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RESEARCH ARTICLE

Evaluating localized conceptions and embedded applications of the Food Waste Hierarchy in luxury hotels

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ABSTRACT

The Food Waste Hierarchy is a prescriptive framework advocating the use of waste prevention and reuse strategies above less sustainable ones such as recycling, recovery, and disposal. However, its adoption and effective deployment in the tourism and hospitality sector remain questionable. This paper examines hospitality workers' conceptions and applications of waste hierarchy principles within the context of routine operations to assess the implications of embedded organizational practices for the adoption of optimal approaches. Primary data were collected through documentary analysis, participant observation, and semi-structured interviews at luxury hotels. The data suggest that the Food Waste Hierarchy is not fully understood. Consequently, choices that do not help to maximize environmental benefits are often adopted. Furthermore, various levels of the hierarchy potentially conflict and undermine the implementation of other options. The findings stress that, although the general principles of the waste hierarchy clearly have merits, the application of this framework within tourism and hospitality is likely to be limited by several contextual factors. These factors shape employees' behaviours and guide organizational routines in hotels that shape the prevention and effective management of food waste.

Introduction

Food waste is increasingly being recognized as a major sustainability challenge. Though the precise measurement of waste is complex, research estimates that the total food discarded as waste is in the region of 1.3 billion tonnes per annum (Filimonau, 2021; Meier et al., 2021; Närvänen et al., 2020). The scale of the problem is concerning since between one-third and half of food produced globally ends up as waste, which continues to make a significant contribution to global greenhouse gas emissions (Filimonau, 2021; Martin-Rios et al., 2018; Meier et al., 2021; Papargyropoulou et al., 2016). Given the increased concern about global food insecurity, it is difficult to rationalize the wastage of edible food. Finn (2014) argued that, in developed countries, wastage is broadly reflective of a 'culture of abundance' and apathy towards food. Bonaccorsi (2015) also noted that wastage was largely a consequence of the relatively low cost and easy availability of food in affluent societies. Food may simply be valued at its monetary cost rather than as a resource essential for human survival, well-being, and good health. For these reasons, the wastage of edible food has continued unabated in domestic as well in commercial foodservice spaces (Principato et al., 2018).

Previous research assessing conceptions and causes of food waste generation, and prevention strategies, has focused extensively on domestic settings (Katan, 2023; Närvänen et al., 2020; Vittuari et al., 2023), and on consumers in commercial settings (Chang, 2022; Dolnicar et al., 2019; Filimonau, Kadum et al., 2022, Filimonau, Matute 2023; Talwar et al., 2023). However, foodservice workers, particularly those involved in food preparation, have received much less attention (Chawla et al., 2021; Filimonau, Chiang, et al., 2023; Luu, 2020). There is limited knowledge regarding foodservice employees and the dynamics surrounding food waste generation in the food preparation context, encompassing receiving, storage, cooking, and service elements. Consequently, there have been growing calls to develop a stronger understanding of how food waste is conceived and addressed among employees working in these 'back-of-house' domains (Chawla et al., 2022; Filimonau, Chiang et al., 2023; Goh et al., 2021).

The hotel industry has attracted criticism and a growing body of research has demonstrated how wasteful practices have become embedded within the sector's food production systems (Bilska et al., 2022; Chawla et al., 2021; Filimonau, Matyakubov, et al., 2022; Leverenz et al., 2021; Tomaszewska et al., 2021). After households and the food processing industry, hospitality (including accommodation and foodservice) generates the most food waste in Europe (FUSIONS, 2016). The problem is pervasive as similar results have been reported in the USA (Environment Protection Agency, 2018), the UK (WRAP, 2017), and Malaysia (Papargyropoulou et al., 2016). Food waste is garnering attention, as it is the second-largest waste category (by weight) in the hospitality and foodservice sectors (WRAP, 2013). This is indicative of embedded issues within hospitality foodservice systems, further punctuated by the fact that up to 75% is avoidable waste (WRAP, 2013). Therefore, it can be argued, that edible food products are allowed to go to waste and that there are significant opportunities for preventing waste from arising (Papargyropoulou et al., 2016; Pirani & Arafat, 2016; Principato et al., 2018).

Previous studies on food waste management demonstrate awareness among practitioners that this is a problematic issue, but one that lacks a coherent framework for redress. Radwan et al. (2012), for example, observed that hotel managers preferred to have food waste removed from the site as quickly as possible instead of seeking alternative uses for it. Others have noted that hotel operators were reluctant to engage with waste management due to a multitude of factors (see Pirani & Arafat, 2014; Sealey & Smith, 2014). These include lack of storage space and facilities; limited options provided by waste collection companies; lack of concern; lack of knowledge and commonly held negative perceptions (such as concerns about hygiene, unpleasant sights and smells, and potentially attracting vermin). However, many studies have signalled a positive change in this regard. Principato et al. (2018) and Camilleri (2021) found that hospitality managers were increasingly more concerned about this issue and were actively taking steps to address it. This shift may primarily have been in response to greater pressure from stakeholders for hospitality businesses to conduct their operations more responsibly (Dhir et al., 2020). Evidently, the literature is divided and there is a lack of consistency regarding waste management practices in the hospitality and tourism industry.

In the context of these international debates, and in response to these pervasive challenges, this study contributes to knowledge by examining localized (i.e. spatially situated) conceptions and embedded (i.e. contextual) applications of the Food Waste Hierarchy (FWH) in luxury hotel operations. The paper is not concerned with staff perceptions of or attitudes towards FWH as an abstracted framework, but rather as something embedded in organizational spatial practices. Empirical data are used to assess how the movement of foodstuffs across organizational spaces potentially influenced staff's perceptions of the status and value of food and of their roles and responsibilities in preventing and managing food waste. The findings highlight how and why various levels of the hierarchy may conflict when applied in hotel operations. Furthermore, it argues that the unique features of the luxury hospitality sector may hinder the practical application of the FWH.

