

**Exploring Restaurant Managers' Awareness, Attitudes, and Motivations towards
Mitigating Food Waste**

by

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Abstract

Food waste is an enormous global issue with severe financial, environmental, and social implications. The U.S. restaurant industry is a sector known to significantly contribute to food waste. While this topic has gained considerable interest in recent years, it remains a much under-research topic. The relevant literature is mostly comprised of client-generated food waste. However, it has been found that the attitudes and behaviors of restaurant managers towards food waste can directly impact the amount of food waste generated. Therefore, understanding the causes of restaurant food waste, the mitigation practices used, and the managerial attitudes is required to effectively manage the problem.

The purpose of this study was to investigate and compare front-of-house (FOH) and back-of-house (BOH) restaurant managers' awareness, attitudes, and motivations for food waste mitigation. Additionally, this study explored the operational aspects of food waste generated in restaurants to uncover the causes, mitigation practices employed, and barriers faced. A qualitative approach was utilized in this study. Semi-structured interviews were conducted with FOH and BOH managers of restaurants (n =13). The Upper Echelons Theory was applied to assess whether the different upper echelon characteristics, observable and psychological, of the two sets of managers (FOH (n = 6) and BOH (n = 7)) impacted their attitudes and motivations. The data was thematically analyzed to identify the overarching themes and subthemes.

The results indicated that all participants were highly aware of food waste and displayed negative sentiment towards restaurant food waste. It was found that most participants (77%) developed a heightened awareness of food waste upon stepping into their management roles. Reducing costs was found to be the key motivating factor for the desire to lessen food waste. However, the majority of BOH participants (71%) were also motivated by profound respect and

appreciation for the food itself. Additionally, the findings suggested that the FOH operational/functional area is responsible for a considerable proportion of restaurant food waste. The findings from this study provide valuable insight into the underlying cognitive base and values for restaurant managers' awareness, attitudes, and motivations towards restaurant food waste. The theoretical and practical implications are discussed in detail.

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List of Abbreviations

FOH Front-of-house

BOH Back-of-house

U.S. United States

U.E. Theory Upper Echelons Theory

CHAPTER 1 INTRODUCTION

This chapter addresses pertinent reasons why research needs to be conducted to explore restaurant food waste mitigation practices. In particular, the role restaurant managers have in food waste mitigation and their subsequent awareness, attitudes, and motives relating to food waste mitigation will be discussed. The purpose of this study, its significance, research questions, and the organization of the study will also be attended to in this chapter.

Overview

Food waste is a global issue with significant environmental, financial, and social implications (Jayalakshmi et al., 2017; Katajajuuri et al., 2014; Williams et al., 2015). In total, approximately one-third (33%) of food produced for human consumption, or 1.3 – 1.6 billion tons of food, is wasted each year (Food and Agricultural Association of the United States, 2013; Gustavsson et al., 2011; Recycle Track Systems, 2021). A study conducted by Thyberg et al. (2015) indicated that U.S. food waste has been drastically increasing for the last two decades. Levels of food waste for each global region can vary; as Gustavsson et al. (2011) reports, medium to high-income countries (developed countries) have more significant levels of food waste than low-income countries (developing countries). In the U.S. alone, approximately 40% of the food supply (66.1 million tons) is wasted annually, making the U.S. the country that generates the most food waste in the world (United States Environmental Protection Agency, 2018). Per capita, this equates to one pound per person each day (Cooper, 2020; James Beard Foundation, 2014; RTS, 2021;). In fact, food waste occupies more room in U.S. landfills than

any other waste product (RTS, 2021), and according to the USEPA (2012), food waste in the U.S. takes up an entire 21.1% of the municipal discarded waste stream, otherwise simply known as “garbage”.

Environmentally, food waste is a top contributor to global warming due to greenhouse gas emissions from the decomposition of food in landfills (Solomon et al., 2007). Food waste also leads to a significant amount of wasted water, with approximately 45 trillion gallons lost each year due to global food waste (Barclay, 2013). Financially, the FAO (2014) approximates the cost of annual food waste to be about \$1 trillion. On top of this food wastage, the world is amid a global hunger crisis in which one in nine people suffer due to hunger each day (FAO, 2021). It is apparent that mitigating food waste would be beneficial from many different perspectives (FAO, 2021).

The restaurant industry in the U.S. is responsible for 22 to 33 billion pounds of food waste each year (Gunders, 2012; ReFED, 2018). These figures highlight the importance of researching food waste mitigation in restaurants. The primary source of restaurant food waste is consumers, with an approximate 17% of restaurant meals being uneaten and only 45% of these leftovers taken home (Bloom, 2010; National Resources Defense Council, 2012). Factors such as large portion sizes and consumer behavior have been attributed to these significant levels of food waste (Blešić, 2021; Gunders, 2012). Consumers are not the only culprit when it comes to restaurant food waste, however, as it has been found that 4-10% of food in restaurants is wasted before even reaching the consumer (Gunders, 2012). Of the food wasted in restaurants, about 84.3% of generated food waste is disposed of directly into landfills (Food Waste Reduction Alliance, 2014).

Managerial practices are highly responsible for restaurant-generated food waste, as it is found that managers directly impact how employees perform at work (Heikkilä et al., 2016). It has been found that increasing food waste awareness among restaurant managers would aid in restaurant-generated food waste mitigation, as this would be relayed to employees (Alcorn et al., 2020). Other drivers of restaurant-generated food waste are employees making errors at work and different restaurant service styles, with buffets cited as the most wasteful (Filimonau & De Coteau, 2019; Marthinsen et al., 2012; Ramanathan et al., 2016).

Managers have a direct impact on how a restaurant is operated. Broadly speaking, there are two main types of managers in restaurants, each managing separate operational/functional areas within the restaurant: front-of-house (FOH) and back-of-house (BOH). Most FOH managers are responsible for the front-of-house employees of a restaurant, or the employees that come into direct contact with guests (servers, hostesses, bartenders, cashiers, etc.). They oversee the operations in the service area (dining room and bar), and their main priorities are ensuring that guests have a positive experience of the service being provided to them. On the other hand, BOH managers are responsible for the food production operations (kitchen, storage, and dish wash areas). Their main priority is ensuring that food production is run smoothly and efficiently. Both FOH and BOH managers are responsible for ensuring a restaurant is profitable (Walker, 2014). Given the role restaurant managers have in the operations, and therefore the impact they can have on food waste mitigation in their businesses, they are an essential cohort in the industry to study as it relates to food waste.

Purpose of the study

The primary purpose of this study is to qualitatively investigate and shed light on the awareness, attitudes, and motivations towards restaurant food waste among FOH and BOH

restaurant managers. To do so, this study applied the Upper Echelons Theory to examine the underlying characters of management relating to their awareness, attitudes, and motivations towards mitigating restaurant food waste by applying. The Upper Echelon Theory states that the upper echelon characteristics of managers impact the lens in which managers perceive situations that present themselves when running a company. Upper echelon characteristics include both psychological and observable characteristics, such as values, age, socioeconomic backgrounds, and career paths. How managers perceive these situations then influences the strategic decisions made by managers, thus impacting organizational outcomes. Considering the different skillsets, knowledge, and experiences required to become a FOH and BOH manager in a restaurant, it is proposed that the area of the restaurant the manager operates will impact their awareness, attitudes, and motivations towards food waste mitigation. The secondary purpose of this study is to investigate the operational aspects of restaurant food waste, such as its causes, barriers faced when trying to mitigate it, and the mitigation practices that are currently in place.

Significance of the study

Given the immense amount of food waste produced within the restaurant industry, it is an essential sector to investigate (Reardon, 2020). While the analysis of restaurant food waste is prominent within the literature, most studies focus on client-generated restaurant food waste or focus solely on kitchen-generated food waste. Several studies have researched the quantity, causes, and disposal systems of restaurant food waste (Sakaguchi et al., 2018), with some studies focusing on BOH food waste (kitchen waste) alone (Reardon, 2020; Charlebois et al., 2014) and client-generated food waste in restaurants (Principato et al., 2018; Kallbekken and Saelen, 2013). These factors are all practically and theoretically valuable; however, restaurant managers must be further investigated due to their significant impact on restaurant food waste (Heikkilä et al.,

2016). Managers oversee the people, activities, and processes of a restaurant, and their decisions heavily influence the outcomes of an organization. Additionally, new research must be conducted regarding FOH food waste. Most restaurant food waste studies focus on kitchen-generated food waste or restaurant food waste as a whole, not the FOH segment in particular, which is still responsible for food waste within the restaurant industry. A qualitative research design was implemented in this study because it enables a more thorough, deep understanding of restaurant manager awareness, attitudes, and motivations regarding food waste mitigation that cannot be measured or counted.

Through using the Upper Echelons Theory, this explorative study aims to qualitatively investigate and compare how upper echelon characteristics of FOH and BOH restaurant managers impact their awareness, attitudes, and motivations for food waste mitigation. This research will contribute to the literature by closing the existing gap and opening new avenues for future research endeavors. For the restaurant industry, this research aims to assist in efforts to mitigate food waste as the literature has shown the significance of managers regarding the topic. For actual change to occur, as per the Upper Echelons Theory, one must understand the awareness, attitudes, and motivational drivers behind the behaviors of restaurant managers regarding food waste. Knowledge of the awareness, attitudes, and motivational drivers of restaurant managers is important for the effective management of food waste and determining the speed in which restaurants can adopt a “green” approach (Chou et al., 2012; Martin-Rios et al., 2018; Lang et al., 2020).

In addition, this study will examine the reported causes of restaurant food waste in both FOH and BOH, along with current food waste mitigation practices that are in place. Better understanding the phenomenon of restaurant food waste can aid in designing operational

interventions for more effective management of the challenge that food waste presents (Filimonau et al., 2019). In addition, the findings from this study could inform the development of a more targeted educational product that can be utilized across the industry to encourage managers to adopt a series of best practices to mitigate food waste.

Research questions

This study aims to address the following research questions:

- 1) What are the awareness and attitudes of managers towards food waste in restaurants and the reduction of food waste?
 - 1a) Do these awareness and attitudes differ among FOH and BOH managers?
- 2) What are the motivations for managers to reduce food waste?
 - 2a) Do these motivations differ among FOH and BOH managers?
- 3) What are the main sources of food waste for each type of restaurant
- 4) What practices are managers implementing to reduce food waste in restaurants?
- 5) What are the barriers faced while trying to mitigate food waste?

Organization of the study

This research is broken into five chapters. Chapter 1 provides relevant background information, along with the aims and significance of the study. Chapter 2 is an extensive review of the relevant literature providing definitions of terms utilized throughout the study. In chapter 3 the research methodology will be explained and justified. Chapter 4 provides the results of data

analysis, and Chapter 5 will discuss these results, along with the implications, limitations, and opportunities for future research that have stemmed from the study.

CHAPTER 2 LITERATURE REVIEW

Introduction

The focus of this chapter is to provide a comprehensive review of the most relevant literature to support the research construct and the primary research questions that have been developed for the current study. The literature review is structured so that each carefully selected aspect included is discussed in a natural, logical progression to ensure complete comprehension of the study. Key terms are defined, the impacts of food waste originating in restaurants from a global and local perspective are discussed, and fitting underpinning theory is discussed that will aid in achieving the aim of the study. This literature review harbors in on the impact restaurant managers have on food waste generation and how the Upper Echelons Theory can be utilized to understand the awareness, attitudes, and motivations of restaurant managers regarding food waste.

To begin, a definition of food waste is provided, as there are various definitions throughout the literature. An overview of food waste is then provided, along with the economic, environmental, and social implications it harbors. Next, the food supply chain is discussed, along with the food waste at each stage as cited by the literature. Getting more specific, restaurant food waste literature is then discussed, first focusing on client-generated restaurant food waste. This chapter then focuses on restaurant food waste specifically, discussing its causes, implications, and current mitigation practices that are in place. Finally, the Upper Echelons Theory is defined and explained, and the relevant literature applying this theory will be discussed, followed by the theory's relevance to the current study.

Food waste defined

To discuss the relevant literature regarding restaurant food waste reduction, it is essential that the term "food waste" is first clearly and comprehensively defined. Food waste's varied nature and complex composition pose a significant challenge in defining it (Williams, 1995). As such, there are several definitions of food waste and little consistency amongst these definitions (Xue et al., 2017). Some of these definitions are rather simplistic, and others are broader and encompass the complexity of food waste. Several bodies (federal agencies, associations, etc.) and researchers have provided definitions of food waste, or wasted food. Heikkilä et al. (2016) provide a simplified definition of avoidable wasted food: "wasted food and raw material that could have been consumed had it been stored or prepared differently". While this definition does include some aspects of restaurant food waste, it fails to encompass non-edible, organic waste, such as vegetable peels and coffee grounds, which will be discussed in the current study.

The United States Environmental Protection Agency (USEPA) defines food waste as "food such as plate waste (i.e., food that has been served but not eaten), spoiled food, or peels and rinds considered inedible that is sent to feed animals, to be composted or anaerobically digested, or to be landfilled or combusted with energy recovery" (2021). While it is broad and holistic in nature, this definition includes many instances in which food is wasted; however, it fails to fully encompass the different categories of food wasted at restaurants.

In a study conducted by Marthinsen et al. (2012), food waste was defined as "organic waste which has its origin in food or inputs in food production". The researchers expanded on this definition by detailing two different categories of wasted foods: avoidable and unavoidable food waste. Avoidable food waste is food waste that humans could have consumed at one point of its existence (edible food waste); some examples are the flesh of fruits, the meats of land and

sea animals, and dairy products such as cheese, cream, and milk. Furthermore, avoidable food waste represents food waste whose production quantities can be controlled entirely or partially by foodservice providers (restaurant staff). Finally, avoidable food waste refers to food that has become unusable due to poor transportation, storage, and preparation techniques (Heikkilä et al., 2016). In contrast, unavoidable food waste is never considered edible by humans and is therefore a by-product of the food preparation process; some examples are eggshells, coffee grounds, and bones. This definition, due to its broad and holistic definition of food waste, includes all sorts of restaurant food waste. It includes both food that has and has not been prepared and includes both inedible and edible food waste. Thus, this definition will be adopted for the purpose of this study. All food waste definitions underline the inability of humans to consume food that was initially intended for consumption (Wang et al., 2017).

