

Resourcefulness of chefs and food waste prevention in fine dining restaurants

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ABSTRACT

The challenge of food waste in top-end, luxury foodservice provision is understudied, especially from the chefs' perspective. This is a major knowledge gap as (in)effective management of food waste depends on chefs' (dis)engagement. This exploratory study employs practice theory to examine how chefs (dis)engage in food waste prevention in kitchens of UK fine dining restaurants. 17 in-depth, semi-structured interviews reveal that chefs have good awareness of food waste and understand its negative socio-economic and environmental implications. Chefs have access to professional equipment enabling them to waste less food. However, the competencies of chefs in resourceful cooking are often limited while corporate policies and procedures discourage resourcefulness in the kitchen. The study's findings suggest that resourceful cooking should become an integral element of hospitality teaching curriculum and chefs' training. Corporate policies and procedures of fine dining restaurants should be streamlined to encourage more active engagement of chefs in food waste prevention.

1. Introduction

The sector of foodservice provision (or catering in some countries) generates significant amounts of food waste (FW) (Vizzoto et al., 2021b). This FW should be prevented to enable sector's progress towards sustainable development goals set by the United Nations (De Visser-Amundson, 2022). Although research on FW in foodservice operations is steadily emerging, there remain critical knowledge gaps which need to be addressed (Wu et al., 2021).

One knowledge gap is the limited focus of analysis (Filimonau and Coteau, 2019). A specialist review by Dhir et al. (2020) demonstrates that most studies on FW in foodservice provision are concerned with restaurants in general and fail to differentiate between specific restaurant categories. This is a major shortcoming as the FW dynamics in, for instance, fine dining and quick-service restaurants are different (McAdams et al., 2019). A more nuanced approach is warranted to examine the phenomenon of FW in each category of catering establishments

(Filimonau and Uddin, 2021).

More detailed FW studies are necessitated for top-end, luxury foodservice providers, such as fine dining restaurants. The population of fine dining restaurants is relatively small which explains why they have only been featured in a handful of studies (Charlebois et al., 2015). The luxury segment of the global foodservice market has been growing rapidly prior to the COVID-19 pandemic (Romeo, 2018). This growth has accelerated environmental externalities, such as FW, thus calling for a dedicated stream of research on how to prevent FW occurrence in fine dining restaurants (Athwal et al., 2019).

Another knowledge gap is the restricted research focus on specific actors of FW in foodservice provision. Although studies are increasingly looking at FW knowledge, perceptions and behaviours of consumers and managers (see, for instance, Vizzoto et al., 2020; Vizzoto et al., 2021b), employees have been under-examined (Goh and Jie, 2019). This particularly concerns chefs, especially in top-end catering establishments, such as fine dining restaurants (Batat, 2021). Chefs are

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responsible for the design and administration of kitchen processes (Chawla et al., 2020) and these processes account for up to 70% of FW in foodservice provision (Filimonau et al., 2020b). This suggests that dedicated research should focus on chefs as they play a major role in FW prevention (Batat, 2020).

This study responds to the call for more nuanced research on the drivers and impediments of environmental sustainability within the luxury segment of foodservice provision set by Athwal et al. (2019). Further, this study responds to Batat (2020)'s call for more active engagement of senior kitchen staff of top-end catering establishments in sustainability research. To this end, this study critically evaluates the role of chefs in preventing FW in fine dining restaurants.

The study considers the problem of FW in foodservice provision through the lens of practice theory (Schatzki, 2018). Practice theory offers a valuable insight into the phenomenon of FW due to its focus on the issue's contextualisation (Kuijjer, 2014). This focus implies that practice theory is concerned with the specific 'context' of FW occurrence (Hennchen, 2019) which varies significantly across restaurant categories (for example, compare fine dining and quick-service) and areas of foodservice operations (for instance, compare kitchen and post-kitchen). This contrasts other theories previously applied in FW studies in foodservice provision, such as theory of planned behaviour (Coşkun and Özbük, 2020) or norm activation theory (Yu et al., 2021). These theories, albeit being useful, employ the generic *cognitive-behavioural* outlook which does not always account for the specific context of FW occurrence, such as in kitchens of fine dining restaurants (Hennchen, 2019). The next section provides a brief overview of existing research on FW in luxury catering establishments and introduces the theoretical basis of the current study.

2. Literature review

2.1. FW in the hospitality and foodservice sector

The sector of hospitality and foodservice provision wastes significant amounts of food; for example, in the EU, it accounts for circa 12% of total FW generated in all economic sectors of the region (Filimonau and Coteau, 2019). Similar figure has been reported for the UK; interesting, however, is that hospitality and foodservice provision is the only sector of the UK economy where the amounts of wasted food have grown since 2011 rather than declined (WRAP, 2020). This highlights the sector of hospitality and foodservice provision as a priority target in national FW prevention strategies in the UK, but also in other countries.

Food is wasted in various sub-sectors of hospitality and foodservice provision, and scholarly research has attempted to shed light on the phenomenon of FW in hotels (Amicarelli et al., 2022), restaurants (Sakaguchi et al., 2018), cafes (Filimonau et al., 2019b), staff and student canteens (Derqui et al., 2018), healthcare facilities (Cook et al., 2022), kindergartens and nurseries (Filimonau et al., 2022a), and cruises (Li and Wang, 2020). Within the different types of hospitality and foodservice operators, restaurants waste the largest amounts of food; for instance, in the UK, they account for 22% of total sector's FW (WRAP, 2020). This positions restaurants as the main targets for FW prevention interventions.

2.2. FW in restaurants

Scholarly research on FW in restaurants has been concerned with measurement and management of FW in different restaurant types and categories (Silvennoinen et al., 2019). Studies have established direct correlation between restaurant size and amounts of wasted food (McAdams et al., 2019). Studies have also identified association between restaurant's specialism and the magnitude of FW they generate (Filimonau and Uddin, 2021).

Research has also attempted to understand the drivers of FW occurrence in restaurants. Studies have looked at quick-service (Sirieix

et al., 2017), casual dining (Filimonau et al., 2019a), and fine dining restaurants (Charlebois et al., 2015), among others. The drivers of FW in restaurants have been established as manifold, and studies have categorised the determinants of FW generation as business- and consumer-related.

The business-related determinants incorporate business models: for example, buffet foodservice wastes more food than a la carte foodservice (Chang, 2022). The business-related determinants are also associated with restaurant size and specialism: for instance, smaller, independent restaurants generate more FW per guest served than large, chain-affiliated businesses (Filimonau and Uddin, 2021). Lastly, personality of restaurant owners/managers and their sustainability orientation influence how much food is wasted in restaurants and how this FW is managed (Principato et al., 2018).

The consumer-related determinants of FW generation in restaurants include socio-demographic, psychological and psychographic factors: for example, females and regular restaurant guests waste more food compared to males and less frequent restaurant customers (Vizzoto et al., 2021a). The consumer-related determinants are also attributed to cultural factors: for instance, the extent of consumer religiosity influences FW occurrence on customer plates (Filimonau et al., 2022b). Situational factors can also play a role: for example, more food is wasted during social events and functions compared with solo dining or dining with close family members (Papargyropoulou et al., 2016). Research has concluded that effective prevention of FW in restaurants requires an understanding of all determinants of FW generation, but also necessitates their careful analysis within the specific context of food consumption.

2.3. FW in fine dining restaurants

The dynamics of FW in luxury catering establishments differs from that in other restaurant settings. While most wastage in quick-service and casual dining restaurants occurs on customer plates, top-end restaurants waste excessive amounts of food in the kitchen (McAdams et al., 2019). Fine dining restaurants apply stricter standards to the visual appearance of dishes (Filimonau et al., 2019a). This scrutiny represents a frequent cause of FW in the kitchen as chefs reject plates that do not comply with their aesthetics requirements (Charlebois et al., 2015). The same holds true for food preparation as only the foodstuffs of premium quality are used in cooking and chefs discard the ingredients of insufficient freshness (Hennchen, 2019). Lastly, unlike many casual dining restaurants, top-end catering establishments do not consider large portions as market differentiators, but excel in quality, presentation, and service instead (Peters and Remaud, 2020). This implies reduced plate waste due to smaller portions (Papargyropoulou et al., 2019). However, this also suggests that more FW occurs in the kitchen as excessive trimming and plating is required to make meals aesthetically pleasing, as discussed above.