Literature review

The importance of the FWH as a framework to support waste management decisions has been acknowledged internationally (Teigiserova et al., 2020). The framework has guided much of contemporary practice-based research on food waste. The FWH has also been referred to as the Food Recovery Hierarchy (Ceryes et al., 2021) and the 3Rs managerial framework (OECD, 2010). The FWH challenges the premise that waste destined for landfill is an inevitable output of a process (Kopnina, 2018). The framework prioritizes actions that prevent food waste from occurring, distinguishing between four approaches to waste management: reduction/prevention, reuse, recycle, and finally disposal.

The European Union's Directive 2008/98/EC, Article 3 defined waste reduction as measures taken before a product has become unusable and therefore ends up as waste. In other words, reduction focuses on lowering the amount of food waste that is generated. Prevention and reduction of food waste have been given priority and are at the top of the hierarchy. This approach has merit since the reduction in food disposed of as waste directly translates into lower costs for the business. Furthermore, the wastage of resources, such as water and energy used to produce, store, and transport food can also be minimized (Quested et al., 2013). Waste reduction initiatives may span a wide range of possible changes that can be implemented within food and beverage practices in hospitality businesses. Many of these have been examined, including engaging organizations in material flow analysis (Pirani & Arafat, 2016), manipulation of the material work environment to encourage pro-environmental behaviour (Chawla et al., 2020), introducing efficiencies in menu planning (Camilleri, 2021), using smaller plates with buffet service options (Kallbekken & Sælen, 2013), changing service styles (Chang, 2022), and offering guests incentives (Dolnicar et al., 2020).

Despite the preventative practices mentioned above, surplus food production remains commonplace in hotels. This is a result of unpredictable daily fluctuations in demand. For that reason, the reuse of edible food has been advocated (Demetriou, 2022). Reuse is often achieved through redistribution of surplus food items for human consumption. Reuse strategies are gradually being adopted by hotels in various forms. Camilleri (2021) reported that many large hotel chains and other foodservice establishments are increasingly using applications such as ResQ and OLIO to support food redistribution. These apps provide hospitality businesses a platform to advertise food products that are likely to end up as waste at lower cost to potential consumers. In some cases, food products are offered free.

Such reuse policies are clearly directed towards minimizing the amount of food waste going to landfill. The InterContinental Hotels Group (2020) pledged to support local food banks and community projects in 70 countries by donating excess food items. Such initiatives are increasingly being encouraged and supported by governments and local authorities. For example, 'Good Samaritan Food Donation' acts in the USA and Italy protect hospitality businesses by minimizing legal liability for food products donated to charities. Through the Garot Law, France compelled large supermarkets to draw up voluntary agreements to redistribute edible food that would have been wasted and this was extended to include some commercial catering operators. Redirecting surplus food from the buffet for use in staff canteens is another reuse strategy that is commonly employed in hotels (Tomaszewska et al., 2021). It is not always possible to use surplus food for human consumption. In such cases, food products could be used as animal feed in countries in which it is permissible by law (see Dou et al., 2018; Trung & Kumar, 2005). Using food as animal feed helps to preserve valuable nutrients within the food chain and therefore has merit over and above recycling. Notably, this reuse practice was banned in Europe (Food Standards Agency, n.d.).

Recycling refers to attempts to find non-food uses for food waste. Traditionally, hotels have engaged in composting as a suitable method for waste management (Camilleri, 2021; Sealey & Smith, 2014). However, Salama and Abdelsalam (2021) concluded that hotel managers were willing to engage with advanced methods of recycling such as anaerobic digestion. This enables food waste to be transformed into bioenergy. Landfill are at the bottom of the FWH because of

the negative environmental costs associated with this disposal method. Despite this, disposing of food waste in landfill remains common in the industry, because this is viewed as the easiest method in comparison to others (Filimonau et al., 2021; Papargyropoulou et al., 2019).

Methods

Research context and data collection

This paper is based on empirical field research conducted in a multinational hotel chain with a global presence. Two of their 5-star hotels were selected as study sites: the first was located next to one of the busiest and largest UK international airports; the second was in the centre of a German metropolitan city. The two hotels can be considered characteristic and illustrative cases within the luxury hospitality segment in a developed economy context.

Ethical approval for the project was granted by Oxford Brookes University (UREC 160998). Data were collected through interviews, observation, and documentary analysis. Studying documents such as corporate sustainability reports, procedural manuals, alongside standard recipes helped to understand the business context and the organization's strategic decisions regarding purchasing, production, branding, and sustainability-related investments. Document analysis was a key component in data triangulation (Denzin, 2009) to enhance the credibility of the overall findings and conclusions, and the insights gleaned from organizational documents guided the other data collection activities.

Employees who controlled or influenced food-related decision-making or production were invited to participate in interviews, and respondents comprised representatives from all levels of the organizational hierarchy. Individual interviews were conducted with 16 key informants, and a

Table 1. Profile of interviewees and their sphere of influence on food waste.

