Food Waste Reduction through Food Sharing Initiatives: The lived Experiences of Restaurants and Food Bank Employees in Riyadh

FOOD WASTE REDUCTION THROUGH FOOD SHARING INITIATIVES: THE LIVED EXPERIENCES OF RESTAURANTS AND FOOD BANK EMPLOYEES IN RIYADH

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Abstract

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Today's world is characterised by considerable inconsistency. In some parts of the world people are living in starvation and malnutrition, while in some other parts of the same world, about 1.3 billion tons of food is wasted every year. We do not know enough about what contributes to food waste. However, there seems to be an emergent pattern of behaviour around sharing food. This hermeneutic phenomenological research will explore how food sharing might reduce food waste in a cultural and community-based society like Saudi Arabia through the lived experiences of restaurants and food bank employees.

Research data were collected through a face-to-face semi-structured interview method from 15 participants from selected restaurants and food bank in Riyadh. Using the theory of planned behaviour (TPB) as the theoretical lens, a conceptual framework was proposed to elicit underlying behavioural and cultural factors impeding food waste reduction and the inefficiency of food sharing. Using Paul Colaizzi's approach, the collected interview data were reviewed, analysed, and seventeen themes were elicited for further discussion.

The findings suggest that culture through an affluent way of life and the show-off lifestyle of hosts continue to contribute to more food wastage. The strictly business nature of restaurants operation leads to edible food fit for human consumption ending up in the garbage. The revised conceptual framework provides insight into the factors hindering food waste reduction and food sharing. With supporting regulations and policies, food leftovers can either be distributed to people in need or put to an alternative use.

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List of Abbreviations

Abbreviation	Definition
CE	Circular Economy
FAO	Food and Agriculture Organisation
FL	Food Loss
FSC	Food Supply Chain
FW	Food Waste
GHG	Greenhouse Gas
ICT	Information and Communication Technology
IoT	Internet of Things
TPB	Theory of Planned Behaviour

1 Introduction

Food waste is a term for edible food that is appropriate for human consumption but wasted or left to spoil during the consumption phase (FAO 2012). Even though there is no consensus on the definition of food waste, this profound global phenomenon impacts the environment, economy, and society (Principato 2018). Presently, we do not know enough about what aspect contributes to food waste in restaurants and the factors hindering effective food sharing in Saudi Arabia. However, there seems to be an emergent pattern of behaviour around sharing food which could lead to the reduction of food waste (Morone et al. 2018; Huang et al. 2020). Food sharing holds a considerable promise for the reduction of food waste through the expectation of digitalization of the collection and distribution of food leftovers (Davies et al. 2017a; Michelini et al. 2018). Previous studies have highlighted that food waste occurs largely towards the end of the food supply chain (FSC) rather than at the early phase (Parfitt et al. 2010; Gustafsson et al. 2013; Esmaeilian et al. 2018). Food sharing among other types of prevention measures such as prevention at the source, recycling, recovery, and disposal which is the least preferable measure (Papargyropoulou et al. 2014), has been implemented to decrease food waste to alleviate the social, economic, and environmental impact of the phenomenon.

Moreover, some scholars suggest that behaviours and attitudes are major contributors to the amount of food wasted (Sakaguchi et al. 2018; Al-Zahrani et al. 2019). Morone et al. (2018) stated that food waste reduction does not automatically occur because of food sharing. Thus, further research was required to provide more understanding of the factors hindering food waste reduction through food sharing. This qualitative hermeneutic phenomenological study aimed to explore the lived experiences of restaurants and food bank employees about food waste reduction through food sharing. This DBA study suggested significant recommendations for practitioners and researchers in food waste reduction, as well as in food sharing initiatives. The findings of this research contributed to the existing literature by addressing the gap in the current understanding of factors hindering effective food sharing initiatives.

This first chapter introduces the research and provides the research background. The research rationale, country context, research questions, aim, objectives, and research

methodology are presented in this chapter. The overall thesis chapter outlines are also described in this chapter.

1.1 Research Background and Rationale

The Saudi Ministry of Environment Water & Agriculture estimated food wastage costs about $13 billion annually (Baig et al. 2018b). Similarly, food waste around the Gulf countries represents a significant societal challenge consuming economic and energy resources. Most of the countries in the Gulf region have limited fertile land and scarce water resources for mass agricultural production to support their increasing population; food demands are met through importation and subsidies (Baig et al. 2018a). Despite the food production challenges, food waste represents about 50% of the solid waste in the region. A recent survey by Baig et al. (2018a) suggests that "…, about 78% of food purchased in Saudi Arabia is wasted each week to make room for new groceries.". A similar level of food wastage is reported in Qatar, Bahrain, and UAE, other member countries of the Gulf region.

According to a report by Nelson, "…, every year, one-third of the food produced in the world for human consumption or 1.3 billion metric tons gets lost or wasted." (Nelson 2018: p.28). There are several studies about global food wastage such as global food losses and food waste extent, causes and prevention (Gustafsson et al. 2013), and the food waste hierarchy as a framework for the management of food surplus and food waste (Papargyropoulou et al. 2014), food waste management innovations in the foodservice industry (Martin-Rios et al. 2018); many are lost along with the supply chain network, while some are wasted at the post-consumption stage. Some studies such as 'link between climate change mitigation and resource efficiency' (Barrett and Scott 2012) and 'the food waste hierarchy as a framework for the management of food surplus and food waste' (Papargyropoulou et al. 2014) indicated that the global carbon footprint is one of the significant environmental impacts of food waste. Food waste symbolizes a lack of proper food production and consumption system. Food waste is said to occur at every stage of the global food value chain, i.e. from production through to the consumption phase, with household and commercial food operators such as hotels and restaurants accounting for about 40% of the total food waste (Kibler et al. 2018; Nelson 2018; Filimonau and De Coteau 2019).

The ramifications of food waste on society are quite significant; despite the awareness of the problem of food waste and probably due to the complexity of the problem, it is still on the rise in many parts of the world. A considerable amount of food is customarily served in Saudi Arabia at events like wedding parties, Eid, or special occasions. Consequently, a colossal quantity is left uneaten, otherwise known as leftovers or surplus food (Sebbane and Costa 2018). Several food banks in the form of charity organisations are presently involved in collecting surplus food and distributing it to people in need, as a form of food sharing initiative (Hultén et al. 2016).

Literature indicates that households, consumers, and hospitality operations such as hotels and restaurants are the most significant food waste producers (Martin-Rios et al. 2018; von Kameke and Fischer 2018). These corroborate Baig et al. (2018a) reports on the significant food waste in Saudi Arabia and neighbouring countries in the middle east as a global phenomenon. Food wastage is rising globally, and Saudi Arabia is no exception to places where food is being wasted. Food waste in the Middle East has surged recently due to the increase in restaurants. It was reported that "… in Saudi Arabia alone, the estimated economic impact of food waste is about $13.3 billion per year, while in the UAE, 40% of the country's total waste is derived from food" (Visschers et al. 2016). As indicated in previous studies, consumer behaviour influences food waste globally and in Saudi Arabia, where a considerable amount of food is wasted in households, restaurants, and party venues during festivities and special occasions (Jr 2018). The lack of clear and supportive food waste management programs and consumer behaviour in the region is part of the challenges of reducing food wastage.

According to the United Nations Food and Agriculture Organisation (FAO) report, annually, one-third of the food produced to be consumed by humans is lost or wasted, bringing the figure to about 1.3 billion tons of food wasted (Mu'azu et al. 2018). Wasting this enormous amount of food also means wasting related resources like energy and water. The global increase in food waste is drawing attention due to its triple social, economic, and environmental (Garrone et al. 2016). Food wastage around the middles east is also relatively high, especially during the holy month of Ramadan, an enormous amount of food is wasted during the particular month for

example, in Bahrain, an excess of 400 tons per day, and in Qatar, almost half of the food prepared during Ramadan are wasted (Papargyropoulou et al. 2014).

Acquiring sufficient and recent data on food waste reduction at the consumption stage in Saudi Arabia remains a perennial challenge for researchers. However, a previous study about food waste among consumers, retailers, and food service outlets highlighted factors such as culture, awareness, food industry policies and regulations, and food valuation are significantly contributing to food waste (Baig et al. 2018b). The increasing food waste is also noticeable in Saudi Arabia and other parts of the world, and about 50% of the solid waste in the country comprises food products (Mu'azu et al. 2018). It was reported by Baig et al. that "…, about 35 - 40% of cooked rice is wasted annually in Saudi Arabia which is valued to cost nearly SR 1.6 billion." (Baig et al. 2018b: p.6).

There are few food sharing initiatives in Saudi Arabia, driven by charity organisations such as the Saudi food bank "Eta'am". They are responsible for collecting leftover food from wedding party venues after the events and distributing the leftover food to the needy. However, the collection and distribution of leftover food do not extend to restaurants due to a lack of supporting regulations and policies to allow the donation of surplus food to the needy. Therefore, only fractions of surplus food are collected and distributed, while the majority ends up in the garbage. Food sharing is globally gaining popularity to achieve food waste reduction. Innovative solutions to move excess food to where it is most needed are being created by food banks using information and communication technologies (ICT) based platforms. These initiatives are expanding globally due to the benefit of lowering the barrier for food donors and recipients (Morrow 2019a). Therefore, understanding food waste reduction and food sharing initiatives from the frontline workers, employees of restaurants, and food banks in Riyadh, Saudi Arabia, is of interest to the researcher of this study.

1.2 Country Context

Saudi Arabia shares borders with eight other Arabia countries: United Arab Emirates, Jordan, Yemen, Qatar, Bahrain, Kuwait, Iraq, and Oman. Saudi Arabia occupies about 90% of the Arabian Peninsula, with a total land area of 2,215,000 square kilometres. The country comprises 13 provinces, with Riyadh being the capital city located at the

centre, and Makkah and Madinah are Islam's holiest cities located in the western province. About 3 million people annually visit the pilgrimage (Hajj) or the lesser Hajj (Umrah). The country's territory is largely desert with limited arable land leading to high importation of food products to ensure food security for the citizens and foreigners. However, imported food products are highly subsidized to make them affordable due to the country's lack of sustainable agricultural activities. Clean water is another challenge but tacked by the government's massive investment in desalinization plants. The below figure shows the map of Saudi Arabia and its 13 provinces (Bowen 2014).

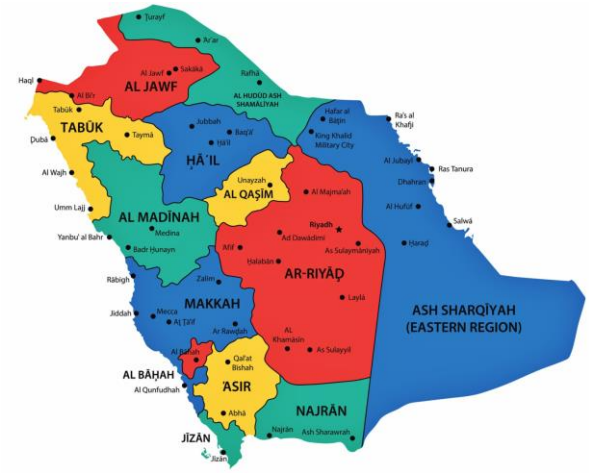

Figure 1.1: Map of Saudi Arabia and the 13 Provinces

According to the country's Ministry of Interior (MOI), the vast country has just about 35 million people as of mid-2020. About 35% of the total population are expatriates from different parts of the world. Regarding economic indicators, as the Kingdom is diversifying from oil, the gross domestic product (GDP) is 6.8% as of Q3 of 2021, inflation is 0.8%, and unemployment of about 11.3% (MOI, 2021).

The quest for agricultural sustainability and self-sufficiency, especially in agricultural commodities such as wheat, was a record success and supported by the then farmer-friendly policies of the 1980s. Within the frame of the policies, farmers were encouraged by the provision of an interest-free loan, land, and modern irrigation systems. Saudi Arabia achieved self-sufficiency in many agricultural commodities and became one of the leading wheat export countries. The domestic needs of other products like barley, millet, fruits, vegetables, meat, dairy products, fish, poultry, and

dates were met through the farmer-friendly program. However, it was soon realized that the massive production of various agricultural products has significantly impacted the limited water resources and is no longer sustainable (Baig and Straquadine 2014).

Due to the agricultural production impact on the already scarce water, the Saudi Arabia government decided to gradually reduce wheat production from 2008 through 2009 and finally phase out wheat production by 2016. Figure 1.2 shows the decrease and phase-out phases of wheat production in the Kingdom. Grindle et al. (2015) also added that the effort to reduce wheat production increased as indicated in Food and Agriculture Organisation (FAO 2011) report. Between 2007 and 2011, the overall wheat production was reduced by more than 50%, and wheat importation over the same period increased about a thousand times (Grindle et al. 2015). Figure 1.3 shows the FAO 2011 report. The consequence of the phase-out decision reduced the Kingdom's food self-sufficiency and increased reliance on high importation to ensure food security and availability continuity. Henceforth, the country's food requirement was met by increasing the importation of agricultural food commodities. Despite the rising price of food products in the international markets, the Kingdom continues to provide food products at a very subsidized rate. The affordability and availability of food products due to the high subsidy seem to have created a new wave of food waste behaviour in society (Al-Zahrani et al. 2019). Arabs are generally known for their hospitality in welcoming their guests, and food has been one way to demonstrate such a gesture. An enormous quantity of food is continuously being wasted because of such gestures during special events, parties, Eid, and the holy month of Ramadan.

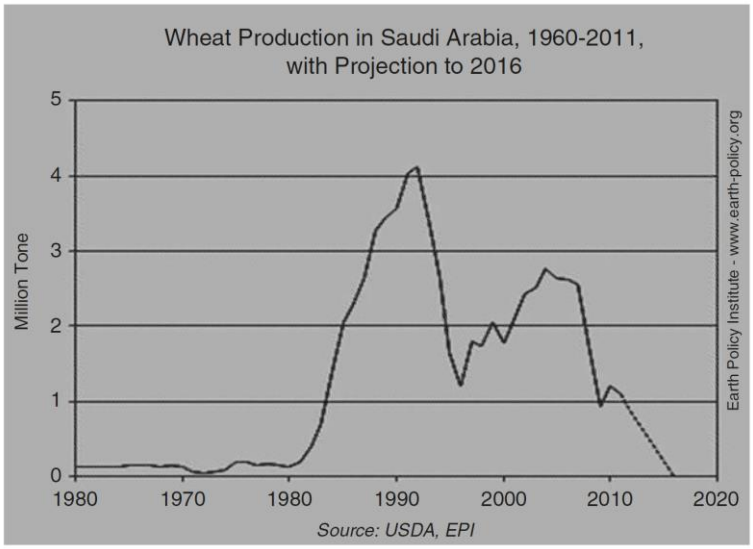

Figure 1.2: Wheat production decreases and phases out. [Source: Al Zahrani et al. 2019]

Production of top 10 agricultural products in Saudi Arabia, 2007 and 2011.

Product	Total production (tons)		Exports (tons)		Imports (tons)	
	2007	2011	2007	2011	2007	2011
Wheat	2,558,000	1,184,484	19	2,773	1,986	2,066,573
Milk, whole fresh cow	1,095,052	1,700,000	12,280	20,412	55,857	65,986
Dates	982,546	1,008,105	48,762	77,795	1,568	47,026
Meat indigenous, chicken	558,113	576,270	17,951	10,972	438,810	737,263
Tomatoes	447,572	520,034	6,095	15,355	207,714	190,375
Potatoes	463,000	404,679	48,853	110,266	55,857	65,986
Vegetables, fresh nes	448,223	600,000	82,745	146,314	5,861	6,537
Watermelons	393,234	365,903	31,249	53,028	5,170	3,654
Fruit, fresh nes	285,899	412,410	16,109	15,933	12,374	69,524
Cucumbers and gherkins	259,997	228,762	2,643	7,162	986	506

Food and Agriculture Organization of the United Nations: Statistics Division (FAO, 2011b).

Figure 1.3: Top 10 Agricultural products in Saudi Arabia 2007 to 2011 [Source: Grindle et al, 2015]

Riyadh, the capital city in which this research is conducted, is the second-largest province in the Kingdom of Saudi Arabia in both population and area. The city has different restaurants and cafes, from famous world-class to budgetary restaurants and cafes, from international cuisine to local and surrounding country's cuisines. More restaurants are opening in the city as the country is transforming and opening to more international businesses as part of diversification from Oil.

