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Waste not, want not: Managerial attitudes towards mitigating food waste in the Swiss-German restaurant industry

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ABSTRACT

This paper examines managerial perceptions of challenges for further food waste reduction within the restaurant industry. Although research gauged underlying drivers for food waste, the attitudes of foodservice managers toward practices and the corresponding operational barriers have received scant academic attention. This qualitative study thematically analyzed data from 14 managers and head chefs in Swiss-German restaurants through semi-structured interviews and compared responses against the model of the food waste hierarchy. For businesses, the paper highlights the importance of increased preventive practices and education of staff and customers. However, multiple inhibiting and enabling factors lie outside the organizations' control, depending on macro and societal contexts. Governmental interventions and facilitating waste collection are necessary, whereas the feasibility of food redistribution is perceived as limited. The study revealed great potential to implement additional practices through increased collaborations with various stakeholders and overall societal sensitization to change consumer behavior and facilitate responsible business practices.

Introduction

Over the past years, food waste has received increasing attention, with many businesses allegedly wasting tremendous amounts of resources (Filimonau & De Coteau, 2019). There is widespread recognition that it is a "complex, interdisciplinary, and international issue which can have profound effects for global sustainability" (Thyberg & Tonjes, 2016, p. 118). However, 2.6 million tons of food are still wasted annually in Switzerland alone (Bundesamt für Umwelt BAFU, 2019), implying substantial financial losses and negative environmental repercussions. The total amount of food wasted has the same ecological effect as half of Switzerland's motorized private traffic (Bundesamt

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für Umwelt BAFU, 2019). Moreover, considering that 10.8% of the world population suffers from undernourishment (Food and Agriculture Organization of the United Nations FAO, 2019), the enormous amount of food discarded raises questions regarding food security.

The Swiss foodservice sector is responsible for 11% of total food wasted within the country and ranks as the number three contributor, following households and the food industry (Beretta et al., 2015). The Swiss government estimates the concerning financial losses to amount to around 1 billion Swiss Francs for the sector alone (Bundesamt für Umwelt BAFU, 2019). When broken down to a single plate, large foodservice companies can waste up to 190 g per guest for one meal (Baier & Reinhard, 2007). Concerning the fact that more than two-thirds of the hospitality food waste could be avoidable (Bundesamt für Umwelt BAFU, 2019), those numbers are particularly alarming. Moreover, the foodservice sector lies at the end of the food supply chain (FSC), where the most resources have been used due to a constant increase in preparation, transport, and packaging with each step down the chain (Thyberg & Tonjes, 2016). Thus, reducing the amount of waste within the foodservice sector plays an essential role to foster environmental, social, and economic sustainability.

The issue of food waste has not only received increased attention in businesses and the political landscape but also academic literature. Underlying reasons have been identified along the FSC and the foodservice industry. However, little academic attention has been dedicated to practices already implemented and the attitudes of managers toward them. Indeed, exploring this social aspect is crucial to assess the operational feasibility of initiatives, possible managerial barriers, and the potential for reduction in light of the day-to-day challenges in foodservice businesses. Thus, the present study contributes to the growing literature on food waste by identifying existing practices within the Swiss-German restaurant industry and further explores managerial attitudes toward barriers and drivers for change. Moreover, it proposes implications on the micro and macro levels and how businesses can move toward more sustainable practices in line with the theoretical model of the food waste hierarchy (FWH).

Literature review

Definitions of food waste

Definitions of food waste vary according to the point it occurs within the FSC. At the early stages of the chain, the literature uses the term *food loss* or *food spoilage* to describe waste that occurs during post-harvest, processing, and production (Gustavsson et al., 2011; Parfitt et al., 2010). During the later stages of retail, consumption, and sometimes production, discarded food is defined

as *food waste*. At this point, the occurrence of waste is heavily influenced by human behavior (Papargyropoulou et al., 2014; Parfitt et al., 2010).

Next, the distinction between *food waste* and *food surplus* remains crucial. The latter describes food produced exceeding the nutritional value required to feed the human population (Smil, 2004). A certain surplus is necessary to ensure food security; however, some developed countries show a surplus of over 150% (Bender & Smith, 1997; FAO, 2019), surpassing the necessary buffer level of 130%. Since supply exceeds the nutritional demand, food waste is a natural product of surplus.

Betz et al. (2015) classified food waste into two categories, namely *unavoidable* and *avoidable*. The former refers to parts of food that were never fit for consumption, such as bones or apple cores. Avoidable waste could initially have been consumed but is no longer wanted or edible and, therefore, discarded. These definitions are especially crucial at the retail and consumer level, where products are processed, and behavioral factors play a role.

This study focuses on the foodservice sector, which lies at the very end of the FSC (i.e., consumption). Thus, the term *food waste* is the most appropriate to use. Further, mitigation of predominantly *avoidable* waste is investigated.

The Food Waste Hierarchy (FWH) as a theoretical framework

Not every approach to dealing with waste is equally successful. Thus, the theoretical model of the FWH is applied throughout the study, classifying different practices according to their environmental effectiveness (Papargyropoulou et al., 2014). The preferred measure is prevention by not producing waste in the first place, whereas disposal into landfills remains the least preferred option. For instance, redistributing surplus food to staff is more effective than using it for energy production. In contrast, the latter option is more favorable than throwing leftovers into the trash (see Figure 1). Throughout this study, the stages are referred to in descending order, prevention being the first, and disposal the fifth stage.

When distributing the 290′000 tons of Swiss gastronomic food waste to the hierarchy, we can observe that the vast majority (90%) is used for recovery through energy or bio-gas production and partially for compost recycling. 10% ends up in the regular trash (Bundesamt für Umwelt BAFU, 2019).