	Country	Formal title	Spheres of influence on food waste
1	Germany	General Manager	Strategic planning, negotiating supplier contracts, key financial decisions
2	Germany	Director of Operations	Cost, revenue and quality management, new product development
3	Germany	Head Chef	Menu planning, food cost management, employee satisfaction
4	Germany	Assistant Head Chef	Oversee food production, control quality and quantity of food prepared and served
5	Germany	Assistant Restaurant Manager	Buffet replenishment, customer experience management, liaising with chefs regarding demand
6	Germany	Breakfast Assistant Chef	Pre-preparation, preparation, portion control, training
7	Germany	Breakfast Supervisor	Stocktaking, supervising and training apprentices
8	Germany	Waiting Staff	Buffet replenishment, portioning food items, buffet clearing
9	Germany	Waiting Staff	Buffet replenishment, portioning food items, buffet clearing
10	Germany	Waiting Staff	Buffet replenishment, portioning food items, buffet clearing
11	Germany	Waiting Staff	Buffet replenishment, portioning food items, buffet clearing
12	Germany	Apprentice Chef	Pre-preparation, preparation, portion control
13	Germany	Apprentice Chef	Pre-preparation, preparation, portion control
14	UK	Director of Finance	Forecasting, budgeting, capital investment
15	UK	Director of Operations	Operational control, overseeing all departments and managing department heads
16	UK	Head of Sustainability	Equipment maintenance, recording and reporting sustainability metrics
17	UK	Food and Beverage Manager	Menu planning, quality control
18	UK	Food and Beverage Cost Controller	Quality management and stock control
19	UK	Assistant Head Chef	Menu planning and ordering, overseeing operations of all kitchens
20	UK	Senior Sous Chef	Managing food cost, food hygiene, wastage, production standards, menus
21	UK	Sous Chef	Cost, hygiene and waste management, production quality control
22	UK	Sous Chef	Stocktaking, forecasting, ordering, overall management of cold kitchen
23	UK	Restaurant Supervisor	Training and supervising waiting staff
24	UK	Junior Sous Chef	Stocktaking, pre-preparation, food preparation, portioning
25	UK	Breakfast Chef	Food ordering and preparation for breakfast buffet, portioning
26	UK	Back of House Supervisor	Waste disposal and recycling

further 10 participants were interviewed across three group interviews. Table 1 below provides an overview of the interviewees, their formal roles within the business, and spheres of influence concerning food-handling practices.

The interviews used a semi-structured format to explore participants' attitudes towards waste, alongside their perceptions and experiences of waste generation, prevention, and management in the organization more generally, and in their specific work domains. Audio recording of interviews was made with the participants' consent, and these were complemented by extensive hand-written notes. The interview recordings were transcribed manually by the field researcher who collected the data, which helped to ensure the trustworthiness of the transcriptions and ensured the credibility of the analysis in conjunction with the field notes they made.

Observations spanned all areas of food production in each case study hotel, including food procurement, storage, preparation and cooking, service, and eventually disposal. The staff canteens served as an additional location for observing food waste management practices because leftovers were frequently redeployed there. Observations were overt but unobtrusive, and a conscious effort was made not to interfere with the routine operations. This was achieved by positioning the observer away from specific workstations, in areas that allowed a clear view of multiple sections at the same time. In addition to making extensive field notes during observations, informal conversations and follow-up questions to the formal interviews provided additional insights, which were also useful in triangulating the data generated through the other methods.

Data analysis

The general principles of Braun and Clarke's (2013) reflexive thematic analysis were adopted to analyze the qualitative data. We continued to question the positionality and subjectivity of the field researcher in our interpretation of the findings because we remained conscious of the potential influence of observer and social desirability bias in the responses and behaviours. The data and methodological triangulation were useful in ensuring the trustworthiness of the data and analysis insofar as it helped to identify potential discrepancies between what organizational members claimed and what the observations and documentation evidenced. Utilizing the three sources of data also reinforced conclusions where the disparate data showed convergence.

Initially, one member of the research team directly involved with the fieldwork read and re-read interview transcripts and observation notes multiple times as part of a familiarization strategy (see Braun & Clarke, 2013). This was used to identify points of interest in the data and the printed transcripts and fieldnotes were annotated manually. The initial coding by the field researcher was informed by the literature, but these were complemented by open coding. Specifically, the key stages of the FWH provided a useful guiding template for coding and ordering of data, but this was reduced to three broad thematic areas: prevention/reduction, reuse, and recycling in preparation for reporting and display within the context of this manuscript. Subsequent analysis cycles that involved the other members of the research team used focused coding, specifically in attempting to (re)order the data, for example, to distinguish between factors that acted as antecedents to the adoption of one or more waste management strategies.

Findings and discussion

To begin with, it is important to examine how respondents viewed food waste, in context. This is critical since the way people define waste is likely to influence their choices to combat the issue. Defining food waste is fraught with complexity. While some respondents alluded to the notion of avoidable and unavoidable waste, others viewed waste as food products that were usable at some stage but were then rendered unusable (also see Chawla et al., 2021; Food and Agriculture Organisation of the United Nations, 2021). Viewed in relation to the FWH, this suggested that

preventative strategies were adopted to combat avoidable food waste while recovery was seen as the most appropriate for unavoidable waste.

> I would say waste is everything that was edible, but is no longer edible. I think there is a difference between preparation of something, if you prepare an orange juice, you have waste, but it's a necessary waste, you need to get your orange juice. So, waste for me is everything that was edible, that was nutritionally valuable to a human life … is then … not used or is then put into a rubbish bin or put into landfill or whatever.
>
> (Head Chef, Germany)
>
> I guess food waste to me operationally is when it has gone past its use by date. You cannot use it for health and safety reasons, legal reasons.
>
> (Food and Beverage Cost Controller, UK)

Yet others defined waste more simply as food materials that ended up in the bin, regardless of the reason. The implication being that if there was a secondary use, such food products would not normally be classed as waste.

> Food waste for me is food that is thrown away. We did not separate it and it ends up in landfill. It is all about reducing what goes into landfill. For me, food waste is what is in the bin to be disposed of.
>
> (Head of Sustainability, UK)

This contrasts with the European Commission's definition, which stipulates that any food that is removed from the supply chain to be recovered or disposed is also wastage (FUSIONS, 2016). Applying an FWH perspective, if the waste was reused or recycled, they would not classify it as waste but rather has a resource that has some value. This latter approach towards food waste is operationally problematic, as the availability of easy recovery options such as anaerobic digestion may deter employees from pursuing the 'best' option within the FWH. For example, deciding to put food that is still suitable for human consumption but has not been eaten into the easy-to-access anaerobic digestion container at the end of a buffet service rather than engaging in the more time consuming action of sending it for redistribution. Thus, the classification of food that does not end up in landfill as a resource may dissuade employees from preventative actions.