Impacts of food waste

Both avoidable and unavoidable food waste is produced at all stages of the food supply chain with significant economic, ecologic, and social implications (Jayalakshmi et al., 2017; Katajajuuri et al., 2014; Williams et al., 2015). These implications can be associated with expenses related to the production and harvesting (agricultural) of food, transportation, manufacturing, preparation, and food disposal (landfill maintenance) (Monier et al., 2010). From an economic standpoint, the annual cost of food waste in the U.S. equates to \$161 billion (Cooper, 2020). The financial consequences of food waste affect all levels of the food chain, as agriculture/livestock suppliers, processors and packagers, retailers, and consumers all lose money due to food waste. Agriculture/livestock suppliers, processors and packagers, and retailers lose money from food waste due to the fact they spent various resources (time, labor, money) on supplying/distributing this wasted food, while consumers lose money from food waste as they

have spent their money on a product that is ultimately disposed of (Nahman & de Lange, 2013). In fact, reducing food waste is often considered a "win-win", as it would benefit both consumers' pockets and businesses' bottom line (Read & Muth, 2021). In addition, it has been reported that the price of food has been steadily increasing throughout the decades (Hall et al., 2009). While rising food prices are caused by several factors – inflation, shipping costs, etc. – it has been found that food wastage also has a direct impact on food prices. Munesue et al. (2015) reported that by decreasing food waste, thus increasing the supply and availability of food, food prices will subsequently decrease.

From an environmental perspective, food waste is detrimental to the environment, namely as a significant contributor to climate change through the production of greenhouse gases and the use of water. In the U.S. specifically, of the 66.1 million tons of food wasted each year, 55.9% is dumped directly into landfills (USEPA, 2018). It is known that food waste in landfills decomposes and produces methane, a greenhouse gas considered a heavy contributor to global warming (Solomon et al., 2007). While methane gas is sometimes collected from landfills to eventually be used as an energy source, food decomposes at a much quicker rate than other waste products. This means that the methane gas produced by decomposed food is often released prior to methane collection, thus entering the atmosphere (Levis & Barlaz, 2011).

It has been found that over 70% of the available water on the planet is utilized for agricultural purposes; this includes drinking water for livestock and irrigation for growing crops (Hoekstra & van Heek, 2017). Of this water, a staggering 24% is lost each year due to food waste, which is equivalent to the yearly flow of the Volga River in Russia (Barclay, 2013; FAO, 2013). This poses a severe problem, as the freshwater supply, perhaps Earth's most valuable resource, is notably decreasing worldwide (Heggie, 2020). In the U.S., the amount of water

wasted due to food waste is even more severe, taking up about 32% of the freshwater supply (James Beard Foundation, 2015).

Socially, the issue of food waste is complicated. While significant amounts of food suitable for human consumption are wasted each year, the world still faces a severe hunger and food insecurity crisis. According to a 2021 report, approximately 720 – 811 million people globally, which accounts for approximately 11% of the global population, struggle with hunger on a daily basis (FAO, 2021; WHO, 2018). The world hunger crisis is not due to a lack of global food production; many reports have stated there is more than enough food being produced to feed the world's population (Leng, 2019; Schönherr, 2017). The issue of world hunger is much more complex, with factors such as poverty, government, underdeveloped infrastructures, and distribution issues all coming into play (FAO, 2019; Larson & Larson, 2019). Wasting food in the presence of such staggering statistics on global hungry people represents an unaffordable luxury (Filimonau et al., 2021). Therefore, necessary measures are required to reduce wastage and divert wasted food to feed hungry people in need (Vlaholias et al., 2015).

Food waste through the supply chain

Food waste is an issue that impacts each level of the food chain due to various reasons that will be further discussed. Figure 1, adopted from Adenso-Díaz & Mena (2013), depicts a schematic of the food supply chain. While food can be wasted at all different levels of the food supply chain, for the purpose of this study, the focus will be edible and inedible food that is wasted once it is inside a restaurant.

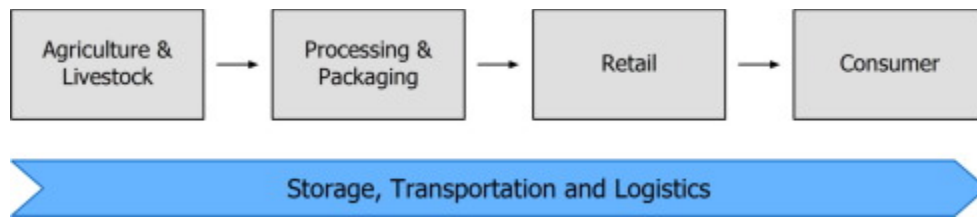


Figure 1 The Food Supply Chain

Source: Adenso-Díaz & Mena (2013)

Agriculture and livestock

The first stage of the food supply chain is the agriculture and livestock level. This refers to the point of food production in which farmers are responsible for growing, harvesting, and raising crops and livestock (EUFIC, 2006). The FAO estimates that approximately 30% of global food waste occurs at the agriculture and livestock stage of the food supply chain (Astill, 2020). At the agriculture and livestock stage of the food supply chain, overproduction is the main contributor to food waste. Papargyropoulou et al. (2014) investigated global food production levels by interviewing professionals in the agricultural sector and concluded that a 30% surplus of food is actually recommended when in the production phase as a contingency plan for unanticipated losses caused by weather-related issues, poor harvesting techniques, and food being eaten by other wildlife (Parfitt et al., 2010). While there may be a need for a certain amount of a surplus food produced, the current amount of surplus food being produced by the agricultural sector is over 50%. This higher level of surplus is attributed to poor communication between farmers and purchasing agencies at the later stages of the food supply chain, contractual penalties for not producing enough food, and poor demand forecasting ultimately encourage farmers to overproduce (Parfitt et al., 2010).

Global food prices also contribute to agricultural food waste. In fact, the prices of fruits and vegetables are some of the most unstable compared to other grocery food items. At certain

times of the year, farmers may not even break even on their crops if the prices for a particular crop are astoundingly low (Astill, 2020). This can result in the farmers ceasing to harvest these crops, leading to them being wasted as farmers do not see the point.

Processing and packaging

The processing and packaging stage of the food supply chain is responsible for approximately 3% of global food waste (Astill, 2020). This stage is vital for food preservation, as the key role is to protect the safety and quality of food and increase its shelf life prior to arrival at food retailers (Verghese et al., 2015). In the processing stage, foods are made suitable for consumption; this can range from simply washing, slicing, and packing food, adding preservatives, to utilizing other processing treatments (Britannica, 2021). The primary purpose of food packaging is food protection, information sharing (to customers), and the reduction of waste (Verghese et al., 2015). Thus, adequate and correct packaging of food is crucial for food waste reduction, as improper packaging can lead to food becoming damaged and inedible (Parfitt et al., 2010). Many by-products are often produced during the processing stage. These by-products refer to raw foods that are not requested by retailers but still hold value. Raak et al. (2017) found that the value of these by-products is often not high enough for processors to recover; thus, they are disposed of and ultimately contribute to food waste.

Retail food waste

Retail food waste refers to food waste that occurs once food has reached retailers. Food retailers are defined as “grocery stores, convenience stores, drug stores, mass merchandisers, and foodservice facilities” (Blazquez, 2021). In the U.S., it has been found that up to 40% of food waste occurs within restaurants, grocery stores, and foodservice operators (RTS, 2021). The United States Department of Agriculture (USDA) reported that in 2008, 39 billion kilograms (86

billion pounds) of food was wasted by households and foodservice operations (restaurants, cafeterias, and caterers) together (Gunders, 2012). Over the last decade, the literature on retail food waste has rapidly increased. Researchers have suggested that a large amount of food deemed "unusable" by retailers, ultimately being disposed of, is actually perfectly suitable for human consumption (Lebersorger & Schneider, 2014; Segrè et al., 2010). Improper stock management has also been attributed to a large portion of retail food waste. This can include overstocking due to improper planning, damaged packaging due to improper storage (Cicatiello et al., 2017).

Consumer food waste

When reviewing the food waste supply chain literature, consumer food waste is by far the most heavily researched topic. In the U.S., approximately 60% of food waste occurs at the consumer level (Griffin et al., 2009). In a 2020 study, it was found that the average American consumer spends over \$1,300 a year on food that is ultimately wasted (Conrad, 2020).

The majority of the literature concerning consumer food waste behavior focuses on consumer food waste at home. Mattar et al. (2018) analyzed the at-home food waste attitudes and behaviors of consumers in Lebanon. Researchers found that employment, income, and education impacted an individual's food waste behavior, with lower-income individuals wasting less food, likely because food was viewed as more valuable to these consumers. Interestingly, their findings also indicated that 88.7% of participants felt guilty when wasting food, ultimately causing them to waste less. Consumers feeling a sense of guilt about their food waste is a common finding in the literature (Qi & Roe, 2016; Stefan et al., 2013). Qi and Roe analyzed the attitudes and awareness of U.S. consumers in the realm of food waste through multivariate regression (2016). Similar to Mattar et al. (2018), 69.7% of participants stated that wasting food

led them to feel guilty. In terms of awareness of food waste, 58.4% of respondents acknowledged that food waste is harmful to the environment, while only 42.1% stated that wasting food was also wasting their money, and about 25% of participants stated they did not have enough time to worry about food waste.

While the literature has shown that consumers are aware of food waste and feel guilty when contributing to it, one may ask what is causing it? The Recycle Track System's 2021 report cites food spoilage as the leading contributor to at-home food waste, whether it be perceived or genuine (RTS, 2021). Misinterpretation of expiration labels was found to be a leading factor responsible for confusion among consumers, in particular, the differing terms on the labels – "use by", "sell by", "best by". Because of this confusion, consumers often throw away food that is perfectly fine for consumption (RTS, 2021).

Food purchasing and preparation behaviors have also been shown to have a significant impact on household food waste (Evans, 2011; Mattar et al., 2018 Stancu et al., 2016). Stancu et al. (2016) examined the food-related routines of consumers and their impact on consumer food waste behavior. Findings indicated that consumers who did not plan their food shopping routines ultimately over-purchased items, eventually leading to more items being thrown out at home. Similarly, Mattar et al.'s study found that consumers who did not prepare a grocery shopping list prior to grocery shopping and who would buy special offers at the grocery store would be more likely to excessively purchase items, ultimately contributing more food waste (2018).

Consumer behavior at retailers is also a prominent driver of retail food waste (Gustavsson et al., 2011). The people who operate food retailers try to appease their consumers, and consumers have particular preferences when shopping. It has been found that consumers often base their food purchases based on the physical appearance of foods, for example, only buying

fruits and vegetables that look ripe (Gunders, 2012). Ultimately, this causes retailers to keep a large stock of ripe fruits and vegetables, giving them a shorter shelf life. If every single one of these items does not get bought, which is rarely the case, they all go to waste.

Another contributor to consumer food waste is the lack of households that compost. In the U.S., only about 28% of people compost their at-home food waste, meaning 72% of households are discarding their food waste straight into the trash (Nwra, 2014). Those who do not compost state that it is simply inconvenient; therefore, they are unwilling to do it.

Restaurant food waste

While it is essential to recognize the food waste at each level of the food chain, restaurant food waste is a unique retail industry sector. The foodservice sector makes a notable contribution to global food waste. In the European Union, foodservice operations account for approximately 12% of wasted food on average across this region's food supply chain (FUSIONS, 2016). In the U.S., a figure of 25% on average has been reported (ReFED, 2018). In a 2012 report, it was found that restaurants in the U.S. waste from 22 to 33 billion pounds of food each year (Gunders, 2012). Furthermore, the Food Waste Reduction Alliance found that 84.3% of unused food in restaurants is thrown directly into the trash (FWRA, 2014).

According to the literature, food waste occurs at various stages of restaurant operations (Heikkila et al., 2016). Restaurant food waste is often categorized into two main types: client-generated food waste and kitchen-generated food waste (Risku-Norja et al., 2010; Papargyropoulou et al., 2016; Principato et al. 2018; Filimonau et al., 2019; 2021; Kantor et al., 1997). It is estimated that client-generated food waste accounts for 30-35%, while kitchen-

generated food waste accounts for 45-65% of restaurant food waste, although these figures can vary significantly depending on restaurant type and location (Baldwin et al., 2010).

Client-generated restaurant food waste refers to the edible food not consumed by restaurant clients after completing a meal; this is also known as 'plate waste' (Kantor et al., 1997). About 17% of meals served to consumers in restaurants are left uneaten, and of those uneaten meals, roughly 45 percent are taken home as leftovers, and the rest is discarded into the trash (Bloom, 2010; Krummert, 2016). It is important to note that this client-generated food waste can be due to consumer preferences – adverse hedonic reactions to the food that a consumer has purchased (WRAP, 2013). In this instance, irresponsible consumer behavior can significantly contribute to restaurant food waste by prioritizing personal satisfaction over environmental concerns when dining out (Sakaguchi et al., 2018). On the other hand, kitchen-generated food waste refers to the food waste generated in the restaurant kitchen during the food preparation stage and includes on-site spoilage. This food waste can be generated due to overproduction, over-cooking, improper storage, portioning, preparation, and cooking (Principato et al., 2018). Some aspects of the front-of-house operations in a restaurant have been included in previous empirical studies on restaurant food waste, namely type of service (buffet service) (Papargyropoulou et al., 2016). For the most part, the contribution that clients have on food waste in restaurants, in addition to kitchen-generated food waste, has been a primary focus of studies as a contributing factor to restaurant food waste (Gunders, 2012; Krummert, 2016). However, there has been little focus on front-of-house operations' contribution to generating food waste in restaurants. The current study solely focuses on restaurant operations and encompasses food waste generated in both the kitchen (back-of-house) and the dining room (front-of-house) of a restaurant as the sole scope of the research.

Causes of restaurant food waste

Overproduction

It has been found that 4 - 10% of food in restaurants is wasted prior to reaching the consumer (Gunders, 2012). In a study conducted about restaurant managers, researchers even found this number to be as high as 13% (Principato et al., 2014). According to the literature, the overproduction of food appears to be a leading driver of restaurant food waste. Silvennoinen et al.'s (2015) case study in Finland observed that the overproduction of food is often initiated by demand forecasting errors regarding how many guests would be dining in per shift. Other studies found that the overproduction of food is mainly caused by the prioritization of customer satisfaction over mitigating food waste; some managers prefer having to dispose of excess food at the end of the shift rather than have it run out and thereby potentially leaving guests unsatisfied (Aamir et al., 2018; Papargyropoulou et al., 2014). There is increased societal expectations of quantity and quality of the restaurant product (food and service), resulting in managers prioritizing customer satisfaction over food waste reduction (Makani, 2016). With many foods having specific hold times, or the amount of time it is allowed to sit under a heat lamp prior to being served to a guest, lots of this over-produced food must be shortly disposed of (Heikkilä et al., 2016).