Reasons for food waste and challenges for reduction

In a foodservice outlet, food waste occurs at the production and the consumption stage. Production-related food waste refers to leftovers occurring during preparation, whereas consumption-related waste represents what customers leave on their plates (Pirani & Arafat, 2014). Plate waste contributes a significant amount of avoidable waste generated, with the most common
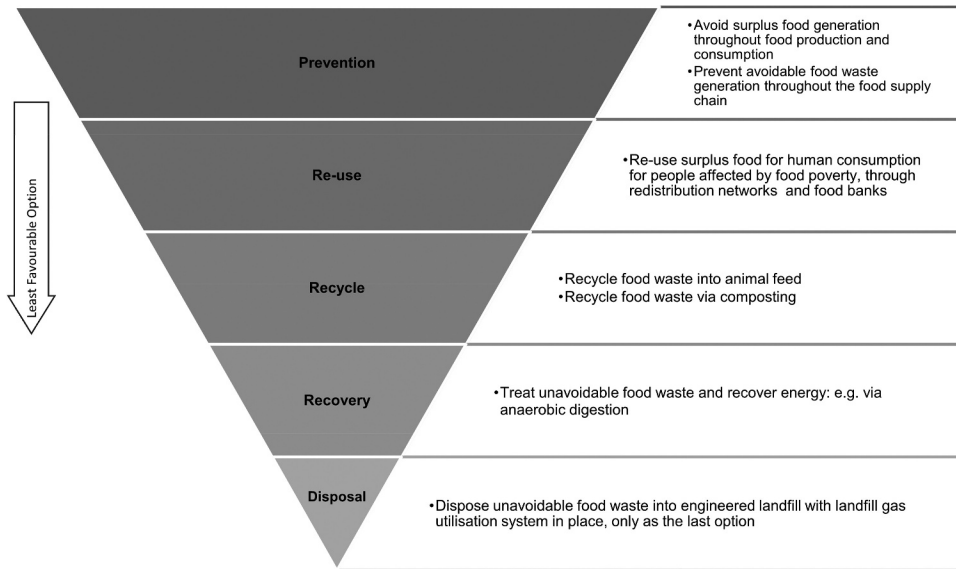
Figure 1. The food waste hierarchy (Papargyropoulou et al., 2014).

reasons being large portion sizes or unwanted side dishes (Silvennoinen et al., 2015; Thyberg & Tonjes, 2016). On the production side, incorrect demand forecasting, overproduction and factors related to staff members have been identified as significant challenges (Filimonau et al., 2019; Garrone et al., 2014; Gruber, Holweg, & Teller, 2016). Especially within small operations, managers often do not take a step back from busy daily operations to set up proactive strategies (Duursma et al., 2016). Thus, efforts are often short-term focused, managers shy away from substantial but beneficial investments, and operational inefficiencies persist.

When investigating the second stage of the FWH, several obstacles become evident. Firstly, traditional redistribution systems are largely fragmented, implying that multiple food banks or charities are available; however, those institutions remain with limited outreach due to their size and lack adequate resources (Caplan, 2016; Edwards & Davies, 2018; Facchini et al., 2018). Consequently, a deficiency of more extensive networks hampers the facilitation of logistics for both food donors and receivers. Secondly, managers are concerned about food safety, making them hesitant regarding redistributions of leftover foods to staff and redistribution networks (Marthinsen et al., 2012; Sakaguchi et al., 2018). Thirdly, the emergence of doggy bags is related to multiple challenges. Asking to take leftovers home still creates embarrassment among guests due to stigmatization regarding appearing needy or poor (Giorgi, 2013; Mirosa et al., 2018).

A British study outlined that the predominant reason not to recycle appears to be insufficient amounts of waste, mostly because the effort of collection of

compost seems unproportionate to the cost savings (Michalec et al., 2018). Further common reasons are lack of space for multiple bins, convenience, increased costs, or scant knowledge about legal obligations as well as environmental repercussions of food in landfills (Radwan, Jones, & Minoli, 2012; Sakaguchi et al., 2018). Moreover, staff members fail to separate waste correctly due to busy daily operations and time pressure (Michalec et al., 2018). Thus, a considerable amount of food waste is still disposed into landfill containers.

Societal mind-sets significantly affect how foodservices operate. They orient themselves toward standard business practices, trends, and consumer behaviors (Canali et al., 2013; Gollnhofer, 2017; Heikkilä et al., 2016). These elements shape operators' attitudes and the perceived urgency of mitigation across the FWH. Overall, a strong focus lies on recycling and recovery rather than on the earlier stages (Mourad, 2016). With the emergence of more advanced solutions for anaerobic digestion and bio-gas production, recovering food has become more accepted and legitimized (Marthinsen et al., 2012). Such a strong focus on the later stages is likely to have negative implications on more favorable stages further up the FWH.

Solutions and opportunities for mitigation

The awareness of the negative repercussions of food waste is growing and is reflected in recent literature, providing evidence of possible solutions and opportunities to combat gastronomic food waste (Canali et al., 2013; Duursma et al., 2016; Marthinsen et al., 2012; Thyberg & Tonjes, 2016). Several interventions to prevent production-related waste have been proposed. These include better menu planning and forecasting, improved internal processes, monitoring food waste, and staff training (Canali et al., 2013; Marthinsen et al., 2012; McAdams et al., 2018; Priefer et al., 2016; Sakaguchi et al., 2018). Further, portion control and reduced plate size present approaches to reduce consumer-stage food waste (Kallbekken & Sælen, 2013).

When it comes to external drivers, technology and the sharing economy model enable more significant distribution networks which tackle the issue of their dispersity and benefit the re-use stage of the FWH (Filimonau & De Coteau, 2019). An example is *Too Good To Go* (TGTG), a smartphone app allowing users to collect leftover meals at a discounted price (Too Good To Go, 2019). There is also an increasing number in public and independent organizations, such as the association United Against Waste (UAW), providing supporting resources and coaching sessions.

Since causes of food waste are interlinked with numerous factors, the issue needs to be tackled with a more holistic approach. Academics agree that a stronger multi-sector collaboration of stakeholders is needed (Martin-Rios et al., 2018; Mourad, 2016; Priefer et al., 2016). Regarding state interventions,

a British study showed that coffee shop managers expect more involvement from the government when it comes to regulations (Filimonau et al., 2019). Approaches to the development of food waste policies were proposed (Thyberg & Tonjes, 2016). However, their effectiveness is difficult to gauge, mostly because such policies are in their early stages. Nevertheless, the few studies having gathered insights on relationships between government intervention and the potential for gastronomic food waste reduction were predominantly conducted in the UK, US, and in Scandinavia (Filimonau et al., 2019; Sakaguchi et al., 2018; Thyberg & Tonjes, 2016). Since said countries might have different legislation, the researchers of this study analyzed managerial expectations toward the Swiss government.

Aim of this study and research questions

Food waste has become an emerging issue, and a fair amount of research has been dedicated to assess the underlying reasons affecting its emergence. At the consumption stage, academics have discussed the underlying problems in retail and households; however, the foodservice industry remains the least investigated. Additionally, the existing studies in this domain have mostly only analyzed the issue from the perspective of large-scale catering and canteens (Heikkilä et al., 2016; Silvennoinen et al., 2015; Strotmann et al., 2017). Even though operations might be similar, cost structures, accountability, and managerial motivations vary when it comes to independent restaurants. Thus, the issue was analyzed from their perspective for this paper. Next, despite the quantitative evaluation of gastronomic food waste (Baier & Reinhard, 2007; Beretta et al., 2015; Betz et al., 2015), present research failed to gather a deeper understanding of the drivers for mitigation from the perspective of Swiss restaurant managers. This hinders a practical understanding of their attitudes toward changes in their operations in favor of a more sustainable approach to food waste mitigation.