As the above example indicates, food waste is a complex matter, and there were wide differences and a lack of shared understanding in the way respondents perceived waste. This is unsurprising as existing literature has also identified problems in qualifying and quantifying food waste (European Commission, 2015). Hence, waste arising in operational areas may not be identified in the same way as waste arising from serving food to customers via the buffet. In the former context, it may even go unnoticed (Radwan et al., 2012).

Waste prevention/reduction

Waste prevention refers to any activity that avoids the creation of waste, thereby reducing waste quantity in the first place. As per the FWH, waste prevention is the most beneficial option, and one that can maximize socio-environmental benefits. Senior managers at both hotels recognized the pressing need for waste prevention.

> I would say it's higher up the agenda than it's been, because of customer pressure, and also the cost pressure; the pressure is not to waste stuff, and if you can prevent it, then it's better than dealing with the aftermath.
>
> (Director of Operations, UK)
>
> This [food waste prevention] is a challenge for a business like us. But there is definitely an aspirational aspect for us as managers to be responsible and not throw food away; this is an over-arching task that we want to do.
>
> (General Manager, Germany)

Despite management's keen focus on waste prevention, food waste persisted at both case study hotels. Respondents presented various operational realities that counteracted efforts to prevent waste from arising. Employees attributed wastage to a range of factors, including the hedonic nature of luxury hospitality and consumer behaviour (see also Dolnicar et al., 2019; Dolnicar & Juvan, 2019).

> It is a difficult one because the whole point of a hotel is try to … almost encourage greed and encourage waste … because you want to make more revenue … . I say that especially, right, this is how many desserts we've sold, and celebrate the fact that we've sold a 100 desserts when I know that probably 80 desserts out of the 100 we sold were probably fully consumed and 20 were part eaten and chucked in the bin.
>
> (Director of Finance, UK)
>
> So if you order something just to pretty much buy it, and then without tasting it or anything just throw it away, so you get it for getting it and not for eating it.
>
> (Waiter, Germany)

Others also argued that waste prevention was difficult to achieve due to business variability, legalities, and perceived reputational risks stemming from customer dissatisfaction (see also Chawla et al., 2021, 2022; Heikkilä et al., 2016).

> [On the] restaurant side, there are chances of wastage, because it's a prediction, complete prediction, playing like a lottery. How many numbers come in, you don't know.
>
> (Assistant Head Chef, UK)
>
> You don't want to have too much, but you don't also want to run out because you run out … customers kicking off then, you can't have that.
>
> (Junior Sous Chef, UK)
>
> There are some of those HACCP guidance we need to follow, and if we have the hot things, if we have them for more than four hours on the buffet, then we have to throw them away.
>
> (Breakfast Supervisor, Germany)

For these reasons, food waste was often seen as a normative outcome of luxury hotel operations (Chawla et al., 2021, 2022). Unsurprisingly, there was limited consideration given to opportunities for food waste prevention. Instead, reuse or recycling were generally seen as rational strategies, though these were well recognized as less favourable from a sustainability point of view. For example, the General Manager in Germany acknowledged that this approach only mitigated the negative social, economic, and environmental consequences of waste: 'But the principle remains … with the production part of it in my opinion; because the other thing [such as reuse or recycle] can only be a solution … to limit the damage'.

Reuse

According to the FWH, reuse involves the redistribution of surplus food for secondary use. Waste prevention in these luxury hospitality operations was difficult to achieve, and was, therefore, not seen as a practical choice. Previous research by Filimonau et al. (2019) found that the reuse of surplus food was a normative practice in some parts of the hospitality industry, for example in the café sector, where this was possible with certain types of foodstuffs. In contrast, respondents argued that within this organizational context, redirecting surplus food externally was not viable due to fear of legal liability (cf. Demetriou, 2022). Direct quotes below further illustrate this point and explain why reuse was not favoured as an operational practice:

> Yes, in the old times we could send it to the pig farmers, but we cannot do that any more because there is too much coffee in it. I don't know, it has to be processed before but otherwise it is not good for the pigs to eat as well.

(General Manager, Germany)

They [members of staff] are increasingly asking the question – why can't we take it to the homeless? But we can't due to legalities involved, health and safety etc. Twenty years ago, we would take the food out to a soup kitchen, hotels just don't have the time for it. Food has been out on the buffet for two hours – we all say it is a shame, as people will take it, but the legalities …

(Restaurant Supervisor, UK)

Since external redistribution was deemed impractical, both case study hotels had established internal reuse mechanisms. This involved redirecting excess supplies from the buffet to the staff canteen (see also Mourad, 2016; Tomaszewska et al., 2021). Despite relatively easy access to this reuse outlet, few surplus food products were reused. Only those that were of high quality were redirected to canteens. Furthermore, concerns about food safety influenced employees' perceptions and drove their decision to reuse food or not.

I think even in the bread section, there is a lot thrown away because it's not easy to reuse it. Because it's getting dry and it's getting hard and it's not good enough for the staff, better throw it away.

(Assistant Restaurant Manager, Germany)

I witnessed clearing up of buffet after breakfast service and witnessed some interesting events here. Foodstuffs returning from tables in their packaging are thrown away. It is interesting to see how perceptions of food safety change. As soon as food is touched by a customer [even in its packaging], it is no longer deemed safe to eat or be reused.

(Observation log, Germany)

Though reuse of surplus is favoured in the FWH, many employees in the case study hotels suggested that waste prevention was given lower priority because surplus food products could be redirected internally to staff cafeterias and the waste was, therefore, less immediately visible. This indicates that the easy availability of reuse mechanisms may in fact counteract preventative thinking. The redirection of edible food for internal reuse thus remained an active waste management strategy.

But here, what is good here, because we have a staff canteen, we have more chances of recycling instead of wasting.