Service style

The service style has been cited by numerous studies within the restaurant food waste literature impact food waste. Buffets, in particular, are notorious for their contributions to food waste (Juvan et al., 2017; Marthinsen et al., 2012; Silvennoinen et al., 2015). Overproduction has shown to be a persistent food waste issue in buffet-style restaurants, as customers prefer a full buffet, causing staff to replenish buffets even if the restaurant is soon to close (Ramanathan et al.,

2016). This issue can be exacerbated since buffet-style restaurants generally do not take reservations, thus making it difficult to accurately forecast demand and ultimately resulting in further overproducing (Betz et al., 2015; Pirani & Arafat, 2012).

Menu size has also been found to be a contributing factor to restaurant food waste. More extensive menus require a larger inventory of ingredients which can be difficult to monitor (Collison & Cowil, 1986; Filimonau & De Coteau, 2019). Further, dish portion size has also been reported as a contributor to generating food waste. In particular, larger portion sizes that exceed clients' needs have been known to contribute to food waste (Wansnk & van Ittersum, 2013). It is ultimately up to management to monitor the foods being over-served and reduce the portion sizes where appropriate to prevent this waste (Principato et al., 2018).

User error

User error is another major contributor to restaurant food waste frequently cited in the literature. User error refers to mistakes made by employees within the restaurant. Principato et al. (2014) found that spoilage and incorrect preparation are common causes of restaurant food waste due to employees underperforming at work. Similarly, Heikkilä et al. (2016) cited kitchen staff making mistakes when preparing food as a typical user error while qualitatively investigating food waste in foodservice businesses in Finland. Furthermore, the authors found that these mistakes made by kitchens staff were due to several factors, such as improper training systems or the simple carelessness of employees. In fact, Marthinsen et al. (2012) found that 51% of restaurateurs cited proper training as a crucial part of mitigating restaurant food waste in their report of food waste in the Danish hospitality sector.

Managerial practices

Lack of food waste awareness among restaurateurs is often referenced in the restaurant food waste literature, as many operators do not view the problem of food waste as their responsibility (Ofei & Mikkelsen, 2011; Lang et al., 2020). However, a lack of managerial awareness of food waste in the restaurant industry poses a serious problem, as managers' awareness and behavior have a significant, direct impact on how kitchens and dining rooms operate (Heikkilä et al., 2016; Principato et al., 2018). Managers oversee essential functions such as pre-shift prepping, stocking inventory, menu planning, and food waste monitoring. If there is a lack of food waste awareness among restaurant managers, employees will not consider food waste when performing work-related tasks (Heikkilä et al., 2016).

In a case study conducted concerning food waste restaurants in the U.S., researchers found that 34% of restaurant operators did not view food waste as an issue, with 38% ignoring their restaurants' food waste altogether (Sakaguchi et al., 2018). Moreover, this lack of managerial awareness regarding restaurant food waste can manifest in managers failing to monitor and measure food waste. In a study investigating the perspective of restaurant managers regarding food waste in Shanghai restaurants, the researchers found that no restaurant managers were able to provide an exact amount of how much food their restaurants wasted (Filimonau et al., 2020). In fact, Derqui et al. (2018) found that restaurateurs tend to underestimate how much food their operations waste, resulting in a lack of motivation to reduce it. The monitoring of food waste is highly recommended, however, as it would allow managers to identify the sources of food waste within their organizations and aid in food waste reduction (Silvennoinen et al., 2019). Numerous studies have also found that managers tend to prioritize the customers' satisfaction

over their efforts to reduce food waste, eventually impacting how the employees perform in the kitchen (Charlebois et al., 2015; Papargyropoulou et al., 2014).

Food waste reduction in restaurants

While the literature suggests a lack of awareness regarding food waste among restaurant managers, many efforts are still being made to mitigate restaurant food waste. The hospitality industry as a whole has begun to recognize the need to proactively control its negative environmental footprint (Namkung & Jang, 2013). In terms of restaurants, few studies have investigated the motivations of restaurant managers to reduce food waste in restaurants. However, of the few existing studies, economic reasons are cited as the leading motive among managers (Aamir et al., 2018; Hennchen, 2019; Martin-Rios et al., 2018; McAdams et al., 2019). This is not surprising, as restaurants already have a thin profit-margin, and the only further diminishes this (Giorgi, 2013; Pirani & Arafat, 2014). The literature shows that reducing food waste and reusing (redistributing) food as attainable means to mitigate food waste (Principato et al., 2018). More specifically, managing inventory, menu engineering, training staff, demand forecasting, and reusing food are cited as the most common practices implemented by restaurant managers in efforts to mitigate food waste (Filimonau et al., 2019; 2021; Pirani & Arafat, 2018; Principato et al., 2018; Silvenoinnen et al., 2015).

Managing inventory

As stated previously, on-site spoilage is a common cause of avoidable restaurant food waste (Principato et al., 2018). In efforts to tackle this problem, many restaurants utilize specific inventory control systems and protocols to monitor and control their perishable inventory. The most common inventory control protocol involves kitchen staff labeling each product with its 'use by' date and enforcing the 'First In, First Out' method (Bematech, 2019; Lipinski et al.,

2013). 'First in, first out', otherwise referred to as 'FIFO' within the industry, requires kitchen staff to use older ingredients (stored first) before using the newer ones. Upper management at restaurants also carefully monitors their food inventory, whether manually or with technological assistance (Martin-Rios et al., 2018). Chan (2019) notes that managers being aware of their restaurants' food inventory allows managers to determine where most food waste is occurring and maintain the freshness of ingredients.

Menu engineering

Duursma et al. (2016) define menu engineering as “the process of analyzing the performance of a menu item in order to optimize its contribution to the margin.” The performance of the menu item is evaluated based on two metrics; (i) dish popularity – comparing sales of an item to expected sales, and (ii) profitability – the contribution a menu item has to the margin (Walker, 2013). This process includes developing menu items, determining how the menu items are prepared, and selecting where to source the products from. Menu engineering is a crucial part of a restaurant's efforts to mitigate its avoidable food waste, as when it is done strategically, the literature states that restaurant managers can ultimately decrease overproduction and spoilage while simultaneously assisting in inventory management (Principato et al., 2018; Silvenoinnen et al., 2015). Strategic menu engineering includes practices like aligning menu items with on-hand inventory, repurposing ingredients throughout multiple dishes, assessing the correct amount of food to prepare each shift, and prioritizing whole-product utilization (Blum, 2020; Duursma et al., 2016; ReFED, 2018).

Customer demand forecasting

As stated previously, overproduction is a primary driver of restaurant food waste (Filimonau et al., 2020). Accurate customer demand forecasting is frequently cited in the

literature as a critical means of reducing food overproduction, as it enables restaurants to prepare the appropriate amount of food for each meal service. However, while accurate customer demand forecasting plays a significant role in mitigating food waste, it proves to be a difficult task for restaurant managers due to the unpredictability of the restaurant industry (Aamir et al., 2018; Duurma et al., 2016; Papargyropoulou et al., 2014).

A commonly-adopted customer demand forecasting process is observing the number of reservations scheduled for meal service and relaying the information to the kitchen, aiding kitchen employees in determining the quantity of food to prepare (Hennchen, 2019). However, this system is not the most effective, as restaurant reservations are constantly shifting, especially throughout the seasons, and it does not account for customers without reservations, known as walk-in customers. Another customer demand forecasting method being utilized by managers is the analysis of point-of-sales (POS) data. This method allows for the comparison of actual food sold versus demand forecasted food sales (Blum, 2020). This information assists in determining the quantity of food required for future meal services. Again, this method is not highly effective, as forecasting consumer demand for each night is challenging (Papargyropoulou et al., 2014). While improving customer demand forecasting is commonly suggested by researchers, the literature rarely offers any practical guidance in how to do so.

Training staff

As found by Heikkilä et al. (2016), managers have a significant, direct impact on how employees operate. When managers can motivate employees and effectively deliver instructions, it ensures employees are equipped with the necessary information and skills to operate a kitchen and dining room successfully. Therefore, the training systems in place are crucial to mitigating restaurant food waste (Makani, 2017). Furthermore, despite how tenured employees are, periodic

and constant training of employees is proven to generate long-lasting effects (Charlebois et al., 2015).

Restaurants implement several employee training systems intended to reduce food waste. Perhaps the most important is professional skills training; this ensures employees are equipped with the necessary professional skills to reduce mistakes and errors that can lead to excessive amounts of avoidable food waste, such as cooking mistakes and incorrectly reading or carelessly following recipes (Heikkilä et al., 2016). Inadequate training is a commonly recognized cause of restaurant food waste (Heikkilä et al., 2016; Goh & Jie, 2019). Therefore, adequately training employees can greatly assist in reducing restaurant food waste (Alcorn, 2020; Sakaguchi et al., 2018). Moreover, there is evidence that increasing employee awareness, through training and communication, of the severe implications of restaurant food waste is an effective way of increasing their engagement in reducing food waste (Alcorn et al., 2020; Bohdanowicz, 2006).

Reusing/repurposing food

The practices discussed in the previous sections detail methods of reducing food; however, many restaurants employ methods of reusing/repurposing unused food that would be otherwise disposed of (Principato et al., 2018). Rather than disposing of unused foods at the end of a meal service, many restaurants use these ‘leftovers’ to feed employees as a means of reducing their food waste (Filimonau et al., 2020; 2021). Sakaguchi et al. (2018) found this method to be the most common form of handling unused food among restaurants, with 72% of participants in their study citing this method.

Donating unused foods to charities is another method restaurants utilize to reduce their generated food waste; however, many restaurants are reluctant to participate (Sakaguchi et al., 2018). Several studies have indicated that restaurant managers are hesitant to donate unused food

due to health and safety regulation barriers (Filimonau et al., 2020; Pirani & Arafat, 2016). These health and safety barriers may be misconceptions among restaurant managers as several acts are in place that protect foodservice operators from legal liabilities associated with donations (Martin-Rios et al., 2018; Sakaguchi et al., 2018). For example, the Bill Emerson Good Samaritan Food Donation Act in the U.S. states that any donation made in "good faith" and meets all quality and labeling standards imposed by federal, state, and local laws and regulations that is made to a nonprofit organization is protected from legal liabilities (Buzby, 2021). Sakaguchi et al. (2018) found that when making participants who did not donate unused foods were made aware of this act, over half of the participants were more likely to consider donating, and Rack's (2018) study found there to be a positive correlation among restaurant managers who donated unused foods and their knowledge of the Good Samaritan Act. Other reasons restaurant managers do not donate unused foods as cited in the literature are transportation difficulties, managers finding the donation process taxing, and restaurants not producing enough food waste to donate (Pirani & Arafat, 2016; Rack, 2018; Sakaguchi et al., 2018).

Food waste disposal

Many efforts are made within restaurants to mitigate food waste. Despite these efforts, restaurants still produce a significant amount of unavoidable food waste. How restaurants dispose of this food waste can vary. The most common form of food waste disposal is simply discarding it into landfills, with 84.3% of U.S. restaurant food waste being disposed of this way (WRAP, 2014). As stated previously, this disposal method has significant environmental and social consequences. However, it remains the most cost-effective and convenient form of food waste disposal (Sakaguchi et al., 2018).

Food waste recycling is the alternative food waste disposal method cited in the literature. While the literature does not have one universal definition of food waste recycling, it is essentially the process of repurposing discarded food (edible or inedible) into a functional product (Cheaper Waste U.K., 2021). According to the literature, composting is almost the only food waste recycling method being implemented at restaurants. Composting refers to recycling organic matter, in this case, food waste, into a rich plant fertilizer (Lobo & Dorta, 2019). Composting in restaurants is accomplished by placing compostable organic material (food scraps), such as coffee grounds, produce, and eggshells, into a bin with soil to decompose to create fertilizer. Composting has multiple benefits, such as reducing greenhouse gas production, conserving water, and improving soil health (Hu, 2020).

According to the literature, the popularity of restaurants composting food waste varies around the world. In Pirani and Arafat's (2016) study, it was found that 67% of hospitality businesses in the United Arab Emirates partake in composting. However, in the U.K., it is reported that only 6% of hospitality businesses compost their food waste (Williams et al., 2011). United States restaurants reportedly recycle about 14.3% of food waste. Nevertheless, there is no existing figure for the percentage of restaurants that engage in composting specifically (WRAP, 2014). A study conducted by Sakaguchi et al. (2018) found that 84% of restaurants in Berkeley, California, compost food waste, yet, the city of Berkeley is a unique case, as the city incentivizes businesses to compost. While many restaurant operators express the desire to compost, many barriers are preventing them from doing so. Filimonau et al. (2020) found that restaurants face complications like limited space on-site and a lack of local resources preventing them from composting. Composting also imposes cosmetic concerns for restaurants, as it typically requires a large, bulky container that can emit strong unpleasant odors (Mbuligwe & Kassenga, 2006).

Gap in restaurant food waste literature

There are a growing number of studies that address the issue of restaurant food waste in recent years, however, this area is still severely under-researched. The literature concerning restaurant food waste is comprised chiefly of studies investigating the causes and sources of restaurant food waste and the steps being taken to mitigate it (Charlebois et al., 2015; Martin-Rios et al., 2018; Sakaguchi et al., 2018). No studies currently segment the restaurant based on its operational/functional areas to assess the contribution each operational/functional area has towards restaurant food waste. Moreover, despite the increasing public attention on restaurant food waste, only a few studies investigate the awareness, attitudes, and behaviors of restaurant managers and the practices they implement to mitigate food waste. These studies were conducted in Bulgaria (Filimonau et al., 2019) and China (Filimonau et al., 2020; Lang et al., 2020), not the U. S., which is one of the leading countries for generating restaurant food waste (ReFED, 2018). Additionally, no study has examined the differences in FOH and BOH manager awareness, attitudes (morals, values, and perceptions), and motivations regarding food waste based on their position within the restaurant. This study aims to fill this gap in the restaurant food waste literature.

Upper Echelons Theory

The Upper Echelons (U.E.) Theory, developed by Hambrick and Mason in 1984, will be utilized for the current study. The U.E. theory is a management theory stating that manager backgrounds can partially predict organizational outcomes (Hambrick and Mason, 1984). The theory was based on findings by March and Simon (1958), who stated that decision-makers of a company carry a set of “givens”, or assumptions, reflective of their cognitive base and values. The cognitive base of an individual refers to one’s psychological characteristics, which are

impacted by factors like cognitive processes, personalities, beliefs, and ethical norms that make someone who they are as a person and ultimately determine his or her values (Abatecola & Cristofalo, 2018). The assumptions that are reflective of one's cognitive base and values are stated by Hambrick and Mason (1984) as follows:

- 1) knowledge or assumptions about future events,
- 2) knowledge of alternatives, and
- 3) knowledge of consequences attached to alternatives.