With the present study, it is attempted to fill this gap in the literature by assessing attitudes of restaurant managers and head chefs toward food waste mitigation in the Swiss restaurant industry. Due to matters of language, the study was limited to the German part of Switzerland. Nonetheless, the outcomes of the study can be extrapolated to the other parts of the country. The following research questions were defined:

RQ1: What are the current approaches to food waste mitigation in the Swiss-German restaurant industry?

RQ2: What are the managerial motivations behind said practices?

RQ3: What are the perceived challenges to implement further practices?

RQ4: Which factors would enable restaurant managers and head chefs to implement practices further up in the FWH?

Methods

Quantitative studies have previously been conducted to gauge the amount of food wasted or to identify measurable trends (Beretta et al., 2015; Betz et al., 2015; Mirosa et al., 2018). However, the exploratory characteristics of qualitative research permit to give a first view on the issue, especially when the phenomenon of study is complex and calls for the collection of rich data (Strauss & Corbin, 1998). The aim of the study is to analyze underlying reasons, behavior, and attitudes; thus, a qualitative research design is appropriate to collect detailed data. Semi-structured interviews proved to be a practical approach to obtain deep insights from various perspectives (Cassell, 2015), also in the context of similar research (Filimonau et al., 2019; Martin-Rios et al., 2018; Michalec et al., 2018). Hence, the said method was chosen for this study.

The semi-structured interviews were conducted with managers and head chefs (afterward referred to as managers) from restaurants in the German part of Switzerland. All restaurants selected are full-service. Other types of operations, such as fine dining restaurants, take-aways, and canteens, were purposefully excluded from the sample since operations vary greatly and would complicate an accurate comparison. Table 1 summarizes the characteristics of the interview participants and their restaurants.

The restaurants were selected based on the non-probability method of convenience sampling, which is adequate when time, resources, and access are limited (Adams et al., 2007). A total of 14 participants were interviewed in their respective restaurants in October and November 2019. The interviews lasted between 25–50 minutes, were digitally recorded, and

Table 1. Characteristics of the interview participants.

#	Restaurant location	Nr. of employees	Management type	Managerial role of interviewee(s)
1	Basel	7	Independent	Restaurant Manager
2	Basel	40	Gastronomic Group	Restaurant Manager
3	Basel	7	Independent	Restaurant Manager & Head Chef
4	Bern	15	Independent	Head Chef
5	Bern	5	Independent	Restaurant Manager
6	Bern	12	Independent	Restaurant Manager
7	Bern	32	Independent	Head Chef
8	Lucerne	35	Independent	Restaurant Manager
9	Lucerne	12	Independent	Restaurant Manager & Head Chef
10	Lucerne	32	Gastronomic Group	Restaurant Manager
11	Zurich	10	Independent	Restaurant Manager
12	Zurich	11	Independent	Head Chef
13	Zurich	5	Independent	Restaurant Manager
14	Zurich	15	Independent	Restaurant Manager

followed an interview protocol. As suggested by Jacob and Furgerson (2012), the interviewees were asked a set of broad questions, allowing them to talk freely without interruption. Occasional prompts were used as follow-up questions to enrich answers. The interviewees were guaranteed anonymity.

The interview transcripts were interpreted based on thematic analysis, recognized as a sound method in qualitative research, especially when examining people's opinions (Boyatzis, 1998). More precisely, the six-step method established by Braun and Clarke (2006) was applied: Reoccurring patterns in the answers were identified and the themes were then grouped into different topics, namely underlying motives as well as barriers and opportunities on the business, macro, and societal levels. Codes were based on themes identified in the literature as well as mentioned by the participants. Further, the researchers of the present study have employed a deductive approach since it aims at examining managerial attitudes in light of the existing theoretical framework of the FWH (Braun & Clarke, 2006; Maguire & Delahunt, 2017). Lastly, to prevent the distortion of meaning, the data was analyzed in German, the resulting themes and verbatim quotes were translated into English, and, at a later stage, translated back into German for validation.

Results

Implemented initiatives

The initiatives identified in the participating restaurants are summarized in Table 2.

The practices are arranged according to their stage within the FWH. The table states whether food waste mitigation is a primary (*direct) or* secondary (*indirect*) benefit of the practice, or both (*direct/indirect*). Further, the table indicates how many restaurants employ the corresponding initiative.

Motives for food waste mitigation

The interviews revealed four general themes regarding the underlying motives of why managers are eager to implement food waste initiatives: sustainability, ethics, costs, and managerial competency. In Table 3, the themes are explained.

Barriers

Business level

The business level comprises all the barriers that restaurants face within and around their operations (internal and external elements), as presented in Figure 2.

Table 2. Implemented initiatives by the interview participants.

Initiative	Stage in the FWH	Direct / indirect practice	Count
Flexible daily menus	Prevention	Direct	5
Re-processing (avoidable waste)	Prevention	Direct	12
Re-processing (unavoidable waste)	Prevention	Direct	5
Careful planning & forecasting	Prevention	Direct & indirect	9
Underproduce / limited # of dishes available	Prevention	Direct	5
Daily purchasing	Prevention	Direct & indirect	5
Cooking fresh & freezing if necessary (increases shelf life)	Prevention	Indirect	3
Reduced portion sizes	Prevention	Direct	12
Reduced portion sizes & 2. serving possible	Prevention	Direct	8
Few positions on menu	Prevention	Direct & indirect	5
Investing in skilled labor	Prevention	Indirect	1
Staff training about food waste	Prevention	Direct	4
Innovative technology (preparation / storage)	Prevention	Indirect	2
Communication with kitchen during service	Prevention	Direct	5
Purchase pre-portioned food	Prevention	Direct & indirect	1
Projects / campaigns for guest awareness	Prevention	Direct & indirect	3
Staff meals (on-site)	Prevention & re-use	Direct & indirect	7
Take-away for staff	Re-use	Direct	10
Providing doggy bags	Re-use	Direct	14
Proactively offering doggy bags	Re-use	Direct	7
Donations to charity	Re-use	Direct	1
Redistribution networks (e.g., TGTG)	Re-use	Direct	1
Cheaper sale at end of day	Re-use	Direct	1
Animal feed	Recycle	Direct	1
Composting	Recycle	Direct	3
Collection container for bio-gas	Recovery	Indirect	9
Landfill disposal	Disposal	Indirect	2

Table 3. Identified motives for food waste mitigation.

