management, including reducing food waste, lowering waste management costs, and promoting environmental sustainability within the hospitality industry. Educating hotel operators and consumers about how food waste affects the environment may help mitigate global warming by enabling them to make informed choices.

Looking ahead, the government must prioritise initiatives that address food loss and waste. This includes promoting sustainable practices such as encouraging local produce, community farming projects, and national campaigns to improve food waste management and reduce food loss. Such measures will help protect food security and contribute to a more sustainable future.

Recommendation

Moving forward, efforts should focus on implementing targeted strategies that integrate environmental considerations into hotel operations and policy frameworks. By leveraging the insights gained from this study, stakeholders can develop effective interventions to foster a more sustainable and resource-efficient food system. This study lays the groundwork for future research to refine food waste management strategies and enhance the sustainability practices of hotels in Shah Alam and beyond.

Co-Author Contribution

The authors confirmed that there is no conflict of interest in this article. Author 1 carried out the fieldwork and prepared the literature review. Author 2 wrote the research methodology. Authors 3 and 4 did the statistical analysis. Author 5 interpreted the results.

References

86,177 Tonnes of food wasted in Malaysia last Ramadhan. (2024, March 15). *Bernama*. https://www.bernama.com/en/infographics/index.php?v=12084

Adhikari, B. K., Barrington, S., & Martinez, J. (2006). Predicted growth of world urban food waste and methane production. *Waste Management and Research, 24*(5), 421–433. https://doi.org/10.1177/0734242X06067767

Amicarelli, V., Aluculesei, A.-C., Lagioia, G., Pamfilie, R., & Bux, C. (2022). How to manage and minimize food waste in the hotel industry: An exploratory research. *International Journal of Culture, Tourism and Hospitality Research, 16*(1), 152-167. https://doi.org/10.1108/IJCTHR-01-2021-0019

Amicarelli, V., Fiore, M., & Bux, C. (2021). Hidden flows assessment in the agri-food sector: Evidence from the Italian beef system. *British Food Journal, 123*(13), 384–403. https://doi.org/10.1108/BFJ-05-2021-0547

Amicarelli, V., Lagioia, G., & Bux, C. (2021). Global warming potential of food waste through the life cycle assessment: An analytical review. *Environmental Impact Assessment Review, 91*(June), 106677. https://doi.org/10.1016/j.eiar.2021.106677

Antonschmidt, H., & Lund-Durlacher, D. (2021). Stimulating food waste reduction behaviour among hotel guests through context manipulation. *Journal of Cleaner Production, 329*, 129709. https://doi.org/10.1016/j.jclepro.2021.129709

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. https://doi.org/10.1016/j.wasman.2014.09.015

Chawla, G., Lugosi, P., & Hawkins, R. (2022). Factors influencing hospitality employees' pro-environmental behaviours toward food waste. *Sustainability, 14*, 9015. https://doi.org/10.3390/su14159015

Deraman, F., Ismail, N., Mod Arifin, A. I., & Mostafa, M. I. A. (2017). Green practices in the hotel industry: Factors influencing the implementation. *Journal of Tourism, Hospitality & Culinary Arts (JTHCA), 9*(2), 1-12.

Djekic, I., Miloradovic, Z., Djekic, S., & Tomasevic, I. (2019). Household food waste in Serbia – Attitudes, quantities and global warming potential. *Journal of Cleaner Production, 229*, 44–52. https://doi.org/10.1016/j.jclepro.2019.04.400

Farr-Wharton, G., Foth, M., & Choi, J. H. J. (2012). Colour coding the fridge to reduce food waste. In *Proceedings of the 24th Australian Computer-Human Interaction Conference, OzCHI 2012* (pp. 119–122). https://doi.org/10.1145/2414536.2414556

Flanagan, A., & Priyadarshini, A. (2021). A study of consumer behaviour towards food waste in Ireland: Attitudes, quantities and global warming potentials. *Journal of Environmental Management, 284* (February), 112046. https://doi.org/10.1016/j.jenvman.2021.112046

Goh, E., & Jie, F. (2019). To waste or not to waste: Exploring motivational factors of Generation Z hospitality employees toward food wastage in the hospitality industry. *International Journal of Hospitality Management, 80*, 126–135. https://doi.org/10.1016/j.ijhm.2018.10.006

Gustavsson, J., Cederberg, C., Sonesson, U., Van Otterdijk, R., & Meybeck, A. (2011). *Global food losses and food waste*. Food and Agriculture Organization of the United Nations. https://www.researchgate.net/publication/267919405_Global_Food_Losses_and_Food_Waste

Hennchen, B. (2019). Knowing the kitchen: Applying practice theory to issues of food waste in the food service sector. *Journal of Cleaner Production, 225*, 675–683. https://doi.org/10.1016/j.jclepro.2019.03.293

Johanson, G. A., & Brooks, G. P. (2010). Initial Scale Development: Sample Size for Pilot Studies. *Educational and Psychological Measurement*, 70, 394-400. http://dx.doi.org/10.1177/0013164409355692