According to the U.E. theory, when a manager is presented with a situation that requires a decision to be made, the assumptions of the manager are already present. These assumptions serve as a filter, ultimately altering the way a manager perceives the situation. In addition to a manager's cognitive base and values, the theory states that the observable characteristics of a manager also affect how a situation is perceived. Hambrick and Mason identify these observable characteristics as age, education, socioeconomic background, functional tracks, other career experiences, financial position, and group characteristics. Hambrick and Mason primarily drew these observable characteristics from a literature review of existing business publications, along with the authors' speculations. It is also important to note that the observable characteristics of an individual have an impact on his or her psychological characteristics, for example, an individual who grew up in a low-income household may have different values than an individual who grew up in a high-income household. Hambrick and Mason refer to the combination of these three factors – cognitive base, values, and observable characteristics – as "upper echelon characteristics". To put it simply, the theory states that the way in which a manager perceives a situation depends on the upper echelon characteristics a manager possesses.

U.E. theory states that organizational outcomes, in general, are partially predicted by the observable characteristics of certain top executives. Hence, the three fundamental principles underlying U.E. theory are the: (i) strategic decisions reflect the values and cognitive bases of powerful actors; (ii) such values and knowledgebases conform to certain observable characteristics such as training or experience; and therefore, (iii) the results are associated with the observable characteristics of these actors (Carpenter, Geletkanycz, & Sanders, 2004).

According to Hambrick and Mason, a manager's perception of a situation leads to a strategic decision regarding handling a situation. This strategic decision ultimately impacts a company's performance, whether it be profitability, growth, or survival. Figure 2 displays the relationship of the discussed factors. To summarize, managers' experiences, personalities, and values must be considered to understand why companies perform a certain way.

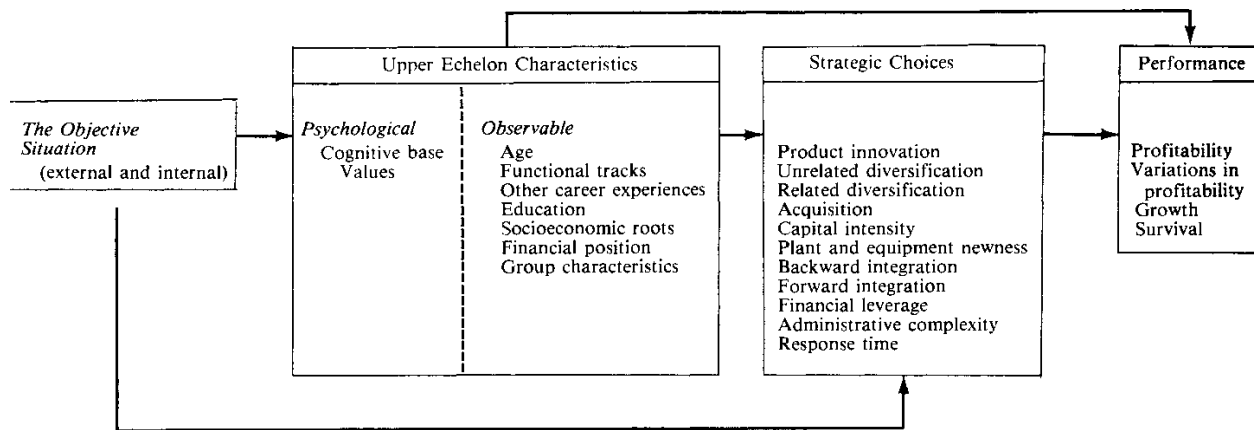


Figure 2 The Upper Echelons Theory

Source: Hambrick and Mason (1984)

As shown in Figure 2, there are cases in which a manager makes a strategic choice that upper echelon characteristics cannot predict. It is also found that the upper echelon

characteristics of a manager can directly impact company performance without a strategic choice ever being made.

In 2007, Hambrick published an article that made two main adjustments to the original Upper Echelons Theory. First, Hambrick found that managerial discretion acts as a moderator to the theory. Managerial discretion is present when managers are not faced with many constraints or have freedom when making decisions for their company. In Hambrick's update to the theory, it is found that when managerial discretion exists, the upper echelon characteristics are reflected in company strategy and performance. The level at which these characteristics are reflected is relative to management discretion, as when there is no managerial discretion, the upper echelon characteristics will likely not be reflected in company strategy and performance.

The second alteration made by Hambrick (2007) to the Upper Echelons Theory regards the job demands of management. In the study, Hambrick states that the job demands of management may vary from company to company, although they share the same role. It is found that these demands moderate the strength of the Upper Echelons Theory's ability to predict company strategy and performance, as managers with more job demands may be inclined to take "mental shortcuts" to handle their workload. This means managers with higher job demands are likely to make decisions based on their observations in the past, leading to management upper echelon characteristics being reflected in company strategy and performance. In addition, Hambrick states that managers with more time on their hands are likely to make more comprehensive, objective decisions as they are not faced with the same job pressures.

Upper Echelons Theory in the relevant literature

Within the restaurant food waste mitigation literature, no existing studies have applied the U.E. theory. Rather, the most relevant literature that applies the U.E. theory to other facets of

the hospitality industry will be discussed. The most relevant study within the literature is that of Mensah and Ampofo (2020). Researchers applied the Upper Echelons Theory to determine whether hotel waste management practices reflected the environmental attitudes of small hotel managers. Results of this study were significant, with managers' environmental attitudes having a strong influence on waste management practices being implemented at the hotels. While this study focused on waste management practices, it did not focus on food waste specifically but the overall waste produced by hotel operations.

Another study applying the Upper Echelons Theory also observed participant environmental attitudes as an upper echelon characteristic. The interaction between green consumption values, environmental attitudes, and environmental proactivity of craft brewery owners based on the Upper Echelons Theory was examined by Sozen et al. (2021). Researchers found green consumption values – the tendency of owners to purchase green products when doing personal shopping – to have a positive, significant effect on both environmental attitudes and environmental proactivity. In addition, findings indicated that craft brewery owners' environmental attitudes also have a positive, significant effect on environmental proactivity. Business challenges faced by brewery owners were also found to moderate the relationship between participant environmental attitudes and environmental proactivity, with more challenges leading to less environmental activity.

Lee et al. (2018) also found a moderator to the Upper Echelons Theory; they hypothesized that restaurant internalization would moderate the relationship between management upper echelon characteristics and franchise decision making. Findings of the study indicate that restaurant internalization has a moderating effect, with highly educated managers

more likely to take risks in their franchising decisions, while more tenured managers less likely to take risks in their franchising decisions.

Lastly, Lee et al. (2017) applied the Upper Echelons Theory to their study concerning corporate social responsibility (CSR) activities among restaurant Chief Executive Officers (CEOs). Findings indicated older, highly educated CEOs partake in less CSR activities, while longer-tenured CEOs partake in more. While restaurant food waste mitigation may be considered an environmental CSR activity, this study was not specifically focused on restaurant food waste mitigation, rather the broad umbrella term of CSR activities.

Relevance to the study

According to March and Simon (1958), managers bring their own set of assumptions to an administrative which reflect their cognitive base and values. The basis of the U.E. theory is that managers perceive situations on their upper echelon characteristics and make decisions based on these perceptions that eventually lead to organizational outcomes. This theory is highly relevant to the study, as the two groups of participants manage and operate two very distinctively different operational/functional areas in a restaurant – front- and back-of-house of restaurants.

While these two operational/functional areas work in harmony to produce the desired end service of a pleasant dining experience for restaurant clients, they require distinctively different competencies, skills, knowledge, training, and experience to perform well. Furthermore, the managers themselves and the employees that they oversee have varying degrees of engagement with the actual tangible product served to clients, the food. BOH managers are typically more hands-on when it comes to the food; they are responsible for designing menus, creating menu items (dishes), purchasing the raw ingredients, and overseeing the preparation and cooking of the food. While, for the most part, FOH managers are less engaged with food and more concerned

with the entangled aspects of the meal experience, managing the guest experience. As such, it is reasonable to assume that FOH and BOH managers may have psychological and observable upper echelon characteristics that differ, that being their values towards food and food waste, the cognitive base for these values, and their functional tracks. The functional tracks of the managers are the roles they currently hold, i.e., FOH manager (dining room manager) or BOH manager (kitchen manager (executive chef)).

According to the theory, these characteristics will heavily influence the lens through which a manager perceives the situational issue of restaurant food waste, impacting their awareness, attitudes, and motivations regarding the topic. Seeing as these characteristics vary based on whether a manager is FOH or BOH, one can assume based on the theory that the perceptions of restaurant food waste may fluctuate between the two sets of managers. How the participants perceive this issue will then impact their decisions regarding the issue, such as whether they find it to be a problem worth solving, how to solve the problem, or how much to prioritize the problem. These decisions made by managers will ultimately impact how the organization performs. This study will focus mainly on the first three stages of the Upper Echelons Theory – the situation, the upper echelon characteristics, and the strategic decisions – as the primary focus of this study is to analyze the awareness, attitudes, and motivations of FOH and BOH managers regarding restaurant food waste mitigation. Using the U.E. theory to explore the potential differences in awareness, attitudes, and motivations between FOH and BOH managers may shed light on the antecedents of their cognition, values, and perceptions that govern their decision-making and strategic choices relating to restaurant food waste.

Summary

To conclude, this chapter has provided insight into the most relevant literature regarding restaurant food waste. First, the global impacts of food waste were discussed, followed by the different causes of food waste within the food chain. This chapter then concentrated on the restaurant food waste literature, discussing its causes and current forms of mitigation. Finally, the Upper Echelons Theory was explained while displaying how it has previously been utilized within the hospitality literature. This chapter encapsulates how understanding the awareness, attitudes, and motivations among managers regarding restaurant food waste mitigation is crucial to its reduction.

CHAPTER 3 METHODOLOGY

Overview

A qualitative approach was adopted for this exploratory study in order to grasp a further understanding of restaurant managers' awareness, attitudes, and motivations regarding restaurant food waste mitigation. This research technique allows for in-depth interviews to be conducted that ultimately lead to a richer, more profound understanding of the participants' perceptions of restaurant food waste that otherwise could not be evaluated or predicted (Creswell, 2007). The qualitative approach also grants the opportunity to uncover causes of restaurant food waste, food waste mitigation practices, and barriers faced when trying to mitigate food waste, adding original insight into the existing body of literature. This type of data cannot be simply measured or counted; thus, the qualitative approach was utilized.

Following an extensive review of the relevant literature of research articles on the topic of restaurant food waste, alongside industry publications, a gap in the research was identified. It was uncovered that restaurant managers have a significant impact on the food waste generated within restaurants; however, there was limited research examining the awareness, attitudes, and motivations of restaurant managers to reduce food waste. Furthermore, no research has been conducted discussing how these awareness, attitudes, and motivations may differ depending on the operational/functional area of the restaurant a manager oversees. This study's qualitative, exploratory approach allowed the individual awareness, attitudes, and motivations among FOH and BOH managers to be examined in-depth.

Population and sampling method

The present study's population consisted of thirteen restaurant managers in the Southeastern United States. Most research participants (n=12, 92%) were selected by analyzing contacts already acquired by researchers who worked as restaurant managers, whether they be contacts made from previous experience in the industry, previous research conducted pertaining to the industry, or networking. Data collection began by first contacting restaurant managers through convenience sampling. Participants were contacted via e-mail, phone call, and in-person to ask whether they would be willing to participate in the study. Upon the participants agreeing, interviews were scheduled within the following weeks. Of the participants, there were three sets (1 FOH manager, 1 BOH manager per set) that worked at the same restaurant, meaning a total of 10 separate restaurants and 13 managers (6 FOH and 7 BOH) were involved in the study. The sample included restaurant operations of different types, both independent restaurants and chain restaurants. Furthermore, different restaurant operation segments were targeted, fast-food, fast-casual, and casual dining. This provided a broader understanding of food waste across the industry. Two rounds of semi-structured interviews were conducted with each participant over the course of one year, with the final interview being conducted in Spring 2021. Upon interviewing the thirteen respondents, the primary research questions were able to be addressed.

Instrument development

A semi-structured interview protocol was created to reflect the main questions the study attempts to explore (Giousmpasoglou et al., 2018). The qualitative semi-structured interview protocol for the first round of data collection was developed through an extensive review of relevant literature on restaurant food waste to ensure enough data was gathered to address the primary research questions. The researcher and the researcher's advisor reviewed the initial

interview protocol, and a pilot interview was carried out with a FOH manager to identify any discrepancies. Following the pilot test, minor adjustments to the interview protocol were made, and the remaining twelve participants were interviewed.

The first interview protocol questions were regarding the personal attitudes of participants towards food waste in general, then more specifically, food waste in the restaurant industry. Participants were then asked questions about their awareness of food waste, such as where it stemmed from and whether it had increased upon stepping into their roles as restaurant managers. The next set of questions pertained to the operational aspects of restaurant food waste, such as its causes, critical benefits of food waste reduction, practices in place to reduce restaurant food waste, and barriers faced when attempting to mitigate food waste. Subsequently, participants were asked their primary motivations to mitigate food waste within their organizations. Finally, following analysis of the data from the first round of data collection, new questions emerged throughout interviews to further understand participants' perspectives. As such, a second interview protocol was developed for a second round of data collection to further address the research questions. This protocol asked which restaurant areas produce food waste and approximated the percentage of food waste that stemmed from each area. A copy of the two interview protocols is attached in the Appendix.

Data collection

Interviews were conducted with participants either in person, through Zoom video meetings, or by phone call. The first round of data collection involved an interview with participants that took approximately 25-35 minutes to complete. The second round of interviews with participants took approximately 5-10 minutes to complete. Data collection ceased upon reaching data saturation (Gill, 2014). While 13 participants would be considered a relatively

small sample in quantitative studies, it would be considered rather large for a qualitative sample (Mac Con Iomaire et al., 2020). Some studies have been between one and four participants as samples (Lepkowska-White & Parsons, 2019).

Data analysis

Each semi-structured interview was audio-recorded and transcribed verbatim. Transcripts were then uploaded to NVivo Qualitative Analysis Software version 12 (QSR International Inc., MA, U.S.). For thematic analysis, the direct quotes from the interview transcripts were categorized into overarching themes and their corresponding subthemes that emerged from the data. A theory triangulation approach was adopted, as two researchers of different positions analyzed the interview data individually and then compared analyses to establish validity (Guion, 2002). Several rounds of data analysis were conducted and compared until the researchers were in agreement on five central themes that addressed the primary research questions (Creswell, 2007). These themes will be presented and discussed in the following chapter.