Although fine dining represents a growing segment of foodservice provision, only a handful of studies have been concerned with the issue of FW in top-end catering establishments. McAdams et al. (2019) and Papargyropoulou et al. (2019) quantified FW in fine dining restaurants of Canada and Malaysia, respectively. Both studies showcased high magnitude of FW and demonstrated its prime occurrence in food preparation. A survey of foodservice providers in Lebanon (Zeineddine et al., 2021) offered further evidence of large FW generated by luxury catering establishments compared to casual dining restaurants. Bharucha (2018) interviewed a sample of restaurant managers in India, including those from the top-end segment. Commonalities were identified in the FW dynamics across different categories of restaurants, but fine dining establishments had larger wastage occurring in the kitchen. Charlebois et al. (2015) studied fine dining restaurants in Canada. They showcased the important role of quality standards in FW generation but, concurrently, demonstrated the criticality of chefs' decisions for FW prevention in the kitchen. Filimonau et al. (2020b) interviewed a sample of senior

managers in China, including those from top-end restaurants. They indicated the dominance of kitchen processes in FW generation and highlighted the lack of chefs' engagement in FW prevention in fine dining.

In conclusion, the literature review identifies the kitchen as the main operational area in top-end catering establishments where significant amounts of food are wasted. This pinpoints chefs as the key responsibility holders for FW generation. It is therefore important to better understand how chefs can be more actively engaged in FW prevention and what actions are necessitated to facilitate this engagement.

2.4. FW in the restaurant kitchen and the role of chefs

Kitchen FW occurs at the stages of receiving/storing and producing meals (Ball et al., 2003). At the stage of receiving/storing, food is wasted due to spoilage which is driven by technological faults (consider, for example, breakdown of chillers), but also by over-stocking which is fuelled by demand forecasting errors (Filimonau et al., 2020b). Inadequate stock management also plays a role in storing; for example, although the first in, first out (FIFO) approach has long been accepted in the foodservice sector to minimize spoilage, it is not always effectively applied (Charlebois et al., 2015).

Meal production incorporates various processes of 'meal preparation', such as pre-treating, trimming, and cutting, but also 'meal cooking' that includes boiling, frying, and portioning (Ball et al., 2003). The final process is holding which precedes serving assembled and plated meals to consumers. McAdams et al. (2019) argue that meal preparation and cooking account for 74% of FW in kitchens of fine dining restaurants while the contribution of receiving/storing and holding is less significant. This highlights the need for resourceful cooking as a means of preventing FW occurrence in the kitchen (Thompson and Haigh, 2017).

The concept of resourceful cooking, or simply resourcefulness, emerged during World War II whereby food was considered a precious resource due to its intermittent supply (Porpino, 2016). Recently, scholars have called for the revitalisation of this concept considering excessive FW in modern societies (Michalec et al., 2018). Resourcefulness has been reconceptualised as a means of saving meals from waste not because food is scarce nowadays, but because it is environmentally, socio-economically, and morally unacceptable to discard food in presence of climate change and poverty (Thompson and Haigh, 2017).

In the context of foodservice provision resourcefulness describes willingness and ability of chefs to prevent FW in various processes of meal preparation and cooking (Filimonau and Uddin, 2021). Resourcefulness also describes the skills of chefs to re-use surplus ingredients to avoid wastage due to spoilage (Michalec et al., 2018), the concept which is sometimes referred to in the literature as 'skilful cooking' (Burke and Napawan, 2020). To be resourceful, chefs need to change their cooking practices to make them less wasteful (Chawla et al., 2020). This change can however be difficult to achieve given that many chefs have developed specific habits of cooking (De Visser-Amundson, 2022). Chefs are often conservative in their cooking habits, and may therefore resist changing their kitchen routines, thus failing to embrace the idea of resourcefulness (Filimonau et al., 2021).

This highlights the critical role of chefs in preventing FW in kitchens of fine dining restaurants (Batat, 2020). By embracing resourceful cooking, chefs can reduce FW and increase business profitability (Chawla et al., 2020). The extent and determinants of this embracement remain however unexplored as only a handful of studies have considered, often indirectly, chefs' resourcefulness as a driver of FW prevention in fine dining restaurants.

Batat (2020) explored the sustainability perspectives of chefs in Michelin-starred restaurants. The study highlighted chefs' resourcefulness as one of the factors in more sustainable foodservice provision albeit the important role of customer experience was also recognised. Batat (2020) argued about the need to balance out resourceful and experiential cooking to promote environmental sustainability in fine

dining restaurants. Hennchen (2019) outlined the importance of chefs' knowledge in FW prevention. Although neither explicitly mentioning resourcefulness nor focusing on fine dining, Hennchen (2019) showcased the need for chefs to understand their kitchen, its processes and staff for more efficient resource utilisation. Mac Con Iomaire et al. (2021) looked at the causes of failures in foodservice kitchens, including FW occurrence. Although Mac Con Iomaire et al. (2021) did not specifically focus on fine dining or considered the issue of resourcefulness, they highlighted chefs' knowledge of the resources available to them (expertise, money, staff, machinery) as one of the critical factors in failure minimization. Chawla et al. (2020) examined the role of material apparatus in chefs' cooking routines. This study demonstrated how kitchen equipment aided chefs in achieving more resourceful cooking. Lastly, Carrillo Ocampo et al. (2021) examined food storage and preservation practices of chefs in restaurants during the COVID-19 pandemic. Carrillo Ocampo et al. (2021) argued that chefs should learn how to re-use leftover ingredients to prevent FW in the kitchen. This suggests the need for resourceful cooking among chefs as discussed earlier.

2.5. Practice theory

Practice theory (Rouse, 2006) can justify the need for chefs to be resourceful to prevent FW in kitchens of fine dining restaurants. Practice theory is associated with the Bourdieu's model of practice, especially the notion of *habitus* (Mac Con Iomaire et al., 2021). Habitus incorporates habits, skills, and dispositions that people develop over the course of time (Bourdieu, 2005). People view the social world through the prism of their habitus and utilise their skills to undertake specific actions in response to external stimuli (Lizardo, 2004). Habitus is often shared by people with similar social or professional backgrounds: for example, in restaurants, chefs have habitus, which is different from that of waiting staff.

Schatzki et al. (2001) developed the ideas of Bourdieu to provide an alternative theory of practice. Schatzki et al. (2001) posit that people act in line with what they think is meaningful for them to do in a specific situation. As a specific situation reoccurs, the actions get routinised, thus becoming practices (Reckwitz, 2002). When translating this to the context of kitchens in fine dining restaurants, chefs act routinely in line with the business needs (Mac Con Iomaire et al., 2021) which require them to produce best quality dishes within short time. Sustainability considerations are not always featured in this chefs' practice, but it becomes important to understand how this can change, if at all (Batat, 2020).

Practices comprise three inter-related components: meanings, competencies, and materiality (Reckwitz, 2002). Meanings describe the extent to which people understand the rationale behind a specific practice and the value they attach to this rationale. For instance, in 'green' restaurants, chefs are expected to understand the relationship between food choices and environmental sustainability (Batat, 2020). Chefs should subsequently use specific produce (for example, seasonal or local) to reduce the environmental footprint of foodservice provision (Filimonau and Krivcova, 2017). Competencies describe skills required to accomplish a specific practice. For instance, in 'green' restaurants, chefs need to know how to make the best quality meals out of seasonal or local ingredients (Bui and Filimonau, 2021). Likewise, to prevent FW due to over-stocking, chefs should know how to re-use surplus ingredients (Vizzoto et al., 2021b). Materiality describes physical resources, such as tools and machinery, alongside their providers, such as suppliers and manufacturers, which can aid in practice delivery. For instance, as shown by Chawla et al. (2020), reliable kitchen apparatus is paramount for wasteless cooking.

In summary, practice theory is explicitly linked to the concept of resourceful cooking in fine dining restaurants. Chefs need to understand how much FW is generated in their kitchen, where this FW originates from, and why it should be prevented. This aligns with the meanings

component of practice theory as advocated by Reckwitz (2002). Chefs should also know how to prevent FW in the kitchen which relates to the competencies component of practice theory (Reckwitz, 2002). Lastly, chefs need to possess the tools which they can use for FW prevention in the kitchen. This stands for the materiality component of practice theory (Reckwitz, 2002). Given the overlap between the elements of resourceful cooking and practice theory, it is therefore argued that practice theory can provide a useful lens through which the phenomenon of FW prevention in restaurant kitchens should be studied. More specifically, practice theory can aid in determining facilitators and inhibitors of chefs' resourcefulness. This current study investigates the application of practice theory in the context of fine dining and the next section explains its research design.