Motive	Sustainability	Ethics	Costs	Managerial competency
Description	• Using and wasting as few resources as possible to protect the environment • Climate crisis as a driver, contributing one's part even though it might impose slightly higher costs	• Linked to sustainability • But also encompass moral factors such as the paradox of wasting food while people live with hunger	• Food in the trash does not bring any returns • Two cost streams in wasted food: purchase & disposal, implying that the product is paid for twice without generating revenue	• Referring to the importance of good business practices, marking a restaurant as an efficient & successful business • According to some of the participants, a restaurant with much food waste cannot be seen as well-run
Count	10	8	7	4

Firstly, human factors encompass the incompetence of management and staff as well as internal unawareness about the problem's magnitude. Employees' cultural backgrounds showed to influence their approach to handling food, too. Next, limited resources play a significant role, both in terms of time and costs:

> *You don't have endless resources to deal with that. You look into it once, realize that it's probably not really feasible, and that's it.* (Manager).
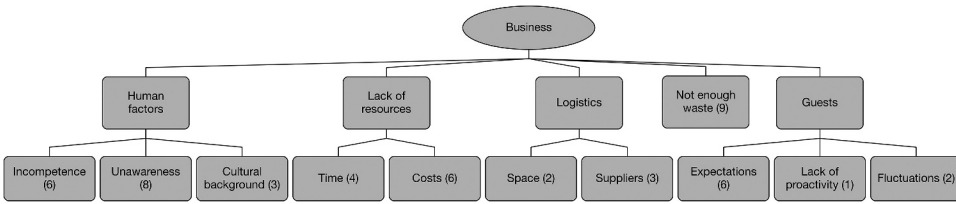
Figure 2. Barriers at business level.

Logistics imply a further obstacle, such as lack of space for separate waste containers or limited workspace. Collaboration with suppliers was also viewed as difficult since restaurants are not always able to order small quantities. Moreover, "not having enough leftovers" was a prevalent theme throughout almost all interviews; participants stated that it is not worthwhile to redistribute to food save networks since they had very little edible food waste. Lastly, satisfying guest expectations represents a considerable barrier to food waste reduction, e.g., customer backlash when running out of items:

> *We don't overproduce, which naturally results in us running out of certain dishes or components during service sometimes. And there are always customers who just don't have any sympathy for that.* (Head chef).

Another factor stated by several participants was fluctuations in the number of guests, which hamper accurate predictions and forecasting, often leading to overproduction.

Macro level
Barriers on the macro level include factors within the broader environment of the restaurants, as presented in Figure 3. The businesses do not have direct influence on those factors, but operations are influenced by them.

Most interviewees perceived food safety regulations and expiry dates as restrictive. Moreover, safety regulations impact recycling and recovery practices, such as the legal requirement that businesses need to store organic waste intended for bio-gas in a cooled container until collection,
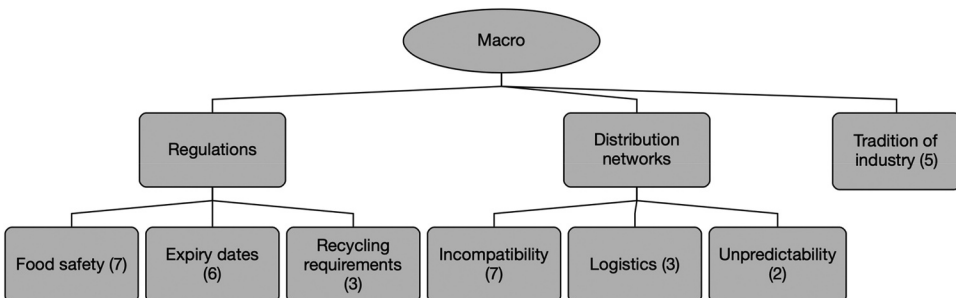

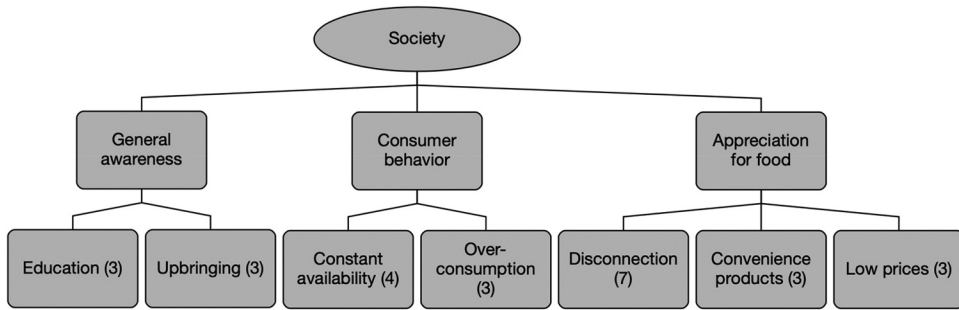**Figure 3.** Barriers at macro level.

Figure 4. Barriers for society.

demanding resources, and imposing extra costs. Except for one, no restaurant is part of any redistribution network. Not enough waste appeared to be the typical reason; however, half of the interview participants viewed the concept of, e.g., TGTG to be incompatible for their own independent business, also due to the inability to predict leftovers in advance. Moreover, participants considered logistics as difficult. Also, the traditionalist nature of the restaurant industry appeared to be a further barrier. Gastronomy is seen as

> an industry with a lot of tradition, very old-established, with a "but that's how you do it" mentality, where rethinking takes time. (Manager).

Society

The third level refers to the bigger context, describing societal elements, as seen in Figure 4. They have a more overarching effect on business practices, attitudes, and behaviors.

Many interviewees criticized the lack of societal awareness about the problem. They believed that people are not well informed, which might explain why individual businesses do not act. Three participants attributed this unawareness to upbringing; others blamed it on educational matters. Participants also criticized the notion of constant availability, implying that restaurants are expected to serve every single dish day and night or that supermarkets sell fresh bread until closing time. Further, some interviewees expressed concerns about the level of overconsumption in Switzerland. A lack of societal appreciation for food as a valuable resource represents another reoccurring theme. Interviewees criticized the disconnection to food because people tend to forget about the effort it took to produce it. According to one participant, they

> don't know anymore where food is coming from, it is merely seen as a commodity, a matter of cost. (Manager).

A couple of interviewees mentioned a superfluity of convenience products as well as low prices, which are responsible for the disappearance of a psychological barrier to throw away food.

Opportunities

Business level

The following subsection outlines the elements that can potentially benefit further reduction on a business level. Elements are presented in Figure 5.