Trustworthiness of qualitative data

The credibility of the quality of data derived from qualitative research has often been criticized in comparison to quantitative data. While quantitative data is analyzed through formulas, rules, and numbers, qualitative data analysis is more of a creative process (Patton, 1999). According to the model proposed by Lincoln and Guba (1985), four criteria must be met for qualitative research to be trustworthy: credibility, dependability, transferability, and confirmability.

Credibility refers to the criterion used to achieve "confidence in the truth of findings" (Lincoln & Guba, 1985). There are several ways to achieve credibility in qualitative research

according to Lincoln and Guba's (1985) model, with one being the triangulation of sources. The triangulation of sources refers to using a uniform data collection method among various sources (Patton, 1999). Researchers of the present study achieved the triangulation of sources by asking the same series of research questions verbally to different people. Lincoln and Guba (1985) also suggest prolonged engagement as a means of achieving credibility, meaning researchers become familiar with the setting being researched by spending long periods of time in said setting. Both the researcher and the researcher's advisor have years of experience working in the restaurant industry. In addition, Sandelowski (1986) proposes that for qualitative research to be credible, it must present accurate descriptions of the human experience, which is achieved in this study by including direct quotes from participant interviews.

Dependability means qualitative research is consistent, or the results could be repeated if the study were to be conducted again (Lincoln & Guba, 1985). Dependability is achieved when researchers carefully lay out the decision trail of their research so it can be followed by another researcher (Thomas & Magilvy, 2011). This trail is laid out by clearly stating the purpose of a study, explaining how and why participants were gathered, explaining how data was collected and analyzed, discussing the findings, and presenting the various credibility techniques utilized throughout the study. Researchers can do so by providing a thorough explanation of the research methods used in a study.

The transferability of a study refers to how applicable the study's findings are in another context (Lincoln & Guba, 1985). In terms of this study, "another context" in which this study could be applied could be among restaurant managers in a different region of the U.S. or restaurant managers of an individual restaurant sector. Lincoln and Guba (1985) cite thick description as a way to achieve transferability, which means researchers have provided sufficient

information in their study so it can then be transferred to another context. However, transferability is ultimately up to the researcher wishing to transfer the data, as it is their responsibility to transfer the findings to the new area being researched.

Lastly, confirmability of a study is the level of neutrality held by researchers, meaning the findings are not altered by researcher bias, motivations, etc. (Lincoln & Guba, 1985). A method to achieve confirmability is theory triangulation. Theory triangulation refers to data analysis being conducted by more than one researcher to ensure the data is analyzed through different perspectives (Patton, 1999). The present study applied theory triangulation to achieve confirmability, as two researchers analyzed and interpreted data individually then compared results. This process was repeated until researchers agreed upon finalized results.

Ethical considerations

In order to meet the current standards for research involving human subjects, many procedures took place. The Institutional Review Board of Auburn University first reviewed the study and interview questions prior to performing the research. All ethical considerations were met, and the study was approved to be conducted. The researcher and supervising faculty are both CITI trained and certified. In order to ensure anonymity among participants, the names of participants and their corresponding restaurants have been protected throughout the study.

CHAPTER 4 RESULTS

General introduction

This chapter will present the results acquired through semi-structured interviews with thirteen FOH and BOH managers at restaurants. The chapter will be separated into three sections, which are as follows: Section one will provide a description of the demographics of the interview participants. Section two will discuss, in detail, the overall results. Each of the themes and subthemes that emerged from the analysis of the interview data will be discussed, along with supporting excerpts from interview participants. Section two is broken into two sub-sections, with the first subsection centering on the awareness, attitudes, and motivations among participants regarding food waste mitigation. This subsection will also include a comparison of the awareness, attitudes, and motivations among participants regarding the area of the restaurant they oversee, and the results discussed in this subsection will be utilized to address research questions 1 and 2. The second subsection will discuss the operational aspects of restaurant food waste to address research questions 3, 4, and 5. Section three will provide an overall summary of the findings.

Participant demographic information

A total of thirteen interview participants participated in this study ($n = 13$), the demographic information is presented in Table 1. All the participants in this study were male. The participants were divided into two groups in terms of occupation, with six participants being front-of-house (FOH) managers ($n = 6$) and seven being back-of-house (BOH) managers (head/executive chefs) ($n = 7$). One interview participant was Asian-American, one was Latin-American, and the remaining eleven were Caucasian. The interview participants have worked in

management positions for a range of 6-20 years. A majority of interview participants, 85% (n=11), represented independently-run restaurants, and 15% (n=2) of participants represented chain restaurants. For the purpose of this study, a chain restaurant will be defined as a restaurant with ten or more locations (Vaccaro, 2014). Regarding the restaurant industry segments, one restaurant can be classified under the *fast-food* segment, two under the *fast-casual* segment, five under the *casual* segment, and the remaining four under the *casual-fine dining* segment.

Table 1 Participant demographics

Participant	BOH/FOH	Restaurant Type	Restaurant Sector	Race	Gender
1	BOH	Independent	Fine dining	White	Male
2	BOH	Independent	Café/fine dining	White	Male
3	BOH	Independent	Fast casual	White	Male
4	BOH	Independent	Fast casual	Asian American	Male
5	BOH	Independent	Casual	White	Male
6	BOH	Independent	Fine dining	White	Male
7	BOH	Independent	Casual	Latin American	Male
8	FOH	Independent	Fine dining	White	Male
9	FOH	Independent	Casual	White	Male
10	FOH	Independent	Casual	White	Male
11	FOH	Chain	Fast food	White	Male
12	FOH	Chain	Casual	White	Male
13	FOH	Independent	Fine dining	White	Male

Overall Results

The overarching themes and subthemes generated from the thematic analysis of the interview data are detailed in the subsections below. Each of the subsections addresses different research questions. The first subsection presents the participants' perceptions of where food waste is generated in a restaurant. The second subsection details the overarching themes and subthemes that pertain to research questions 1 and 2, which address the awareness, attitudes, and motivations towards food waste mitigation in restaurants restaurant managers. This section also analyzes the differences within these results among FOH and BOH participants. On the other hand, the third subsection details the themes and subthemes that pertain to research questions 3, 4, and 5, which address the operational aspects (causes of food waste, preventative measures, and barriers) of food waste mitigation in restaurants.

Awareness, attitudes, and motivations

The emergent themes and subthemes of *manager awareness, attitudes, and motivations regarding food waste mitigation* are presented in Table 2. They are discussed in detail in the following subsections.

Table 2 Awareness, attitudes, and motivations

Theme	Subtheme
Food Waste Awareness and Attitudes	Strong negative sentiment towards the issue of food waste
	Origin of the participants' awareness and sentiments
	Developing an awareness of food waste in the restaurant industry from working in restaurants
	Greater awareness of food waste in the restaurant industry from working in management roles
	Food waste reduction is an inherent aspect of the culture of professional kitchens
	Cost-reduction

Motivations to Reduce Food Waste	Personal morals and values
	Respect for the product

Food waste awareness and attitudes

The first emergent theme from the interview data was *Food Waste Awareness and Attitudes* amongst the restaurant managers. This theme refers to the overall issue of food waste in society as a whole, whether it be food waste on a global scale or food waste at home. This also includes the issue of food waste generated in the restaurant industry. It was apparent that each interview participant was quite aware of the issue of food waste in society. Moreover, it appeared that many of the interview participants shared had a *strong negative sentiment towards the issue of food waste* in society and the restaurant industry.

“I think it is a shame that there is so much food waste in general, I am not sure on the exact amount nationwide and worldwide, but I’m sure if you looked into it, it would be staggering. Which is upsetting because being in that industry [restaurant industry], it kind of pulls at the heartstrings that you’re part of the problem”.

“Personally, I detest wasting food. It's one of my biggest pet peeves; I hate it both at home and at work”.

The *origin of the participants’ awareness and sentiments towards food waste* varied. The awareness of the issue of food waste derived from past lived experiences prior to working in the restaurant industry was cited by several participants (38.4%). This shows that these participants acknowledged food waste as a societal issue regardless of knowledge derived from working in the restaurant industry. There was a difference in these past experiences; several BOH

participants, three in total, stated they were raised in households that purposely minimized food waste; in contrast, this lived experience was not cited by any FOH participants.

“I come from a family where we don’t waste food and it’s something we were brought up in and how we were brought up”.

In addition, two interview participants, one FOH and one BOH, cited that travel and living abroad provided significant exposure to other cultures, thereby highlighting the paradox of wasting food while food insecurity is still a significant issue in many world regions.

“I ended up moving to and working in India. So, I got the chance to sort of see that first hand. See, I’m thinking about water right now, definitely water and as fresh as it was and the importance of saving the food and what we could do with this food and things like that. So, I would say the answer to that question is traveling outside the U.S. to other countries. Seeing how some families have worked so hard to eat so little, and the daily portions and the general consumption of groceries compared to the USA”.

Regarding food waste in the restaurant industry, each participant had an awareness of the topic. However, a major subtheme that emerged from the data was *developing an awareness of food waste in the restaurant industry from working in restaurants*. In fact, almost half (46%) of all participants credited the restaurant industry for their current awareness of the issue of food waste in the restaurant industry, with 50% of FOH participants and 42% of BOH interview participants citing that prior to working in the restaurant industry, they were not aware of the high levels of food waste that can occur in restaurants.

“Working in restaurants just kind of opens your eyes”.

Furthermore, while it was clear that all interview participants were aware of the issue of food waste in the restaurant industry, a majority of interview participants (77%) cited that they developed an even *greater awareness of food waste in the restaurant industry from working in management roles* within the restaurant industry. In terms of FOH and BOH comparison, 83% of FOH participants cited this greater awareness as compared to 71% of BOH participants. Further, it appears that this greater awareness is due to the responsibility that a FOH and BOH manager has to reduce operational costs and maximize profits for their respective functional/operational areas in a restaurant.

“...seeing the numbers side of it [food waste] now, I’m becoming more aware of the financial impact that it has”. “I think both chefs and people in my position [management], I think we’re more aware of food waste and I would say along the lines of specifically dealing with food costs, a lot of hotel chefs and F&B directors, hotels in general, are very much driven by food cost”.

Lastly, a significant emergent subtheme was that several participants (38.5%) expressed that *food waste reduction is an inherent aspect of the culture of professional kitchens*. This was cited by four of the seven BOH participants (57%) and only one FOH participant (16%).

“It’s [minimizing food waste] just been something that’s been drilled into me for a long time, I mean I’ve worked in a couple different fine dining restaurants over my career, and some of them have little to no food waste”.

“I’ve been in the kitchen for ten years now, it’s something they showed us in the first kitchen I ever worked in and it’s just kind of stuck with me ever since. Definitely a big part of being responsible as a chef, you want to utilize your waste as much as possible”.

Motivations to reduce food waste

The second central theme that emerged from the data was *motivations to reduce food waste*. While it was evident that each participant was motivated to reduce food waste in their restaurants, the apparent driving factor of these motivations varied amongst FOH and BOH participants. The distribution of motivations among FOH and BOH participants is displayed in Table 3.

Table 3 Food waste reduction motivations

Motivation Subtheme	FOH	BOH	Total
Cost reduction	6	7	13
Personal morals and values	3	5	8
Respect for the product	0	5	5

The most prevalent subtheme within the interview participants' motivations was *cost-reduction*, which 100% of the interview participants mentioned. This subtheme speaks to how reducing food waste within restaurants typically results in a higher profit for their restaurant, as they stated it has a direct impact on food cost.

"It's really the financial side of it. Like where can we optimize cost and make that extra dollar any way possible?"

"It's obviously in our financial interest; it drives down our food cost".

A portion of participants (61%) cited their *personal morals and values* as a key motivation for reducing food waste. However, the distribution of this motivation must be noted

as it was cited by 71% of BOH participants and 50% of FOH participants. Several interview participants expressed an apparent sense of guilt by wasting food in light of the significant level of food insecurity that exists in societies nationally and globally, and also, from a sustainability standpoint, *the negative impact that food waste can have on the environment.*

“Through a stewardship standpoint of not wanting to misuse product that we have that could be eaten by someone.”

“It's also a sustainability thing; we don't want to throw away food that's usable”.

An interesting finding was that having a *respect for the product (food)* was cited by several interview participants (38%) as a critical motivation for food waste reduction; moreover, each of these participants was a BOH manager. It appears that the BOH participants demonstrated an appreciation for the intrinsic worth of the food and the physical (labor) and environmental resources put into producing the ingredients at the agricultural level that they utilize on their menu.

“You feel bad throwing away, overcooking or burning vegetables, when you know the farmer and picked up the vegetables out of their pickup truck that morning”.

Furthermore, this point was expanded on by two BOH participants, as they explained that the respect for the product derives from the personal relationships they have established with local farmers and suppliers that produce the food they use.

“Respecting the ingredients because we get a lot of our produce from local farmers that have spent a lot of hard work growing that product, and we have good relationships with them so for them to do all that hard work and us take the ingredient and just use half of it is kind of disrespectful. That's a key motivating factor”.

Operational aspects of restaurant food waste

The next section of this chapter will focus on the operational aspects of food waste mitigation within restaurants to address research questions 3, 4, and 5. First the findings of the managers perceptions of how food waste is generated in their restaurants is presented. This is followed by the findings from the thematic analysis of the interview data.

Perceptions of food waste distribution

Participants were asked “what functional/operational areas (FOH and BOH) of their restaurants generate food waste” and were asked to give estimates of the proportions of food waste generated in each functional/operational area. The results of these perceptions of food waste distribution are presented in Figure 3.