1.3 Research Problem

We do not know enough about what aspect contributes to food waste in restaurants and the factors hindering effective food sharing in Saudi Arabia. However, there seems to be an emergent pattern of behaviour around sharing food. Current research suggests that sharing food might alleviate food waste. About 50% of the solid waste in Saudi Arabia is composed of food products, costing the country about $13 billion annually, as reported by the Saudi Ministry of Environment, Water, & Agriculture (Baig et al. 2018b). Food waste is a global phenomenon that occurs due to several reasons such as consumer behaviour, food culinary skills, and lack of proper planning and shopping which leads to overbuying of food products, and cooking extra food (Gjerris and Gaiani 2013; Baig et al. 2018a). Welcoming guests with a large quantity of the food as commonly seen in the Arab culture also leads to food waste generation (Al-Zahrani et al. 2019).

Food waste was found to be common among consumers in developed countries due to the high purchasing power of food products and general behaviour towards food (Gustafsson et al. 2013; Esmaeilian et al. 2018). As food waste generation increases, the impact on the environment, economy, and society also increases. Attitude and behaviour towards food were found to be major contributors to food waste generation (Sakaguchi et al. 2018). Food waste reduction through food sharing was investigated and the outcome was that food waste reduction does not automatically occur due to food sharing practices, certain enablers are required to make food sharing more effective (Morone et al. 2018).

This qualitative phenomenological study explored the lived experiences of restaurants and food bank employees to understand the behavioural and cultural factors enhancing food waste generation and factors impeding effective food sharing in Riyadh, Saudi Arabia. The factors contributing to food waste generation and hindering effective food sharing uncovered in this research could help practitioners and regulators to formulate more effective policies and regulations about food waste reduction through food sharing.

1.4 Research Questions

Several studies have investigated food waste and food sharing from different perspectives such as food waste in the Kingdom of Saudi Arabia (Al-Zahrani et al. 2019), food waste management current practices and sustainable future approaches (Mu'azu et al. 2018), the role of reducing food waste for resilient food systems (Bajželj et al. 2020), a consumer behavioural approach to food waste (Aktas et al. 2018) or understanding food sharing models to tackle sustainability challenges (Michelini et al. 2018). As outlined in the previous section, food waste is rising globally and locally in Saudi Arabia. Various food sharing organisations are also making attempts to reduce food waste through the collection and distribution of leftover food. But there is a growing increase in food waste. The context of this research is consumer food waste and food sharing, and the overarching research question for this Interpretive phenomenological study is to understand factors contributing to food waste and hindering effective food sharing initiatives in Saudi Arabia. The understanding gained

will provide more insight into the factors hindering effective food sharing. The phenomenological research question is always centred around participants lived experiences (Creswell and Poth 2016; Peoples 2020), which is adopted in this doctoral study.

The custom of hosting guests in Saudi Arabia is to provide a large quantity of food, more than required and is practised way back in time. An oil-rich and food-secure country like Saudi Arabia, which relies heavily on food import because of limited arable land and scarce water resources, provides highly subsidized food commodities to their citizens and residents to ensure high food prices do not affect the people. According to (Baig et al. 2018a), a large amount of food waste occurs due to the tradition of serving guests more food than required and economic affluence factors. Food products are affordable and available in surplus quantity because of subsidies on imported food products and support provided to local retailers and food producers. Food waste reduction remains a challenge because the surplus availability of food commodities is taken for granted.

Mu'azu et al (2018) also echoed the habit of serving guests surplus food and added that restaurants and household food waste during festivities are mainly influenced by behaviour. Despite the impact of cultural practices and consumer food habits which leads to an increase in food waste, only limited private charity organisations collect leftover food from events places and distribute it to underprivileged people in society. This type of food-sharing initiative, which is participated by a few charity organisations, leaves a vast amount of edible leftover food not collected and ends up in the garbage (Mu'azu et al. 2018). Food waste also leads to other resource waste, such as labour, land, water, energy, fertilizers, and fuel for transporting food products. The environment also has its share of the impact of food waste, where harmful greenhouse gases are emitted into the atmosphere because of wasted food dumped in landfills, which contributes to rising climate change. Factors such as lack of shopping planning, awareness, reluctance in consuming leftover food, and culinary skills, among other factors, are considered responsible for food waste in Saudi Arabia (Al-Zahrani et al. 2019). Therefore, the research problem focus of this DBA thesis is consumer (in restaurants and events places) food waste reduction through food sharing initiatives, and the research questions are:

RQ1: What are the factors hindering food waste reduction in restaurants in Saudi Arabia as experienced by restaurant employees?

The purpose of this research question is to uncover the factors that are preventing food waste reduction in restaurants in Saudi Arabia and through the experiences of the restaurants' employees as they are the frontline workers. The insights that will be gathered through this research question will increase the understanding of factors contributing to the increasing food waste generation.

RQ2: To what extent do behaviour and culture affect food waste reduction in restaurants in Saudi Arabia as experienced by restaurant employees?

The purpose of this research question is to reveal behaviour and cultural factors contributing to food waste generation and prevents food waste reduction in restaurants in Saudi Arabia and as experienced by the restaurants' employees.

RQ3: What are the factors preventing food bank organisations from operating effective food sharing as experienced by food bank employees?

The purpose of this research question is to uncover the factors that are preventing effective food sharing which includes the collection and distribution of leftovers by food banks in Saudi Arabia and as experienced by the restaurants' employees.

1.5 Research Aim

This qualitative phenomenological research aims to explore the lived experiences of restaurant and food bank employees to understand the behavioural and cultural factors enhancing food waste generation and factors impeding effective food sharing in Riyadh, Saudi Arabia. This will provide a further understanding of the factors contributing to food waste generation and factors hindering an effective food sharing initiative.

1.6 Research Objectives

To explore this phenomenological study, the understanding of behavioural and cultural factors objective, factors impeding food sharing objective, and the framework development objective are aligned to research question one (RQ1). The understanding of behavioural and cultural factors objective, and the framework development objective are aligned to research question two (RQ2). Research question three (RQ3) is aligned with all four objectives, the research methodology, the understanding of behavioural and cultural factors objective, factors impeding food sharing objective, and the framework development objective. The following are this study's research objectives:

Objective 1

To design and develop a suitable research methodology for data collection to better understand the lived experiences of the studied phenomenon.

The purpose of this objective is to develop a research methodology appropriate for this doctoral phenomenological study, from the method of data collection to a suitable data analysis approach.

Objective 2

To understand the behavioural and cultural factors which contribute to food waste generation through the lived experiences of restaurant employees.

The essence of this second objective is to gather insightful data expected to better our understanding of the types of behaviour or cultural factors leading to food wastage. The knowledge of the behavioural elements will shed more light and add to existing knowledge about food waste in Saudi Arabia.

Objective 3

To explore factors that impede effective food sharing.

The purpose of this objective is to gather information about factors that are hindering effective food sharing. It is expected that the information collected will provide more insight into how food sharing can be improved. There are several food sharing

initiatives by charity organisations and individuals through the collection and redistribution of leftover food from party venues or public fridges placed outside homes by individuals for donating and sharing leftover food. This third objective will attempt to understand, despite these initiatives, why food waste is still increasing.

Objective 4

To develop a framework for the exploration of the studied phenomenon and propose recommendations for enhancing food sharing.

The essence of this objective is to develop a framework for the exploration of food waste reduction through food sharing initiatives and through the lived experiences of restaurants and food bank employees. As phenomenological research, this study will be explored through Martin Heidegger's hermeneutic phenomenological approach, which allows a supporting conceptual framework. Therefore, the framework that will be developed through this objective will provide more understanding of the studied phenomenon better.

1.7 Research Methodology

This research used a phenomenological methodology to investigate the lived experiences of restaurants and food bank employees about food waste reduction through food sharing in selected restaurants and food bank in Riyadh. To understand the lived experiences of the phenomenon of food waste reduction through food sharing, the phenomenological methodology was considered suitable since it relates to participants' lived experiences (Beck 2019). Peoples (2020) stated that the phenomenological approach is suitable for a study when it is important to investigate the lived experiences of individuals. Lived experiences can uncover participants' experiences of phenomenon (Creswell and Poth 2016), which were necessary to this DBA research.

This research does not seek to identify causal relationships or test some hypothesis; instead, they seek to explore lived experiences of front-line workers in selected restaurants and food bank in Riyadh about food waste reduction through food sharing. As quantitative methodology focuses on numerical data and statistical analysis

(McCusker and Gunaydin 2015), the quantitative methodology is therefore not suitable for this study. A qualitative research technique such as the phenomenological approach is required for this study to ensure that the lived experience of the participants was the focus of this study (Cassell et al. 2017). Furthermore, many previous studies employed a qualitative approach to examine food waste reduction (Papargyropoulou et al. 2014; Martin-Rios et al. 2018; Filimonau and De Coteau 2019; Goh and Jie 2019), which further justifies this study's choice of exploring the phenomenon using a qualitative research technique.

An individual face-to-face semi-structured interview method was used for data collection from selected participants through a purposeful and criterion sampling approach. The interview data were analyzed using Paul Colaizzi's (1978) data analysis steps, which provide a systematic and structural approach to the procedural steps involved in analyzing phenomenological data (Beck 2019). The profound philosophy behind meaning-making derived from the interplay between subject and object defines how knowledge was developed in this study and operationalized by exploring how food waste reduction could be achieved through food sharing by understanding the meanings of lived experiences of people working in the food industry.

1.8 Contribution

This DBA study contributes to academic knowledge through some unique findings such as adherence to culture, affordability, an affluent way of life, and a show-off lifestyle of hosting guests with surplus food just to appear generous. The restaurant management is another finding of this study, whereby food leftovers are thrown away even if the customer pays for them, due to a lack of supporting regulations to share or donate food leftovers. The uniqueness of these findings could provide opportunities for a remedy to the phenomenon. By developing a new business model which accommodates cultural practices and well-formulated regulations that allows the sharing of food leftovers in restaurants.

This study also provides valuable insights into how food banks collect and distribute food leftovers from parties and other event venues. Despite the level of technological

adoption in the Kingdom of Saudi Arabia, there are still ample opportunities revealed through this study to leverage the capabilities of technology to facilitate an effective and efficient food-sharing initiative. The findings of this DBA research also reinforce previous research through findings on the impact of culture on food waste, and the need for an awareness program to enlighten citizens and customers on the impact of food waste.

1.9 Thesis Outline

Chapter one introduces this research, starting with the background of the research and research rationale, covering highlights about food waste globally and in Saudi Arabia and food sharing initiatives. These are followed by the research aim, research questions, and objectives.

Chapter two is a critical literature review of previous academic literature in the following knowledge areas: food waste, Food behaviour, Food culture, Food system, and Food sharing. This will be done to understand present studies conducted on food waste reduction and food sharing.

Chapter three presents the development of this study's conceptual framework.
Chapter four details the choice of this research's methodology and the justification of the approach. Also covered in this chapter is Martin Heidegger's hermeneutic phenomenological theoretical framework, research design, data collection, and analysis using NVIVO 12 software, a qualitative research analysis software.

Chapter five presents this study's findings, an outcome of the analysis of the transcript data following Paul Colaizzi's data analysis approach.

Chapter six will cover this research discussion, where the findings will be discussed in more detail and synthesized with previous scholarly literature. The revised framework will also be presented in this chapter and the research findings to better understand food waste reduction through food sharing initiatives as described by restaurants and food bank employees through their lived experiences.

Chapter seven presents the overall conclusion of this research addressing the research questions. Contributions to knowledge will be presented, and as a DBA study, the recommendation to practice will also be presented in this chapter. Like any other research, the limitations of this research will also be presented along with future research recommendations.

2 Literature Review

2.1 Introduction

The previous chapter established the research background about the rapid increase of food waste and how it has become a significant societal challenge costing the Kingdom of Saudi Arabia about $13 billion yearly. In a country with a vast land area of about 2.2 million square kilometres largely desert with limited arable land leading to high importation of food products which are heavily subsidised in the oil-rich country, making them affordable for citizens and foreigners. The surplus nature of food products tends to contribute to wastage. However, the literature described in this chapter does not include a definitive study on how food waste can be reduced through food sharing initiatives in the Kingdom of Saudi Arabia. The themes and subthemes relevant to food waste generation, reduction, and food sharing initiatives were covered in this literature review chapter. This chapter was structured thematically to present the necessary topics for understanding the study and draw from broad concepts to selected studies upon which this research was based.

This qualitative phenomenological study aimed to explore the lived experiences of restaurants and food bank employees to understand the behavioural and cultural factors enhancing food waste generation and factors impeding effective food sharing in Riyadh, Saudi Arabia. The overarching research question, “To understand the factors contributing to food waste generation and hindering effective food sharing initiatives” is focused on two main themes: (i) understanding factors contributing to food waste generation in Saudi Arabia, and (ii) understanding factors preventing effective food sharing initiatives in Saudi Arabia.

The review of literature begins with a comprehensive review of food waste literature, and it includes food waste generation and reduction strategies on a global level and locally in Saudi Arabia. The concepts of the circular and linear economy will also be covered in this section. Some of the key arguments are to understand consumer food waste behaviour, especially in restaurants and through observation “…, instead of self-reported food waste behaviour through

surveys." (Coşkun and Özbük 2020: p.176) Thus, the food behaviour theme will be further explored through the review of the food behaviour literature. Festivities, celebrations, and generosity through serving guests substantial quantities of food as part of the social norms will also be further explored through the review of food culture literature. To address the food waste phenomenon, alternative collection and distribution approaches aimed at reducing food waste are emerging. Thus, food sharing and associated themes such as sharing economy will be further explored through the review of the food sharing literature. Food waste also emerged from literature as a challenge to a sustainable food supply chain. Therefore, food systems literature will be further explored for the understanding of food waste along the phases of the food supply chain. The following Figure 2.1 identifies the following five categories of literature, which will be explored in subsequent sections to understand food waste reduction and food sharing.

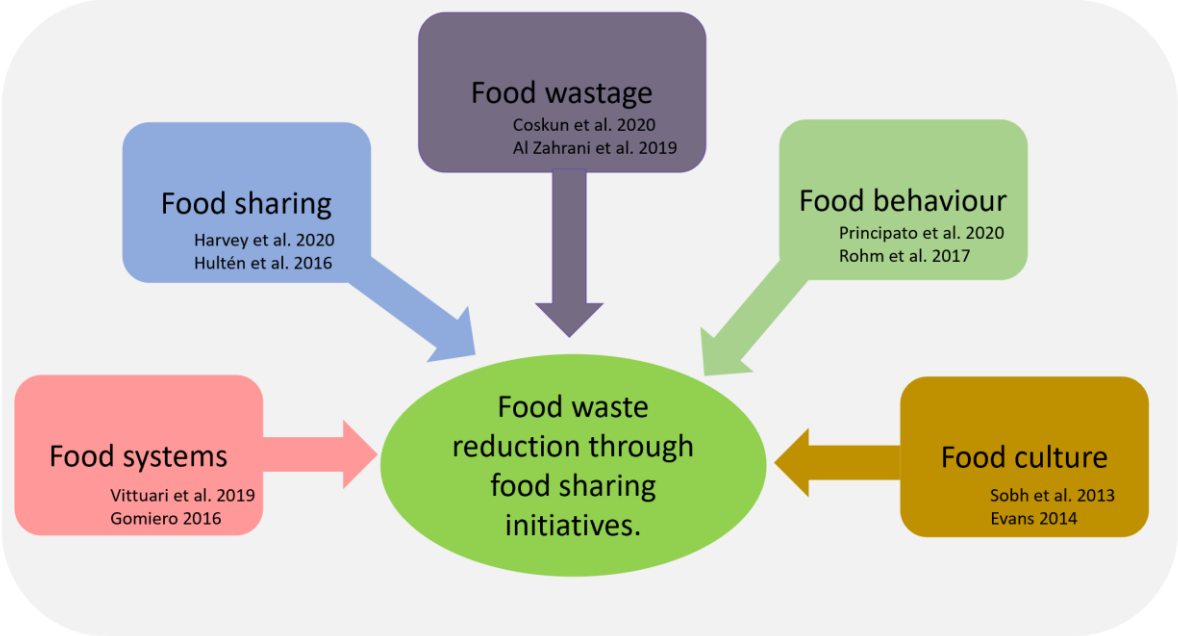

Figure 2.1: Bodies of Literature

In this chapter, each category of literature will be explained in more detail starting from the next Section 2.2. The first Section describes food waste generation and reduction strategies on a global level and locally in Saudi Arabia. The concepts

of the circular and linear economy are also covered in this section. The second Section describes on a global and local levels behaviour towards food such as poor food purchase planning, shopping routines, and culinary skills. The third Section covers food culture on global and local levels in Saudi Arabia, explaining what characterised people by what they eat and with whom they eat, a comparative insight which provides more understanding of the research topic. The fourth Section focuses on food systems, explaining some of the benefits and impacts along the food value chain. The fifth and last Section, food sharing, discusses food sharing initiatives, the adoption of sharing economy as an enabler on a global level, and the food sharing initiatives in Saudi Arabia. The below figure shows the bodies of literature reviewed for this interpretive phenomenological research.