(Assistant Head Chef, UK)

I think we don't have the issue during production because we reuse some things in the staff canteen.

(Assistant Restaurant Manager, Germany)

However, the efficacy of internal reuse systems could be questioned. The practice of reusing surplus foods in the staff dining area led to unanticipated issues, including a disproportionate percentage of all food waste being channelled through the staff catering facility. The following observation at the UK property is illustrative of this key point:

I just witnessed that a 240-litre bin in the staff canteen is almost full to the brim, and it's only 11.48 am. It seems that all other kitchens bring all their surplus food to the canteen. The canteen cannot cope with the volumes of food coming from other kitchens and being at the end of food chain, [the staff] throw away all the surplus foods.

(Observation log, UK)

The practice of redirecting surplus food indicated that chefs were keen to engage with pro-environmental actions through the reuse strategy. However, a bulk of surplus food items finally ended up in bins albeit in the staff canteen rather than in the kitchen. This suggests that the practice of reuse may be tokenistic, where displacement was perceived to resolve the problem.

Recycle

Recycling was the 'end-of-pipe' solution at the two case study sites. It was highly favoured because it helped to minimize food waste that ended up in landfill while requiring minimal staff effort. This finding reflects an interesting paradox. On the one hand, it shows an interest among employees in embracing practices that are antithetical to sustainability (cf. Principato et al., 2018). On the other, it shows risk aversion to adopting practices that were higher up the FWH, but which may have had implications for customer service and/or legal compliance. The two case study hotels had put rigorous systems in place to recycle their food waste. The hotel in Germany sent their food waste offsite for anaerobic digestion. The UK hotel had an onsite digester for processing food waste.

> We have these digesters that decompose food. We still have the same amount of food waste, it does not change that, it just means that it does not go off site to wherever it goes.

> (Head of Sustainability, UK)

> In Germany, waste in general is a very hot topic; Germans are very much into recycling. Food waste in Germany and especially here in the city is used to make energy with, that's what we do with ours. So, for them as long as they are seeing a beneficial return on food waste, for them … they feel they've done their part.

> (Head Chef, Germany)

Recycling helps to minimize food waste going into landfill. At the same time, excessive reliance on recycling can be questioned for three primary reasons. First, recycling systems do not lead to a reduction in food waste. Second, they do not foster proactive pro-environmental actions among employees. Third, the easy availability of recycling systems may steer hotel employees away from reducing or reusing food waste.

The fact that food waste could be recycled was partly used to rationalize wastefulness at both hotels. It was clear that by recycling food waste, chefs felt that they had done enough towards the business' pro-environmental goals. Waste was largely viewed as a resource, as is evident from the implicit reference to value and the explicit use of 'beneficial return' by the German Head Chef in the previous quote. However, the value that can be derived diminishes progressively from the top to the bottom of the hierarchy. In other words, the fact that not all options depicted in the FWH bring equal socio-environmental returns may not be fully appreciated.

Table 2 summarizes the study's thematic findings, including the key drivers for engaging with food waste management and the organizational practices they generate. It captures the perceived opportunities and principal challenges presented by responsive practices. The table also shows how these organizational practices translate into approaches to managing food waste, with reference to how these correspond to waste hierarchy principles.

Conclusion

Within these luxury hospitality contexts, there was greater emphasis on waste management rather than waste prevention strategies. Disposal options such as landfill and recycling required less effort in comparison to forecasting, redirection and stock control, and waste management strategies at the lower end of the hierarchy also involved fewer organizational and reputational risks than those associated with reuse. Moreover, hotel staff did not necessarily differentiate between waste prevention and sustainable disposal as distinct organizational practices. This suggests that, in practice, boundaries between various levels of the FWH may be blurred. Furthermore, embedded practices such as internal reuse and recycling counteracted preventative behaviour. These represented the normative practice of managing waste in a guilt-free manner. Chefs took comfort in the knowledge that something useful was done with the waste, without fully understanding that this was done in a way that reduced the value of waste rather than maximize it. Evidently, such reactive measures can

Table 2. Summary of key findings.

Key drivers (for engaging with food waste management)	Responsive organizational practice(s)	Perceived opportunities	Principal challenge(s)	Key organizational practices addressing food waste	Primary waste hierarchy approach(es)
Commitment to corporate social responsibility (CSR)	Menu planning	Enhanced brand value	Organizational commitment to responsible practice	Prevent 'upstream' waste generation	Reduce
	Forecasting	Increased CSR profile and impact	Organizational resources available for effective management		
	Stock control				
Business variability	Forecasting	Increased customer satisfaction	Organizational resources available for effective management	Prevent 'upstream' waste generation	Reduce
	Overproduction	Reducing risk to brand reputation	Inability to change consumer behaviour	Use for energy recovery (through anaerobic digestion)	Recycle
Hedonic nature of luxury hospitality consumption	Overproduction	Increased customer satisfaction	Inability to change consumer behaviour	Use for energy recovery (through anaerobic digestion)	Recycle
		Reducing risk to brand reputation		Waste removal	Disposal
Brand standards	Overproduction	Increased customer satisfaction	Inflexibility of brand standards	Use for energy recovery (through anaerobic digestion)	Recycle
		Reduced risk to staff reputation due to complaints		Waste removal	Disposal
Perceived economic value of unused food	Internal redeployment of unused food	Potential to capture lost value	Displaces problem of waste management rather than reducing waste creation	Redirect to staff canteen	Reuse
		Reduced cost of removing waste from premises		Use for energy recovery (through anaerobic digestion)	Recycle
Perceived social value of unused food	External redistribution of unused food	Unused food viewed as 'not wasted' by organization	Food safety legislation	Use for energy recovery (through anaerobic digestion)	Recycle
			Lack of resources and ecosystem for redistribution	Waste removal	Disposal
Perceived organizational value of unused food	Internal redeployment of unused food	Unused food viewed as 'not wasted' by kitchen/chefs(s)	Perceived quality of food	Redirect to staff canteen	Reuse
		Perceived ease	Displaces problem of waste management rather than reducing waste creation		

only limit the negative environmental impacts of food waste in hospitality, and minimize the opportunities for saving on food procurement costs. This suggests that specific conceptions of the various stages of the FWH are in direct conflict and may even undermine the adoption and effectiveness of each other. Furthermore, operational and practical realities may present unique challenges in applying the FWH within the context of hotel operations. These external and contextual forces may limit the practical application of the FWH within the luxury hotel sector.