Kasavan, S., Mohamed, A. F., & Halim, S. A. (2017). Sustainable food waste management in hotels: Case study Langkawi UNESCO global geopark. *Planning Malaysia*, *15*(4), 57–68. https://doi.org/10.21837/pmjournal.v15.i4.317

Kim, M. H., Song, H. B., Song, Y., Jeong, I. T., & Kim, J. W. (2013). Evaluation of food waste disposal options in terms of global warming and energy recovery: Korea. *International Journal of Energy and Environmental Engineering*, *4*(1), 1–12. https://doi.org/10.1186/2251-6832-4-1

Koivupuro, H. K., Hartikainen, H., Silvennoinen, K., Katajajuuri, J. M., Heikintalo, N., Reinikainen, A., & Jalkanen, L. (2012). Influence of socio-demographical, behavioural and attitudinal factors on the amount of avoidable food waste generated in Finnish households. *International Journal of Consumer Studies, 36*(2), 183–191. https://doi.org/10.1111/j.1470-6431.2011.01080.x

Lee, H. (2019). Understanding ethical consumers through person/thing orientation approach. *Journal of Business Ethics, 158*(3), 637–658. https://doi.org/10.1007/s10551-017-3661-9

Luu, T.T. (2020). Reducing food waste behavior among hospitality employees through communication: Dual mediation paths", *International Journal of Contemporary Hospitality Management*, 32(5), 1881-1904. https://doi.org/10.1108/IJCHM-09-2019-0779

Marangon, F., Tempesta, T., Troiano, S., & Vecchiato, D. (2014). Food waste, consumer attitudes and behaviour: A study in the North-Eastern part of Italy. *Italian Review of Agricultural Economics, 69*(2–3), 201–209. https://doi.org/10.13128/REA-16922

Okumus, B. (2019). How do hotels manage food waste? Evidence from hotels in Orlando, Florida. *Journal of Hospitality Marketing and Management*, 29(1), 1-19. https://doi.org/10.1080/19368623.2019.1618775

Parfitt, J., Barthel, M., & MacNaughton, S. (2010). Food waste within food supply chains: Quantification and potential for change to 2050. *Philosophical Transactions of the Royal Society B: Biological Sciences, 365*(1554), 3065–3081. https://doi.org/10.1098/rstb.2010.0126

Parry, A., James, K., & LeRoux, S. (2015). Strategies to achieve economic and environmental gains by reducing food waste. *Waste and Resources Action Programme (WRAP), Banbury, UK* (Issue August 2014). www.wrap.org.uk

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

Read, Q. D., Brown, S., Cuéllar, A. D., Finn, S. M., Gephart, J. A., Marston, L. T., Meyer, E., Weitz, K. A., & Muth, M. K. (2020). Assessing the environmental impacts of halving food loss and waste along the food supply chain. *Science of the Total Environment, 712*, 136255. https://doi.org/10.1016/j.scitotenv.2019.136255

Sandaruwani, J. A. R. C., & Gnanapala, W. K. A. C. (2016). Food wastage and its impacts on sustainable business operations: A study on Sri Lankan tourist hotels. *Procedia Food Science, 6*(Icsusl 2015), 133–135. https://doi.org/10.1016/j.profoo.2016.02.031

Secondi, L., Principato, L., & Laureti, T. (2015). Household food waste behaviour in EU-27 countries: A multilevel analysis. *Food Policy, 56*, 25–40. https://doi.org/10.1016/j.foodpol.2015.07.007

Shabanali, H., Aramyan, L. H., Sijtsema, S. J., & Alambaigi, A. (2019). Determinants of household food waste behavior in Tehran city: A structural model. *Resources, Conservation & Recycling, 143*(August 2018), 154–166. https://doi.org/10.1016/j.resconrec.2018.12.033

The Star. (2022). M'sians continue to waste food. https://www.thestar.com.my/news/nation/2022/06/06/msians-continue-to-waste-food

Tonini, D., Albizzati, P. F., & Astrup, T. F. (2018). Environmental impacts of food waste: Learnings and challenges from a case study on UK. *Waste Management, 76*, 744–766. https://doi.org/10.1016/j.wasman.2018.03.032

When good food goes to waste. (2024, February 4). *The Star*. https://www.thestar.com.my/news/education/2024/02/04/when-good-food-goes-to-waste

Wikström, F., Verghese, K., Auras, R., Olsson, A., Williams, H., Wever, R., Grönman, K., Kvalvåg Pettersen, M., Møller, H., & Soukka, R. (2019). Packaging strategies that save food: A research agenda for 2030. *Journal of Industrial Ecology, 23*(3), 532–540. https://doi.org/10.1111/jiec.12769

Yusof, M. S. (2019). Understanding the importance of biodiversity and conservation and its symbiotic relation with mankind based on international and national legal setting. *GADING (Online) Journal for Social Sciences, 21(1), 29-33.* https://gadingssuitm.com/index.php/gadingss/article/view/12/203

Zainab, S., Zainal, N. A. M., Sulong, S. N., & Bakar, A. M. F. (2022). Handling food waste in the hotel industry. *Malaysian Journal of Social Sciences and Humanities (MJSSH), 7*(11), e001926. https://doi.org/10.47405/mjssh.v7i11.1926