3. Materials and methods

3.1. Research method

This study is exploratory as no research has explicitly considered resourcefulness of chefs as a means of FW prevention in kitchens of fine dining restaurants. Exploratory studies are often underpinned by naturalistic inquiry which utilises qualitative research methods to investigate human experiences in highly contextual settings (Lincoln and Guba, 1985). This approach enables researchers to shed light on the topic in question and obtain an initial understanding of the key issues of relevance that can be tested or validated in subsequent, confirmatory investigations (Creswell, 2013). Qualitative research methods are particularly suited for the chosen research context (fine dining restaurants) because chefs, especially in such segments as luxury catering, have traditionally been difficult to engage in academic investigations (Carrillo Ocampo et al., 2021). Past studies of chefs in top-end, luxury foodservice establishments have also utilised naturalistic inquiry and the methods of qualitative research (Batat, 2020, 2021; Filimonau et al., 2020b).

Data were generated by semi-structured interviews supplemented with on-site, in-kitchen observations. Semi-structured interviews were chosen due to design flexibility, but also because of their ability to provide a more detailed and nuanced understanding of the studied reality (Bryman and Bell, 2011) i.e., in-kitchen practices of chefs. Semi-structured interviews enable researchers to understand human experiences (Saunders et al., 2016). This aligns with the objectives of the current study which considers the FW issue in kitchens of fine dining restaurants through the lens of practice theory. This requires an analysis of chefs' habits, but also an evaluation of the levels of chefs' knowledge and competencies for FW prevention. Semi-structured interviews have been effectively applied in research on FW in the foodservice sector (Bharucha, 2018; Hennchen, 2019; Vizzoto et al., 2020).

Semi-structured interviews were supplemented with on-site observations performed by the research team in kitchens of three fine dining restaurants which agreed to contribute to this project as study informants. The observations aimed at data triangulation whereby the interview data were compared with the observational data to cross-check the validity of interview findings (Filimonau et al., 2022c). The research team was given access to the kitchens of each participating restaurant for four consecutive days. Wednesday, Thursday, Friday, and Saturday were chosen for observation as these were the days with low (Wednesday and Thursday) and high (Friday and Saturday) demand.

The observations were performed during business operation hours and included the research team in-situ observing food preparation and service, but also the post-service activities that were of relevance to this study, such as FW audit and disposal. As part of FW audit and disposal, the research team weighed the amounts of wasted food and categorised FW in line with its character (for example, vegetables or meat) and reasons for occurrence (for instance, over-preparation or cooking errors). To this end, the guidelines provided by Filimonau et al. (2021), Papargyropoulou et al. (2019) and Wang et al. (2017) were followed.

In-kitchen observations have been effectively used for data triangulation in previous studies on FW in foodservice provision (Li and Wang, 2020; McAdams et al., 2019; Papargyropoulou et al., 2019) as they add value to managerial interviews and verify the results of FW audits.

The interview schedule design was informed by the findings of the literature review. In particular, the insights from Batat (2020), Charlebois et al. (2015), Filimonau et al. (2020a), Goh and Jie (2019), Hennchen (2019), Mac Con Iomaire et al. (2021), Vizzoto et al. (2021b) and Wu et al. (2021) were adopted when developing interview questions. The interview questions were intended to analyse how chefs: (1) understand the issue of FW in the kitchen, including their perception of FW magnitude and drivers (=the meanings component of practice theory); (2) prevent FW in the kitchen (=the competencies component); and (3) engage physical resources in FW prevention (=the materiality component). In particular, the interview questions on the competencies and materiality components of practice theory aimed at understanding resourcefulness of chefs as a means of FW prevention.

The interview schedule was reviewed for consistency, content, and face validity by two academics majoring in restaurant management and culinary arts. It was further pre-tested with three head chefs from fine dining restaurants. A copy of the interview schedule is provided in Supplementary material, Appendix 1.

3.2. Study administration

Study informants were recruited via purposive sampling from among chefs of independent fine dining restaurants in the UK. Purposive sampling is popular with studies underpinned by exploratory research design and qualitative research methods (Palinkas et al., 2015). It aims at identifying and recruiting 'information rich' cases i.e., the study informants who are best positioned to provide detailed answers to the chosen research questions (Creswell, 2013). Purposive sampling has been effectively applied in previous studies on FW in foodservice provision (Chawla et al., 2020; McAdams et al., 2019; Michalec et al., 2018). To facilitate recruitment, the research team included a chef with specialism in fine dining whose professional contacts were utilised to initially reach for study informants. As interviewing began, snowball sampling was subsequently applied whereby the study informants would refer the research team to colleagues from their professional networks who were subsequently recruited subject to meeting the recruitment criteria. The main recruitment criteria were as follows: (1) a head or sous chef in a fine dining restaurant; (2) at least five years of work experience in fine dining; (3) at least two years of work experience as a chef in fine dining. The focus on independent fine dining restaurants was deliberate as the UK sector of luxury catering is dominated by the non-chain affiliates (Filimonau and Uddin, 2021).

The studied sample included 17 head and sous chefs in fine dining restaurants of various sizes and specialisms located in three different UK countries (Table 1). Sample size was determined by data saturation: the interviews were analysed iteratively whereby each transcript was carefully read after each interview and interviewing was stopped when no new themes were found emerging from the new data (Srivastava and Hopwood, 2009). Although sample size is of less relevance for qualitative research (Braun and Clarke, 2021), previous studies on FW in foodservice provision reported saturation with 13 (Beretta and Hellweg, 2019), 17 (Hennchen, 2019) and 18 interviews (Filimonau and Suljok, 2021) which aligns with sample size of the current project.

Interviews lasted, on average, 42 min; they were conducted face-to-face (in the case of fine dining restaurants in London) and via Skype/Zoom (in the case of fine dining restaurants in other UK localities). Interviews were digitally recorded for subsequent transcription with no financial incentives provided to the study informants for participation. In-kitchen observations were performed by strictly adhering to the related health and safety protocols, such as maximum capacity, social distancing, and mask-wearing.

Data collection took place in August 2020 i.e., in the first month after

Table 1
Study informants (n = 17).

Pseudonym	Role	Age	Work experience in fine dining (years) in <u>any</u> capacity	Work experience in fine dining <u>specifically in the capacity of a chef</u> (years)	Cuisine (Type)	Restaurant location	Restaurant size (seats) Small (<20) Medium (21–50) Large (>50)
Alexander	Head Chef	30 s	20	6	Fusion	Edinburgh, Scotland	Medium
Ben	Head Chef	30 s	12	7	British	London, England	Medium
Daniel	Head Chef	30 s	14	9	Scottish	Glasgow, Scotland	Large
Elizabeth	Sous Chef	20 s	5	2	Fusion	Manchester, England	Large
Eric	Head Chef	30 s	10	5	Scottish	Edinburgh, Scotland	Medium
Euan	Sous Chef	30 s	6	2	British	London, England	Small
Greg	Head Chef	50 s	30	25	Asian	Cardiff, Wales	Medium
Harry	Sous Chef	20 s	5	3	Fusion	Glasgow, Scotland	Large
John	Head Chef	40 s	30	22	Fusion	Leeds, England	Large
Juan	Sous Chef	30 s	10	6	French	Glasgow, Scotland	Medium
Lester	Sous Chef	20 s	5	2	British	Edinburgh, Scotland	Medium
Michael	Sous Chef	30 s	8	5	French	London, England	Large
Roy	Head Chef	40 s	25	23	Fusion	York, England	Medium
Sean	Head Chef	40 s	15	12	Asian	Cardiff, Wales	Medium
Ted	Sous Chef	30 s	6	3	British	Liverpool, England	Medium
Terry	Sous Chef	20 s	6	4	Scottish	Edinburgh, Scotland	Small
Tom	Head Chef	50 s	40	28	Fusion	Birmingham, England	Medium

the reopening of the UK foodservice sector following the COVID-19 lockdown period. This month was chosen because of the Eat Out To Help Out scheme run by the UK Government from 3 to 31 August 2020 to support hospitality businesses after restrictions (UK Parliament, 2020). Under this scheme the UK Government covered 50% of the cost of food and/or non-alcoholic drinks consumed at participating foodservice businesses. The scheme proved to be successful which resulted in high demand for food away from the home, including in the fine dining segment.

3.3. Data analysis

The data were analysed thematically in line with the guidelines by Braun and Clarke (2006). The analysis was facilitated by NVivo qualitative data analysis computer software (version 12). For data trustworthiness, the neutrality approach was applied to data codification (Nowell et al., 2017). Neutrality in data analysis aims at the freedom from personal, professional, or academic bias in the interpretation of the study's findings (Sandelowski, 1986). Neutrality can be enhanced when the data are analysed and coded independently (Lincoln and Guba, 1985).