A significant driver identified is organizational culture. Several interviewees stated that wasting little food is "one of the restaurant's principles." Relevant keywords were intrinsic motivation and being an authentic role model as a manager. Next, managers viewed giving agency to their employees as crucial, which includes providing a platform for exchange and offering them creative freedom. In the opinion of some interviewees, providing chefs with more autonomy would enable them to experiment and adjust dishes, which might reduce waste. Furthermore, conveying the restaurant's effort to reduce food waste to guests was seen as crucial:

> It's the staff's job to explain that we're cooking fresh and want little leftovers. Because then guests often understand. (Manager).

Some managers even suggested to actively educate them, e.g., through small awareness campaigns.

Macro level

Several opportunities for further food waste mitigation lie on the macro level, as presented in Figure 6.

Some interviewees were strongly in favor of interventions from the Swiss government:

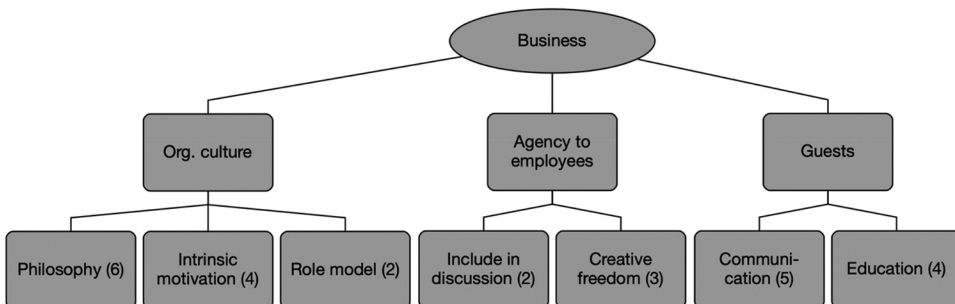> Things probably won't change without regulations. (Manager).

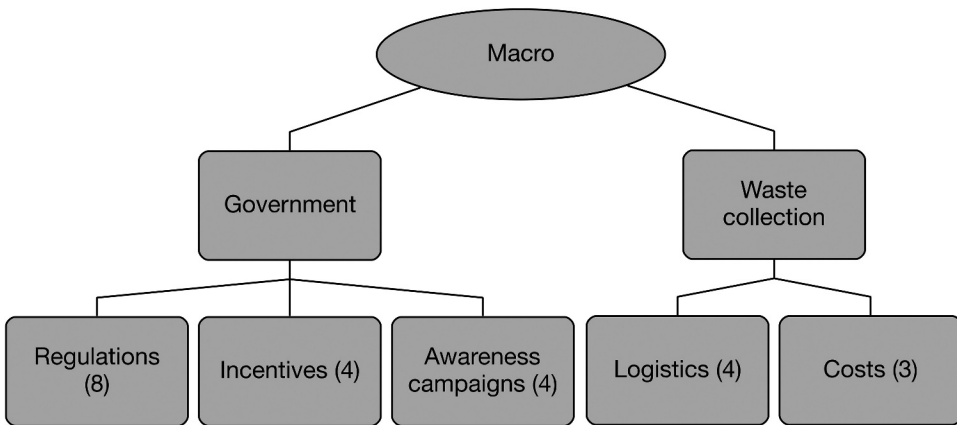**Figure 5.** Opportunities at business level.

Figure 6. Opportunities at macro level.

Participants advocated waste collection fees, "quotas" on the amount of waste produced, and re-introducing compulsory patents to open a restaurant to reduce the number of "restaurants with incompetent management." Some participants were more in favor of incentives:

> *Those who produce less waste should receive subventions or tax reductions.* (Manager)

They also expected increased proactivity from the government when it comes to raising awareness among businesses:

> *If restaurants received some official information now and then, I'm sure that it would trigger something. It is an important topic right now and they could probably raise awareness quite quickly.* (Manager).

According to most interviewees, waste collection services should be improved in terms of logistics and costs. All managers disposing of food into regular trash stated that they would consistently follow through with collecting food scraps in a separate container if they were to be collected free of charge or gathering was facilitated.

Society

The reoccurring themes regarding societal opportunities are summarized in Figure 7.

Numerous participants saw an opportunity in the fact that saving food and reducing food waste is becoming a societal trend, "capturing the zeitgeist," and might reflect in customer demand:

> *We see that there is pressure coming from below. Guests start to ask for different practices, and that's when restaurants have to act at the latest.* (Head chef).

However, other participants still viewed it as essential that "we work on people's awareness." A repeated possibility brought up was incorporating the
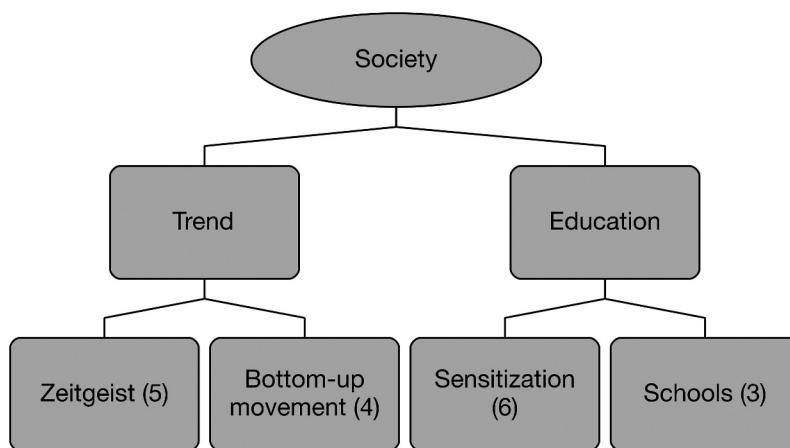
Figure 7. Opportunities for society.

issue into the curriculum of schools, regardless of the career path the children were pursuing.

Discussion

Implemented initiatives

Among the implemented preventive practices, re-processing of avoidable waste represented the most frequent one mentioned. As suggested by some managers, this practice can be reinforced by giving more freedom to chefs since it allows them to create dishes with leftovers. Next, almost all interviewees indicated to have reduced portion sizes to decrease plate waste. Many specified that they are willing to give second servings to guests if desired, representing an excellent opportunity to avoid waste without compromising the guest experience. Careful planning and forecasting were frequently stated, too, even though said practice is primarily implemented to manage operations effectively rather than reducing waste. Also, decreasing the number of positions on the menu was brought up to reduce the range of products needed. Additionally, deliberately producing less and allowing dishes to sell out even during service with the primary aim of reducing leftovers was mentioned several times. This practice can be seen as "strong" prevention since the respective restaurants question the notion of constant availability (Mourad, 2016).

Regarding practices on the re-use stage, providing doggy bags is employed by all the restaurants interviewed. However, not many servers would proactively offer them. Suggesting guests to take their food home is critical because embarrassment still represents a barrier for many guests to ask for it (Giorgi, 2013; Mirosa et al., 2018), which has been confirmed by the interviewees.