2.2 Food Wastage

This section describes food waste, its occurrence and its impact at a global level. Food waste is a global phenomenon which has environmental, economic, and social ramifications (Parfitt et al. 2010; Papargyropoulou et al. 2014). Food waste occurs at different stages of the food value chain, while some of the food waste is inevitable, the majority is avoidable. Less food is wasted in the developing world compared to the industrial world, and the causes are attributed to behaviour and regulations (Halloran et al. 2014). Resources such as water, energy, and transportation put into the production of food products are also wasted because of food waste. for these reasons, it was suggested that food waste should be prevented at the source (Schanes et al. 2018).

2.2.1 Global Food Wastage

Food waste (FW) is a global phenomenon despite all that is known and previously studied. There are several studies about food waste across the food supply chain process in developed and developing countries (Gustafsson et al. 2013; Papargyropoulou et al. 2014; Filimonau and De Coteau 2019). Food waste occurs very differently in the developing and developed world. In developing countries, food waste occurs at the early stage of the food supply chain (FSC) due to a lack of advanced technological know-how and limited financial capabilities for the cultivation,

harvest, collection, and transportation of food products. On the contrary, in the developed world, food waste occurs at the end of the food supply chain (FSC), in the distribution, retailing, and consumption of food products (Esmaeilian et al. 2018). According to Michelini et al. (2018), the high purchasing power of affluent developed countries partially contributes to food wastage, inadequate domestic skills, and a careless attitude toward purchasing more food than required for consumption (Michelini et al. 2018).

Several studies about food waste in developed countries identified consumers as the primary generator of food waste (Parfitt et al. 2010; Thi et al. 2015; Schanes et al. 2018; Djekic et al. 2019). Even though consumers commonly believe it is inappropriate behaviour to waste food (Porpino et al. 2015), a feeling of doing something wrong is expressed by consumers when they throw food away (Graham-Rowe et al. 2014). Despite the technological advancement in storage and packaging (Moult et al. 2018), food waste is a continuous occurrence globally. Food waste in developed countries is generally occurring due to its surplus nature, food waste management concepts like the 3Rs (reducing by preventing surplus food from generating at the source, reuse by distribution to people who may be in need, recycling by using it for animal feeds, etc.) from the food waste hierarchy are prominent amongst scholars (Papargyropoulou et al. 2014; O'Donnell et al. 2015; Salemdeeb et al. 2017). Papargyropoulou et al. (2014) opined that reduction, which is the prevention of surplus food at the source, is the best of the 3Rs, followed by reusing and then recycling (Papargyropoulou et al. 2014). However, Mourad (2016) sees that the 3Rs (Reduce, Reuse, Recycle) approach to food waste management may also compete with each other (Mourad 2016), where food distribution channels may be counting on more wasted food. Food recycling may also be looking forward to food waste as input to the recycling process. Some previous research explored behavioural elements in understanding the reasons behind food wastage (Graham-Rowe et al. 2015; Werf et al. 2019), which is in line with preventing food waste generation at the source. Schanes et al. (2018) highlighted the weakness in the relationship between the intention to reduce food waste and taking practical action, as such in their own words, "…, cognitive aspects such as attitude, intentions, and motivations are not (always) a good indicator of less food being wasted." (Schanes et al. 2018: p.980), it is considered as a causal one-way relationship. Instead, more

active, and co-constructive personal values and practices through social practice theory are suggested.

Food waste is also linked to the increasing greenhouse gas (GHG) related to climate change (Barrett and Scott 2012). This is one of the environmental implications of food waste, it contributes to greenhouse gas emissions as wasted foods are disposed of in landfills, and as part of the decomposition process, methane and carbon dioxide are produced, which are known to be capable of trapping heat in the atmosphere (Papargyropoulou et al. 2014). From the food hierarchy, Eriksson et al. (2015) identified the donation of food for human consumption (reuse) and anaerobic digestion as food waste management options which generate minor greenhouse gases (Eriksson et al. 2015). But if wasted food is not edible for human consumption, Moult et al. (2018) suggested it should be reused as animal feed or anaerobic digestion and emphasized that landfills generate the most greenhouse gas (Moult et al. 2018).

2.2.2 Global Food Waste Reduction Strategies

While food waste continues to be a significant challenge globally, several scholarly works are produced which quantify and characterize food waste and propose approaches to minimize the phenomenon. Quite a several studies have been carried out on food waste reduction strategies (Gustafsson et al. 2013; Warshawsky 2016; Martin-Rios et al. 2018; Filimonau et al. 2019; Närvänen et al. 2020), ranging from controlling food waste at the source of generation to other options of food disposal when it becomes unfit for human consumption (Salemdeeb et al. 2017). Some studies examine food waste by focusing on consumer behaviour (Visschers et al. 2016; Abdelradi 2018; Mak et al. 2018; Goh and Jie 2019) which was highlighted as a contributing factor to most food waste in industrialized countries (Mondéjar-Jiménez et al. 2016).

More than a decade ago, Parfitt et al. (2010) stated that "…, losses are much higher at the immediate post-harvest stages in developing countries and higher for perishable foods across industrialized and developing economies. For affluent economies, post-consumer food waste accounts for the greatest overall losses." (Parfitt et al. 2010: p.3065). In recent times, however, according to Närvänen et al. 2020 "Food waste

research has gradually moved from focussing on quantifying the phenomenon and measuring it towards a more holistic approach." (Närvänen et al. 2020: p.17). The holistic approach suggests looking at the entire phases of the Food Supply Chain (FSC), which includes food manufacturers, transporters, retailers, distributors, and consumers. Food waste management has evolved over the past decade, from when material and energy recovery from food waste through incineration used to be popular in Europe (Grosso et al. 2010), and there seems to be general agreement on the proposed European Union Waste Framework Directive/Food waste hierarchy, as illustrated by previous studies (Papargyropoulou et al. 2014; Ng et al. 2017). However, Eriksson et al. (2015) and Garrone et al. (2016) sees the need to look towards the upper part of the food hierarchy for a better, sustainable solution with lesser emission of greenhouse gas for the challenging food waste phenomenon (Eriksson et al. 2015; Garrone et al. 2016).

While academia and practitioners continue to pursue solutions to global sustainability (social, economic, and environmental) challenges (Eriksson et al. 2018) caused by food wastage, several pilot projects were also running, where Information and Communication Technologies (ICT) were explored as a means to control food waste generation and disposal. In the Gangnam district in Seoul, South Korea, an Internet of Things (IoT) based smart garbage was deployed as a pilot project for food waste management improvement and efficiency (Hong et al. 2014). An IoT based Radio frequency identification (RFID) tag solution for restaurant food waste (RFW) management was deployed in Suzhou China, at the end of the pilot project, the system showed an improvement, and efficiency was realized as a result of the ICT-based solution (Wen et al. 2018). Blockchain technology, a decentralized and immutable ledger solution, has also been implemented to ease food supply chain traceability, improving food waste management (Nelson 2018). Esmaelian et al. (2018) also explored food waste management in the smart emergent city, where the solution was built around centralized product lifecycle data. New business models depend on the data to prevent waste generation (Esmaeilian et al. 2018). Scholars are raising concerns about the food waste management approach; according to Esmaelian et al. (2018), "…, waste management efforts should be focussed on identifying value chains rather than waste removal chains." (Esmaeilian et al. 2018: p.190). Emphasizing the importance of value creation in food waste management, rather than simply

automating (Misra et al. 2018) the entire food waste management process. Similarly, Mourad opined that the traditional food waste management approach of adopting a food hierarchy top priority might also lead to surplus food prevention competing with food reuse and food recycling, and the other way round (Mourad 2016).

2.2.3 Food Waste & Reduction Strategies in Saudi Arabia

With an increasing population and urbanization, a country having only about two per cent of its entire land area of 2.1 million km², arable, and imports about 80 percent of its food products (Lovelle 2015). Paradoxically, with a significant reliance on food importation on one side and on the other side, about 40 percent of municipal solid waste (MSW) is composed of food waste (Ouda et al. 2016). The Kingdom of Saudi Arabia (KSA) is also experiencing the global economic, social, and environmental impact of food wastage. An approximate value of about 1.6 billion Saudi Riyals (SAR) worth of cooked rice was wasted yearly in Saudi Arabia. In a country where food products are imported mainly, most of the food wastage occurs due to the unhealthy habit of serving guests surplus food. Other studies reported that 30% of about 4 million dishes prepared daily valued at about 1.2 million SAR are wasted during the Holy month of Ramadan (Mu'azu et al. 2018). Food is enormously wasted in restaurants, during celebrations, special occasions, and festivals, and following the Arab culture, providing more food than required to guests is considered a good gesture (Sobh et al. 2013). In a seminar "Reducing Food Waste" held in Riyadh, the capital city of Saudi Arabia, it was reported that Saudis food wastage daily is worth $35 million, amounting to $13 billion per year (Mu'azu et al. 2018). Below is a representation of solid waste showing the dominance of food waste among the solid waste composition.

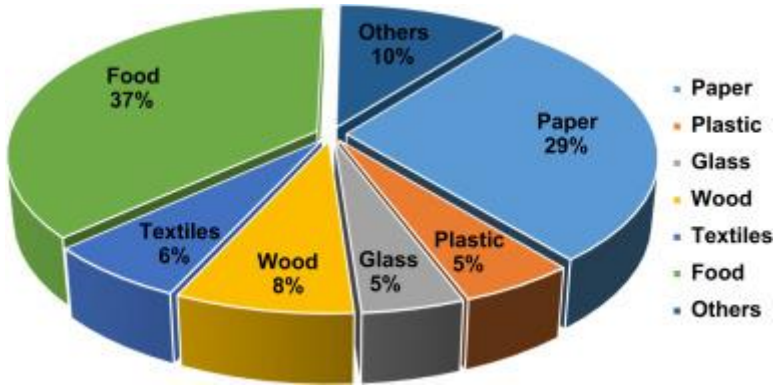

Figure 2.2: Saudi Arabia Municipal solid waste (MSW) composition – *[Source: Ouda et al., 2016]*

Ouda et al. (2016) claimed that the adoption of waste to energy (WTE) through bio methanation (one of the food hierarchy options) is most appropriate for Saudi Arabia's food waste management challenges, according to Ouda et al. (2016) "…, bio methanation technology can prove to be the most suitable WTE technology for KSA due to – availability of high food waste volume (37% of total MSW)." (Ouda et al. 2016: p.328). However, Mourad (2016), highlighted the risk of possible competition among the food hierarchy options, which may impede the objective of food waste reduction (Mourad 2016). Furthermore, waste-to-energy recovery is considered low due to greenhouse gas emissions (Moult et al. 2018). Later studies about food waste management in Saudi Arabia suggested tackling the food waste problems through food hierarchy top priority options (Baig et al. 2018b; Mu'azu et al. 2018).

In a country with limited arable land, food wastage means other nations where the food products are being imported, bearing the wastage's environmental impact. The economic impact is also enormous considering the Saudi Ministry of Environment Water & Agriculture; food wastage is estimated to cost the country about $13 billion yearly (Baig et al. 2018b). Food waste takes a drastic jump during the Holy period in Saudi Arabia; Ramadan (Umrah) and Hajj are religious duties that attract many Muslims to Saudi Arabia. Due to the continuous expansion of the Holy Mosque in Makkah and Madinah, the number of pilgrims keeps increasing simultaneously. In one decade, the number of pilgrims rises by about 50% and the number of international pilgrims by about 40% (El Hanandeh 2013). This significant growth during the Holy period also contributes to food waste, especially during Ramadan. Scholars seem to

share the same opinion on this (Abiad and Meho 2018; Baig et al. 2018a; Baig et al. 2018b; Mu'azu et al. 2018).

Food wastage at the household level in Saudi Arabia is highly associated with the cultural affiliation of welcoming guests by providing more food than required; according to Sobh et al. (2013), "…, the display is significant, and there should be more food than the party could eat." (Sobh et al. 2013: p.10). It is a common habit among the Saudis to provide more food in welcoming their visitors (Mu'azu et al. 2018). Culture seems to be one of the factors to consider in tackling the menace of food waste in Saudi Arabia. Culture plays a significant role in Saudi society by affecting everything related to food and leading to food waste. According to Baig et al. (2018b) "…, food wastage patterns are shaped by cultural approaches to special events and everyday shopping, cooking, and eating. Saudis place a high value on generous hospitality by providing ample food as a welcome gesture." (Baig et al. 2018b: p.6). The probing question is how can food waste reduction be achieved without affecting the culture in Saudi Arabia?

Currently, very little is documented about existing food waste reduction approaches adopted in Saudi Arabia; literature has highlighted the same (Baig et al. 2018b). However, there also seems to be agreement on adopting a food hierarchy for food waste management in Saudi Arabia, by considering food reduction at the source as the most appropriate approach and landfill as the least suitable approach (Baig et al. 2018b; Mu'azu et al. 2018). The literature reviewed calls for improved food waste management in Saudi Arabia by creating more social awareness towards reducing food wastage at the source and improving food donation across the country through food banks. This is an identified gap that is intended to be filled by this research, uncovering factors impeding food waste reduction and exploring how food sharing initiatives can be more effective toward food waste reduction. This will be studied through phenomenological analysis, the lived experiences of restaurants and food bank employees in Riyadh, the capital city of Saudi Arabia.

Some literature has also explored lower food disposal options in the food hierarchy for Saudi Arabia. Food waste management, anaerobic digestion (AD), and waste-to-energy recovery were studied considering the increasing population and urbanization

in the country, which also leads to increased energy demands (Hadidi and Omer 2017). Destruction to energy recovery through refuse-derived fuel and bio methanation was suggested by Ouda et al. (2016) who reported some limitations to the option, including setup capital, operational overhead, and required competencies (Ouda et al. 2016). Even in developed countries, adopting Anaerobic digestion (AD) involves compliance plus ensuring specific criteria, such as feedstock segregation at the source. Failure to adhere to the requirements could lead to low-quality biogas and higher operational cost of pre-treatment of the feedstock (Blake et al. 2017). Rehan et al. (2016) proposed waste-to-energy recovery through pyrolysis technology. They highlighted a further need to study the local condition and cultural practices before initiating such a project (Rehan et al. 2016).

2.2.4 Circular Economy

The concept of circular economy, which is not entirely new, has increasingly become significant in multiple fields, such as the academic field, with an increase in the number of journal articles about the concept. Industries are also exploring the potential opportunities promised by the idea of a circular economy and the benefits that may be derived from the values of the concept. Policymakers have leveraged their image as seen in the formulated comprehensive packages such as the European Circular Economic package (Wuttke 2018) and The Chinese Circular Economic Promotion Law (Lieder and Rashid 2016). Food industries are not left out of the benefit of the concept of circular economy, which is considered one of the ways of reducing wasted food. New business opportunities are emerging through the ongoing food waste management transformation by the concept of circular economy various high-value products, biomaterials, and bioenergy are produced through the circular economy approach to wasted food (Teigiserova et al. 2020).

Several scholars recognize the contributions to the modern circular economy by two British environmental economists Pearce and Turner (Su et al. 2013; Ghisellini et al. 2016; Geissdoerfer et al. 2017). They emphasized the need to move away from the traditional open-ended economic system, which cannot recycle. A circular financial design where the environment is not considered as a waste reservoir (Pearce and Turner 1990), in turn, was built on Boulding's (1966) idea of the earth as a closed

economic system, where the relationship between the economy and the environment is treated as circular and not linear (Ghisellini et al. 2016). Moreover, Sillanpää and Ncibi (2019) cautioned about ascribing the origin of the concept of circular economy to a specific person due to contributions made by various scientists and scholars from different backgrounds (Sillanpää and Ncibi 2019). Humanity's lordship over nature led to several sustainability issues still ongoing today. Thus, an alternative economy emerged, known as the circular economy, which leverages the component flow in recycling to establish a circular relationship between nature and the economy and targets maintaining a balance between nature and economic growth (Winans et al. 2017).