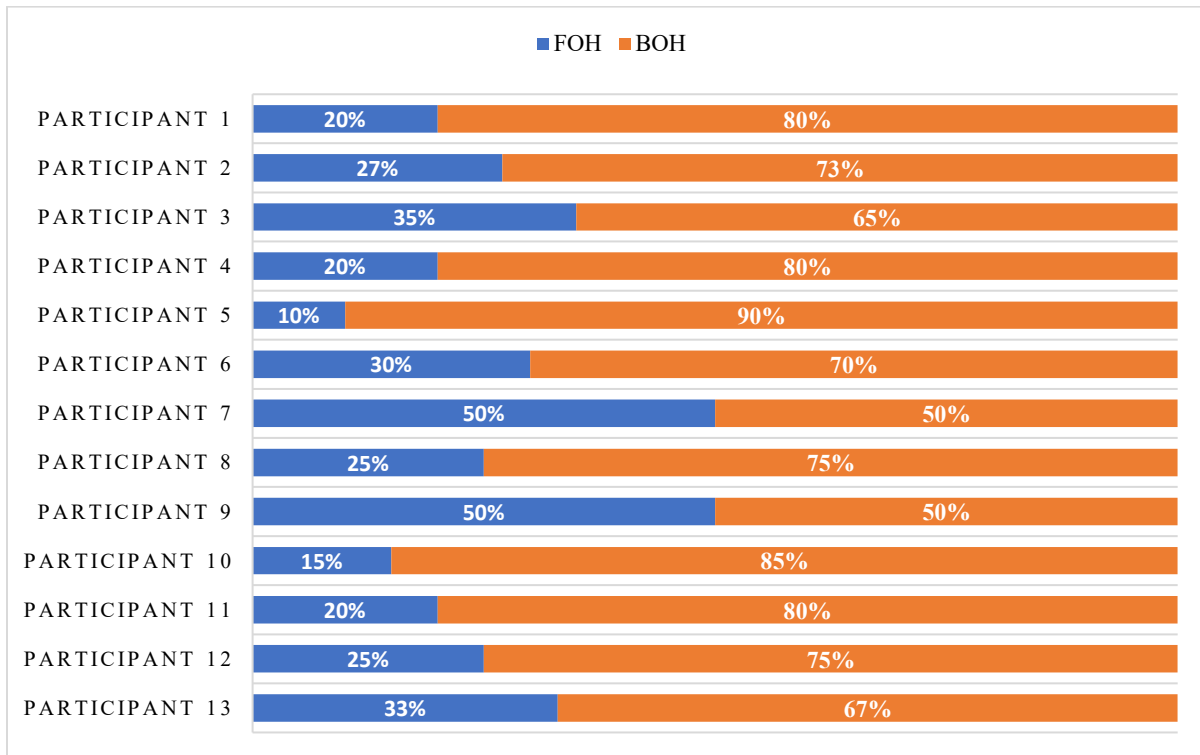


Figure 3 Restaurant manager perceptions of food waste distribution, front of house and back of house

As shown in Figure 3, the perceptions of food waste generation caused by FOH and BOH vary. For the most part, the consensus amongst FOH and BOH managers is that the majority of food waste is generated in the BOH, this is to be expected as this is where the majority of the food is stored, prepared, and cooked, and there is inherent unavoidable food waste associated to food preparation and cooking. However, there is quite some variance across participants, and this can be explained by the fact that each restaurant has a different menu and operational procedures and protocols in place for food production. For FOH-generated food waste, the estimated range varied from 10% to 50%, while the estimated range was 50% to 90% for BOH-generated food waste. However, it must be noted that across all participants, FOH still appears to be a functional/operational area in the restaurant that generates a considerable amount of food waste; for two participants, this figure of 50% of all food waste generated in the restaurant. Furthermore, the perceptions of food waste among FOH and BOH managers are similar, with FOH managers stating an average of 28% of food waste is caused by FOH and BOH managers stating an average of 27% of food waste is caused by FOH.

Findings of operational aspects of restaurant food waste

Three distinct themes are presented: *the causes of food waste*, *food waste prevention practices*, and *barriers faced to reducing food waste* by participants. The emergent themes and subthemes that will be discussed in this section are presented in Table 4.

Table 4 Food waste causes, prevention practices, and barriers to reduction

Theme	Subtheme
Causes of food waste	User-error generated food waste
	Employee mindset regarding food waste
	Hold time for specific foods
	Restaurant service style
Food Waste Prevention Practices	Food waste monitoring strategies
	Strategic menu planning
	Repurposing surplus ingredients
	Staff training
Barriers to Reducing Food Waste	Food donation liability concerns
	Barriers to composting food waste

Causes of food waste

Causes of food waste was the first emergent theme in terms of operational aspects of restaurant food waste. This theme was mainly associated with employee-generated food waste and operational-generated food waste, with several subthemes emerging; *user error*, *employee mindset regarding food waste*, *restaurant service style*, and *hold time for specific foods*. The most prevalent cause of food waste cited by participants was food waste generated through *user error*, that being the restaurant servers or cooks. This subtheme refers to mistakes made by these restaurant employees that result in unnecessary and avoidable food waste; this was mentioned by all interview participants (100%). These *user errors* comprised a variety of mistakes, both in the front-and back-of-house in the restaurants, ranging from a FOH server ordering the wrong food for a customer to a BOH staff member overproducing food in the kitchen.

“I would say that [FOH food waste] is misreading tickets... wrong steak temperature, with blue cheese instead of without bleu cheese, stuff like that.”

“Biggest cause, I would say honestly human error, and that would be somebody per se not wrapping something correctly or maybe perhaps leaving something out on accident or overcooking or burning to be honest. You know, pretty much human error is the biggest waste factor”.

Furthermore, two participants elaborated on this user error, stating it was partially due to how employees are trained.

“I would say honestly it would be lack of accountability, or lack of leadership or lack of knowledge at this point in time would be the main drivers of those aspects, which always would follow up with if this particular person was trained right, are they doing it intentionally or unintentionally?”

Similarly, another source of employee-generated food waste that emerged from the was *employee mindset regarding food waste*. It appeared that for several of the interview participants (23%) that some employees in their establishments can showcase a lack of interest and priority towards reducing food waste. Moreover, it was explained that this apparent lack of prioritization of reducing food waste mainly manifests itself in employees that take shortcuts for various reasons (saving time, lack of effort, etc.), and therefore increases avoidable food waste.

“I don't care, it's not my money, and I don't care. I'm not going to risk cutting my finger because I don't know how to cut a carrot down, I'm not going to waste the energy of trying to cut this little end of the meat; it's easier for me to not cut it out, so there's no point”.

Another cause of food waste cited was *restaurant service style*; more specifically, this is the operational style in which the different restaurants serve their food to customers (table service, buffets (self-service), counter service, etc.). The *service style* most commonly referenced as a significant contributing factor to food waste was self-services buffets.

“One of the biggest ways I see food waste happening is through our catering events (typically buffets). Always over-preparing to make sure we don't run out, and then the food gets left on the buffet and can't be reserved or sits out too long, so then it all just goes into the trash”.

Expanding on the previous subtheme, interview participants cited that the *hold time for specific foods* was a common cause of food waste in their restaurants. Food waste, in this instance, is associated with more perishable cooked food items or dishes that spend excessive amounts of time in hot storage before being served to customers, typically under heat lamps or in a hot box. This can result in the food quality diminishing over time; therefore, the food becomes no longer servable to customers and is subsequently disposed of. This is referred to as '*hold time*' within the restaurant industry, and this *hold time* varies from food to food; as such, there can be varying levels of waste associated with different foods.

“French fries in general for most restaurants, I think, would have a shorter hold time. For us, it's five minutes because they tend to cool down really fast, and they're not nearly as good if they're not at the proper temperature, so definitely we're throwing away all of those”.

Food waste prevention practices

Food waste prevention practices was an emergent theme cited by each interview participant. Further, there were various practices to minimize and prevent food waste cited by interview participants. An apparent first practice in preventing food waste is monitoring and measuring how much food waste is occurring so that corrective action can occur. As such, *food waste monitoring strategies* was the first significant emergent subtheme under this overarching theme. While it was universal across the interview participants that they do not physically measure food waste in their establishments (weigh the quantity of food wasted), the two primary *food waste monitoring practices* mentioned by interview participants were (i) utilizing food cost for tracking food waste and (ii) visually monitoring food waste. A considerable number of interview participants (50%) explained that they estimate food waste in their restaurant by analyzing daily financial reports that detail the dollar amounts associated with food cost. Moreover, it appears that this strategy allowed or participants to identify periods of abnormal food waste occurring in their restaurant.

"We basically go by whatever our various theoretical food cost is, and that's about it. I have a fairly decent awareness of what our food waste is per day, just based on food cost."

"We measure it when it becomes a problem. So, it's not a regimented measurement until we see something skewed. So, if beef cost is out of control, we might start looking for beef waste. If produce cost is out of control, we might start looking for produce waste by, but our concept is built to utilize ingredients to their fullest. So, when we see costs starting to skew out of control, we immediately know that there's probably a waste issue or a quality issue or a shipping issue".

Similarly, a substantial number of interview participants (50%) cited that visual monitoring of food waste was another common food waste monitoring practice. Participants explained that monitoring the dishes that return from the dining room to the dish wash area was a method of assessing the quantity of leftovers; food not consumed by customers. This primarily serves as a quality control measure by potentially indicating consumers' preferences; if they liked the food and therefore consumed it. However, it can, in turn, provide valuable information regarding potential portion sizes issues (incorrectly sized portions) that lead to excessive food waste.

"We don't have a system, but we definitely monitor it visually and say, this piece of whatever, people aren't finishing. Four corn donuts instead of five, whatever it may be. It really is just watching and saying, 'okay, that portion size is too big'".

A large majority of interview participants (84%) cited *strategic menu planning* as one of their food waste prevention practices. Several strategies under this subtheme were mentioned by interview participants, namely (i) cross-utilization of ingredients, (ii) menu reconstruction, and (iii) the adoption of smaller portion sizes. What appeared to be a universal strategy amongst interview participants was curating menus in a manner that cross-utilizes ingredients (cited by 84% of participants). In this way, ingredients are utilized for several menu items, and therefore, this seemingly more efficient way of designing a menu assists in minimizing food waste that can occur when a wider variety of ingredients are used on a menu.

"We have a lot of cross-over on ingredients between our three meal periods".

"We take all of our trim from pork to duck to all of our beef and our fish, we save all of our fish trim for fish tacos, and we have a partnership with a bar where we utilize some

of our products for those items. We use fish trim for fish tacos, we take all of our meat trims, and we freeze it immediately once being cut, and we utilize those scraps and trimmings for burgers, we run different burger specials, so we try to save all proteins unless it's an inedible part of it, like the fin or something like that, it all gets re-ground up into a burger of some sort. Or meatballs, or Bolognese or something like that. So, it all gets utilized".

Several interview participants (39%) explained that strategically reconstructing their menu was a response to experiencing higher than satisfactory food waste or when particular menu items do not sell well. In this way, they alter menu items that generate food waste and also eliminate menu items that contribute to consumer-generated food waste.

"Menu development does have some influence over waste. You might eliminate a product that is not selling as well that you end up having to throw out".

"It was one of the driving factors for why we got rid of our lunch buffet probably four years ago".

Another strategy under *strategic menu planning* mentioned by a small number of interview participants (23%) as a means of food waste prevention is the adoption of smaller plates and portions. By reducing the amount of food served to guests, interview participants expressed that this resulted in less consumer-generated food waste.

"I would say in banquet receptions we'll utilize smaller plates, but we utilize smaller plates, so we don't run out of food, so people aren't taking as much food".

In the same realm as *strategic menu planning*, a large number of participants (84%) cited *repurposing surplus ingredients* as a method of minimizing and preventing food waste. It was

explained that when there is a surplus of ingredients or natural edible waste associated with specific ingredients, for example, trimmings from meat, chefs incorporate these ingredients into other dishes to avoid food waste. The two main strategies for *repurposing surplus ingredients* that interview participants cited were (i) using surplus ingredients to create daily specials on the menu and (ii) using edible leftovers for staff meals. The most cited method was for participants to use surplus ingredients to create daily specials on the menu (84%). This addition of daily specials to the restaurant's standard daily menu proves to be a common method of utilizing such ingredients that would otherwise be disposed of.

“the specials were 100% brought into our lunch menu to reduce food waste”.

“Every single day since we've opened, it always was thirty percent specials but now it's every day entirely specials”.

“We run daily specials to get rid of food that may be scrapped. When we break down our beef tenderloin, we use it in our beef tartare. When we have leftovers from that, we use it to make beef tips and rice. We use leftover ingredients to make specials that we put on social media and sell a bunch of. A lot of people don't know that those specials are created out of leftovers that we have laying around”.

It was also explained by a number of participants (46%) that in some instances, rather than incorporating edible leftover ingredients or surplus ingredients into their menu, they instead prepare staff meals for the employees to enjoy; again, this prevents these ingredients and leftovers from being wasted.

“We take the trimmings of our pork and chicken and make staff meal out of them”.

Effective *staff training* was the final emergent subtheme from the data as an important way of preventing food waste. A large number of interview participants (69%) cited that effectively training employees in a manner that first of all eliminates mistakes that lead to food waste and creates a culture that prioritizes food waste prevention amongst staff members is an effective way of minimizing food waste in their restaurant.

“We actually participate in the James Beard Foundation Smart Catch program, and we've been ranked as a leader in that program nationally for the last two years. So, we educate on that too, sustainability and waste. We train about food waste monthly, if not weekly, about what we can do and watch out for. It's a pretty big centerpiece of what we talk about”.

Barriers to reducing food waste

The last prevalent theme that emerged from the data was *barriers to reducing food waste*. While all the interview participants expressed a desire to further reduce food waste in their establishments, they explained that they faced several substantial *barriers to reducing food waste*. The most commonly cited barrier by participants (69%) was that of *food donation liability concerns*. Several interview participants explained that they would donate their edible leftover food and ingredients; however, due to the liability of any health issues arising from the donated food, it is not possible to do so.

“The last time we had a conversation about it we're not allowed to take leftovers and redistribute them because of liability reasons”.

Another frequently adopted practice to reduce food waste is to compost food waste, both edible and inedible. While some interview participants (38%) expressed an interest in

composting their food waste, they also detailed various *barriers to composting food waste*. Most notable, specific regulations within the restaurant's city can prevent businesses from composting. In addition to this barrier, a lack of physical space was another discussed barrier to composting food waste. Because of these barriers, most interview participants stated that all of their inedible food waste is disposed of.

"We are not allowed to compost in the city; it is a city ordinance, residential or commercial. It's illegal".

Summary

In summary, Chapter 4 presented the results derived from a thematic analysis of thirteen interviews conducted with restaurant managers. The results included a summary of participant demographics presented in a table, followed by an in-depth discussion of each of the emergent themes and subthemes from the data. The participants' attitudes and differing awareness and motivations among FOH and BOH restaurant managers were presented. Next, operational aspects of restaurant food waste, such as its causes, practices to reduce it, and barriers faced when trying to mitigate it, were presented. Direct quotations were pulled from the data to further emphasize the emergent themes from the data. The following chapter will discuss these findings to address the study's research questions and present the implications for the industry and recommendations for future research potential.

CHAPTER 5 DISCUSSION AND CONCLUSION

Overview

This chapter is divided into five sections. To begin, the five primary research questions will be addressed based on the results from the study detailed in Chapter 4 and the relevant literature. The second section will discuss the implications that can be drawn from the study, both theoretically and practically. Next, the limitations of the study will be presented, followed by recommendations for future research. Lastly, a brief conclusion will be presented that summarizes the current chapter and the study in its entirety.