To this end, the interview transcripts were read and coded by two independent members of the research team whereby one came from academic and another one – from professional background. The results of this independent data codification were then compared and, if disagreements were identified, the transcripts were re-read, and a discussion was held to agree on the final coding structure. In a very small number of cases of extreme disagreement a third member of the research team was asked to provide an independent view on the data. Lastly, two

volunteer chefs from the study informants were recontacted after data codification was completed with a request to look at the coding results and confirm their meaningfulness as recommended by Burnard (1991). The results of data codification are presented in Table 2 and visualised in Fig. 1. The next section discusses the study's findings.

4. Findings and discussion

4.1. The meanings

Interviews began by establishing how much chefs knew about the FW issue in their kitchens and how they felt about its occurrence (=the meanings component of practice theory). The study informants were aware of FW and able to identify the most wasted food fractions alongside the main causes of wastage. Fruits and vegetables were referred to as the major category of FW followed by meat and seafood but also dairy products (Table 2 and Fig. 1). This is in line with previous studies on FW in foodservice provision which have established plant-based foodstuffs as most wasted (Wang et al., 2017).

When asked about the size of FW, all chefs claimed they did not measure the amounts of wasted food in their kitchens describing measurements as being 'time consuming' (Daniel), 'laborious' (Elizabeth) and, therefore, 'unnecessary' (Euan), 'impractical' (John) and even 'unrealistic' (Tom). Similar observations were reported in the literature (Bharucha, 2018; Principato et al., 2018) on casual dining and quick-service restaurants, thus showcasing the lack of FW measurements as a major problem across the sector of foodservice provision, in the UK and beyond. As FW was not routinely measured, the study informants were unable to provide accurate FW figures. This outlines a critical issue as

Table 2
Results of data codification.

Theme	Sub-theme	Code	
Meanings	Magnitude of food waste	Moderate	
		Large	
	Type of wasted food	Fruits and vegetables	
		Meat and seafood	
	Reasons to prevent food waste	Dairy	
		Economic	
Competencies	Meal preparation and cooking	Personal	
		Environmental	
		Cooking errors	
	Meal assembly and plating	Overproduction of meals	
		Plating errors	
	Receiving/Storing food	Time pressure	
Miscommunication with customer-facing staff			
Human errors			
Materiality	Kitchen equipment	Failure to follow the 'first in, first out' approach	
		Ordering systems	
	Corporate policies and procedures	Availability of 'smart' technology	
		'Learning when doing'	
	Way forward	Determinants of wastelessness in the kitchen	No ingredient re-use policy
			Prioritisation of customer satisfaction
Chefs' training and retraining			
Education of staff			
		Provision of in-kitchen flexibility for chefs	
		Provision of a farm	

poor FW measurements lead to ineffective management of FW (Eriksson et al., 2019).

Filimonau and Coteau (2019) recommend that, in absence of exact numbers, self-estimates of FW should be sought from restaurant managers and chefs using the small-to-large qualitative assessment scale. Albeit being inaccurate, such self-estimates can provide an understanding of the importance of FW as perceived by the study informants. Most chefs defined size of the FW challenge in their kitchens as 'moderate' while a third considered it 'large' (Table 2 and Fig. 1). Filimonau et al. (2019a) identified the tendency of restaurateurs to lean towards moderate self-estimates of FW in fear of presenting their business in a negative light. In many cases, such moderate estimates would however transform into large FW figures when/if on-site measurements were made. Field observations performed in the kitchens of participating restaurants confirmed this assumption with large amounts of wasted food recorded, especially on Friday and Saturday. For example, over 50 kg of FW were recorded in each participating restaurant on Saturday, which was in the higher spectrum of the FW range reported in a UK casual dining restaurant (Filimonau et al., 2021).

The study informants were requested to elaborate on the importance of FW prevention. Most spoke about the economic benefits (Table 2 and Fig. 1); however, many also discussed the role of personal factors in FW prevention, such as 'it's a morally right thing to do' (Roy) and 'if I don't do it [prevent FW], then my children will have to' (Sean), but also environmental factors i.e., 'food waste is just bad for the environment' (Greg). This is an interesting finding as previous studies have primarily spoken about financial savings as drivers of FW prevention in restaurants (Charlebois et al., 2015). High awareness of chefs of the negative social and environmental implications of FW may be a product of increasing attention paid to this topic by media, especially in the context of the ongoing public discourse on climate change. It may also be a consequence of personal, negative experience with FW whereby large quantities of wasted food were observed by chefs in the kitchens on a regular basis.

In summary, the interviews revealed that the study informants were

knowledgeable of and concerned with the FW issue. This suggests that the meanings component of practice theory affects chefs of fine dining restaurants. Hennchen (2019) first established the criticality of the meanings component in understanding how FW could be prevented in foodservice provision. This current study provided further evidence to showcase the importance of FW meanings for chefs' engagement in FW prevention. This current study also identified an equally important role of other components of practice theory and highlighted a new component/factor i.e., corporate influence, which might have been overlooked in the literature. These components are discussed next.

4.2. The competencies

When spoken about competencies, the study informants referred to their knowledge of specific recipes and described their skills in preparing specific dishes. The study informants did not explicitly link their competencies to the ability to be creative and innovative in the kitchen. For example, the study informants discussed how competent they were in trimming a steak rather than what creative approaches they could use to utilize the steak's trimmings to reduce FW. Specifically, when discussing competencies in FW prevention, many chefs acknowledged their insufficient resourcefulness and inefficient management of kitchen processes as the main contributors to FW occurrence. These incompetencies generated FW in storage, meal preparation and cooking (Table 2 and Fig. 1).

Meal preparation and cooking were the most problematic kitchen processes where large amounts of FW occurred. This confirms the findings of McAdams et al. (2019) and pinpoints the key area for preventative interventions. Errors in trimming, boiling, and frying were most frequently cited alongside the overproduction of meals driven by unstable demand (Table 2 and Fig. 1). These issues were particularly frequented among junior, less experienced chefs:

"The main reason [for food waste] is the technique of chefs. Compared with some skilled chefs, junior chefs are more likely to waste food. Lacking cooking skills, it's easy to discard ingredients that can be re-used. For example, junior chefs get rid of any trimmings rather than thinking of how they could make a puree out of these trimmings. Or, they cook too much expecting high demand but this demand may not necessarily materialise" (Juan)

Experienced chefs made fewer errors; however, they would often refuse cooking differently from what they knew or how they cooked before. This stubbornness of experienced chefs in terms of their unwillingness to change cooking habits affected their resourcefulness. Experienced chefs would reject the idea of trimming or cutting meat differently for the sake of FW prevention, for example:

"Chefs are precious as they're difficult to recruit. However, some chefs are so narrow-minded that I often wonder how they'd even made it to the profession. You tell them one thing, but they say, oh no, I'll do that my way. This concerns many different things, including food waste. You ask them to look at how the cooking could be optimised, and they say, hey, no, I know what I'm doing cause I've been doing this for years. In my opinion, the true chefs should always learn, they should be open-minded to new trends and experiences. As I used to say: you may be a great cook, but are you a good chef?" (Tom)

The quote from Tom outlines scope for an interesting discussion. Chefs appear to be the creatures of habit, and chefs' habits are often associated with effective cooking. However, the rapidly changing environment of food consumption outside the home facilitated, for example, by the COVID-19 pandemic, requires chefs to be creative and innovative. For instance, restaurant industry reports identify sustainability considerations as an increasingly important trend in consumer food choice when dining out (Wolfson et al., 2022). This suggests that, to survive and shine in the highly competitive marketplace, chefs should develop so-called dynamic capabilities (Batat, 2021). Dynamic capabilities are