Giving leftover to staff also appeared to be a popular solution, opposing other redistribution systems.

Further, feeding food scraps of restaurants to animals is officially prohibited in Switzerland due to the risk of transmitting diseases (Schweizer Bundesrat, 2018). As a response, the government suggests disposing of scraps into containers intended for the external production of either bio-gas or compost. The majority of participants deal with the rest of their avoidable, and unavoidable waste this way.

Effects of motives

Since cost-conscious managers want to avoid wasting resources unnecessarily, they often start to reconsider their planning and re-utilizing food to generate profit. Hence, cost as the main driver for mitigating has a positive influence on the prevention stage. However, it does not serve as a motivation to redistribute food to people for free; unless if disposing imposes higher costs or logistical efforts than redistributing. Moreover, as long as disposal results in a better overall impact on the financial statements than costlier collection methods such as composting or bio-gas containers, managers will opt for less environmentally-friendly stages along the hierarchy. Analogously, managerial competency has shown to lead to a similar evaluation of initiatives since it often goes together with a favorable cost analysis. On the other hand, managers aiming at reducing food waste primarily due to sustainable concerns are far more likely to employ practices further up in the FWH, presuming that managers are aware of their ecological effectiveness. Lastly, ethical motives raise managerial concerns about the amount of food disposed of; however, it did not seem to particularly promote prevention over redistribution since both options would save food from the bin. This can be linked to the fact that the FWH classifies initiatives based on their environmental but not on their social sustainability (Papargyropoulou et al., 2014).

Barriers

Business level

On the business level, human factors have been seen as the most consequential inhibiting element, especially incompetence and unawareness of staff and management. Both can be linked to a lack of education and experience. Many interviewees regarded the number of restaurant managers without a hospitality background as problematic, resulting in unsystematic procedures and the inability to accurately forecast. The same applies to the training of cooks: Many of them change profession after their apprenticeship, resulting in a consequential lack of skilled workers. Hence, managers regarded it as crucial

that more emphasis is placed on the education of management and staff, both in regard to food waste as such but also technical skills. This corresponds to previous research (McAdams et al., 2018), where training showed a positive impact on waste mitigation.

Furthermore, according to the interviewees, guest-related factors play a crucial role, which aligns with existing findings (Filimonau et al., 2019; Martin-Rios et al., 2018). Guest expectations as a barrier can be associated with the notion that certain food waste strategies are incompatible with high service quality, providing evidence that foodservice outlets can hardly switch to more responsible practices without integrating customers:

> It has to match the business concept. It (making spontaneous changes to the menu during service) would probably clash with our level of service. (Manager).

However, as long as guests value a particular service quality over sustainable practices, shifts in operations are challenging to realize. It predominantly hampers practices on the prevention stage of the FWH, such as serving smaller portions.

Other barriers frequently stated, i.e., unfavorable logistics, resource-related factors, and the amount of waste, follow the findings of similar previous studies (Filimonau et al., 2019; Martin-Rios et al., 2018; Michalec et al., 2018). The barrier of limited resources, both cost and time, is especially relevant in gastronomy. The restaurant industry is seen as "hard work for little money," leaving little capacity for additional management of waste. Nevertheless, some interviewees presumed that this might also represent a pretext not to act due to inconvenience. One restaurant manager made his point:

> Not to compost or wait for the waste collection here in Switzerland is mostly an excuse. It's not that difficult. (Manager).

The same potentially applies to the assertion of not having enough waste to redistribute it.

Macro level

Restrictive regulations in terms of food safety seemed to be an issue mostly in the context of operations, affecting the prevention, recycling, and recovery stages. They are often hindering head chefs in using their expertise and good judgment. Approaching expiry dates seemed to result in frustration and managers acting based on concerns about fines from food safety inspections. Hence, it is the government's responsibility to potentially consider some relaxations of regulations benefitting food waste mitigation while still ensuring public health. Contradicting the literature (Filimonau et al., 2019; Martin-Rios et al., 2018), the interviewees did not seem to be concerned about food safety when it came to redistributions of leftovers. Most of them were aware that,

based on Swiss regulations, the condition of the food is no longer their responsibility once it leaves the restaurant.

Next, the limited use of redistribution networks confirms existing literature positing that such possibilities are scantly employed due to inconvenience (Facchini et al., 2018). Despite being firmly in favor of the application for large-scale restaurants, networks such as TGTG have been perceived as unfeasible because of lack of waste, incompatibility of the application, or inability to predict exact amounts of leftovers in advance. This is because most restaurants produce their meals à la minute and on order, which rarely results in a complete dish left by the end of the day but instead in single components or untreated products. In regards to charities, redistribution might only work if restaurants had little to coordinate and food would just get picked up in the evening, linking back to the lack of resources.

Society

Many managers attributed the problem to much broader causes than to the business level or even the industry. A general lack of awareness, consumption patterns and too little appreciation for food impact both guest behavior in restaurants as well as how operations are run. As a consequence, managers believed that various societal values and behaviors pose barriers and would need to change first in order for them to implement further reduction practices. Those attitudes interrelate with existing literature that societal mind-sets greatly influence foodservice operations (Canali et al., 2013; Heikkilä et al., 2016). On the other hand, blaming society as a whole might also be a way to shift responsibility and a pretext to wait for the entire system to change before taking proactive steps themselves.

Opportunities

Business level

Restaurants with many active initiatives in place agreed on the importance of embedding the reduction of food waste in the organizational philosophy, making it "the norm." It appeared to reinforce the commitment of management, staff, and new employees; this coincides with previous literature suggesting that organizational culture represents the primary enabler for sustainable business models (Rizos et al., 2016). Consequently, managers must create a culture where mitigating food waste is an omnipresent topic, especially by being an authentic role model.

The fact that many participants brought up communication with and education of guests exemplifies the importance of integrating customers into the process of switching to further mitigation practices. Foodservice businesses cannot just impose new practices on their consumers; it is instead an interplay between the two. Hence, restaurateurs must communicate their

practices or might even implement awareness campaigns, which showed to have a positive effect on guest understanding.