The findings have a number of implications. Regarding strategic investment, hospitality operators may concentrate their efforts on awareness raising and training that focuses on promoting among staff the value of engaging in preventative behaviours. This may start with challenging embedded attitudes regarding the inevitability of waste within a luxury value proposition. This may seem the most simplistic recommendation and the effectiveness of these strategies will be influenced by the recognition and reward systems that accompany individual efforts to adopt preventative strategies. Moreover, incentives to promote prevention require measurement and other organizational interventions that make visible waste creation and reduction practices to assess the effectiveness of staff efforts at multiple points within organizational processes.

Viewing the food management strategies in these luxury hospitality contexts through the FWH lens highlighted that the transition across different strategies, specifically reuse and disposal, became a form of displacement. Reorienting unused foods to staff meals appeared to compromise the valuation process, where its potential to become waste was obscured. This suggests that the organizations would benefit from mapping the various routes through which food moves across their internal spaces, and to use this to evaluate how these transitions involve diverse management strategies within the waste hierarchy. This could help to identify further intervention points and practices, for example, greater use of blast chilling and freezing in conjunction with batch preparation, which could reduce the need to rely on recycling and landfill solutions.

Alternative strategies that make stronger use of reuse strategies rely on the formation of effective inter-organizational collaborations, operating in functioning ecosystems that enable edible but unused foods to be redistributed to create new forms of value (Amicarelli et al., 2022). This is particularly relevant in the context of current economic crises associated with a dramatic rise in the cost of living, which has driven increased demand for food banks and related support services (Gorb, 2022). The effectiveness of such outsourcing initiatives to pursue reuse solutions according to the FWH may rely on structural changes that fall within the domain of the state, for example, changing legislation and providing tax or other corporate financial incentives to enable better reuse of foods (Demetriou, 2022).

Finally, it should be recognized that the findings of this study are based on data obtained from luxury hotels, embedded in specific spatial locations and with particular relationships with local stakeholders. Waste prevention and reuse practices, including greater opportunities for redistribution, may be carried out differently in other type of hospitality operations such as restaurants, contract caterers, and coffee shops, particularly those operating in locations with greater access to organizations with which to collaborate in managing food waste. A broader examination of the FWH in alternative organizational and operational contexts is therefore recommended to assess how their internal structures, including organizational designs and cultures shape staff's engagement with food waste. Moreover, examining the local dynamics of organizations could identify how inter-organizational relations and ecosystems operate to promote waste prevention or effective reuse of food waste.

Studying staff's localized perceptions and contextual understanding of the FWH, including how they assess the transition of foods across the organization, could also help to address the potential unanticipated effects of alternative waste solutions, including the use of onsite and offsite anaerobic digesters. If these technologies are seen as optimal solutions to food waste, which actually promote strategies lower down the FWH, it may compromise efforts to adopt preventative strategies. Researching staff perceptions and attitudes towards waste solution technologies could thus be a first step in creating internal marketing strategies that promote prevention and reuse above recycling or disposal.

Disclosure statement

No potential conflict of interest was reported by the authors.

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References

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

Bilska, B., Tomaszewska, M., & Kołożyn-Krajewska, D. (2022). The management of meals in food service establishments in the context of food waste – Results of focus group interviews with employees and owners. *Sustainability*, *14*(15), 9258. https://doi.org/10.3390/su14159258

Bonaccorsi, G. (2015). Food and human behaviour: Consumption, waste and sustainability. *Journal of Public Health*, *4*, 606.

Braun, V., & Clarke, V. (2013). *Successful qualitative research*. Sage.

Camilleri, M. (2021). Sustainable production and consumption of food. Mise-en-place circular economy policies and waste management practices in tourism cities. *Sustainability*, *13*(17), 9986. https://doi.org/10.3390/su13179986

Ceryes, C. A., Antonacci, C. C., Harvey, S. A., Spiker, M. L., Bickers, A., & Neff, R. A. (2021). "Maybe it's still good?" A qualitative study of factors influencing food waste and application of the EPA food recovery hierarchy in US supermarkets. *Appetite*, *161*, 105111. https://doi.org/10.1016/j.appet.2021.105111

Chang, Y. (2022). All you can eat or all you can waste? Effects of alternate serving styles and inducements on food waste in buffet restaurants. *Current Issues in Tourism*, *25*(5), 727–744. https://doi.org/10.1080/13683500.2020.1870939

Chawla, G., Lugosi, P., & Hawkins, R. (2020). Evaluating materiality in food waste reduction interventions. *Annals of Tourism Research Empirical Insights*, *1*(1), 100002. https://doi.org/10.1016/j.annale.2020.100002

Chawla, G., Lugosi, P., & Hawkins, R. (2021). Food waste drivers in corporate luxury hotels: Competing perceptions and priorities across the service cycle. *Tourism and Hospitality*, *2*(3), 302–318. https://doi.org/10.3390/tourhosp2030019

Chawla, G., Lugosi, P., & Hawkins, R. (2022). Factors influencing hospitality employees' pro-environmental behaviours toward food waste. *Sustainability*, *14*(15), 9015. https://doi.org/10.3390/su14159015

Demetriou, P. (2022). Hotel food waste in Cyprus: An exploratory case study of hotels in Limassol. *Cogent Social Sciences*, *8*(1), 2026556. https://doi.org/10.1080/23311886.2022.2026556

Denzin, N. (2009). *The research act*. Aldine Transaction.