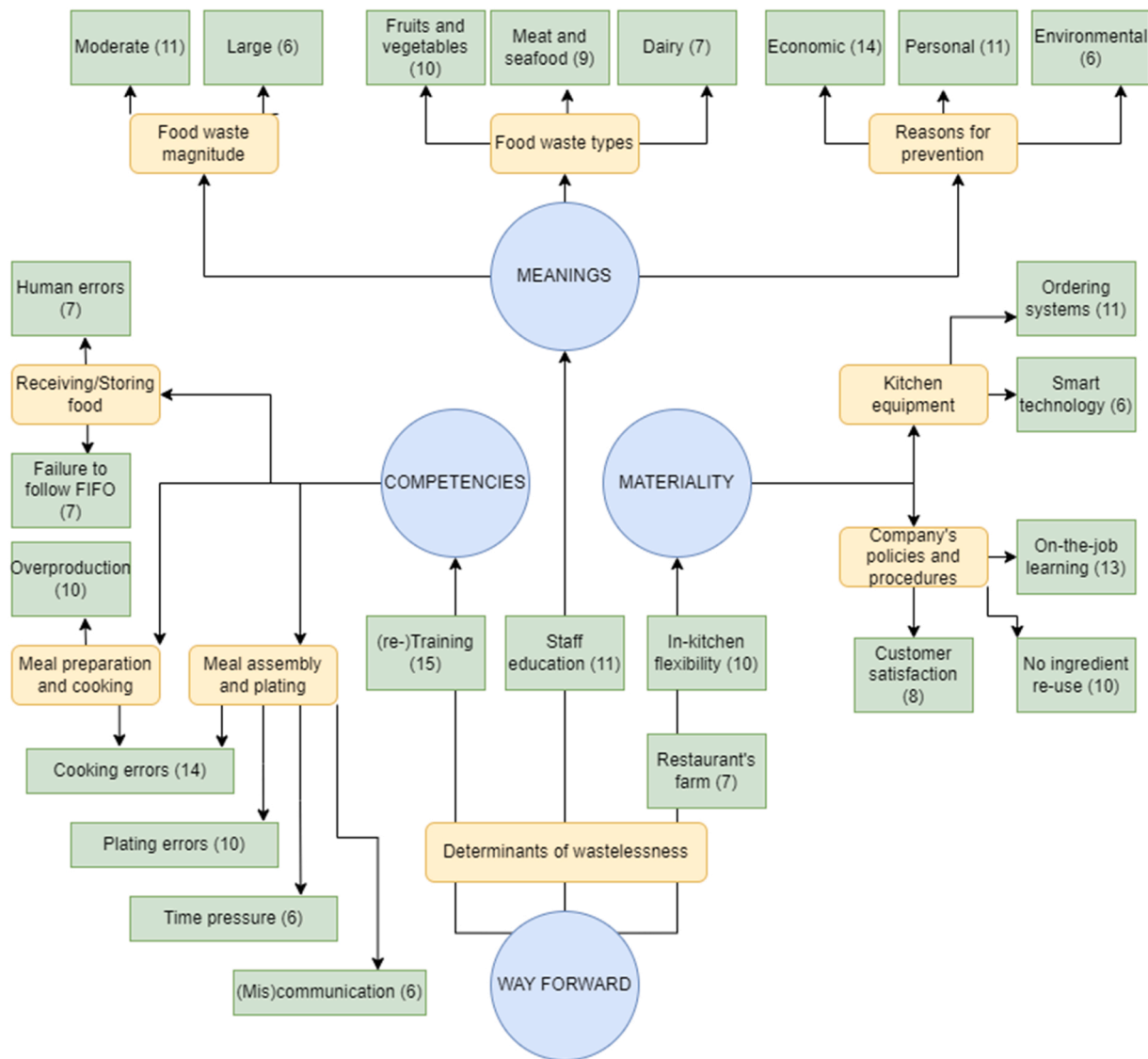


Fig. 1. The results of data codification. Legend: blue colour represents the themes; yellow colour represents the sub-themes; green colour represents the codes. The numbers in brackets showcase the frequency of each code's occurrence in interview transcripts.

defined as the individual's ability to integrate, build, and reconfigure available resources and competences to address the market challenges (Duarte Alonso et al., 2018). Only the chefs who are prepared to change their habits in line with the market trends will stay competitive. However, changing habits is difficult and requires commitment from chefs, but also support from other actors of relevance, such as restaurant owners/managers and kitchen employees. When translated to the context of FW, dynamic capabilities require chefs to maintain the habit of effective cooking while concurrently showcasing the ability to innovative via, for example, developing competencies to cook resourcefully.

Assembly of meals and the process of plating accounted for the second largest area of chefs' incompetencies. Plating errors, often caused by busy service, were highlighted as the main sources of wastage. Miscommunication with customer-facing staff whereby incorrect orders were produced was also referenced as a FW driver. Contrasting the findings of McAdams et al. (2019), this current study also pinpointed storage processes as a wasteful area in the kitchen. Poor adherence to the FIFO principles alongside such errors as non-compliance with temperature regimes were the main causes of FW in storage:

"We waste a lot of food in storage. Some chefs, especially new employees, store food incorrectly. For example, they don't check if the temperature of

the fridge is kept below 5 degrees. Or, they place meat and seafood in the same area, and it causes cross-contamination... Some chefs do not follow the first-in first-out principle. Although they all know this concept, they don't always comply with it when placing inventories. Eventually, the new food ingredients are used, and the old ones are expired and will be discarded" (Terry)

To better understand the extent of chefs' resourcefulness, the study informants were requested to speak about their approaches to FW prevention. Demand forecasting was used by many to avoid the overproduction of meals which confirmed the findings of Gao et al. (2021). In some cases, the forecasts were however made ad-hoc i.e., with limited utilisation of historical data, which agrees with Filimonau and Uddin (2021). Although the literature suggests that many restaurants invest in ingredient repurposing (Vizzoto et al., 2021b), the interviews demonstrated limited uptake of this resourceful cooking technique in the studied restaurants. Most chefs resorted to corporate policies and procedures which prevented ingredient reuse as a key barrier:

"In my opinion, corporate policies on food safety are the main cause of food waste. Sometimes, the ingredients can still be used, but the food is discarded because it doesn't meet the high standards set by the rules. For

example, my restaurant stipulates that, after the ingredient is taken out of the fridge, its life span cannot be more than three days, and once exceeded, the ingredients are abandoned even though they may still be perfectly usable" (Harry)

The seminal study by Hennchen (2019) does not speak about corporate policies and procedures in the context of practice theory. This suggests that a new, overarching and highly contextual, component should be considered in line with practice theory to explain chefs (dis) engagement in FW prevention. The effect of corporate policies and procedures was also detected in the analysis of the materiality component which is discussed next.

4.3. The materiality

The study informants viewed the materiality component of practice theory as a means of FW prevention in negative and positive light. Many chefs highlighted the important role of kitchen equipment in preventing FW occurrence, especially in storage (Fig. 1). Some restaurants invested in automatised ordering systems which would procure food in line with anticipated demand and menu requirements. Some restaurants used smart technology to extend shelf life of ingredients (Table 2 and Fig. 1). For instance, vacuum sealers and deep freezers were considered helpful, thus confirming findings of Filimonau and Sulyok (2021). The equipment was provided by business owners and approved by restaurant managers which highlighted relevance of the corporate factor for the materiality component of practice theory.

Concurrently, a negative meaning was attached to such aspect of materiality as corporate policies and procedures. Many study informants spoke about the lack of generic training on FW, but also task-specific chefs' training on resourceful cooking. Due to highly dynamic nature of kitchen processes, chefs were expected to learn how to cook on the job and they would not prioritise resourceful cooking in this learning. Chefs were concerned with prompt delivery of quality dishes even if this practice was fraught with FW. Some corporate policies and procedures disallowed ingredient reuse by chefs which was in fear of deteriorated food quality and resultant customer complaints. Customer satisfaction was prioritised by the corporates over FW prevention in the kitchen (Table 2 and Fig. 1):

"Restaurant owners, their rules and attitudes can determine if chefs care about food waste. In my twelve years of experience, some restaurant owners paid attention to food waste, but most didn't think it would threaten their business. If restaurant owners don't act on food waste, it'll be a big obstacle for those chefs who'd want to seriously deal with wastage in the kitchen" (Ben)

Corporate policies and procedures as the determinants of (in)effective FW management in restaurants have long been established (Papargyropoulou et al., 2019). The findings of this current study added further evidence to the critical role of the corporates. The current study also indicated that corporate policies and procedures were closely associated with the materiality component of practice theory. Corporate policies and procedures can play a positive and negative but, most importantly, overarching role in linking the different components of practice theory. For example, knowledge of FW among chefs (=the meanings component) can be reinforced by the corporates. This can be achieved via training provision which can be designed to promote resourceful cooking, thus enhancing competencies of chefs in FW prevention. The corporates can also invest in tools for FW prevention, such as smart technology, thus contributing to the materiality component of practice theory.