Discussion of results: addressing the research questions

The primary aim of this exploratory qualitative research was to gain a deeper understanding of the awareness, attitudes, and motivations of restaurant managers regarding food waste mitigation. To do so, this study sought to analyze and compare the traits (upper echelon characteristics) of both front-of-house and back-of-house restaurant managers through the lens of Hambrick and Mason's (1984) Upper Echelons Theory. Finally, this study aimed to understand the current primary causes of restaurant food waste, the practices in place in efforts to mitigate it, and what barriers restaurant managers might face when trying to do so.

R.Q. 1: What is the awareness and attitudes of managers towards food waste in restaurants and the reduction of food waste?

R.Q. 1a: Do the awareness and attitudes differ among FOH and BOH managers?

The results show that each participant, regardless of the operational/functional area, demonstrated a strong awareness of the issue of food waste in restaurants. These findings are not surprising, as many other studies have indicated that food waste awareness has been increasing

over recent years (Duursma et al., 2016; Sakaguchi et al., 2018). Furthermore, several studies have emphasized the importance of restaurant employee awareness regarding food waste mitigation (Hennchen, 2019; Saric, 2019). In addition, participants appeared to display strong negative sentiments towards the issue of food waste. Stirnimann and Zizka's (2021) found that the cultural backgrounds of restaurant managers and chefs can influence their "approach to handling food", in the current study, several participants cited their backgrounds (upbringing) as the root of their food waste awareness.

A significant finding in the current study is that awareness of restaurant food waste increased once participants moved into management positions. It appears that the financial oversight related to the management position is the reason for this greater awareness; mitigating food waste is a cost-reduction opportunity. However, this finding also indicates that base-level restaurant employees may not hold the same awareness as managers regarding food waste, possibly because they are not aware of its financial implications. In accordance with the Upper Echelons Theory (1984), this finding can conclude that the experiences of managers working within the restaurant industry, and later stepping into management roles, resulted in a heightened sense of awareness regarding the issue of food waste, both as a whole and within the restaurant industry. These findings can also be viewed as a positive for the restaurant industry, because manager awareness of food waste has been found to have a direct, negative relationship with the amount of food waste a restaurant produces (Heikkilä et al., 2016; Hennchen, 2019; Marthinsen et al., 2012).

R.Q. 2: What are the motivations for managers to reduce food waste?

R.Q. 2a: Do these motivations differ among FOH and BOH managers?

The primary motivation among participants to mitigate food waste within their operations was cost-reduction (profitability), which is consistent with the literature. Hennchen (2019) found that monetary were the main drivers behind kitchen managers' efforts to reduce food waste. Martin-Rios et al. (2018) found that increasing profitability was one of the most powerful motivations for restaurant managers to reduce food waste due to its impact on food costs. Similarly, Stirnimann and Zizka (2021) found that most restaurant managers are profit-motivated, while further elaborating that wasting food essentially means managers effectively pay for the food twice, first when purchasing the food and again when disposing of it. From a business perspective, there is a tremendous economic requirement to run a food service business efficiently due to the typically narrow profit margins. Reducing food waste has been shown to reduce economic costs in restaurants, in fact, Hanson and Mitchell (2017) demonstrated that the return on investment of reducing food waste is 14:1 for every dollar spent. Moreover, other studies have found that more significant amounts of food waste are generated if managers do not perceive reducing food waste as a cost-reduction opportunity (Heikkilä et al., 2016).

Personal morals and values were found to be a significant driver to reduce food waste amongst participants. In fact, Stirnimann and Zizka's (2021) found that sustainability and ethics were more frequently cited as motivations to reduce food waste than profitability. This difference may be due to the difference in location, as Germany and Switzerland are currently within the top 10 most environmentally-friendly countries globally, unlike the U.S. (World Population Review, 2021). With that being said, only half of FOH (3/6) cited personal morals and values as a key motivation for mitigating food waste, whereas nearly all BOH managers (5/6) cited this.

Additionally, respecting the product (food) was cited by the same number of BOH participants (5/6) as a key motivation to reduce food waste. Moreover, this was not cited by any of the FOH participants. Hennchen (2019) found that a lack of appreciation for the products' intrinsic worth as an underlining reason for unnecessary restaurant food waste for non-culinary professionals. This lack of appreciation was associated with a lack of gastronomic knowledge and experience.

Per the fundamental principles of the U.E. theory (Carpenter, Geletkanycz, & Sanders, 2004), the psychological upper echelon characteristics of *values* and *cognitive base* appear to conform to the observable upper echelon characteristic of the participants (Lopez-Munoz & Escriba-Esteve, 2017), that being their different *functional tracks*. The training and experience of BOH and FOH participants differ greatly, with BOH participants having previous and current experience in the kitchen of a restaurant preparing and cooking the food. Whereas FOH participants work primarily in the service area interacting with customers.

The *cognitive base* for the differentiating *values* of respect for the product (the food) that BOH participants appear to have and FOH participants lack may be explained by the BOH participants being more highly involved with food. The construct of food involvement is defined as the level of importance of food in a person's life (Bell & Marshall, 2006). Moreover, the Food Involvement Scale, developed by Bell and Marshall (2003), was structurally underpinned by the Food Lifecycle Theory (Goody, 1982). The Food Lifecycle Theory proposed the five stages in the lifecycle of food, acquisition, preparation, cooking, eating, and disposing of food. Based on the construct of food involvement, the food itself may be more meaningful to BOH than FOH participants. While both BOH and FOH managers viewed food waste mitigation as a way to increase profits, BOH managers appear to have a deeper connection and respect for the food. While the current study focuses on the fifth stage of the lifecycle of food, disposing of food, it

appears that the activities and behaviors of the BOH participants in the earlier stages of the food lifecycle, most notable the acquisition of the food, influences their perceptions and values towards food waste. The BOH participants cited that having a relationship with the food suppliers and growers themselves enhanced their respect and appreciation for the food. It is worth noting that food involvement was not assessed in the current study.

R.Q. 3: What are the main sources of food waste for each restaurant?

To explore the perception of how food waste is generated in their businesses, participants of the current study were asked to provide an estimate of the contribution towards total restaurant food waste generated from the two operational/functional areas of their restaurants, FOH and BOH. The findings illustrate that managers perceived the BOH as being the significant contributing operational/functional area to food waste. This finding is consistent with previous studies that noted that food waste during food preparation contributes significantly towards restaurant food waste (Aamir et al., 2018; Filimonau et al., 2020; 2021; Principato et al., 2018). Food waste is an intrinsic part of a profession kitchen, the BOH operational/functional area of a restaurant. Both avoidable and unavoidable food waste occur in the professional kitchen, an example of avoidable food waste spoiled food, whereas unavoidable food waste may be food peelings and trimmings. With that being said, an important finding is that the FOH is an operation/functional area that can also significantly contribute to total restaurant food waste, as much as 50% in some instances (Figure 3). More importantly, it appears the vast majority of the food waste that occurs in the FOH of a restaurant is avoidable food waste. Although, food waste generated in operational/functional areas in a restaurant has not been compared directly in previous studies, most studies that investigate drivers of restaurant food waste focus on client- and kitchen-generated food waste (Principato et al., 2018). Comparing actual food waste data

with those obtained from other studies is challenging due to the novelty of the research topic, the relatively small number of the published articles, and different methods of quantifying food waste (Betz et al., 2015; Principato et al., 2018).

Regarding the specific causes of restaurant food waste, the findings of the study are in agreement with the body literature on restaurant food waste. In particular, user error (employee mistakes) was cited as a significant cause of food waste. The findings from this study indicated that a lack of proper training and the mindset of employees often leads to more user errors. This is in line with the literature, as Heikkilä et al. (2016) found that untrained restaurant employees are more susceptible to making mistakes that lead to avoidable food waste, such as misinterpreting a recipe or overcooking food items. McAdams et al. (2019) also observed that the amount of mistakes made by an employee that ultimately results in food waste is directly correlated with the employee's skillset; to put it simply, the more skilled an employee, the less food waste they generate. As proper training and professional skills are crucial to food waste mitigation within restaurants, due to the high turnover rate in the industry, it is difficult for restaurants to acquire and sustain a staff that acquires such professional skills (McAdams et al., 2019). In relation, the findings of this study indicated that employee mindsets often result in food waste being generated. Several participants cited that employees may take shortcuts to save time, even though these shortcuts may result in more food being wasted.

Operationally, the two factors cited by participants of the study that caused food waste were the service style and specific hold times for foods. Regarding service style, the restaurants that served food in a buffet-style on specific occasions (wedding catering, brunch buffet, etc.) stated this generated much more food waste than their typical a la carte menu. This finding was not a surprise, as the literature frequently states that buffets are the most wasteful style of

restaurant (Juvan et al., 2017; Marthinsen et al., 2012; Silvennoinen et al., 2015). Foods being wasted due to their hold times is also not a surprise, as this cause has been cited in previous studies (Heikkilä et al., 2016; McAdams et al., 2019).

R.Q. 4: What practices are managers implementing to reduce food waste in restaurants?

Most participants monitored food waste, which is frequently recommended within the literature as a crucial strategy for reducing food waste (Filimonau & De Coteau, 2019; Principato et al., 2018; Silvennoinen et al., 2019). The most common method of food waste monitoring within participating restaurants was tracking food costs, which is not surprising given that the primary motivation among participants to reduce food waste was cost-reduction and profitability. Sakaguchi et al. (2018) reported similar findings, with 24% of restaurants in their study doing so. It was also found that no participants physically measured their generated food waste, with Martin-Rios et al. (2018) finding the same results and Sakaguchi et al. (2018) finding just 7% of their participating restaurants implemented this practice. Although Filimonau and De Coteau (2019) and Dhir et al. (2020) state that measuring food waste is a crucial practice for managers to grasp the scale of food waste within their restaurants fully, it is apparent through the literature and this study's findings that this is not a common practice. This may be due to several factors, as Sakaguchi et al. (2018) found many managers did not see a need to measure food waste, however seeing that all participants of the current study held a great sense of awareness of food waste, along with a negative attitude towards it, this is probably not the case. Many studies that sought to quantify the amount of food waste generated in restaurants required specific types of equipment to be used and considerable time to physically measure food waste. Perhaps these are obstacles preventing participants from measuring their food waste (Betz et al., 2015).

Regarding food waste mitigating practices, most participants cited strategic menu planning as a method of food waste mitigation within their organizations. This finding is expected, as Marthinsen et al. (2012) found that over half of their participants stated that menu planning aided food waste reduction, and Martin-Rios et al. (2018) found most participants practiced the same. Martin-Rios et al. (2018) also emphasized that menu planning requires cooperation from both the FOH and BOH because the BOH managers may be primarily focused on the cross-utilization of ingredients, FOH managers have to make sure the customers will still enjoy the menu.

Participants had various methods of utilizing surplus ingredients, one method being incorporating these surplus ingredients into daily specials. This finding confirms some of the literature, having been cited as a standard method implemented in restaurants to avoid food waste (Filimonau et al., 2020; Heikkilä et al., 2016; McAdams et al., 2019). However, an interesting paradox lies in the literature, as Alcorn et al. (2020) cited daily chef specials as contributing to restaurant food waste due to the varying ingredients needed each day. This may be because these restaurants were not offering daily specials with the motivation of reducing food waste but rather to appease consumers. Some participants also stated that their restaurant utilizes surplus ingredients to prepare a staff meal, which is consistent in the literature (Filimonau et al., 2021; Filimonau et al., 2020; Sakaguchi et al., 2018).

Effectively training employees was cited by a large portion of participants as a means of reducing food waste within their organizations, which is in keeping with the literature (Alcorn, 2020; Heikkilä et al., 2016; Sakaguchi et al., 2018). However, while training procedures were cited by 69% of participants to mitigate food waste, 100% of participants still cited user error as a primary source of food waste. This was a paradox within the study, as user error is commonly

attributed to improper training. This finding displays how the current training systems in place may not be as effective as managers believe; therefore, more effective training systems focused on food waste mitigation are needed within the restaurant industry.

R.Q. 5: What are the barriers faced while trying to mitigate food waste?

The main barrier faced by participants preventing them from reducing their food waste was the concern of liabilities when donating leftovers to charities. This finding is reflected in the literature, as Sakaguchi et al. (2018) found this to be true for 75% of restaurants studied, and Marthinsen et al. (2012) found this to be true for 98% of restaurants surveyed. Findings in the literature indicate that these liability concerns are typically due to manager misperceptions, and by making managers aware of the Good Samaritan Act and its protection, managers may reconsider making charitable food donations (Rack, 2018; Sagakuchi et al., 2018). The second barrier faced by managers was that of composting, as managers stated specific city ordinances and special concerns prevented them from doing so, ultimately confirming the literature (Filimonau et al., 2020; Mbuligwe & Kassenga, 2006).

Implications

Theoretical implications

The current study contributes to the understanding of awareness, attitudes, and motivations of restaurant managers regarding food waste mitigation. More specifically, the study qualitatively focused on food waste generated in the different operational/functional areas of the restaurant. Contrary to prior literature that considers food waste generated in a restaurant as kitchen-generated and/or client-generated (Heikkilä et al., 2016; Principato et al., 2018), this study segmented food waste generated by the restaurant based on operational/functional areas. The findings demonstrate that the FOH of a restaurant can significantly contribute to restaurant

food waste. Thus, this study is the first to highlight the role that FOH plays in restaurant food waste.

Furthermore, a significant theoretical implication is the comparison of the awareness, attitudes, and motivations of FOH and BOH management in restaurants. By applying the Upper Echelons Theory as a theoretical lens, observable and psychological characteristics of managers were found to influence their awareness, attitudes, and motivations towards restaurant food waste mitigation. This is the first study to explore the underlying cognitive base and values for restaurant managers' awareness, attitudes, and motivations towards restaurant food waste. Thereby contributing a more profound understanding of managers' awareness, attitudes, and motivations towards restaurant food waste to the body literature on this topic.

As is typical with an exploratory qualitative approach, patterns and themes emerged from an analysis of the data outside the study's original scope. While the present study did not focus on constructs such as food involvement, it appears this construct could, in fact, be the underlying cognitive base for the managers' perspectives. This preliminary result could be expanded on for future research. Lastly, while the U.E. theory has been applied in previous hospitality research (Chesang, 2016; Lee et al., 2018; Sozen etl al., 2021), this study is the first to apply this theory to examine restaurant food waste.