As defined by Mac Arthur "…, a circular economy is an industrial system that is restorative or regenerative by intention and design. It replaces the end-of-life concept with restoration, shifts towards renewable energy, eliminates the use of toxic chemicals, which impair reuse, and 'targets' for eliminating waste through the superior design of the material, product, systems, and business models." (MacArthur 2013: p.7). This concept is based on certain principles, and as depicted in Figure 2.3, the first is the nature of product design, which does not give room to waste. Instead, products are designed for reuse and recycling. Secondly, the circular economy concept initiates a clear difference between durables and consumable parts of products. The former, such as computers made of technical components like plastics and metals designed from the beginning for reuse. On the other hand, the latter consumables are made of biological features that are non-toxic. Thirdly, the circular system resilience is increased through renewable energy (MacArthur 2013). Compared to the linear product design or material usage shown in Figure 2.4, the circular economy concept leads to value creation through the principles mentioned above. Unlike the idea of buy-and-consume, durable products are designed and manufactured to be reused, whether shared or rented. If sold, they are bundled with incentives to encourage buyers to return the products, reuse them after that, or their materials are reused.

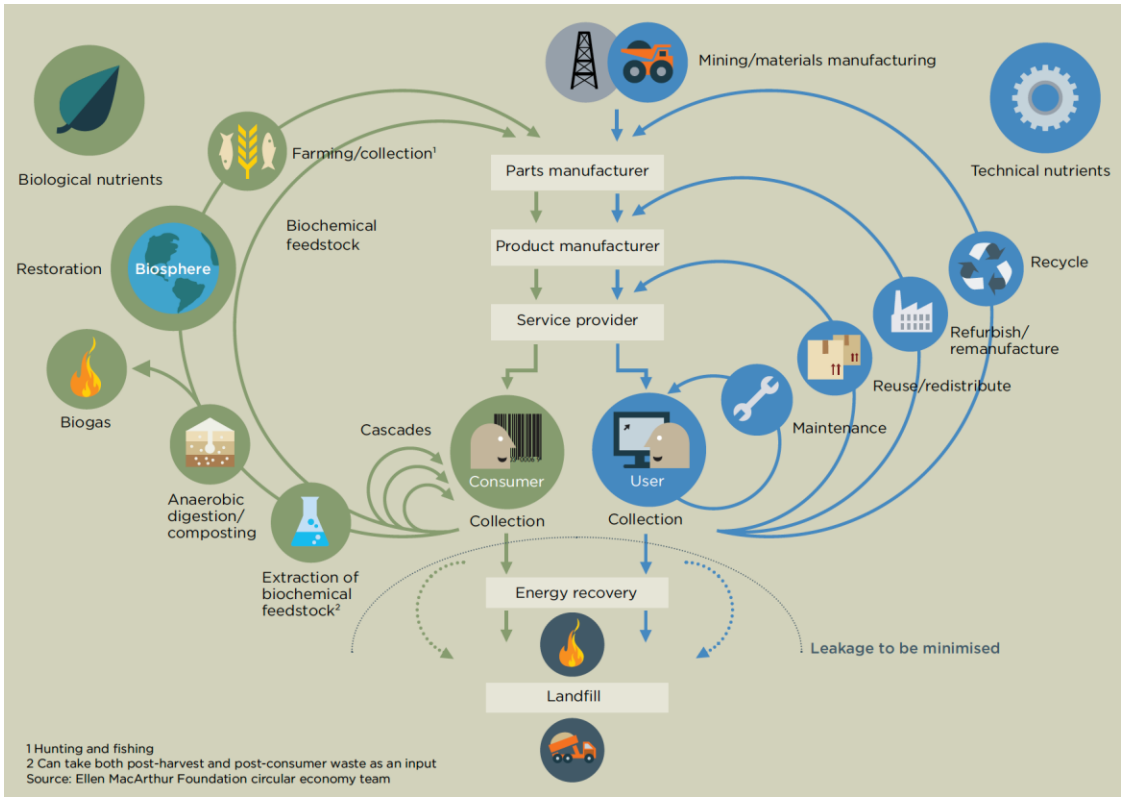

Figure 2.3: Circular Economy – Industrial System that is restorative by design – *[Source MacArthur 2013]*

The take-make-dispose linear economy model based on the abundance of resources that are no longer sustainable is presented in the figure below. The linear economy model centred around unlimited input resources, which in recent times turned out to be significantly limited; this unsustainable economic model calls for a closed-loop model, as such the circular economy concept (Muthu 2018).

Figure 2.4: Linear Economy – *[Source Muthu 2018]*

The demand for products and services is continuously increasing due to the corresponding increase in consumers, especially within the middle class. Maintaining a linear model of exploitation of resources would lead to the exhaustion of raw materials and natural resources, including possible price volatility and inflation. Given these tendencies and mitigating these risks, companies are beginning to shift away

from the industrial model, which heavily relies on increasingly scarce resources for growth and profitability. Parallel to the industrial model evolution is the continuous effort by policymakers to explore possible ways of shifting from a linear production system that depletes natural resources to a circular system. A system intentionally designed to self-generate, where biological products are destined to fall back to the biosphere, and durable technical products are designed to be reused and recycled for as long as possible (Muthu 2018).

The circular economy has increasingly become essential to sustainable development, owing to the continuous depletion of the planet's resources through the ageing linear economic model. Various definitions of the concept were made with intentions echoing each group's professional, financial, or business interests. The concept of circular economy has come a long way, as shown in Figure 2.5 below, where Prieto-Sandoval et al. carried out a study and came up with a knowledge map of the evolution of the concept of circular economy dating back from the 18th century to the present day. The study shows that it all started during the Industrial Revolution era when planet resources were over-exploited. Following the growing interest in the environment and publications by prominent scholars like Boulding (1966), who opined the idea of the earth as a closed economic system where the economy and environment established a circulation relationship making resources unlimited by recycling limited resources. This interrupted the era of the industrial revolution and led to initiatives of industrial ecology (Ayres and Kneese 1969); these notable scholars posited that industrial activities could work in the same manner as metabolism, where individual entity's resources and waste can be their source of integration which is recycled repeatedly through a resource inventory system. A greener economy emerged in this era, although it was perceived as incapable of transforming the linear and consumption systems. The third and final era came to light in the 90s when the environmental economists Pearce and Turner (1990) built on Boulding's study and emphasized the need to move towards circularity and away from a system that cannot recycle, thus the open-ended economic systems (Prieto-Sandoval et al. 2018).

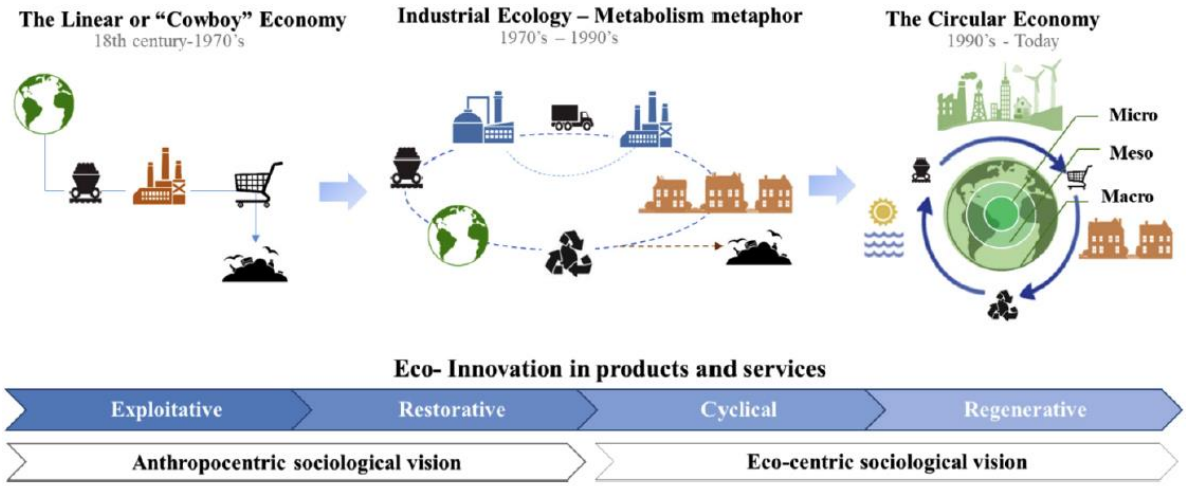

Figure 2.5: Circular Economy Knowledge Map – *[Source Prieto-Sandoval et al. 2018]*

The circular economy concept has developed over time and through discussions and engagements within the academic, business, and policymaking circles; thus, the adoption of the circular economy appears to be a promising approach for many industries and countries for sustainable economic development in this increasing resource scarcity period. Economic, environmental, and social benefits can be achieved by adopting circularity in sectors such as chemical, mining, textile, agriculture, and water; the primary objective of a circular economy is to eliminate waste from industrial processes through the reuse and recycling of resources, thus leading to less dependency on new resources and significant economic savings. Benefits anticipated to be derived by the adoption of the circular economy by industries includes but are not limited to substantial resource savings, creation of new jobs, improving social welfare, providing avenues for innovation and a competitive edge, and ensuring economic resilience (MacArthur 2013). Minimizing the depletion of planet resources can be realized by adopting a circular economy in the industrial sectors. Greenhouse gas emissions, landfill, and solid waste can be reduced through recycling and reuse activities, leading to minimal environmental impact (Lieder and Rashid 2016).

Adopting innovative recycling practices signifies a vital opportunity to minimize the chemical industry's environmental carbon footprint in chemical industries. Creative recycling involves by-product recycling and recovery of solvents against traditional recycling, which is usually linked to the end-of-life treatment of components

(Cucciniello and Cespi 2018). Like most industries, the chemical industry has made crucial contributions to improving the quality of life of humans all over the globe. However, on the flip side, Matus et al. (2012) highlighted that it had been a source of harm to human life. The need to balance the quality of life and a healthy human environment is achievable through green chemistry and green engineering, similar to the broader concept of sustainability (Matus et al. 2012). Green chemistry enables chemical industries to leverage their full potential for implementing the circular economy concept from product design to waste management and various resource recovery systems. Compared to traditional chemistry, green chemistry's primary objective is to eliminate the creation or use of hazardous chemicals through chemical product design and processes (Sillanpää and Ncibi 2019).

Metals are essential mineral resources over which modern society's growth, development, and prosperity depend (Sauvé et al. 2016)—minimizing the reliance of economic growth on the use of primary resources and shifting towards the use of the secondary resources that flow through a circular system is one of the essential principles of the circular economy concept and applicable to the mining industry. However, despite improvements in recycling activities, experts in the mining sector believe that the economy will continue to rely on primary extracted resources like metals (Allwood 2014). In the mining industry and according to Le`bre et al. (2017), reprocessing mining waste or mineralized waste for the recovery of minerals is considered secondary extraction instead of metal recycling. This is because the mining wastes contain many minerals that can still be extracted (Lèbre et al. 2017). Below is a depiction of the mining processing flow showing mineralized wastes (waste rock, tailings, slag & leached ore) looped back as primary resources.

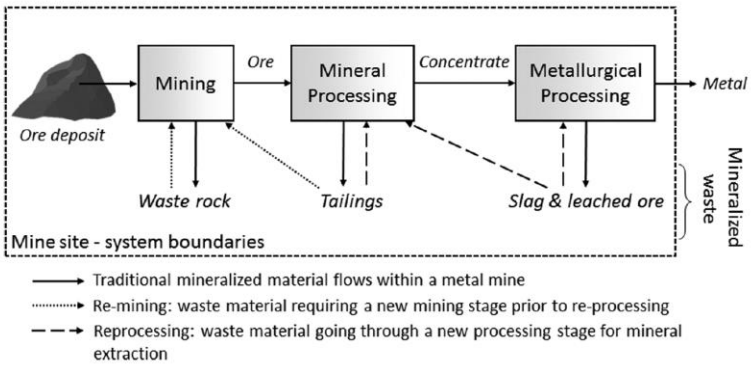

Figure 2.6: Mining Processing Flow – [*Source Le`bre et al. 2017*]

Adopting a circular economy in the mining industry would reduce the linear economic model's challenges to the environment, development, and economic growth (Singh et al. 2020).

In the food sector, a circular economy has a vital role in addressing global issues, such as food shortages in many parts of the world, food wastage in most developed countries, and increasing global population (Sillanpää and Ncibi 2019). World's population is projected to grow by 1.7 billion people by 2050, which will have a more significant impact on food and water resources, adding to the existing challenges of about 1 billion people undergoing chronic hunger (Alexandratos and Bruinsma 2012). Some of the challenges are related to the consumers, especially in a linear economic model, where consumers are at the last stage of the food supply chain. Wastages generated in previous stages of the food supply chain are food waste, standard practices occurring in developed countries at consumption stages. The causes of these practices are attributed to behaviour and affluence in the developed world, contrary to the conduct of consumers in food-insecure countries where food is carefully not wasted (Timmermans et al. 2014). Some scholars also share similar opinions by highlighting that consumers are the primary producers of food waste in developed countries due to their behaviour, abundance, and affluent which makes consumers choose to waste edible food (Porpino 2016; Hebrok and Boks 2017a; Rohm et al. 2017; Al-Zahrani et al. 2019; Soorani and Ahmadvand 2019).

However, some studies also emphasized that food waste reduction could be achieved through circularity and a closed system, where consumers at the epicentre could still

play a significant role by returning their food waste to retailers in return for some discounts and triggering a re-circulation process (Mirabella et al. 2014; Borrello et al. 2017). Furthermore, involving consumers in the circular economy is still challenging due to the commitment and behavioural changes required to collect and return their waste to retailers. But a worthwhile challenge that will provide a better understanding of the transformation towards a circular economy (Mylan et al. 2016). Adopting a circular economy in the food sector is limited to recycling food waste but curbing the trash from the source, exploring alternative economic models, and improving resource management (Ghisellini et al. 2016; Lehtokunnas et al. 2020). Some researchers carried out a study to test the circular economy concept in understanding if materials along the food supply chain of an Italian pasta production could be reused. Their research demonstrated the benefit of adopting principles of the circular economy by showing that food loss and waste (FLW) along the production chain could be reused as input resources for other beneficial purposes, such as wheat co-products reused for animal feeding, straw produced in the cultivation phase reused as a natural fertilizer (Principato et al. 2019).

2.3 Food Behaviour

Consumer behaviour is a major contributing factor to food wastage in developed countries, as highlighted by previous studies (Schmidt 2016; Principato 2018). The food-related behaviours identified include; poor food purchase planning, shopping routines, culinary skills, marketing influence (Principato et al. 2020), and lack of willingness to consume suboptimal food (Rohm et al. 2017). Despite the possibility of suboptimal food being safe, they are neither bought nor consumed due to their shape or colour, a large portion of food items would have been saved from ending up in the garbage only if consumers changed their food behaviour by accepting to buy or consume such a category of food. It is apparent from previous studies that behaviour is a crucial determinant of how food ends up either being consumed or wasted, right from the starting point of food purchase planning to consumption.