Dhir, A., Talwar, S., Kaur, P., & Malibari, A. (2020). Food waste in hospitality and food services: A systematic literature review and framework development approach. *Journal of Cleaner Production*, *270*, 122861. https://doi.org/10.1016/j.jclepro.2020.122861

Dolnicar, S., & Juvan, E. (2019). Drivers of plate waste: A mini theory of action based on staff observations. *Annals of Tourism Research*, *78*, 102731. https://doi.org/10.1016/j.annals.2019.05.008

Dolnicar, S., Juvan, E., & Grün, B. (2020). Reducing the plate waste of families at hotel buffets – A quasi-experimental field study. *Tourism Management*, *80*, 104103. https://doi.org/10.1016/j.tourman.2020.104103

Dolnicar, S., Knezevic Cvelbar, L., & Grün, B. (2019). A sharing-based approach to enticing tourists to behave more environmentally friendly. *Journal of Travel Research*, *58*(2), 241–252. https://doi.org/10.1177/0047287517746013

Dou, Z., Toth, J. D., & Westendorf, M. L. (2018). Food waste for livestock feeding: Feasibility, safety, and sustainability implications. *Global Food Security*, *17*, 154–161.

Environmental Protection Agency. (2018). Estimates of generation and management of wasted food in the United States in 2018. Retrieved July 3, 2023, from https://www.epa.gov/sites/default/files/2020-11/documents/2018_wasted_food_report-11-9-20_final_.pdf.

European Commission. (2015). *Closing the loop – An EU action plan for the circular economy*.

Filimonau, V. (2021). The prospects of waste management in the hospitality sector post COVID-19. *Resources, Conservation and Recycling*, *168*, 105272. https://doi.org/10.1016/j.resconrec.2020.105272

Filimonau, V., Chiang, C. C., Wang, L. E., Muhialdin, B. J., & Ermolaev, V. A. (2023). Resourcefulness of chefs and food waste prevention in fine dining restaurants. *International Journal of Hospitality Management*, *108*, 103368. https://doi.org/10.1016/j.ijhm.2022.103368

Filimonau, V., Kadum, H., Mohammed, N. K., Algboory, H., Qasem, J. M., Ermolaev, V. A., & Muhialdin, B. J. (2022). Religiosity and food waste behavior at home and away. *Journal of Hospitality Marketing and Management*, *31*(7), 797–818. https://doi.org/10.1080/19368623.2022.2080145

Filimonau, V., Krivcova, M., & Pettit, F. (2019). An exploratory study of managerial approaches to food waste mitigation in coffee shops. *International Journal of Hospitality Management*, *76*, 48–57. https://doi.org/10.1016/j.ijhm.2018.04.010

Filimonau, V., Matute, J., Kubal-Czerwińska, M., & Mika, M. (2023). Religious values and social distance as activators of norms to reduce food waste when dining out. *Science of the Total Environment*, *868*, 161645. https://doi.org/10.1016/j.scitotenv.2023.161645

Filimonau, V., Matyakubov, U., Allonazarov, O., & Ermolaev, V. A. (2022). Food waste and its management in restaurants of a transition economy: An exploratory study of Uzbekistan. *Sustainable Production and Consumption*, *29*, 25–35. https://doi.org/10.1016/j.spc.2021.09.018

Filimonau, V., Nghiem, V. N., & Wang, L. E. (2021). Food waste management in ethnic food restaurants. *International Journal of Hospitality Management*, *92*, 102731. https://doi.org/10.1016/j.ijhm.2020.102731

Finn, S. M. (2014). Valuing our food: Minimizing waste and optimizing resources. *Zygon*, *49*(4), 992–1008. https://doi.org/10.1111/zygo.12131

Food and Agriculture Organisation of the United Nations. (2021). Food loss and food waste. Retrieved July 3, 2023, from https://www.fao.org/food-loss-and-food-waste/flw-data

Food Standards Agency. (n.d.). Hazard analysis and critical control point, Retrieved July 3, 2023, from https://www.food.gov.uk/business-guidance/hazard-analysis-and-critical-control-point-haccp

FUSIONS. (2016). Estimates of European food waste levels. European Commission. Retrieved July 3, 2023, from http://www.eu-fusions.org/phocadownload/Publications/Estimates%20of%20European%20food%20waste%20levels.pdf

Goh, E., Okumus, B., Jie, F., Djajadikerta, H. G., & Lemy, D. M. (2021). Managing food wastage in hotels: Discrepancies between injunctive and descriptive norms amongst hotel food and beverage managers. *British Food Journal*, *124*(12), 4666–4685. https://doi.org/10.1108/BFJ-05-2021-0513

Gorb, A. (2022). *Food bank demand the rising cost of living*. House of Commons Library. Retrieved July 3, 2023, from https://commonslibrary.parliament.uk/food-bank-demand-and-the-rising-cost-of-living/

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. https://doi.org/10.1016/j.wasman.2016.06.019

InterContinental Hotels Group. (2020). IHG launches global effort to feed local communities in response to COVID-19 pandemic. Rerieved July 3, 2023, from https://www.ihgplc.com/en/news-and-media/news-releases/2020/ihg-launches-global-effort-to-feed-local-communities–in-response-to-covid-19-pandemic

Kallbekken, S., & Sælen, H. (2013). Nudging' hotel guests to reduce food waste as a win–win environmental measure. *Economics Letters*, *119*(3), 325–327. https://doi.org/10.1016/j.econlet.2013.03.019

Katan, L. (2023). How the waste management system's materialised normativity influences engagement in sustainable waste practices. *Journal of Environmental Policy & Planning*, *25*(4), 443–458. https://doi.org/10.1080/1523908X.2023.2171976