Macro level

Many managers were in favor of government intervention, even though in different forms. Regulations were suggested to tackle waste production directly (fees, waste quotas) or to address the issue of "incompetent" management, which links back to closing the education gap. However, there has been a disagreement among the interviewees whether regulations could solve the issue or not. Some participants claimed that regulations are needed, whereas others believed that it is the responsibility of each restaurant to reconsider its business practices. Advocates of the latter argued that the situation would not change without the intrinsic motivation of managers. Therefore, they were more in favor of incentives and awareness campaigns to call upon people's values rather than rigid rules which businesses might bypass. Educational campaigns proved to have a positive effect in provoking behavioral change in the context of tourism as well as household food waste since higher levels of awareness correlate positively with more sustainable choices (Gössling et al., 2016; Parizeau et al., 2015). Therefore, they might be beneficial in the context of food waste reduction, too. Additionally, participants made strong links to the use of local, seasonal, and organic produce (7 times); as well as reduced consumption of meat and dairy (6 times). Many were firmly in favor of further corresponding interventions, e.g., quotas or price mark-ups for animal products. This refers to "strong" prevention (Mourad, 2016) and is seen as the most effective way to a sustainable food system since it implies a radical shift in consumer patterns, questions food surplus, and tackles the issue of overproduction.

When it comes to improved waste collection, interventions were welcomed, especially by restaurants currently disposing of their waste into the regular trash. It showed to be essential to break down either logistic or cost barriers. For example, restaurants should be provided with access to a cooled container and collection of organic waste should cost less than general waste. However, the implementation of waste regulations and incentives would ask for specific coordination at a federal level to circumvent the risk of businesses disposing of in neighboring towns with more favorable conditions. Further, facilitating or subsidizing the collection of separate organic waste needs to be implemented with caution. It might decrease disposal but could also encourage the production of more waste, which otherwise might have been prevented or re-used. Nevertheless, increasing garbage taxes might help a business to move up to the fourth stage of recovery. Focusing on such a shift is also of utmost importance to facilitate effective management of unavoidable waste, which can neither be prevented nor re-used.

Society

In regard to societal opportunities, a discord can be observed. Some participants believed in an emerging bottom-up movement where society will shape the demand for more responsible restaurants, while some interviewees were rather skeptical. One head chef said:

> The issue is still very abstract for many. People somewhat know that we have to change (...) but are overwhelmed because they don't know what they have to do concretely. (Manager).

The statement exemplifies the existing value-action gap in our society: People are increasingly aware of the negative repercussion of their food choices; however, they frequently fail to act in line with their sense of ethics (Blake, 1999). Therefore, participants emphasized the importance of educating people further on food waste and giving them concrete examples of how to reduce it. Education should start at a young age by addressing the topic of food and its impact at schools, which might shape children's perception and their connection to it as a resource. Following existing literature (Heikkilä et al., 2016; Thyberg & Tonjes, 2016), the present study demonstrated that food waste is a fundamental problem rooted in society's values, going far beyond the impact of foodservice companies. Therefore, not only restaurants themselves but also the government and additional stakeholders must take responsibility to facilitate a shift toward more responsible business models and practices collectively.

Research questions

RQ1: What are the current approaches to food waste mitigation in the Swiss-German restaurant industry?

The present study has shown that a wide range of initiatives is already in place, covering all levels of the FWH. At the first stage of prevention, improved planning, re-processing leftovers, and reduced portion sizes are the most common practices. At the re-use level, most interviewees opt for redistribution to staff or providing doggy bags but scantly use redistribution networks. Thirdly, only a few businesses compost; hence, the recycling stage is not prominent. Consequently, avoidable and unavoidable waste is predominantly discarded in containers intended for external bio-gas production, i.e., at the fourth stage of recovery. Nevertheless, some participants still dispose of their waste in garbage bags.

RQ2: What are the managerial motivations behind said practices?

Four different themes have been identified when it came to the underlying motives of mitigating practices, namely sustainability, ethics, costs, and managerial competency. The four motives seemed to have different effects on the FWH. The latter two promote initiatives on the prevention but not so much on the re-use stage. Further, cost as a primary driver can result in less effective practices at the bottom stages of the hierarchy since the ecological alternatives appeared to often come with higher financial implications. Overall, ethical and, especially, sustainable motivations showed to foster the most favorable practices according to the FWH.

RQ3: What are the perceived challenges to implement further practices?

Multiple business factors hamper food waste mitigation, including lack of resources, unfavorable logistics, insufficient amounts of waste, guest-related elements as well as human factors. The latter was seen as most impactful, especially incompetence and unawareness of both staff and employees. On the macro level, strict regulations, mostly regarding food safety and the incompatibility of redistribution networks, represent an obstacle for further mitigation. Lastly, the lack of societal awareness about the issue, irresponsible consumer behavior, and disconnection to food need to be alleviated in order to facilitate the implementation of better practices.

RQ4: Which factors would enable restaurant managers and head chefs to implement practices further up in the FWH?

Internally, the establishment of an organizational culture, where mitigating food waste represents a shared vision, the education of management and staff on the issue, and training showed to be of high significance. Managers also understood the importance of integrating guests into the transition through communication and education. Externally, government involvement was welcomed in different forms, ranging from strict disposal regulations to waste incentives and campaigns to raise public and institutional awareness. Moreover, breaking down logistics and cost barriers to waste collection was suggested to facilitate the recovery and recycling stage. On a broader level, managers agreed on the importance of increased sensitization of society on the topic, provoking changes in consumer behavior and business practices.

Theoretical implications

The study contributes to the existing literature by outlining current food waste reduction practices implemented in Switzerland and provides insights into the opinions of managers concerning their feasibility across the FWH. Many managers emphasized the significance of prevention, confirming the viability
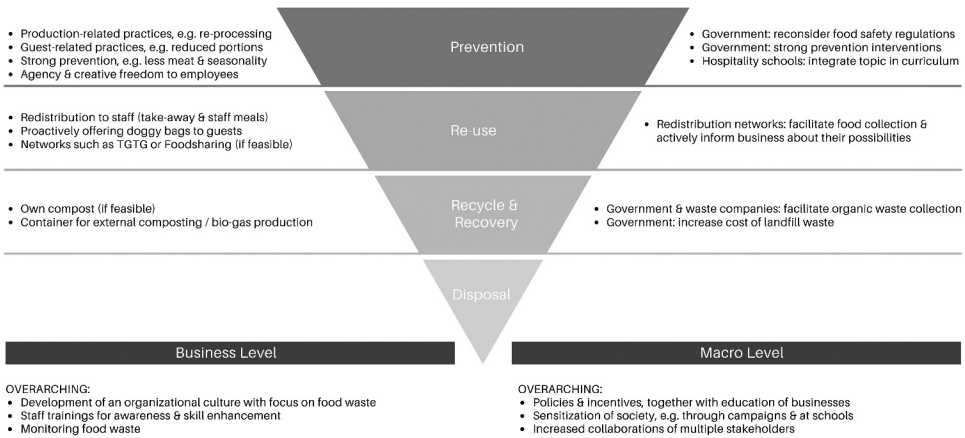
Figure 8. Adjusted version of the FWH including managerial and macro implications.

of the first stage. Secondly, external re-use showed to be of limited feasibility due to perceived incompatibility and logistical barriers. Thus, redistribution to both guests and staff gains in importance. Next, realizing practices at the third stage of recycling appeared to be complicated: Feeding scraps to animals is prohibited, and leftovers collected in the organic bins are often not recycled but recovered into energy. Therefore, the stage is only relevant if restaurants have the possibility of composting themselves and blurs with the fourth stage. Taking said findings into account, an adjusted model of the FWH emerges: Firstly, the internal redistribution to staff and the external redistribution directly to guests needs to be stressed. Secondly, the re-use stage needs to be merged with the recovery stage. With said adjustments, the FWH illustrates how businesses can be enabled to implement practices further up in the hierarchy. Figure 8 presents the adjusted versions of the FWH, including the practical implications outlined below.