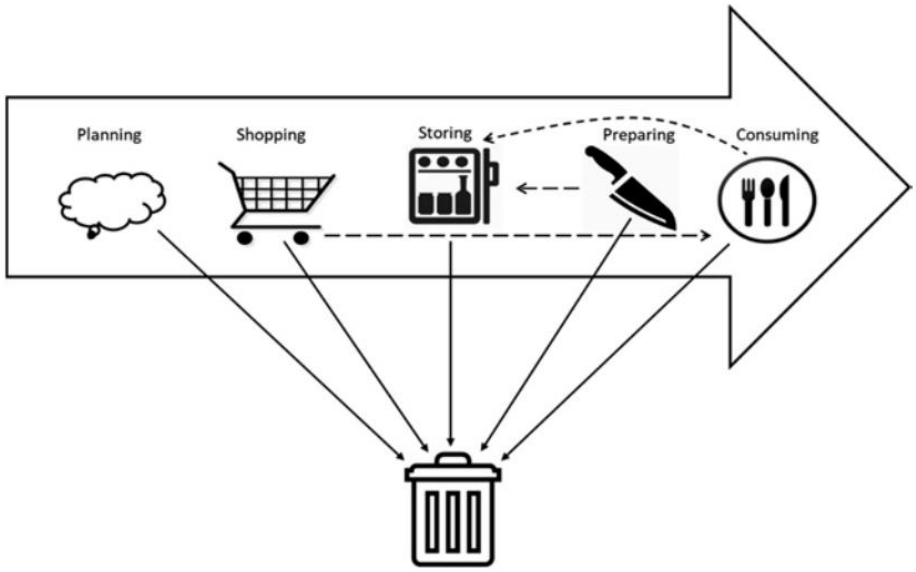

Figure 2.7: Consumer Food Management – [Source: Närvänen et al., 2020]

Food products do not just end up in the garbage, as shown in Figure 2.7, until behavioural elements come to play in each of the above stages, from planning to consuming. Overplanning food purchases, impulsive buying, poor storing practices, and excessive cooking, according to Närvänen et al. are some of the food behaviours leading to an increase in food wastage (Närvänen et al. 2020). Food behaviour can be subtle and unnoticed by consumers during their daily activities. But it is vital and instrumental in how food ends up. Consumer decisions about what to eat, when to eat, and how much to eat all contribute to the end state of food, either consumed or wasted.

The research illustrated that food is wasted in households due to the value placed on food and behaviour towards food, leftovers, packaging, and storage, among other factors. Leftovers are often preserved in the fridge and are the consequence of over-cooking or over-buying food without proper planning. It is common among consumers not to always resort to their leftovers as the next meal before deciding on something new to eat, thereby rendering leftovers wasted (Hebrok and Boks 2017b). Leftovers are considered among the highest wasted food products due to some consumers cooking in considerable quantities in anticipation of reserving food for a couple of days ahead (Block et al. 2016). It may also be due to a sense of providing sufficient food for the family or a lack of culinary skills to portion food appropriately.

Behind food waste behaviour are the following factors associated with individual characteristics, socioeconomic, psychological, and demographic (Principato et al. 2020). It has been shown in previous studies that older people tend to waste less food than younger people. Similarly, households with children tend to waste more food products than adults-only households (Quested et al. 2013). The older consumer's minimal food wastage may be due to their life experiences and general mindfulness about wastage. Contrary to older consumers, households with younger people tend to waste more food due to their lack of understanding of the socio-economic impact (Porpino 2016).

2.3.1 Food Behaviour in European Countries

Consumption in an affluent society is not new, and previous literature shows it has increased and become more essential in recent decades (Lorenz 2012). According to Galbraith, "…, the more that is produced, the more that must be owned to maintain the appropriate prestige." (Galbraith 1998: p.97). Society is dominated by the quest always to possess and have more. This mindset is not limited to luxurious items only but is also extended to food products. Several studies highlighted the social, environmental, and economic impact of food wastage (Mondéjar-Jiménez et al. 2016; Richter and Bokelmann 2017; Galli et al. 2019), research also shows that in countries that are considered affluent or economically stable, more food products are being wasted. It was stated that "…, the abundance of food available at low prices in affluent countries influences how food is valued and how much food is wasted." (Hebrok and Boks 2017b: p.6).

Most of the countries in Europe are developed, but food waste still occurs at the final phase of the food supply chain, a phase where more of the resources put into food production is equally wasted with the food waste. Previous studies show that European countries confronted with food shortages in the time of war have changed their prudent food-management skills with rising food waste behaviour (Porpino 2016). Household waste in Germany for example is estimated to range from 47% to 65% (Leal Filho and Kovaleva 2015), and the whole of Europe is estimated to waste about 123 kg (cap/year) (Vanham et al. 2015). In contrast to the abundance mentality, empirical evidence indicated that due to the severe recession that occurred some

years back, the people in Greece were found to have positive food waste behaviour. For example, people properly plan their food shopping, and their fresh food supplies are wisely purchased (Abeliotis et al. 2014).

Moreover, continuous effort is made by scholars to develop a better measurement to estimate food waste to understand better the underlying causes and identify policy intervention strategies to tackle the phenomenon. According to Gaiani et al., who investigated Italian household food behaviours leading to food waste, their study shows that household demographics, household size, and household level of income (the higher the income, the higher the amount of food waste) were found to be significant concerns about food waste behaviour (Gaiani et al. 2018).

2.3.2 Food behaviour in KSA

The Kingdom of Saudi Arabia, with consumers food behaviour like one of Gaiani et al. (2018) findings. The higher the income, the higher the amount of food waste, an oil-based economy with large oil reserves which makes the Kingdom a food security country. Food is available and affordable because the government can import large quantities of food commodities and make the food products available to the population at a subsidized rate. Food waste seems to be unavoidable in the Kingdom. As part of Arab generosity, providing a large quantity of food is a gesture to welcome guests to the Arabs (Al-Zahrani et al. 2019).

In contrast to countries with limited income and affordability, people have developed positive behaviour towards food because of limited resources. In Saudi Arabia, food behaviour leads to food waste because food products are affordable and available at a subsidized rate which encourages negative food behaviours. Empirical evidence indicated a lack of proper planning and shopping, which leads to overbuying food products, and cooking extra foods are all attributed to wasteful food behaviour (Baig et al. 2018a). An impactful awareness campaign that will inform the citizens about the social, economic, and environmental impact of wasteful food behaviour is required through multiple mediums.

2.4 Food Culture

Food has played a significant role in identifying culture by simply using what people consume. According to Wilson "…, groups of people in Europe are defined by themselves and others, by what, how, where, and with whom they eat and drink." (Wilson 2006: p.15). In most societies, eating is much more than foodstuff consumption; they are part of cultural identity. For example, in Europe, certain countries are known for certain foods; Italians are known for pasta, Irish with potatoes, and Swiss with cheese. These various food products have become a symbol of identity in those countries for a long time. Similarly, beef is symbolic to the English, as stated by Spiering that "…, being red meat, the product combines well with the core aspect of the English national self-image, such as honesty, love of liberty and, above all, manliness and martial prowess." (Spiering 2006: p.46). Culturally, it is eminent that food is one of the components and identifiers of society. Thus, the value placed on food will determine how it is treated during consumption.

Humans do not simply eat what they eat; there are reasons behind the choice of food people eat. Besides the obvious physiological reasons for people to eat to survive and live healthily, people eat because of food taste and the range of food available in their locality. Previous literature illustrated that what people eat, how they eat, when, where, and with whom they eat are profoundly influenced by the traditional practices of a society, thus culture (Garnsey 1999). For many years culture has emerged as a common denominator, determining what and how people eat. The cultural differences among people could determine the value placed on food products and food consumption. Place-based consumption of food and social norm has significantly influenced many societies. Culture and society are two tightly coupled words; the first is described as a way of life or behaviour, whereas the latter refers to the people who share a common form of energy (Fieldhouse 2013).

Europe's food culture is characterized by people's exposure to foreigners from other food cultures. Due to geographical location and the high influx of people in and out of some European countries, the food culture in such countries is dynamic and comprises varieties. Other peripheral European countries may not be exposed to such experiences due to their geographical location (Askegaard and Madsen 1998). Based on the availability of natural resources in each society, traditional cuisines are

prepared. But nowadays, due to an improved food supply chain, information, communication, and technology (ICT), immigration, and tourism, varieties of food products can be found in societies with a high population of foreigners. These, along with other factors mentioned earlier, “caused great upheavals in most European food cultures.” (Askegaard and Madsen 1998: p.558). Their study indicates that northern European countries tend to prefer a single-dish meal. In contrast, some central and part of southern European countries are said to have an overwhelming choice for a composite dinner (Askegaard and Madsen 1995).

Food culture has evolved in many countries worldwide from what was once defined by geographical location and culture to a more composite type of cuisines and reshaped by language, religion, economy, or generally, globalization. The increased availability of varieties or single meals leads to poor consumption habits and food waste (Evans 2014). Over a period, the northern European countries, the Scandinavian countries known for single dish preference, have also evolved in food culture and consumption. According to Hermansen, in about 4 -5 decades, the quantity of potatoes consumed by the people of Scandinavian countries has reduced by about 30kg per person. In the same period, meat consumption has increased by about 20 kilograms per person; these changes are linked to the strong influence of globalization (Hermansen 2012). Despite the lack of homogeneity amongst Scandinavian consumers regarding income and shopping habits, their food culture is still greatly influenced by global trends. Previous studies indicate a high level of impulsive shopping habits attributed to the likeness of fresh food products (Gjerris and Gaiani 2013).

Food culture in Germany has also undergone rapid changes, especially home cooking. In recent times the level of home cooking has declined; people have adopted the habit of eating out, preventing the younger generation from opportunities to be involved and learn about food through cooking (Heinzelmann 2008). Similarly, Belgium, neighbouring Germany on the western border, also experienced cultural food changes due to importation and globalization. Eating out also exists among the Belgian, leading to poor food culinary habits. This common standard across European countries is reported to have occurred decades ago due to other household tasks like cleaning, childcaring, clothes mending, which have been commercialized, and

services rendered outside the home. The service offering has been expanded by adding eating out and allowing customers to choose what to eat and how to pay, without taking care of the food product shopping or cooking (Scholliers 2008).

The Arab food culture is also not spared from globalization, leading to the availability of various food products, making it a multicultural food society. Arab hospitality is deeply rooted as part of the culture and dated back to the Arab Bedouin as a survival strategy. It is well known as part of the Arab culture to feed their guest and take care of them even at times beyond the means of the host. The emphasis is placed on the elaborate display of varieties of food as a gesture of welcoming a guest (Sobh et al. 2013).

Arab countries have become highly multicultural in recent times because a variety of food can be found nearly everywhere in their society, ranging from American, South Asian, or a combination of Arab food products. Eating out is a common practice in Arab countries and has a social significance for affirming a business relationship or building new networks. As part of Arab hospitality, which has a significant cultural value, friends and family members are welcome to visit one another in their homes, especially during the festive periods. During such visits, guests are served elaborate dishes that signify hospitality in Arab culture (Torstrick and Faier 2009).

2.5 Food Systems

Food systems have always been of interest to scholars and policymakers, even though some seem to look at the food system as a potential opportunity to overcome food scarcity challenges. However, in recent times, the food system is increasingly gaining attention due to the growing concern about the impact of the outcomes of food systems, ranging from environmental, trade, dietary, and health issues around food systems space (Béné et al. 2019). Adopting the food systems approach is considered beneficial to growing enough food to feed the growing population of about 9 billion people by 2050 (Grant 2015). While pursuing this objective, Bene et al. (2019) suggest that attention needs to be paid to the social, economic, and environmental impact of food production, distribution, and the entire supply chain (Béné et al. 2019). Food systems incorporate interrelated activities along the food value chain; specific inputs

are transformed into outputs such as food security, and environmental and social quality, leading to food production and consumption (Timmermans et al. 2014; Grant 2015).

Food systems are a complete process that involves all the necessary activities, from food production to food consumption. According to Haddad et al., it involves "…, growing, harvesting, packing, processing, transforming, transporting, marketing, consuming and disposing of food." (Haddad et al. 2016: p.82). The values placed on food because of consumers' food culture are significant in shaping consumers' expectations of food systems in terms of what they eat. Therefore, food systems have indications of overwhelming influence on food culture due to availability from the movement of food products from one place to another, making societies a multicultural food society. The food system is such an echo system that revolves around human and natural resources, driven by environmental, socio-cultural, and economic factors, from within and outside of the system (Allen and Prosperi 2016).

Haddad et al. (2016) opined that food systems are diverse worldwide and comprise a short and long food chain; the former is where food products are less treated and locally produced and consumed at the local community level. At the same time, the long chain involves a longer food supply chain with a high potential for treated food products for ease of storage and transportation from one place to another. The study also highlighted a shift towards the long food chain, implying that food products are transferred, processed, and traded (Haddad et al. 2016). This leads to consumers purchasing food products rather than growing the foods at the household level and discarding over-purchased or unused food products. However, turning towards sustainable practices like an efficient consideration of food waste along the phases of the food value chain could lead to a transformation of the negative environmental impact of food systems' main activities (production, processing, distribution, marketing) to positive or at least neutral outputs. Thus, shifting from food systems to sustainable food systems (Chaboud and Daviron 2017).

Food systems are end-to-end systems that include growing food, harvesting, handling, storage, transporting, processing, packaging, wholesale, retail, consuming, and

disposing of food. The outcome consists of safe, healthy, and affordable food, and maintaining the output flow entails ensuring minimum damage to natural resources and the environment (MacDonald and Reitmeier 2017). Food systems sustainability results from a harmonious relationship between various actors, ranging from farmers, distributors to consumers, and all the stages. However, Bene et al. (2019) cautioned about the interpretation and use of the concept of sustainability, stressing that it should be all-encompassing and should go beyond the provision of more food to feed the world, but also consider potential challenges around the food systems ecosystem (Béné et al. 2019).

While the sustainability of food systems grows through agricultural mechanization and technological advancement, the consequential environmental impact also increases. For example, the influx of rural to urban migration, the reuse of natural environment for agricultural land, water and air pollution, the effect of climate change, and soil degradation (Gomiero 2016). Food systems sustainability is profoundly challenged by the global population increase and food demand is expected to rise by 70% by 2050 (FAO 2012). Presently, millions of people are undernourished and dying of hunger-related diseases (Nellemann and MacDevette 2009); paradoxically, previous studies reported that about one-third of the food produced and suitable for human consumption is wasted (FAO 2012; Kibler et al. 2018; Schanes et al. 2018). The literature describes the urgency, and according to Vittuari et al., "…, it is urgent to address the food waste issue." (Vittuari et al. 2019: p.250). The interrelationship between food systems and food loss and waste cannot be overstated. Previous studies have shown that food waste occurs at later stages of the food supply chain in industrialized countries due to behavioural factors (Setti et al. 2016; Gaiani et al. 2018). The below figure depicts food losses and wastage along the food value chain.

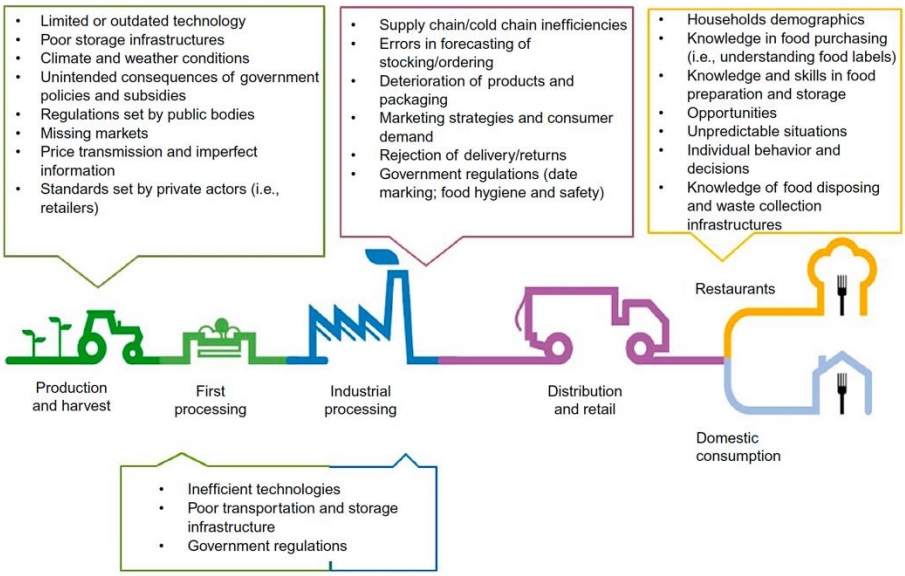

Figure 2.8: Food loss and waste along the food supply chain - *[Source Vittauri et al. 2019]*

The growing global population, increasing food waste generation, the rising effect of climate change, and soil degradation are all challenges to food systems sustainability. Food waste seems to have more significant consequences on food security and food systems sustainability due to the ramification on a social, economic, and environmental level. As such, mitigating and reducing food waste along the entire food value chain will significantly improve and address the food system's sustainability.

Proponents of the sustainable food system see food waste reduction and resilience as critical objectives for attaining food system sustainability. Although, there are conflicting elements within food resilience and sustainability, for example, redundancy which is a vital component of resilience (Tendall et al. 2015), and can be heading in the opposite direction as a conflict to food waste reduction (Godfray and Garnett 2014) which is considered significant to the sustainability of food system. However, literature shows that food waste occurs to accomplish food resilience through redundancy in some cases. These cases include overproduction by farmers and over-purchasing by consumers to mitigate uncertain events like scarcity (Bajželj et al. 2020).