Kopnina, H. (2018). Circular economy and cradle to cradle in educational practice. *Journal of Integrative Environmental Sciences*, *15*(1), 119–134. https://doi.org/10.1080/1943815X.2018.1471724

Leverenz, D., Hafner, G., Moussawel, S., Kranert, M., Goossens, Y., & Schmidt, T. (2021). Reducing food waste in hotel kitchens based on self-reported data. *Industrial Marketing Management*, *93*, 617–627. https://doi.org/10.1016/j.indmarman.2020.08.008

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

Martin-Rios, C., Demen-Meier, C., Gössling, S., & Cornuz, C. (2018). Food waste management innovations in the foodservice industry. *Waste Management*, *79*, 196–206. https://doi.org/10.1016/j.wasman.2018.07.033

Meier, T., von Borstel, T., Welte, B., Hogan, B., Finn, S. M., Bonaventura, M., Friedrich, S., Weber, K., & Dräger de Teran, T. (2021). Food waste in healthcare, business and hospitality catering: Composition, environmental impacts and reduction potential on company and national levels. *Sustainability*, *13*(6), 3288. https://doi.org/10.3390/su13063288

Mourad, M. (2016). Recycling, recovering and preventing "food waste": Competing solutions for food systems sustainability in the United States and France. *Journal of Cleaner Production*, *126*, 461–477. https://doi.org/10.1016/j.jclepro.2016.03.084

Närvänen, E., Mesiranta, N., Mattila, M., & Heikkinen, A. (2020). *Food waste management: Solving the wicked problem*. Palgrave Macmillan.

OECD. (2010). *OECD environmental performance reviews: Japan 2010 – waste management and the 3Rs*.

Papargyropoulou, E., Steinberger, J. K., Wright, N., Lozano, R., Padfield, R., & Ujang, Z. (2019). Patterns and causes of food waste in the hospitality and food service sector: Food waste prevention insights from Malaysia. *Sustainability*, *11*(21), 6016. https://doi.org/10.3390/su11216016

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. https://doi.org/10.1016/j.wasman.2016.01.017

Pirani, S. I., & Arafat, H. A. (2014). Solid waste management in the hospitality industry: A review. *Journal of Environmental Management*, *146*, 320–336. https://doi.org/10.1016/j.jenvman.2014.07.038

Pirani, S. I., & Arafat, H. A. (2016). Reduction of food waste generation in the hospitality industry. *Journal of Cleaner Production*, *132*, 129–145. https://doi.org/10.1016/j.jclepro.2015.07.146

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. https://doi.org/10.1016/j.ijhm.2018.02.022

Quested, T. E., Marsh, E., Stunell, D., & Parry, A. D. (2013). Spaghetti soup: The complex world of food waste behaviours. *Resources, Conservation and Recycling*, *79*, 43–51. https://doi.org/10.1016/j.resconrec.2013.04.011

Radwan, H. R., Jones, E., & Minoli, D. (2012). Solid waste management in small hotels: A comparison of green and non-green small hotels in Wales. *Journal of Sustainable Tourism*, *20*(4), 533–550. https://doi.org/10.1080/09669582.2011.621539

Salama, W., & Abdelsalam, E. (2021). Impact of hotel guests' trends to recycle food waste to obtain bioenergy. *Sustainability*, *13*(6), 3094. https://doi.org/10.3390/su13063094

Sealey, K. S., & Smith, J. (2014). Recycling for small island tourism developments: Food waste composting at Sandals Emerald Bay, Exuma, Bahamas. *Resources, Conservation and Recycling*, *92*, 25–37. https://doi.org/10.1016/j.resconrec.2014.08.008

Talwar, S., Kaur, P., Yadav, R., Sharma, R., & Dhir, A. (2023). Food waste and out-of-home-dining: Antecedents and consequents of the decision to take away leftovers after dining at restaurants. *Journal of Sustainable Tourism*, *31*(1), 47–72. https://doi.org/10.1080/09669582.2021.1953512

Teigiserova, D. A., Hamelin, L., & Thomsen, M. (2020). Towards transparent valorization of food surplus, waste and loss: Clarifying definitions, food waste hierarchy, and role in the circular economy. *Science of the Total Environment*, *706*, 136033. https://doi.org/10.1016/j.scitotenv.2019.136033

Tomaszewska, M., Bilska, B., Tul-Krzyszczuk, A., & Kołożyn-Krajewska, D. (2021). Estimation of the scale of food waste in hotel food services – A case study. *Sustainability*, *13*(1), 421. https://doi.org/10.3390/su13010421

Trung, D., & Kumar, S. (2005). Resource use and waste management in Vietnam hotel industry. *Journal of Cleaner Production*, *13*(2), 109–116. https://doi.org/10.1016/j.jclepro.2003.12.014

Vittuari, M., Garcia Herrero, L., Masotti, M., Iori, E., Caldeira, C., Qian, Z., Bruns, H., van Herpen, E., Obersteiner, G., Kaptan, G., Liu, G., Mikkelsen, B. E., Swannell, R., Kasza, G., Nohlen, H., & Sala, S. (2023). How to reduce consumer food waste at household level: A literature review on drivers and levers for behavioural change. *Sustainable Production and Consumption*, *38*, 104–114. https://doi.org/10.1016/j.spc.2023.03.023

WRAP. (2013). Overview of waste in the UK hospitality and foodservice sector. Waste Resource Action Programme. Retrieved July 3, 2023, from https://wrap.org.uk/sites/default/files/2020-10/WRAP-Overview%20of%20Waste%20in%20the%20UK%20Hospitality%20and%20Food%20Service%20Sector%20FINAL.pdf

WRAP. (2017). Estimates of food surplus and waste arising in the UK. Waste Resource Action Programme. Retrieved July 3, 2023, from https://wrap.org.uk/sites/default/files/2021-02/WRAP-Estimates-of-Food-Surplus-and-Waste-Arisings-in-the-UK-2017.pdf