4.4. The way forward

The interviews ended with the questions about the study informants' vision on the future of effective FW management in fine dining

restaurants (Table 2 and Fig. 1). More specifically, chefs were asked about how the different components of practice theory could be reinforced for more effective FW prevention in the kitchen. The study informants spoke about the need for dedicated training to enhance the competencies component of practice theory. This training should explain the concept of resourcefulness and showcase examples of resourceful cooking to chefs. The training would be particularly useful for junior chefs given their tendency for cooking errors. Senior chefs would also need to be (re-)trained to improve their understanding of why FW prevention is important, change cooking habits, and encourage integration of resourcefulness into day-to-day cooking practices:

"The lack of sufficient pre-employment and on-the-job training makes the implementation of [food waste prevention] measures difficult or impossible. I recommend the restaurant management teams to have good training plans for their chefs. Through a complete training course, your staffs, be they junior or senior, will improve their culinary skills and have more knowledge to understand each ingredient and make changes to waste it less" (Roy)

The chefs spoke about the power of education to reinforce the meanings component of practice theory. Educational campaigns would particularly benefit experienced chefs given this category of kitchen staff had their own opinion on how cooking should be performed. Educational campaigns should explain the importance of FW prevention, thus encouraging resourceful cooking. Educational campaigns can be combined with dedicated training, as per above, thus creating a multiplying effect aimed at different chefs' categories at the same time:

"If people don't have a deep understanding of things, they won't make any changes to their lifestyles. I think it's necessary to educate chefs but also other employees so that they understand what food waste is and why it's bad to waste food. When they start to learn and have basic concepts, they'll remind themselves and guests not to waste food. Eventually, they'll work hard together to solve the food waste problem" (Daniel)

The study informants discussed how technology could enhance the materiality component of practice theory. Investment in smart technology was considered necessary while more operational flexibility was requested in the kitchen. Flexibility was demanded for more resourceful decisions whereby chefs would judge themselves on, for example, how/if surplus food ingredients could be reused in cooking.

Lastly, a novel business model of fine dining was outlined. This model was concerned with the idea of linking a fine dining restaurant to a farm. The farm would be owned by the restaurant or informal collaboration could be established between a farmer and a restaurant owner. The farm would supply fresh produce to the restaurant while such fractions of FW as fruits and vegetables would be sent back to the farm for composting:

"If there is enough space, I'd strongly recommend that the restaurant had its own farm. Where I work, we have our own veg, herb and spice garden. When we need ingredients, we can pick them up at any time. In this way, we don't have to worry about the waste caused by ordering too much in advance. In addition, we can compost food leftovers that are suitable for composting" (Elizabeth)

The important role of suppliers in FW prevention in the foodservice sector has long been recognised in the literature. Reliable and responsive supply chains enable foodservice providers to better plan menus and order ingredients on demand, thus reducing FW due to spoilage in storing (Charlebois et al., 2015). The relationships built by foodservice providers with suppliers have become ever critical during the COVID-19 pandemic. For instance, Tuomi et al. (2022) showcase how foodservice operators have embraced innovation when working with their suppliers to prevent FW in the periods of suddenly abrupt and/or unstable consumer demand. Collaboration between suppliers, such as farms, and foodservice operators with the purpose of FW prevention has been referred to in the literature as the industrial symbiosis (Filimonau and

Ermolaev, 2022). The application of novel business models underpinned by the principles of pro-environmental collaboration between farmers and fine dining restaurants, such as the industrial symbiosis, can improve the circularity of foodservice provision and shorten its food supply chain. Such novel models can also enhance chefs' awareness of the FW challenge, thus encouraging more active engagement in resourceful cooking.

5. Conclusions

This study examined the role of chefs in FW prevention in UK fine dining restaurants. From the knowledge perspective, it responded to the call by Athwal et al. (2019) for more empirical research on the sustainability challenges in the luxury segment of foodservice provision. The study also addressed the call by Batat (2020) for better involvement of chefs in scholarly investigations concerned with the topic of sustainable management in restaurants.

From the theoretical perspective, this study showcased how the different components of practice theory could explain the extent of chefs' (dis)engagement in FW prevention in kitchens of fine dining restaurants. In particular, this study established the strongest effect of the competences component: although chefs acknowledged excessive FW and understood its manifold negative implications, only few engaged in FW prevention. The lack of skills in resourceful cooking among chefs was the key determinant of this disengagement. Practice theory can therefore provide useful conceptual underpinning to future scholarly investigations on FW in various sub-sectors of foodservice provision in the UK and beyond.

The study also demonstrated that chefs' competencies should not be considered static but need updating to respond to the challenges of the rapidly changing marketplace. Chefs' competencies should in fact be considered from the perspective of dynamic capabilities which dictate the need for chefs to constantly adjust their cooking habits in line with new market and business demands. Resourceful cooking represents one of such dynamic capabilities as it reduces FW in the kitchen, thus increasing restaurant profitability and responding to the sustainability expectations of foodservice customers. By developing and/or adopting resourceful cooking, chefs can develop themselves personally and professionally, but they will also enhance their employability and improve image of the business which they work for.

Further, given that practice theory emphasises the need to contextualise the analysis, this study highlighted the value of this theory in revealing the important role of contextual factors in FW management. Contextual factors, such as in-kitchen processes facilitated by chefs, are often overlooked in scholarly investigations of FW in the sector of foodservice provision. This is a critical shortcoming as generalisation prevents the identification of factors which can prove critical for effective FW management. For example, by contextualising the issue of FW to kitchens of fine dining restaurants, this study established the importance of such factor as corporate policies and procedures for FW prevention.

Corporate policies and procedures can therefore represent another, overarching component of practice theory in the context of kitchens in fine dining restaurants but also other restaurant categories. This component, to be called *corporate influence* or similar, affects the other components of practice theory by either minimizing or maximizing their influence, thus defining the extent of FW prevention by chefs. For example, corporate influence can minimize the effect of the meanings component i.e., even the chefs who are knowledgeable about the detriment of FW do not engage in FW prevention because of the need to follow corporate rules on, for instance, surplus ingredient reuse. In contrast, corporate influence can maximise the effect of the competencies component if, for instance, a fine dining restaurant provides chefs with training in resourceful cooking. Future studies on environmental sustainability in fine dining restaurants, but also other restaurant categories, underpinned by practice theory should therefore integrate corporate influence as the key, overarching component of analysis.

From the management perspective, this study highlighted the importance of chefs' (re-)training in resourceful cooking as a means of FW prevention in fine dining restaurants, but also other restaurant categories. This (re-)training can be provided on the job, but it should also be integrated into the design of teaching curricula in hotel/hospitality schools and Universities offering courses in restaurant business management and culinary arts. Resourceful cooking should be introduced to students at the very start of their professional career so that they could understand the importance of FW prevention. For example, Ko and Lu (2022) report that professional courses on surplus food management offered to hospitality students can determine their future on-the-job performance and enhance stability of their employment within the industry.

Master classes on wasteless menu design and ingredient repurposing should be arranged for chefs who are already in employment. Industry associations, such as UK Hospitality or the Institute of Hospitality in the UK, and non-governmental organisations, such as UK's Waste and Resources Action Programme (WRAP), can be tasked to plan and organise such events. Master classes can be led by celebrity chefs to enhance appeal of such events to wider chefs' audiences. For example, a UK celebrity chef, Jamie Oliver, has a dedicated website on FW prevention (Jamie Oliver, 2021); however, this resource targets households rather than chefs. Douglas McMaster, a chef, an author, a popular presenter, and the owner of Silo London, the world's first Zero Waste restaurant, can also be involved (Douglas McMaster, 2022). Master classes for chefs can focus on specific cuisines (English, Chinese, Thai) or even particular dishes, thus enabling creation of the 'blueprints' in resourceful cooking to be utilised by chefs with different specialisms.

Chefs should also be trained to enhance their dynamic capabilities as these can boost chefs' personal and professional development, but also improve their employability. Chefs with strong(er) dynamic capabilities can better understand and anticipate the market trends and adjust their cooking habits accordingly to respond to these trends promptly. Chefs with strong(er) dynamic capabilities can also become more agile and showcase better innovativeness, thus strengthening their entrepreneurial thinking and skills to withstand future disasters and crises that may affect the foodservice sector. Training of dynamic capabilities among chefs can involve courses on the adaptation (to the changing market requirements and future crises), absorption of knowledge and experience (to withstand the market changes), and innovative thinking (to developing coping measures and new business models). Such training courses can be organised by UK hospitality industry associations.

As with any research, this study had limitations. First, the exploratory nature of this investigation implies limited generalisability of findings which are best applicable to the chosen context of foodservice provision (i.e., fine dining) and geographical market of out-of-home food consumption (i.e., the UK). Second, as data were collected in the immediate post COVID-19 lockdown period in the UK, some of the chefs interviewed may have been out of practice due to business closures. This may have caused greater errors in cooking, thus resulting in larger amounts of wasted food in the kitchen and affecting chefs' opinions and perceptions. Third, during interviews, the research team applied every effort to reduce the effect of social desirability bias by reassuring the study informants in anonymity and using data triangulation. Despite these efforts, there is no guarantee that this effect was eliminated entirely. Lastly, the studied sample was dominated by experienced, senior chefs. Inclusion of the perspectives of junior chefs into the analysis may have enriched its findings.