Practical implications

The practical implications of this study are extensive. To begin, as the literature states, food waste awareness is crucial to its mitigation. The findings of this study show that restaurant managers tend to obtain a greater awareness of restaurant food waste once they move into management. Therefore, it is recommended that more action is taken to increase the awareness of food waste of both restaurant employees prior to moving into management positions. For

employees, it is recommended that specific training on food waste and food waste mitigation be provided to increase their awareness. Ideally, restaurants would conduct food waste awareness workshops bi-annually for their entire staff. It is essential to inform and continue to inform employees of the impacts food waste has on the restaurant industry and the world as a primary step in working to reduce it.

It is recommended that food waste training programs focus on three aspects of restaurant food waste to make it more meaningful for trainees and thereby impactful. First, making employees more aware of the financial impact of food waste on restaurant profit margins and highlight how mitigating food waste can be a significant cost-reduction measure. Second, educating employees on the social dilemma of food waste. Lastly, developing a greater appreciation of food, potentially visiting farms to see food production and harvesting. By being aware of the implications of food waste and knowledgeable about the skills required to work in a restaurants, employees should be more motivated to reduce food waste. These impacts must not only be highlighted within training but constantly within the restaurant.

The most cited cause of food waste was user error, which could significantly be reduced through more effective training of employees to increase competency and provide them with adequate skills and knowledge to complete their job tasks. Due to the high turnover rate in restaurants, managers may not feel that spending more time and resources to train employees properly is worth it. Seeing as all managers saw food waste mitigation as a route to profitability, the resources needed to train employees properly could potentially pay off, as this would result in a reduction in food cost. It is recommended that restaurant managers structure a training program to train employees by the longest-tenured and most skilled staff members. Managers must be sure employees know the proper procedures regarding food preparation and storage so fewer

mistakes are made during service. Upon completing this training, employees should be presented with an examination to ensure they obtain the proper knowledge to work in a kitchen. Managers may consider developing incentive plans for food waste and job skills training to increase participation in training, awareness of food waste, and job satisfaction amongst employees.

Lastly, while the literature often suggests that restaurants measure food waste, no participants actively measured their food waste. Therefore, it is recommended that more accessible methods be developed to measure and monitor restaurant food waste. Moreover, to make food measurements more attainable for restaurants, technology may provide a potential solution. For example, utilizing a small camera in dish pits to capture food waste per plate for analysis and quantification by management after service. It is clear that local governments also work with restaurants to assist with food waste mitigation, as it was found that assistance from the government encourages restaurant managers to measure and monitor their food waste (Sakaguchi et al., 2018).

Study limitations

This study has several limitations. The first limitation exists within the research approach. Seeing as this was a qualitative, exploratory study, the sample of participants is relatively small and is not representative of the entire restaurant industry in the U.S. Regarding the participants specifically, most participants represented independent restaurants. Acquiring participants from chain restaurants proved to be difficult, as when chain restaurant managers were contacted, obtaining approval at the corporate level was a challenge. In addition, not all categories of restaurants are represented in the study sample. This study also only focused on restaurants located in the Southeastern U.S., where the viewpoints are potentially different from restaurant managers located elsewhere. Lastly, social desirability may have impacted participants, as they

may not have been sincere due to wanting to portray themselves as individuals and their organizations in a positive light.

Recommendations for future research

This study has opened avenues for further research. First, the Upper Echelons Theory (Hambrick & Mason, 1984) can be further utilized in the restaurant food waste mitigation literature. It is clear that manager characteristics impact how their operations are run; therefore, studies could be conducted regarding manager cultural backgrounds, ages, and other characteristics. Secondly, the constructs of food involvement of restaurant managers could be applied to understand further the relationship between managers and food waste mitigation in a mixed-methods study (qualitative and quantitative). Additional constructs such as environmental attitudes, environmental awareness, new ecological paradigm, and social norms could also be investigated. Lastly, investigating client-generated food waste in addition to FOH and BOH food waste should be conducted to provide a holistic understanding to restaurant food waste.

Conclusion

This study has presented an in-depth analysis of restaurant managers' awareness, attitudes, and motivations regarding food waste mitigation, along with the most prominent causes of food waste mitigation, practices being implemented to reduce food waste, and barriers faced when trying to do so. Through the lens of the Upper Echelons Theory (Hambrick & Mason, 1984), it can be concluded that specific observable and psychological upper echelon characteristics of managers have an impact restaurant managers' awareness, attitudes, and motivations regarding food waste mitigation. This study has advanced the understanding restaurant food waste mitigation.

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Appendix I.

First-round interview questions

1. Generally and from a personal perspective, how do you feel about food waste in the hospitality industry?
2. Generally and from a business perspective, how does your company feel about food waste in the hospitality industry?
3. How long have you been aware of this topic?
4. What in particular has driven your awareness level as it relates to food waste?
5. How prevalent of a topic is food waste for your operation/company? Is it measured in any way? If so, how and how often?
 - a. How do you deal with inedible food waste?
 - b. How do you deal with edible food waste?
6. Do you collaborate with other restaurants in the area in disposing of edible and/or inedible food waste?
7. Does it feature in the strategic or operational planning efforts of your restaurant or company? If so, how?
8. What is the key motivation for doing so?
9. What would you describe as the biggest causes of food waste for your company?
10. What would you describe as the greatest benefits of reducing food waste for your company?
11. What methods/solutions are currently employed by your company to reduce food waste?
Reduce/Reuse/Recycle?
 - a. Do you have a food waste team charged with reduction?

- b. Has your menu ever changed as a means of reducing food waste?
 - c. Have you ever employed the use of smaller plates and smaller portions?
 - d. Is daily purchasing a factor on certain menu items?
 - e. Is there a proper rotation and inventory systems for perishable and nonperishable food items?
12. Does your company employ any form of donation or resale system for unconsumed food?
If so, what?
13. If not, are there specific barriers that prevent you from doing so – for example liability concerns or local regulations?
14. Do you educate employees about food waste and/or being more sustainably oriented?

Appendix II.

Second-round interview questions

1. What is the culture amongst employees at the restaurant in regards to food waste?
2. What areas of the restaurant generate food waste?
3. What is the ratio of FOH to BOH food waste generation? How is food waste generated in FOH?
4. How would you say your awareness/attitudes towards food waste when you became a manager as opposed to being a restaurant employee?

Appendix III.

IRB approval forms

* REVISED *

Auburn University Human Research Protection Program

EXEMPTION REVIEW APPLICATION

For information or help completing this form, contact: THE OFFICE OF RESEARCH COMPLIANCE, Location: 115 Ramsay Hall Phone: 334-844-5966 Email: IRBAdmin@auburn.edu

Submit completed application and supporting material as one attachment to IRBsubmit@auburn.edu.

1. PROJECT IDENTIFICATION

Date 1/17/20

a. Project Title Restaurant Managers Attitudes to Food Waste, Practices to minimize food waste and motivations for doing so?

b. Principal Investigator Martin A. O'Neill Degree(s) PhD Rank/Title Professor and Department Head Department/School Nutrition and Hospitality Phone Number 334-8443264 AU Email moneill@auburn.edu

Faculty Principal Investigator (required if PI is a student) Title Department/School Phone Number AU Email

Dept Head Martin O'Neill Department/School Nutrition and Hospitality Phone Number As above AU Email As above

c. Project Personnel (other PI) - Identify all individuals who will be involved with the conduct of the research and include their role on the project. Role may include design, recruitment, consent process, data collection, data analysis, and reporting. Attach a table if needed for additional personnel.

Personnel Name Mark Traynor Degree (s) PhD Rank/Title Associate Professor Department/School Nutrition and Hospitality Role Secondary data collection, analysis, consent, interviews and data analysis AU affiliated? [X] YES [] NO If no, name of home institution Plan for IRB approval for non-AU affiliated personnel?

Personnel Name Sorcha O'Neill Degree (s) BS Rank/Title Graduate Student Department/School Nutrition and Hospitality Role Secondary data collection, analysis, consent, interviews and data analysis AU affiliated? [X] YES [] NO If no, name of home institution Plan for IRB approval for non-AU affiliated personnel?

Personnel Name Degree (s) Rank/Title Department/School Role AU affiliated? [] YES [] NO If no, name of home institution Plan for IRB approval for non-AU affiliated personnel?

d. Training - Have all Key Personnel completed CITI human subjects training (including elective modules related to this research) within the last 3 years? YES [X] NO []

The Auburn University Institutional Review Board has approved this Document for use from 01/24/2020 to Protocol # 20-027 EX 2001



AUBURN UNIVERSITY

COLLEGE OF HUMAN SCIENCES

Department of Nutrition, Dietetics, and
Hospitality Management

INFORMATION LETTER

for a Research Study entitled:

"Restaurant Managers Attitudes to Food Waste, Practices for minimizing Food Waste and Motivations for doing so"

(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS AN IRB APPROVAL STAMP WITH CURRENT DATES HAS BEEN APPLIED TO THIS DOCUMENT.)

You are invited to participate in a research study that examines the issue of food waste and practices employed by restaurants to minimize food waste. The study is being conducted by Drs. Martin O'Neill and Mark Traynor and Hospitality Masters student, Ms. Sorcha O'Neill, with the Auburn University Department of Nutrition, Dietetics and Hospitality Management. You were selected as a possible participant because you are a Restaurant Manager who may be able to offer valuable insight on this key issue. Additionally, you are an adult, aged 21 and above.

What will be involved if you participate? Your participation is completely voluntary. Your responses are completely anonymous. If you decide to participate in this research study, you will be asked to engage in a short telephone interview. Your total time commitment will be approximately 20-30 minutes.

Are there any risks or discomforts? There are no foreseeable risks or discomforts associated with participating in this study. Similarly, **there are no foreseeable benefits, compensation or costs to yourself** or others for participating in this study. If you change your mind about participating, you can withdraw at any time in advance of the interview or by terminating the interview mid-process.

If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the Department of Nutrition, Dietetics and Hospitality Management or the College of Human Sciences.

Participant's initials _____

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Any data obtained in connection with this study will remain anonymous. We will protect your privacy and the data you provide by ensuring that only the researchers listed below will have access to it. Information collected through your participation may be used to fulfill an educational requirement, published in a professional journal, and/or presented at a professional meeting.

If you have questions about this study, please contact Dr. Martin O'Neill at oneilm1@auburn.edu. **If you have questions about your rights** as a research participant, you may contact the Auburn University Office of Research Compliance or the Institutional Review Board by phone (334) 844-5966 or e-mail at IRBadmin@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION ABOVE, YOU MUST DECIDE IF YOU WANT TO PARTICIPATE IN THIS RESEARCH PROJECT. IF YOU DECIDE TO PARTICIPATE, YOU WILL BE ASKED TO A CONSENT QUESTION AT THE BEGINNING OF THE INTERVIEW, TO WHICH YOU MUST RESPOND, "I AGREE TO PARTICIPATE IN THIS RESEARCH STUDY."

Sincerely,

Dr. Martin A. O'Neill
Nutrition, Dietetics and Hospitality Management

_____	_____	_____	_____
Participant's signature	Date	Investigator obtaining consent	Date
_____	_____	_____	_____
Printed Name		Printed Name	

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Food Waste Study – August 2020

Draft interview Questions

1. Please state your name, title and employer.
2. Do you consent to participating in this telephone interview on attitudes to food waste, reduction practices and motivations for minimizing food waste?
3. Generally and from a personal perspective, how do you feel about food waste in the hospitality industry?
4. How long have you been aware of this problem?
5. What in particular has driven your awareness level as it relates to food waste?
6. How big a problem is food waste for your operation/company? Is it measured in any way? If so, how and how often?
 - a. How do you deal with inedible food waste?
 - b. How do you deal with edible food waste?
7. Do you collaborate with other restaurants in the area on disposing of edible and/or inedible food waste?
8. Does it feature in the strategic or operational planning efforts of your restaurant or company? If so, how?
9. What is the key motivation for doing so?
10. What would you describe as the biggest causes of food waste for your company?
11. What would you describe as the greatest benefits of reducing food waste for your company?
12. What methods/solutions are currently employed by your company to reduce food waste? Reduce/Reuse/Recycle?
 - a. Do you have a food waste team charged with reduction?
 - b. Has your menu ever changed as a means of reducing food waste?
 - c. Have you ever employed the use of smaller plates and smaller portions?
 - d. Is daily purchasing a factor on certain menu items?
 - e. Is there a proper rotation and inventory systems for perishable and non-perishable food items?
13. Does your company employ any form of donation or resale system for unconsumed food? If so, what?
14. If not, are there specific barriers that prevent you from doing so – for example liability concerns or local regulations?
15. Do you educate employees on the importance of reducing food waste and being more sustainably oriented?
16. Do you educate your customers on the importance of reducing food waste and being more sustainably oriented?
17. Do you have anything to add or any questions concerning the study?
18. Thank you for your time! Interview ends

READ, PRINT AND RETAIN THIS DOCUMENT

The Auburn University Institutional Review Board
Office of Research Compliance – Human Subjects
307 Samford Hall
334-844-5966, fax 334-844-4391, hsubjec@auburn.edu

Investigators: By accepting this IRB approval for this protocol, you agree to the following:

1. No participants may be recruited or involved in any study procedure prior to the IRB approval date or after the expiration date. (PIs and sponsors are responsible for initiating Continuing Review proceedings via a renewal request or submission of a final report.)
2. **All protocol modifications** will be approved in advance by submitting a modification request to the IRB unless they are intended to reduce immediate risk. Modifications that must be approved include adding/changing sites for data collection, adding key personnel, and altering any method of participant recruitment or data collection. Any change in your research purpose or research objectives should also be approved and noted in your IRB file. The use of any unauthorized procedures may result in notification to your sponsoring agency, suspension of your study, and/or destruction of data.
3. **Adverse events or unexpected problems** involving participants will be reported within 5 days to the IRB.
4. A **renewal** request, if needed, will be submitted three to four weeks before your protocol expires.
5. A **final report** will be submitted when you complete your study, and before expiration. Failure to submit your final report may result in delays in review and approval of subsequent protocols.
6. **Expiration** – If the protocol expires without contacting the IRB, the protocol will be administratively closed. The project will be suspended and you will need to submit a new protocol to resume your research.
7. **Only the stamped, IRB-approved consent document or information letter will be used** when consenting participants. Signed consent forms will be retained at least three years after completion of the study. Copies of consents without participant signatures and information letters will be kept to submit with the final report.
8. You will not receive a formal approval letter unless you request one. **The e-mailed notification of approval to which this is attached serves as official notice.**

All forms can be found at <http://www.auburn.edu/research/vpr/ohs/protocol.htm>