2.6 Food Sharing

This section describes food sharing on a global level and defines the main stakeholders involved in food redistribution activities. The discussion explains the information and communication technologies (ICT) mediated food sharing and the adoption of sharing economy to enhance the distribution of food leftovers. This description establishes the understanding of ICT-mediated food sharing and its impact on food waste reduction. Also discussed in this section is the concept of sharing economy as enabled by technology and mostly adapted in some food sharing applications in European countries (Ganglbauer et al., 2014). Furthermore, the food sharing initiatives adopted in the Kingdom of Saudi Arabia are also discussed in this section. This includes public fridges placed outside some homes and near food courts in most malls, there are also food sharing charity organisations responsible for the collection and distribution of food leftovers.

2.6.1 Global Food Sharing Initiatives

Food sharing is considered by anthropologists and behavioural scientists as a universal human trait, which has evolved, building on cooperation at the centre of social life since the beginning of human life. With the advancement of information and communication technologies (ICT), sharing has resurfaced in a sophisticated manner on mobile phone applications and huge fridges to drop leftover food (Zurek 2016). The sharing economy has benefited from technological advancement by having a platform through which supply and demand transactions occur without any intermediary (Zurek 2016). Technology has played a vital role in transforming sharing economy concept into a business model where underutilized resources are made available in an online platform for immediate transaction by supply and demand parties (Esmaeilian et al. 2018).

Food sharing studies were carried out within social development in communities to foster face-to-face cooking and eating to balance inequalities within communities (Davies et al. 2017a; Davies et al. 2019; Marovelli 2019). Based on studies carried out in Saudi Arabia, about 40% (Ouda et al. 2016; Mu'azu et al. 2018) of the municipal solid waste comprises wasted food, for this reason, plus the attempt to address the impact on sustainability, this study will focus on how food sharing as an alternative

food distribution can lead to food waste reduction in the capital city of Saudi Arabia, Riyadh.

Food redistribution is a form of food sharing which is not entirely new but involves other stakeholders like food banks, food donors, local redistribution centres, wholesalers, sponsors, retailers, and consumers at the end stage. Food is commonly redistributed through food banks, and surplus food or leftover, as otherwise referred to, is donated by food supply chain donors or individuals from hosting events (Zurek 2016). Like a double-edged sword, food redistribution tackles environmental problems by reducing the impact and providing a means for the needy in society. There are several definitions for the key stakeholders involved in food redistribution activities; however, this study defines them.

Food donor: is a critical player in the food supply chain who donates surplus food for redistribution. Food donors generally include producers, wholesalers, retailers, hotels, restaurants, and individuals in some cases.

Surplus food: this is food that can no longer be sold due to packaging issues, closer to expiry dates, and lack of storage space. Surplus food is sometimes used interchangeably with leftover food, which is hot/cold food; both terms signify food that may still be fit for human consumption and, thus, can be donated with food safety regulations.

Sponsor: primarily the authority, business, individual, or organisation funding the food redistribution activities.

Foodbank: often operates as a charity organisation and facilitates food redistribution activities ranging from receiving surplus/leftover food from donors, managing logistics of their actions, and distributing surplus/leftover food to beneficiaries.

Food sharing is a common practice in some European countries and other parts of the world; the practice is adopted in most countries as a tool for achieving food waste reduction. The shared food items are mostly donated food products that are not marketable, leftover food, and grocery items but are still healthy and safe for human

consumption. Another creative way of sharing is the sharing fridges, otherwise known as public fridges. They facilitate sharing by serving as a platform over which leftover foods are made available by donors and can be collected by individuals or families in need. However, the concept is being criticized for being unhygienic and threatening to the public, and personal health even though it helps to reduce hunger and food waste in society (Zurek 2016). Germany is one of the European countries where the concept of public fridges began; the fridges were organized and managed by non-profit organisations with information and communication technologies (ICT) mediated initiatives. Foodsharing.de founded in 2012, is among the first initiatives in Germany and is actively involved in several food redistribution activities such as peer-to-peer food sharing, decentralized food rescue, and redistribution of leftover food activities (Ganglbauer et al., 2014). The Foodsharing.de organisation introduced public fridges (fair teiler) in 2014 where food is anonymously shared, and by 2017 their network of fridges increased to 350 fridges in the whole of Germany, putting them among the top food-sharing organisations at that time with the most significant global public fridge network (Morrow 2019b).

Communities have benefitted from food charity organisations and the concept of public fridges by serving as a platform where food can freely be shared. However, the idea has also suffered criticisms over public health hazards, an open-access community space where foods are anonymously shared by everyone and not owned by anyone (Morrow 2019b). Unlike hospitality operations like hotels or restaurants, which are regularly inspected for food safety and hygiene, public fridges, on the other hand are not subjected to such compliance. Therefore no one can be held liable if someone gets food poisoning (Zurek 2016). This concept of public fridges also frequently encounters criticism for supporting inequalities of redistributing food, not wealth or power, between food donors and recipients (Caraher and Furey 2017). Food charity organisations' complaints date way back; even though food is surplus in one place, food is wasted in other areas. Meanwhile, food organisations stepping up to curb wastage by proving a link between donors and recipients are criticized and perceived as an indication of the government failure to provide appropriate social welfare (De Boeck et al. 2017). Food charity organisations are heavily criticized even based on the famous “seven ins”, “*inaccessibility* (food is difficult to obtain because of poor location, hours of operation or transit options); *inappropriateness* (food provided does not meet

dietary needs or personal/cultural preference of clients); *inadequacy* (food provided is not nutritious); *indignity* (using the food bank is a stigmatizing experience in which people may be treated with suspicion, depersonalized or lose some of their independence); *inefficiency* (emergency food systems are not efficient and give the illusion of efficiency because they do not count donations as inputs); *instability* (supply depends on donations of money, food, and labour that may be variable or unreliable); *insufficiency* (the inability to provide sufficient food to meet clients' needs).” (Allahyari and Poppendieck 1999: p.383).

The atmosphere looms with the fear of an outbreak from the food taken and consumed from public fridges due to no ownership of the food, even though one of the ideas of the concept is to lower the barrier for both recipients and donors, as an alternative to online sharing. Traceability through detailed registration of food donors (by capturing the amount and type of food) and the recipient (by capturing information about the food delivered to the recipient) is one essential requirement by European Union (EU) legislation. Countries like Denmark have adopted traceability as a requirement for food charity organisations in case of any need for food item withdrawal. The benefit of registration systems is not limited to traceability alone but also provides food donors with the opportunity to put a number on their food donations effort. They can measure cost savings and the amount of food donated over time (Hultén et al. 2016). Furthermore, on public fridges and food safety in general, a technology-augmented approach using scanners, sensors, Internet of Things (IoT), in conjunction with ICT makes it feasible to track the “in” and “out” of food items from public fridges. However, the literature cautioned that imposing a technological augmented solution as a mandatory requirement may increase the overhead of non-profit food charity organisations, forcing them to explore alternative ways to operate outside the boundaries of legislation (Davies 2019).

While internet penetration is increasing globally, organisations digitally transform their businesses and operations. Consequentially, information and communication technologies (ICT) gradually change how people share. Technology-mediated sharing in food redistribution activities may significantly alleviate hunger and food waste reduction (Davies et al. 2017a). In the last couple of decades, the emergence of smartphones, mobile, web applications, and social media are reshaping the ways

people communicate, connect, interact, share and experience services. A wide range of mobile and web applications are presently operational in the arena of food sharing activities, for example, OLIO in the United Kingdom (UK), which has an objective to connect neighbours and local businesses so that surplus food can be saved, shared, and not end up in the garbage (Harvey et al. 2020). ICT-mediated sharing is expanding the range over which sharing can reach, increasing the number of beneficiaries of food sharing activities. This technology augmented food sharing practices, creating environmental impact through food waste reduction and social impact by improving social networks and providing opportunities to save or make money (Mackenzie and Davies 2019).

Website is the most widely used form of the three ICT mediation due to its simplicity and development cost. Meanwhile, apps are the least used form of ICT mediation sharing due to the technical skills and cost required to develop them. However, most app-mediated food sharing activities occur in Europe and North America due to high internet penetration. More food heading to the garbage is turned to productive use through the ease and speed of finding surplus food and identifying people in need using ICT-mediated (website, social media, and mobile apps) forms of food sharing activities (Ciaghi and Villafiorita, 2016).

Research indicates that the logistic part of surplus food redistribution is key to the success of food sharing activities. FoodCloud, founded in 2013 in Dublin, Ireland, is an exemplary case study. This initiative connects Tesco stores with food businesses and six partner charity organisations. As of 2018, a record number of foods has been shared by FoodCloud, 15 million Kg of food from more than 4,000 food and retailers to over 7,500 charity organisations and community groups across Ireland and the United Kingdom. Their success is attributed to adopting innovative and complex technology mediation, which includes a mobile app, and an integrated point of sales system with enhanced features of providing donate options on the scanner used for store management. FoodCloud's digitally managed logistic system fulfils major food safety requirements of food sharing activities within a time frame and under certain conditions. This was achieved through a fully automated and traceable registration system that monitors the interactions between food partners (retailers) and charity organisations. The adoption of ICT-mediated food sharing positioned FoodCloud as a

professional initiative that has developed the ability to broker relationships between corporations and community groups and serves as the quality controller of donated and distributed surplus food (Davies 2019).

2.6.2 Sharing Economy

The concept of sharing g economy with current technological advancements can play a vital role in increasing and improving the benefit of food sharing initiatives. The literature highlighted that the idea of sharing economy is leveraged on bringing people together (Lawrence 2008) and over an online platform (Zurek 2016). The growing number of digital transformations is positively impacting the concept of sharing as stated by Davies et al. (2017) that "…, ICT mediation is reshaping the ways people share and that in the arena of food such technologically mediated sharing may be well placed to confront the abhorrent geographies of hunger and food waste." (Davies et al. 2017a: p.511). The sharing economy is indeed strengthened by the digital revolution, making accessibility more accessible and reaching far and wide, thus increasing the potential of food sharing.

The sharing economy has a broad definition. However, the scope of this study is to leverage the core of the concept to explore food waste reduction through food sharing initiatives. Sharing economy, according to Codagnone et al. (2016, p.22), is "…, a wide range of digital commercial or non-profit platforms facilitating exchanges amongst a variety of players through a variety of interaction modalities (peer to peer (P2P), peer to business (P2B), business to peer (B2P), business to business (B2B) and government-to-government – G2G) that all broadly enables consumption." (Codagnone et al. 2016: p.22). Sharing economy is defined by Gori et al. as "…, a model in which demand and supply are immediately in contact through an online platform." (Gori et al. 2015: p.2). Research indicated that digital platform is the pivotal backbone of sharing economy, acting as a bridge between customers and suppliers (Mair and Reischauer 2017). There is increasing ICT growth (Alshuaibi 2017) in Saudi Arabia, hoping to act as the catalyst for improved food sharing through the sharing economy concept.

Consumers have collaboratively made use of underutilized inventory through paid sharing services offered by the establishments like Uber, Airbnb, and Lyft. This economic model is driven by two significant enablers, technological innovations, and supplier flexibility. Low overhead and a simplified market entry process are some of the benefits of technological innovation to sharing economy. Furthermore, the operational ease of enlisting and delisting as a supplier are some of the flexible attributes of sharing economy (Zervas et al. 2017). The taxi market has completely changed since the adoption of the sharing economy by Uber and Lyft; the home market is also changing the likes of Airbnb (Sundararajan 2017).

The sharing economy has gained considerable attention from scholars and, as such, is defined in many ways. The supporters of the sharing economy concept believe that it is a more sustainable economy than the present economy (Palgan et al. 2017). Meanwhile, contrary to this belief, the idea is also criticized as a "…, pseudo sharing – and a wolf in sheep's clothing phenomenon whereby commodity exchange and potential exploitation of consumer co-creators present themselves in the guise of sharing". (Belk 2014: p.7). The critics opined that the sharing rhetoric overemphasized the environmental benefit of sharing economy over economic and social benefits. Thus, thought to create unregulated marketplaces, unfair competition, and digital slavery (Barnes and Mattsson). According to Mair and Reischauer, sharing economy is "…, a web of markets in which individuals use various forms of compensation to transact the redistribution of and access to resources, mediated by a digital platform operated by an organisation". (Mair and Reischauer 2017: p.12). This definition is centred around five main features of transactions. First, "various forms of compensation" means the different ways of marketing in sharing economy. The Second "market" in sharing is the social space where transactions occur online and offline. Third, "redistribution of and access to resources" implies what is transacted in the marketplaces, such as food, cars, home, clothing, and capital. Fourth, "individuals" pull transaction parties to a commonplace. Fifth, the "digital platform operated by an organisation" shows the significance and provision of infrastructure in sharing economy by organisations (Mair and Reischauer 2017). Frenken and Schor (2017) define sharing economy as " …, consumers granting each other temporary access to underutilized physical assets (idle capacity), possibly for money." (Frenken and Schor 2019: p.2-3). Munoz and Cohen (2017) define sharing economy as "…, a socio-

economic system enabling an intermediated set of exchanges of goods and services between individuals and organisations which target to increase efficiency and optimization of sub-utilized resources in society." (Acquier et al. 2019: p.9).

Sharing economy is characterized by sharing products and services among users; what is transacted is access to the used part or the whole of products or services for a period and not owning the product; this is contrary to the traditional economic model, which is based on products or service ownership. The sharing economy concept is not new in the business-to-business (B2B) and business-to-consumer (B2C) space. Still, it has become widely used in consumer-to-consumer (C2C) transactions due to the following drivers (Hamari et al. 2016).

Consumer behaviour: Consumers find temporary usage more attractive than ownership, for example, cars.

Social Networks and interested customers are linked together by community platforms and social networks.

Mobile devices and Electronic Services: are significant enablers for accessing mobile app services. Smartphones and tablets are examples of devices that can be used for a sharing cars solution, for example, Lyft, and Uber (Puschmann and Alt 2016).

Avoidance of waste, the use of under-utilized assets, and reduction of transaction costs are among the objectives of sharing economy, which is also applicable to cities where resources are becoming scarce due to increasing population and space constraints. The concept employs a collective use of under-utilized assets, where one party offers rental, their home or spare rooms, or idle cars for a limited period. The other party can benefit from the lower cost of renting and negligible transaction overhead. Both parties are brought together through a digital platform (Gori et al. 2015) to leverage and maximize the use of under-utilized assets (Sun et al. 2016).

2.6.3 Food Sharing Initiatives in Saudi Arabia

In Saudi Arabia, some families have taken food sharing to another level, as shown in Figure 2.9 below, by placing a big refrigerator outside of their homes for the collection and distribution of food leftovers and for others to do the same for the needy in society.

Figure 2.9: A Fridge placed in front of a house in KSA for food donation – [*Source Baig et al. 2018*]

Placing a refrigerator outside the home can be an insightful approach to separating food waste from other solid waste; even if the leftovers are not consumed, at least different values can be derived from them. This brings up another question, can a smart refrigerator improve the collection of leftover food? This may be explored further and may lead to an improved value recovery from food waste. Placing a refrigerator outside the home in some parts of Saudi Arabia for food donation can further encourage communal sharing among those who have surplus food and those who need some food which is also a common feature of sharing economy. The households placing the food as the suppliers and the needy are on the demand side, while the refrigerator represents the platform.

One of the popular food banks in Saudi Arabia is Eta'am. They were established as a food charity organisation and have a presence in many cities, including Riyadh, Jeddah, Makkah, and Madinah. Through their charity work of collecting surplus food and distributing it to those in need, many private organisations have signed a partnership agreement with Eta'am to support and expand their operations. Private organisations like Saudi British Bank (SABB), Saudi Aramco, and Saudi Press Agency have signed a joint agreement to support the food sharing initiative through their social

responsibility programs. In addition to collecting and distributing surplus food, Eta'am food bank plans to publish children's magazines and release animated short videos. Their goal is to spread positive food behaviour to the younger population of society.

2.7 Literature Taxonomy

This section provides the classification, context, methodology, and findings of some of the reviewed literature. Table 2.1 below presents the literature taxonomy of the Five categories of literature reviewed.