The study outlined avenues for future research. The focus of this project on fine dining calls for a similar investigation in other restaurant categories, such as casual dining and quick-service. The analysis of chefs' can be supplemented with an analysis of the experiences of other restaurant employees, especially waiters, given that miscommunication with customer-facing staff was established in this study as one of the drivers of FW in the kitchen. Future studies should look at fine dining

restaurants specialising in different types of cuisines, thus offering a more nuanced perspective underpinned by the potential influence of cultural habits of chefs and national cooking traditions. Lastly, given that this study established the important role of corporate influence on resourceful cooking of chefs, opinions of business owners and restaurant managers should be sought on the issue in focus.

CRedit authorship contribution statement

Viachaslau Filimonau Conceptualization, Data curation, Data analysis, Writing – initial draft. **Chien-Chang Chiang** Conceptualization, Data collection, Data analysis, Writing – initial draft. **Ling-en Wang** Conceptualization, Writing – final draft. **Belal J. Muhiyaldin** Conceptualization, Writing – final draft. **Vladimir A. Ermolaev** Conceptualization, Writing – final draft.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.ijhm.2022.103368](https://doi.org/10.1016/j.ijhm.2022.103368).

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. *Int. J. Cult. Tour. Hosp. Res.* 16 (1), 152–167.
- Athwal, N., Wells, V., Carrigan, M., Henninger, C., 2019. Sustainable luxury marketing: a synthesis and research agenda. *Int. J. Manag. Rev.* 21 (4), 405–426.
- Ball, S., Jones, P., Lockwood, A., Kirk, D., 2003. *Hospitality Operations: A Systems Approach*. Thomson Learning Emea.
- Batat, W., 2020. Pillars of sustainable food experiences in the luxury gastronomy sector: a qualitative exploration of Michelin-starred chefs' motivations. *J. Retail. Consum. Serv.* 57, 102255.
- Batat, W., 2021. How Michelin-starred chefs are being transformed into social bricoleurs? An online qualitative study of luxury foodservice during the pandemic crisis. *J. Serv. Manag.* 32 (1), 87–99.
- Beretta, C., Hellweg, S., 2019. Potential environmental benefits from food waste prevention in the food service sector. *Resour., Conserv. Recycl.* 147, 169–178.
- Bharucha, J., 2018. Tackling the challenges of reducing and managing food waste in Mumbai restaurants. *Br. Food J.* 120 (3), 639–649.
- Bourdieu, P., 2005. *Habitus*. In: Hillier, J., Rooksby, E. (Eds.), *Habitus: A Sense of Place*. Ashgate, Aldershot, pp. 43–52.
- Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. *Qual. Res. Psychol.* 3 (2), 77–101.
- Braun, V., Clarke, V., 2021. To saturate or not to saturate? Questioning data saturation as a useful concept for thematic analysis and sample-size rationales. *Qual. Res. Sport Exerc. Health* 13 (2), 201–216.
- Bryman, A., Bell, E., 2011. *Business Research Methods*. Oxford University Press, Oxford.
- Bui, H.T., Filimonau, V., 2021. A recipe for sustainable development: assessing transition of commercial foodservices towards the goal of the triple bottom line sustainability. *Int. J. Contemp. Hosp. Manag.* 33 (10), 3535–3563.
- Burke, E., Napawan, N.C., 2020. Between kitchen sink and city sewer: a socio-ecological approach to food waste in environmental design. In: Närvalä, E., Mesiranta, N., Mattila, M., Heikkinen, A. (Eds.), *Food Waste Management*. Palgrave Macmillan, Cham, pp. 169–191.
- Burnard, P., 1991. A method of analysing interview transcripts in qualitative research. *Nurse Educ. Today* 11, 461–466.
- Carrillo Ocampo, J.C., Marshall, M., Wellton, L., Jonsson, I.M., 2021. When sustainable cuisine imaginaries become unsustainable: storage and preservation practices in Swedish Restaurants. *Int. J. Gastron. Food Sci.* 24, 100353.
- Chang, Y.Y.C., 2022. All you can eat or all you can waste? Effects of alternate serving styles and inducements on food waste in buffet restaurants. *Curr. Issues Tour.* 25 (5), 727–744.
- Charlebois, S., Creedy, A., Massow, M.V., 2015. Back of house"—focused study on food waste in fine dining: the case of Delish restaurants. *Int. J. Cult., Tour. Hosp. Res.* 9 (3), 278–291.
- Chawla, G., Lugosi, P., Hawkins, R., 2020. Evaluating materiality in food waste reduction interventions. *Ann. Tour. Res. Empir. Insights* 1 (1), 100002.
- Cook, N., Collins, J., Goodwin, D., Porter, J., 2022. A systematic review of food waste audit methods in hospital foodservices: development of a consensus pathway food waste audit tool. *J. Hum. Nutr. Diet.* 35 (1), 68–80.
- Coşkun, A., Yetkin Özbük, R.M., 2020. What influences consumer food waste behavior in restaurants? An application of the extended theory of planned behavior. *Waste Manag.* 117, 170–178.
- Creswell, J., 2013. *Qualitative Inquiry and Research Design*. SAGE Publications, Los Angeles.
- De Visser-Amundson, A., 2022. A multi-stakeholder partnership to fight food waste in the hospitality industry: a contribution to the United Nations Sustainable Development Goals 12 and 17. *J. Sustain. Tour.* 30 (10), 2448–2475.
- Derqui, B., Fernandez, V., Fayos, T., 2018. Towards more sustainable food systems. *Address Food Waste Sch. Canteens Appetite* 129, 1–11.
- Dhir, A., Talwar, S., Kaur, P., Malibari, A., 2020. Food waste in hospitality and food services: a systematic literature review and framework development approach. *J. Clean. Prod.* 270, 122861.
- Douglas McMaster, 2022. Waste is a failure of the imagination. Available from: (<https://www.douglasmcmaster.com/>) [Accessed 19 September 2022].
- Duarte Alonso, A., Kok, S., O'Brien, S., 2018. 'We are only scratching the surface'—a resource-based and dynamic capabilities approach in the context of culinary tourism development. *Tour. Recreat. Res.* 43 (4), 511–526.
- Eriksson, M., Malefors, C., Callewaert, P., Hartikainen, H., Pietilainen, O., Strid, I., 2019. What gets measured gets managed—or does it? Connection between food waste quantification and food waste reduction in the hospitality sector. *Resour. Conserv. Recycl.* 4, 100021.
- Filimonau, V., Coteau, D., De, 2019. Food waste management in hospitality operations: a critical review. *Tour. Manag.* 71, 234–245.
- Filimonau, V., Ermolaev, V.A., 2022. Exploring the potential of industrial symbiosis to recover food waste from the foodservice sector in Russia. *Sustain. Prod. Consum.* 29, 467–478.
- Filimonau, V., Krivcova, M., 2017. Restaurant menu design and more responsible consumer food choice: an exploratory study of managerial perceptions. *J. Clean. Prod.* 143, 516–527.
- Filimonau, V., Sulyok, J., 2021. 'Bin it and forget it!': the challenges of food waste management in restaurants of a mid-sized Hungarian city. *Tour. Manag. Perspect.* 37, 100759.
- Filimonau, V., Uddin, R., 2021. Food waste management in chain-affiliated and independent consumers' places: a preliminary and exploratory study. *J. Clean. Prod.* 319, 128721.
- Filimonau, V., Fidan, H., Alexieva, I., Dragoev, S., Marinova, D.D., 2019a. Restaurant food waste and the determinants of its effective management in Bulgaria: an exploratory case study of restaurants in Plovdiv. *Tour. Manag. Perspect.* 100577.
- Filimonau, V., Krivcova, M., Pettit, F., 2019b. An exploratory study of managerial approaches to food waste mitigation in coffee shops. *Int. J. Hosp. Manag.* 76, 48–57.
- Filimonau, V., Todorova, E., Mzembe, A., Sauer, L., Yankholmes, A., 2020a. A comparative study of food waste management in full service restaurants of the United Kingdom and the Netherlands. *J. Clean. Prod.* 258, 120775.
- Filimonau, V., Zhang, H., Wang, L., 2020b. Food waste management in Shanghai full-service restaurants: a senior managers' perspective. *J. Clean. Prod.* 258, 120975.
- Filimonau, V., Nghiem, V.N., Wang, L., 2021. Food waste management in ethnic food restaurants. *Int. J. Hosp. Manag.* 92, 102731.
- Filimonau, V., Ermolaev, V.A., Vasyukova, A., 2022a. Food waste in foodservice provided in educational settings: an exploratory study of institutions of early childhood education. *Int. J. Gastron. Food Sci.* 28, 100531.
- Filimonau, V., Kadum, H., Mohammed, N.K., Alghoory, H., Qasem, J.M., Ermolaev, V.A., Muhiyaldin, B.J., 2022b. Religiosity and food waste behavior at home and away. *J. Hosp. Mark. Manag.* 31 (7), 797–818.
- Filimonau, V., Matyakubov, U., Allonazarov, A., Ermolaev, V.A., 2022c. Food waste and its management in restaurants of a transition economy: an exploratory study of Uzbekistan. *Sustain. Prod. Consum.* 29, 25–35.
- Gao, S., Bao, J., Li, R., Liu, X., Wu, C., 2021. Drivers and reduction solutions of food waste in the Chinese food service business. *Sustain. Prod. Consum.* 26, 78–88.
- Goh, E., Jie, F., 2019. To waste or not to waste: exploring motivational factors of generation Z hospitality employees towards food wastage in the hospitality industry. *Int. J. Hosp. Manag.* 80, 126–135.
- Henchen, B., 2019. Knowing the kitchen: applying practice theory to issues of food waste in the food service sector. *J. Clean. Prod.* 225, 675–683.
- Jamie Oliver, 2021. *Food waste*. Available from: (<https://www.jamieoliver.com/food-waste/>) [Accessed 25 November 2021].
- Ko, W.-H., Lu, M.-Y., 2022. Do professional courses prepare hospitality students for efficient surplus food management? A self-evaluation of professional competence in food waste prevention. *International Journal of Sustainability in Higher Education* 23 (6), 1315–1331.
- Kuijter, S.C., 2014. *Implications of Social Practice Theory for Sustainable Design*. Delft University of Technology Delft, The Netherlands.
- Li, N., Wang, J., 2020. Food waste of Chinese cruise passengers. *J. Sustain. Tour.* 28 (11), 1825–1840.
- Lincoln, Y.S., Guba, E.G., 1985. *Naturalistic Inquiry*. Sage, Beverly Hills, CA.
- Lizardo, O., 2004. The cognitive origins of Bourdieu's habitus. *J. Theory Soc. Behav.* 34, 375–401.
- Mac Con Iomaire, M., Fawzi Afifi, M., Healy, J.J., 2021. Chefs' perspectives of failures in foodservice kitchens, part 1: a phenomenological exploration of the concepts, types, and causes of food production failure. *J. Foodserv. Bus. Res.* 24 (2), 177–214.
- McAdams, B., von Massow, M., Gallant, M., Hayhoe, M.A., 2019. A cross industry evaluation of food waste in restaurants. *J. Foodserv. Bus. Res.* 22 (5), 449–466.
- Michalec, A., Fodor, M., Hayes, E., Longhurst, J., 2018. Co-designing food waste services in the catering sector. *Br. Food J.* 120 (12), 2762–2777.
- Nowell, L.S., Norris, J.M., White, D.E., Moles, N.J., 2017. Thematic analysis: striving to meet the trustworthiness criteria. *Int. J. Qual. Methods* 16 (1), 1–13.
- Palinkas, L.A., Horwitz, S.M., Green, C.A., et al., 2015. Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Adm. Policy Ment. Health Ment. Health Serv. Res.* 42, 533–544.
- 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 Manag.* 49, 326–336.