Practical implications

Managerial implications

Managers should regularly reassess their implemented mitigation practices and consider the implementation of new ones based on both the FWH as well as their operational capacity. Thereby, it remains crucial to focus on preventive strategies, for example, optimizing forecasting approaches or reducing portion sizes, which should be combined with proactive communication about the restaurant's food waste efforts. Further, managers must consider "strong" prevention practices, such as reducing animal product, switching to more local and seasonal produce, and questioning the notion of having every dish available at any time.

When it comes to re-use, redistribution networks should be assessed. For small businesses, more informal networks like Foodsharing (a platform connecting restaurants with individuals to distribute overproduced food for free) could be considered, where the prediction of specific amounts is not required and food gets picked up (Foodsharing, n.d.). Otherwise, the focus should lie on redistribution to staff, such as staff meals or take-home possibilities. Moreover, doggy bags should proactively be offered to guests. Regarding the disposal of unavoidable waste as well as everything that could neither be prevented nor re-used, managers should inform themselves about recycling or recovery options of their municipality if an own compost is not feasible. The option of collaborations with other restaurants in the vicinity might be considered to share a container and, hence, costs. Additionally, monitoring the amount and components of food waste is highly recommended (Duursma et al., 2016; Sakaguchi et al., 2018) but still an uncommon practice among the interviewees. Thus, restaurants should assess their food waste over a specified period.

The study has exemplified the importance of integrating food waste reduction into the company culture. Firstly, managers should conduct regular staff training to simultaneously raise awareness as well as to train employees on how to mitigate. Secondly, chefs should receive more empowerment to experiment with leftovers. Thirdly, employees' appreciation for food as a valuable resource should be enhanced, e.g., by excursions to suppliers.

Macro implications

The present study has demonstrated that several stakeholders have a responsibility to act since many factors lie outside the control of businesses. The government has been identified as a relevant actor. Many managers expected more proactive education from the public sector addressed to businesses, e.g., by informing them about the magnitude of the issue and providing guidelines including concrete steps in line with the FWH. Additionally, the government ought to consider both policies and incentives to decrease organic waste of businesses as well as intense prevention interventions such as price mark-ups on animal products.

Nevertheless, said interventions should be introduced jointly with education to appeal to people's values, as suggested by Thyberg and Tonjes (2016), and to foster intrinsic motivation. Moreover, together with waste companies, the authorities play a crucial role in improving waste collection services: Food scrap collection should be facilitated by providing access to cooled containers, reducing costs for said services, or increasing garbage fees. Lastly, food safety regulations represent a more delicate topic; thus, concrete examples for government interventions need to be further evaluated with the opinion of experts to ensure public health simultaneously. However, it might be advisable to reconsider specific requirements, such as the restrictiveness of expiry dates.

Additionally, increased cooperation between multiple stakeholders is undeniably needed. Actors from different industries all along the FSC should be brought together to develop solutions for a more sustainable food system collectively. Independent organizations and foundations play crucial roles in enabling said collaborations.

A lack of managers' and employees' awareness appeared to be a significant problem. Next to making food a more prevalent topic at public schools, the issue of food waste should be integrated into the curriculum of hospitality education. Future managers, chefs, and service employees will become more aware but are also provided with concrete tools for action. Said educational measures might further challenge the traditional industry mind-sets around wasting food. Eventually, this will help to create critical change agents for a more sustainable future of hospitality.

Limitations and delimitations

The present study is not without limitations and delimitations, proposing several further research avenues. Firstly, outcomes are not generalizable due to the small sample size. Also, restaurants with little practices in places might be reluctant to take part in such a study, resulting in a possible under-representation of said restaurants. Next, the geographical scope was limited to the German part of Switzerland, complicating the drawing of a nationwide conclusion. Taking all of those points into consideration, an extended version of this study might provide more exhaustive insights applicable to the entire restaurant sector of Switzerland.

Secondly, qualitative research design can lead to limited external validity due to the small sample size. It also complicates the assessment of causality between the phenomena studied (Creswell & Creswell, 2018). Hence, it is advisable to investigate relationships and prove the significance of outcomes of the study with quantitative methods.

Next, it has to be acknowledged that the model of the FWH prioritizes initiatives based on their ecological effectiveness. Thus, further studies should analyze practices regarding their social and economic implications to include the entire triple bottom line of sustainability. Additional research could also analyze the individual stages more in-depth to identify further potential for the alleviation of barriers.

Further, it should be assessed which forms of government interventions, i.e., regulations or incentives, have the most powerful impact, which is especially relevant for policymakers addressing food waste mitigation. The same applies to awareness campaigns to investigated if they have the desired effect of provoking more responsible business practices and a change in consumer behavior.

Lastly, the presented paper has explored the issue of food waste based on the attitudes of managers. However, it has become evident that businesses can hardly change their practices without involving customers. Hence, the attitudes of restaurant guests should be explored as well to aid the assessment of their expectations and the identification of opportunities for more responsible practices.

Conclusion

Through the current study, the attitudes of Swiss-German restaurant managers and head chefs regarding food waste reduction within the foodservice industry were explored. Even though many practices are already in place, several challenges for mitigation have been identified, be it on the business, macro, or societal level. Moreover, it has been found that a particular potential for further reduction exists within restaurant operations, also when it comes to the most favorable stage of preventing food waste altogether. However, according to managers, many enablers for change depend on external factors and societal values. The causes of food waste are complicated to pinpoint, and so are the solutions to it. Hence, mitigation calls for a long process where managers, guests, and society as a whole need to be educated, and some fundamental perceptions need to be shifted. Consequently, it has to be acknowledged that restaurants cannot be expected to switch to more responsible business practices in isolation; the issue has to be tackled much more fundamentally, across industries, and including various stakeholders.

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