S/N	Literature Category	Author(s) Year	Title of Paper	Methodological Approach	Theory Used	Summary of Findings
1	Food Waste	Coskun et al. 2020	What influences consumer food waste behaviour in restaurants? An application of the extended theory of planned behaviour	Quantitative - Surveys	Theory of planned behaviour (TPB)	The findings show that: 1. Consumers should believe that they have control over the quantity of food they order. 2. Restaurant management might use price as a strategy to prevent food waste. 3. Awareness could play a role to affect the intention to reduce food waste.
2		Baig et al. 2018a	Food waste posing a serious threat to sustainability in the Kingdom of Saudi Arabia – A systematic review	Systematic literature reviews	Not specified	1. Waste was found to be common in festivals and special events. 2. The custom is to provide more food than required.
3		Sebbane and Costa 2018	Food leftovers in workplace cafeterias: An exploratory analysis of stated behaviour and actual behaviour	Quantitative - Surveys	Not specified	The research found that food leftovers depend on personal characteristics and situational factors.
4		Papargyropoulou et al. 2014	The food waste hierarchy as a framework for the management of food surplus and food waste	Qualitative - focus groups	Grounded Theory – (GT)	Food surplus and waste framework based on three options. 1. Firstly, prevention through minimization of food surplus and avoidable food waste. 2. Secondly, the distribution of surplus food to the needy. 3. Thirdly, converting food waste to animal feed.
5		Schanes et al. 2018	Food waste matters - A systematic review of household food waste practices and their policy implications	Systematic literature reviews	Social Practice Theory – (SPT)	The findings indicated that research needs adopt a social practice ontology that potentially sheds light on the daily routines and practices that underlie household food waste.
6		Papargyropoulou et al. 2016	Conceptual framework for the study of food waste generation and prevention in the hospitality sector	Qualitative & Quantitative (Mixed method) – Case Study approach – surveys, interviews, and ethnography.	Grounded Theory – (GT)	The research findings indicated that food waste is intrinsically linked to the way food is prepared and consumed. Thus, the material and social-cultural context of food consumption and food waste generation.
7		Harvey et al. 2020	Food sharing, redistribution, and waste reduction via mobile	Quantitative	Not specified	The longitudinal study contributed to food sharing in three ways.

			applications: A social network analysis.			1. The use of network measures demonstrates that most food-sharing transactions were not based on reciprocity, as most of the individual plays the role of donor or recipient. 2. Interdependence measures indicate the supply chain between specific groups of donors and recipients is becoming increasingly fragmented as organizations, volunteers, and consumers all mediate their behaviour through a P2P network. 3. The structure and technology created by OLIO are determining factors for sharing to take place.
8	Food Sharing	Hultén et al. 2016	Food Redistribution in the Nordic Region.	Quantitative – Surveys, Interview	Not specified	The following was found: 1. The main barriers to increased redistribution are the lack of efficient systems for quality assurance, infrastructure, and supportive legislative frameworks. 2. Large amounts of food are wasted despite the high food redistribution in Nordic countries. 3. All Nordic countries comply with European Union food safety regulations, although each country has its own national legislative framework for food redistribution.
9		Zurek 2016	Food Sharing in Europe: Between Regulating Risks and the Risks of Regulating	Systematic literature reviews	Not specified	The risks and challenges associated with food sharing ranging from individual, public health, and safety to market fragmentation call for a balanced approach to food-sharing governance in the European Union.
10		Michelini et al. 2018	Understanding Food-Sharing Models to Tackle Sustainability Challenges	Systematic literature reviews	Bottom of the pyramid (BoP) theory	Three food-sharing models emerged from the research, sharing for money, sharing for charity, and sharing for the community.
11		Morone et al. 2018	Does food sharing lead to food waste reduction? An experimental analysis to assess challenges and opportunities of a new consumption model.	Quantitative - Experiment	Not specified	Three identified factors might act as enablers to make sharing practices more effective: 1. Environmentally friendly behaviour, and economic awareness. 2. Domestic skills 3. Collaborative behaviour
12		Principato et al. 2020	The household wasteful behaviour framework: A systematic review of consumer food waste	Systematic literature reviews	Theory of planned behaviour (TPB)	Wasteful behaviour was found to be influenced by psychological, social, situational, demographic, and socio-economic factors.
13		Soorani and Ahmadvand 2019	Determinants of consumers' food management behaviour: Applying and extending the theory of planned behaviour	Quantitative - questionnaire	Theory of planned behaviour (TPB)	The research findings indicated that the three constructs of the theory of planned behaviour (attitude, subjective norm, and perceived behavioural control) plus the extended construct of the 'feeling of guilt' were the drivers of managing food consumption and avoiding food waste.

14	Food Behaviour	Abdelradi 2018	Food waste behaviour at the household level: A conceptual framework	Quantitative - survey	Theory of planned behaviour (TPB)	The findings show that the TPB extended factors significantly affect consumer food behaviour.
15		Lorenz et al. 2017	Determinants of Plate Leftovers in One German Catering Company	Quantitative - questionnaire	Theory of planned behaviour (TPB)	The research findings indicated that individual plate leftovers in canteens are determined to a large extent by behavioural intention to consume the food served.
16		Gaiani et al. 2018	Food wasters: Profiling consumers' attitude to waste food in Italy	Quantitative - survey	Theory of planned behaviour (TPB)	The study shows that household demographics, household size, and household level of income (the higher the income, the higher the amount of food waste) were found to be significant concerns about food waste behaviour.
17	Food Culture	Askegaard and Madsen 1995	European food cultures: An exploratory analysis of food-related preferences and behaviour in European regions.	Quantitative - survey	Not specified	1. There is homogeneity and heterogeneity in European food markets in a new light. 2. The food consumption-capes of Europe are structured both by national and regional differences in terms of traditional cuisines. 3. By differences in penetration of the discourses of globalization and creolization. 4. Exposure to expatriate food.
18		Stefan et al. 2013	Avoiding food waste by Romanian consumers: The importance of planning and shopping routines	Quantitative - survey	Theory of planned behaviour (TPB)	The study findings indicate that to change consumers' food waste behaviour, efforts should be directed towards providing consumers with skills and tools to deal with their food-related activities.
19		Sobh et al. 2013	Islamic Arab Hospitality and Multiculturalism	Qualitative – Ethnography and Interview	Grounded Theory – (GT)	The research findings indicate that. 1. Home hospitality is largely extended inward and involves sharing in with close same-sex friends and family in a tournament of status. 2. Hospitality toward foreigners is largely either nonexistent or outsourced to other foreigners.
20		Gjerris and Gaiani 2013	Household food waste in Nordic countries: Estimations and ethical implications	Quantitative - survey	Theory of planned behaviour (TPB)	The research findings indicate a high level of impulsive shopping habits attributed to the likeness of fresh food products.
21		Tendall et al. 2015	Food system resilience: Defining the concept		Resilience Theory	The study findings suggest that the food system resilience approach has a high potential to help cope with the shocks, complexity and uncertainty facing food systems today, by using the concepts of continuous learning, flexibility, and "back-up" capacity.
22		Allen and Prosperi 2016	Modelling Sustainable Food Systems	Systematic literature reviews	Systems Theory	The research findings indicate that the vulnerability and resilience approach is suggested as a possible framework

						to capture the food system, think prospectively, and identify the system elements that policy can leverage.
23		Vittuari et al. 2019	Food systems sustainability: The complex challenge of food loss and waste	Systematic literature reviews	Not specified	The study findings suggest that. 1. The road to reducing food waste might have been paved with good intentions. 2. But it also requires significant results that represent the knowledge base to address one of the major challenges for the sustainability of the food system.
24		Béné et al. 2019	When food systems meet sustainability – Current narratives and implications for actions	Systematic literature reviews	Not specified	The research findings revealed that the concept of sustainability, although widely used by all communities, remains poorly understood and applied in different ways and in a relatively narrow understanding.
25	Food Systems	Bajželj et al. 2020	The role of reducing food waste for resilient food systems		Economic Theory	The research findings show that there are strong synergistic elements and interventions that support short- and long-term resilience, such as improved storage, which reduces the need to provide a constant flow of ‘surplus food’ and replaces it with a stock of ‘spare’ food.

Table 2.1: Literature Taxonomy

Several studies were carried out as indicated in Table 2.1 above, to understand the consumer food waste behaviour in households and hospitality places such as restaurants and hotels. Previous studies highlighted the importance of attitude and behaviour towards the intention to reduce food waste (Coşkun and Özbük 2020; Principato et al. 2020). Some findings suggest that consumers should be informed about their ability to self-control the amount of food they order. Instead of self-reported food waste behaviour through a survey, a methodological recommendation for future research through observation (ethnography) of consumers in the restaurant was suggested and seeking the opinion of restaurant employees about consumer's food waste (Coşkun and Özbük 2020). Baig et al 2018a also indicated as a limitation of the understanding of food waste that, future research was required to explore the factors contributing to food waste and the underlying social and individual context (Baig et al. 2018a). A call for further studies to explore the effect of national culture on hospitality food waste generation was suggested by previous research (Filimonau and De Coteau 2019).

2.8 Research Gap

Food waste is a global phenomenon that occurs due to several reasons such as consumer behaviour, food culinary skills, and lack of proper planning and shopping which leads to overbuying of food products, and cooking extra food (Gjerris and Gaiani 2013; Baig et al. 2018a). Welcoming guests with a large quantity of food as commonly seen in the Arab culture also leads to food waste generation (Al-Zahrani et al. 2019). Food waste was found to be common among consumers in developed countries due to the high purchasing power of food products and general behaviour towards food (Gustafsson et al. 2013; Esmaeilian et al. 2018). While food waste's impact on the environment, economy, and society increase as food waste generation increases. There are some suggested food waste reduction strategies such as the triple R, (reduce, reuse, and recycle). Reducing by preventing surplus food from generating at the source, reusing by distributing it to people who may be in need, recycling by using it for animal feeds, etc. (Papargyropoulou et al. 2014; Mourad 2016).

Sakaguchi et al. (2018) stated that attitudes and behaviours in restaurants play significant roles in the amount of food discarded in restaurants. Morone et al. (2018) assess food waste reduction through food sharing and found that food waste reduction does not automatically occur due to the adoption of food sharing practices. Furthermore, three factors were identified as enablers to make food sharing more effective, (i) environmentally friendly behaviour, economic awareness, (ii) domestic skills, and (iii) collaborative behaviour. Michelini et al. (2018) examined the food sharing approach and identified three food sharing models, sharing for money, sharing for charity, and sharing for the community. Despite these suggestions, research has shown that food waste reduction through food sharing initiatives is still not achieved (Falcone and Imbert 2017; Michelini et al. 2018; Morone et al. 2018; Sakaguchi et al. 2018; Filimonau and De Coteau 2019). Thus, this DBA research seeks to understand the behavioural and cultural factors enhancing food waste generation and factors impeding effective food sharing.

This research intends to address the research gaps highlighted in previous literature, such as to explore the factors contributing to food waste and the underlying social and individual context (Baig et al. 2018a), and to explore the effect of national culture on hospitality food waste generation (Filimonau and De Coteau 2019). Baig et al. (2018b) stated that food waste management cost Saudi Arabia about $13 billion annually. This study was necessary to contribute knowledge to recommendations policymakers and regulators may use to achieve effective food sharing to reduce food waste generation. This study's findings contribute to knowledge by addressing the gap in research regarding behavioural and cultural factors enhancing food waste generation, and factors impeding effective food sharing initiatives.

2.8.1 Behavioural & Cultural Models

There are two theoretical frameworks that may be adopted for the exploration of this study's food waste reduction through food sharing and through the lived experiences of restaurant and food bank employees. Each of the theoretical frameworks will be described in the next sections.

2.8.1.1 Social Practice Theory

In understanding consumption and transforming practices that have an environmental impact, the social practice theory (SPT) has been widely used (Sahakian and Wilhite 2014). The focus of social practice theory is not on individual decision-making, but rather on the various social practices engaged by the individual. As criticism of other behavioural theories, the social practice theory emphasised how practices are formed and reproduced, and not on an individual's attitudes, choices, and behaviour. The theory also emphasised the use of research methodological techniques capable of observing to properly capture everyday practices, rather than depending mainly on the result of interviews or surveys (Hargreaves 2011).

Several studies have adopted the social practice theory (SPT) to broaden the understanding of consumer food waste behaviour and food waste generation by going beyond psychological elements like attitude and behaviour. For example, Lazell (2016) examined consumer food waste behaviour in a university setting using SPT for encouraging sharing to reduce food waste. The findings indicated that due to the hidden nature of the food waste issue, consumer food waste behaviour can be better understood by focusing on the practices, routines, and habits of consumers (Lazell 2016). Similarly, Leray et al. (2016) applied SPT to investigate how individual, technological, and sociological aspects of consumption practices converge towards household food "metabolic profiles". Their findings illustrated a complex system of interactions between food provisioning, storage, managerial practices, and sociocultural norm (Leray et al. 2016). The social practice theory adopts a conceptual approach to comprehend the socio-temporal nature of practices happening, for example in households. Doing so implies that SPT recognizes that the individual is within a wider social, cultural, and economic part of daily life. Like any other theory, social practice theory focuses on individual practices and does not always account for the wider social contexts and underlying power dynamics (influences) which can in turn, affect the practices. This limitation can make it difficult to understand a complex phenomenon such as increasing food waste generation (Brand 2010).

2.8.1.2 Theory of Planned Behaviour

The theory of planned behaviour (TPB) has been widely used to explain consumer behaviour (Ajzen 1991). This theory is one of the most popularly used theories in understanding human behaviour. The theory of planned behaviour (TPB) was expanded by Ajzen (1991), from the theory of reasoned action (TRA) by the addition of the concept of perceived behavioural control (Ajzen 1991). According to the theory, human behaviour is a function of intention to carry out a specific behaviour, the intention being the central point of TPB, which can be predicted from attitudes towards the behaviour, subjective norms, and perceived behavioural control about the behaviour (Ajzen 1991). The theory of planned behaviour is shown in the below figure.

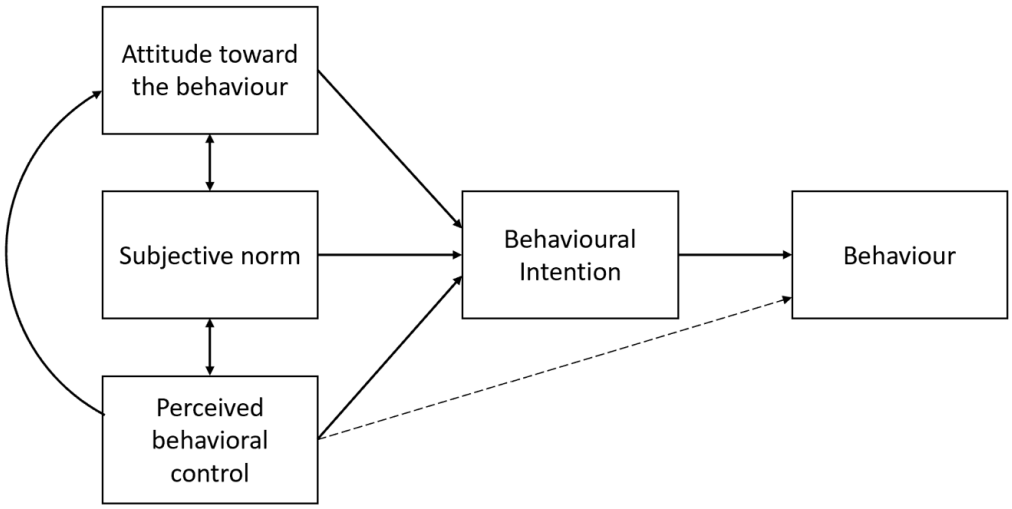

Figure 2.10: Theory of planned behaviour (TPB) Source: (Ajzen 1991: 181)

As depicted in the above figure, the three elements precede intention which later influences a particular behaviour. As such, the high the intention to perform a specific behaviour, the more likely it will be performed. Although the intention can lead to the behaviour only if the behaviour is under the volition of the individual. Therefore, an individual may succeed in carrying out a particular behaviour under a given circumstance to perform the behaviour (Ajzen 1991). Under the theory of planned behaviour (TPB), the three elements have their effects on intention which has an onward effect on the behaviour. The first element is the attitude towards behaviour and refers to the extent of assessment of an individual from being favourable or unfavourable in terms of a specific behaviour. The second element is the subjective

norm, which refers to the perceived social pressure to carry out or not to carry out a behaviour. This includes an individual's beliefs about thinking about whether important others should engage in the behaviour. The third element which determines intention is the level of perceived behavioural control which refers to the perceived ease or difficulty to perform a behaviour in a specific way. The fourth element is the intention which represents the desire to behave in a certain way. The fifth element is behaviour which is the observable action taken. Hence according to Ajzen (1991), the more positive the attitude, subjective norm, and perceived behavioural control towards a behaviour, the more likely a person's intention to perform the behaviour. Ajzen (1991) also stated that the TPB is open to including additional predictors if the additional predictor covers a significant aspect of the variance in intention or behaviour after considering the current theory's variables (Ajzen 1991).