- Papargyropoulou, E., Steinberger, J., 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, 6016.
- Peters, K., Remaud, P.H., 2020. Factors influencing consumer menu-item selection in a restaurant context. *Food Qual. Prefer.* 82, 103887.
- Porpino, G., 2016. Household food waste behavior: avenues for future research. *J. Assoc. Consum. Res.* 1 (1), 41–51.
- Principato, L., Pratesi, C.A., Secondi, L., 2018. Towards zero waste: an exploratory study on restaurant managers. *Int. J. Hosp. Manag.* 74, 130–137.
- Reckwitz, A., 2002. Toward a theory of social practices: a development in culturalist theorizing. *Eur. J. Soc. Theory* 5 (2), 243–263.
- Romeo, P., 2018. Spotty growth forecast for restaurants in 2019. Available from: (<http://www.restaurantbusinessonline.com/financing/spotty-growth-forecast-restaurants-2019>) [Accessed 10 September 2021].
- Rouse, J., 2006. Practice theory. In: Turner, S., Risjord, M. (Eds.), *Handbook of the Philosophy of Science*, vol.15: *Philosophy of Anthropology and Sociology*. Elsevier, Amsterdam, pp. 500–540.
- Sakaguchi, L., Pak, N., Potts, M.D., 2018. Tackling the issue of food waste in restaurants: options for measurement method, reduction and behavioral change. *J. Clean. Prod.* 180, 430–436.
- Sandelowski, M., 1986. The problem of rigor in qualitative research. *Adv. Nurs. Sci.* 8 (3), 27–37.
- Saunders, M., Lewis, P., Thornhill, A., 2016. *Research Methods for Business Students*. Pearson Education, Harlow.
- Schatzki, T., 2018. On practice theory, or what's practices got to do (got to do) with it? In: Edwards-Groves, C. (Ed.), *Education in an Era of Schooling*. Springer, pp. 151–165.
- Schatzki, T.R., Knorr-Cetina, K., von Savigny, E., 2001. *The Practice Turn in Contemporary Theory*. Routledge, London & New York.
- Silvennoinen, K., Nisonen, S., Pietiläinen, O., 2019. Food waste case study and monitoring developing in Finnish food services. *Waste Manag.* 97, 97–104.
- Sirieux, L., Lála, J., Kocmanová, K., 2017. Understanding the antecedents of consumers' attitudes towards doggy bags in restaurants: concern about food waste, culture, norms and emotions. *J. Retail. Consum. Serv.* 34, 153–158.
- Srivastava, P., Hopwood, N., 2009. A practical iterative framework for qualitative data analysis. *Int. J. Qual. Methods* 8 (1), 76–84.
- Thompson, K., Haigh, L., 2017. Representations of food waste in reality food television: an exploratory analysis of ramsay's kitchen nightmares. *Sustainability* 9, 1139.
- Tuomi, A., Ashton, M., Ellonen, H.K., Tussyadiah, I., 2022. Innovation in High-End Food Service During COVID-19 Lockdowns. In: *Proceedings of the 55th Hawaii International Conference on System Sciences*. Available from: (<https://scholarspace.manoa.hawaii.edu/items/47dcf71f-bec5-4cbd-b938-5a61db9f9ae9>) [Accessed 19 September 2022].
- UK Parliament, 2020. Eat Out to Help Out Scheme. Research briefing. Available from: (<https://commonslibrary.parliament.uk/research-briefings/cbp-8978/>) [Accessed 18 November 2021].
- Vizzoto, F., Tessitore, S., Iraldo, F., Testa, F., 2020. Passively concerned: Horeca managers' recognition of the importance of food waste hardly leads to the adoption of more strategies to reduce it. *Waste Manag.* 107, 266–275.
- Vizzoto, F., Tessitore, S., Testa, F., Iraldo, F., 2021a. Plate waste in foodservice outlets: Revealing customer profiles and their support for potentially contentious measures to reduce it in Italy. *Resour. Conserv. Recycl.* 174, 105771.
- Vizzoto, F., Testa, F., Iraldo, F., 2021b. Strategies to reduce food waste in the foodservices sector: a systematic review. *Int. J. Hosp. Manag.* 95, 102933.
- Wang, L., Liu, G., Liu, X., Gao, J., Zhou, B., Gao, S., et al., 2017. The weight of unfinished plate: a survey based characterization of restaurant food waste in Chinese cities. *Waste Manag.* 66, 3–12.
- Wolfson, J.A., Willits-Smith, A.M., Leung, C.W., Heller, M.C., Rose, D., 2022. Cooking at home, fast food, meat consumption, and dietary carbon footprint among US adults. *Int. J. Environ. Res. Public Health* 19 (2), 853.
- WRAP, 2020. UK progress against Courtauld 2025 targets and Sustainable Development Goal 12.3. WRAP, Banbury, UK.
- Wu, Z., Mohammed, A., Harris, I., 2021. Food waste management in the catering industry: enablers and interrelationships. *Ind. Mark. Manag.* 94, 1–18.
- Yu, Z., Ju, X., Bai, L., Gong, S., 2021. Consumer's over-ordering behavior at restaurant: understanding the important roles of interventions from waiter and ordering habits. *Appetite* 160, 105092.
- Zeineddine, M., Kharroubi, S., Chalak, A., Hassan, H., Abiad, M.G., 2021. Post-consumer food waste generation while dining out: A close-up view. *PLoS ONE* 16 (6), e0251947.