The following figure illustrates the key concepts of the theory of planned behaviour aligned with the literature.

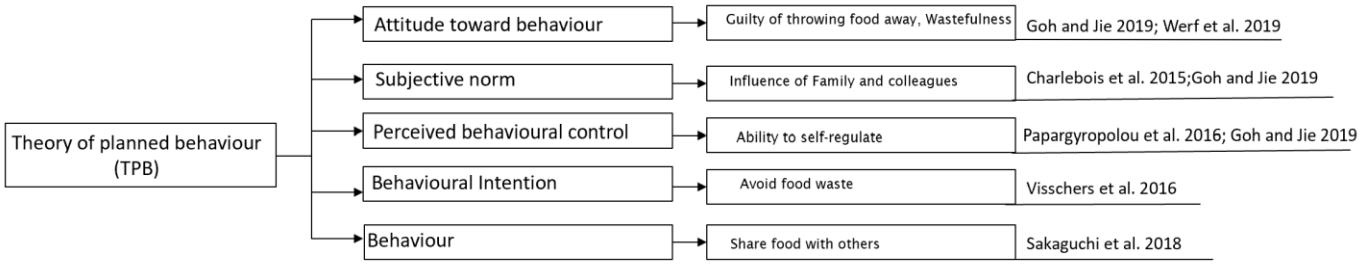

Figure 2.11: Theory of planned behaviour (TPB) Concepts

The theory of planned behaviour has strong applicability in exploring food waste reduction through food sharing. Several studies have adopted TPB and added various predictors to increase the understanding of consumer behaviour, such as the consumer behavioural approach to food waste (Aktas et al. 2018), what influences consumer food waste behaviour in restaurants, (Coşkun and Özbük 2020), to waste or not to waste, exploring motivational factors of Gen Z hospitality employees towards food wastage (Goh and Jie 2019), or determinants of consumers food-management behaviour (Soorani and Ahmadvand 2019). Therefore, the theory of planned behaviour can examine and understand better factors hindering food waste reduction in this doctoral study.

The theory of planned behaviour (TPB), which is considered one of the most recognized frameworks to predict human behaviour, has been widely used in the context of food waste management to explain food waste behaviour in general. The TPB constructs have a predictive power on behaviour, which shows that behaviour is preceded by intention, which is preceded by attitude, subjective norms, and perceived behavioural control. The application of TPB in the context of food waste supports predicting factors contributing to food waste behaviour to allow policymakers to design effective interventions. Previous studies which adopt TPB to investigate barriers to food waste reduction at home and out of home, show the usefulness in predicting consumer food waste behaviour.

A recent study that adopted TPB in understanding Saudi's food waste intention using religiosity and food waste consumption culture as an additional construct to TPB, found that religiosity has a negative impact on food waste, while food consumption culture has a positive and significant impact on food waste intention (Elshaer et al. 2021). Food waste results from the generosity custom of Saudis through their lifestyle of shopping, cooking, eating, cultural approach to special events such as EIDs, wedding parties, and the tradition of hosting guests with a large quantity of food. All of these are continuously happening due to the custom and traditional practices aided by the affordability and availability due to highly subsidize food products (Baig et al. 2018a; Al-Zahrani et al. 2019). Being a high-income country due to oil resources, the per capita income has also increased because of economic growth, and individuals and families tend to spend more and consume more, which corroborates Stefan et al. study that people with high income tend to spend more and household food waste correlates with their income (Stefan et al. 2013).

Goh and Jie (2019) explained the underlying motivational factors of Generation Z hospitality employees towards their food waste behaviour using the constructs of TPB. Using the theory of planned behaviour framework, they were able to identify six (get rid of old stock, better food quality, guilt, throwing money away, bad for the environment, and unethical) attitudinal factors, four (friends/colleagues, family, hotel management, and teachers) subjective norms influencing food wastage, and seven (large portion size, health and safety, wrong order/spillage, poor storage, poor stock

control, take-away policy, and lack of time) perceived behavioural controls towards food wastage among Generation Z in the hospitality industry. Their research suggests that Generation Z hospitality employees hold negative attitudes toward food wastage like feeling guilty and simultaneously acknowledging the impact of food waste on society. Although, they are inclined to follow the workplace cultural norm for the sake of customer satisfaction (Goh and Jie 2019).

Similarly, Coşkun and Özbük (2020) explained what influences consumer food waste behaviour in restaurants using an extended TPB by adding price consciousness and food taste constructs. Being a theory-based study, attitude, subjective norm, perceived behavioural control and the two additional constructs were hypothesized to predict the intention to reduce food waste and food waste behaviour in restaurants. However, their study found that the intention to reduce food waste and perceived behavioural control had a negative effect on food waste behaviour. Whereas food taste appeared to have a positive effect on food waste behaviour. Furthermore, attitude perceived behavioural control and price consciousness had a positive effect on the intention to reduce food waste (Coşkun and Özbük 2020). Several theory-based studies also used TPB to examine factors related to food waste behaviour. For example, Soorani and Ahmadvand (2019) explored the food consumption behaviour of Iranian participants who are responsible for shopping, cooking, and managing the household. The study found that all the construct of the TPB framework positively influenced their food consumption behaviour (Soorani and Ahmadvand 2019). In a similar study, Aktas et al. (2018) explained consumers' food waste behaviour in Qatar using TPB with additional contextual factors such as food choice motives, financial attitude, social relationships, food surplus, planning routines, and Ramadan. Their study illustrated that all the variables of the TPB model have positive effects on the intention to reduce food waste, and behavioural intention insignificantly affects food waste behaviour (Aktas et al. 2018). Barone et al. (2019) explored Italian consumers' household food waste and found that an individual's attitude towards food waste reduction and perceived social pressure when wasting food has a significant effect on the intention to reduce food waste.

Using the theory of planned behaviour, Mak et al. (2018) examined key factors that affect food waste recycling behaviour in the commercial and industrial sectors. The

outcome of their mixed-method research shows that food waste recycling behaviour is affected by three latent variables which are, administrative incentives and corporate support, logistics and management incentives, and lastly economic incentives. Their findings demonstrated that administrative incentives and corporate support as well as logistics and management incentives have a significant effect on food recycling behaviour (Mak et al. 2018).

Previous studies also examine food waste reduction through alternative food sharing models. For example, Michelini et al. (2018) explored how digital technology and the concept of sharing economy impacted food distribution and came up with three models, sharing for money, sharing for charity, and sharing for community models. However, the effect of digital sharing revealed positive and negative inequality issues in the models (Michelini et al. 2018). Papargyropoulou et al. (2014), in their food waste hierarchy as a framework for food waste management proposed three options. The first option is prevention from the source through the minimization of surplus and avoidable food waste. The second option is to distribute surplus food to individuals and families in need. The third option is recycling food waste for animal feed (Papargyropoulou et al. 2014).

3 Conceptual Framework

The theory of planned behaviour (TPB) which has been widely used to explain consumer behaviour provided a theoretical lens for this study. The theory is one of the commonly used theories in understanding human behaviour. The theory is tied to behaviour as presented by its chief architect, Icek Ajzen (1991), which is preceded by an intention to perform a behaviour. The intention, in turn, is based on attitude, subjective norms, and perceived behavioural control concerning the behaviour (Ajzen 2015). Apart from achieving the purpose of research, one of the primary goals of carrying out research is to address the research problem and contribute to knowledge in a field of study (Larsen and Adu 2021). Food products dominate solid waste in Saudi Arabia, and reportedly cost about $13bn annually, a phenomenon which is attributed to consumer behaviour (Baig et al. 2018b).

As stated by Maxwell (2012) that "…, the conceptual framework of research is constructed and not found. It comprises of various elements borrowed from different places, but the overall structure and coherent is built by the research". (Maxwell 2012: p.41). Therefore, Figure 3.1 below shows the development process of this study's conceptual framework. This study's conceptual framework provides a bridge between the researcher and the participants about their lived experiences of food waste reduction through food sharing. This thesis is interpretive phenomenological research, the developed conceptual framework and hermeneutic phenomenological framework will frame this study as allowed within the tenets of Martin Heidegger's phenomenological approach (Peoples 2020).

3.1 Conceptual Framework Development

In this section, the building blocks of this study's conceptual framework which are, personal interest/experience, topical research, theoretical framework, and the developed conceptual framework are all described. Like a blueprint or foundation, this study's framework provides basic support for the research elements and clarifies the research context. This conceptual framework explains the key concepts and illustrates the presumed interrelationships among them. The conceptual framework is an evolving component of research (Miles et al. 2018), the final state of the framework

when combined with the research interview data will be presented in the discussion chapter.

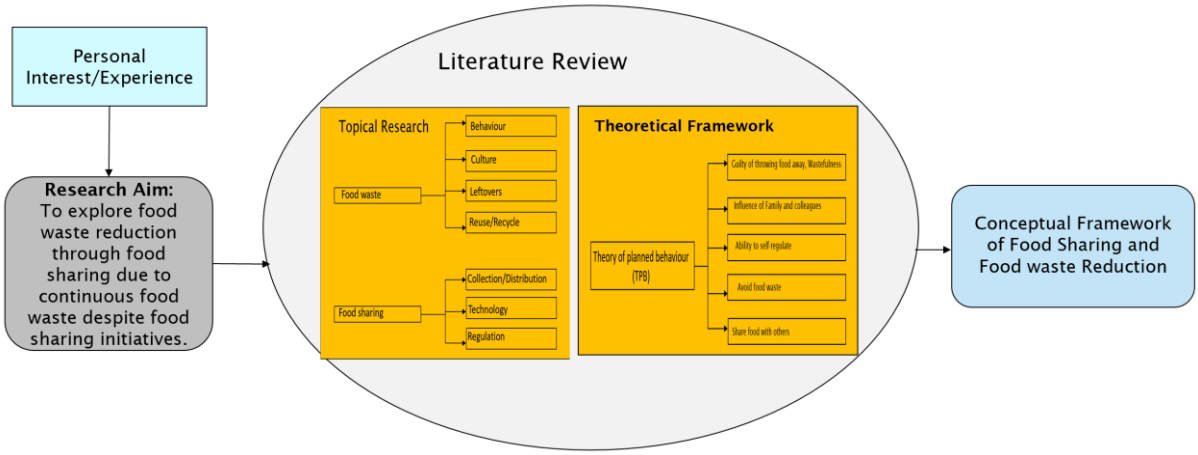

Figure 3.1: Elements of a Conceptual Framework – [Source Ravitch & Riggan (2017)]

3.2 Personal Interest/Experience

Scholars are aligned with the idea of personal interest or experience as being one of the sources of developing a study's conceptual framework (Maxwell 2012; Ravitch and Riggan 2016). The enormous food waste in society which is reported by the Saudi Ministry of Environment Water and Agriculture that cost the country about $13bn annually is observable during special events like wedding parties or even during the Holy month of Ramadan (Baig et al. 2018b). Furthermore, the prices of food commodities are low in the country due to subsidies, and this is taken for granted, plus the lavish style of hosting guests with a huge quantity of food, all of which leads to food waste (Baig et al. 2018a; Al-Zahrani et al. 2019).

Another element of this research conceptual framework is the study aim, which is to explore the lived experiences of restaurant and food bank employees to understand the behavioural and cultural factors enhancing food waste generation and factors impeding effective food sharing in Riyadh, Saudi Arabia. The experiences of selected restaurants and food bank frontline employees based on defined selection criteria will be sorted through a semi-structured interview, to understand their experience of food waste reduction through food sharing.

3.3 Topical Research

The food sharing and food waste reduction key concepts of this study's conceptual framework as identified from the reviewed literature are described in this section and depicted in Figure 3.2 below.

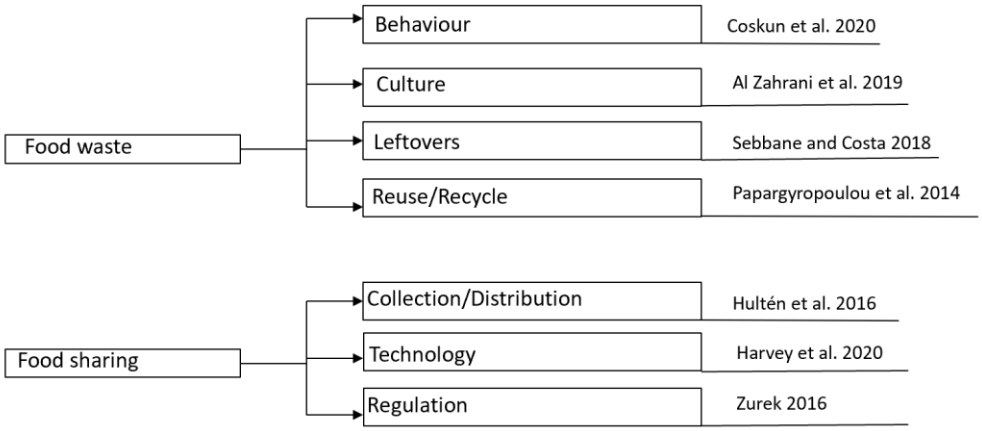

Figure 3.2: Food Sharing & Food Waste Concepts

An abstract representation of the outcome of a data reduction of an event, or behaviour to condense the data is referred to as a concept, and otherwise also referred to as a theme (Larsen and Adu 2021).

3.3.1 Behaviour

This concept relates to consumer behaviour toward food waste which is linked to food affordability and abundance (Stefan et al. 2013; Al-Zahrani et al. 2019). Food is highly subsidized in some rich countries to ensure food security for their citizens. Due to the *low prices of food commodities, consumers tend to take food items for granted,* resulting in increased food waste. Thus, food waste reduction requires that the role of food behaviour remain significant to the intention to reduce food waste (Coşkun and Özbük 2020).

3.3.2 Culture

This concept relates to the consumer food culture in showing hospitality to guests. In some parts of the world and most Middle East countries, serving guests a large amount of food items is considered part of the culture (Baig et al. 2018a; Elshaer et al. 2021). Food waste reduction can be achieved through an effective balancing of the

role of culture in showing gestures of hospitality to guests (Al-Zahrani et al. 2019; Filimonau and De Coteau 2019).

3.3.3 Leftovers

This concept relates to individual food waste (leftovers) and the discrepancy between the stated and observed behaviour. The quantity of food leftovers is related to situational factors such as portion sizes, the food taste and social norms and personal characteristics such as gender (Sebbane and Costa 2018). There is a need to take caution when considering self-reported data on food leftovers because a previous study shows that the actual amount of food leftovers is more than reported food leftovers. To reduce food leftovers in hospitality settings, the hospitality service operation should consider existing recommendations on service style and portion sizes, in addition to raising awareness (Lorenz et al. 2017).

3.3.4 Reuse/Recycle

This concept relates to alternative options of making use of food leftovers. The first option is prevention through the minimization of surplus food and avoidable food waste. The second option is the distribution of surplus food to people in need, and the third option is recycling food waste (Papargyropoulou et al. 2014). From the farmer through to the consumer, every phase of the good supply chain is economically impacted by food waste. The cost of food production, purchase, and disposal of food waste account for the economic impact. Papargyropoulou (2014) opined that the food waste menace should be tackled through sustainable food production and consumption across the global food supply chain. Food waste reduction is most preferred through prevention from the source, donating to people in need, or reusing it for an alternative purpose like animal feed Recycling food waste into biogas or biodiesel is a low-level option, while the least preferred measure is dumping food waste in landfills (Närvänen et al. 2020).

3.3.5 Collection/Distribution

This concept represents the collection and distribution of leftovers, efficient end-to-end process of collecting leftovers from donors and distributing them to people in need is essential to avoid further food waste because of spoilage. A clear pick-up arrangement

from donors and distribution to individuals or organisations through good communication schedules will improve efficiency (Hultén et al. 2016).

3.3.6 Technology

This concept relates to how technology adopted food sharing initiative demonstrates that most food sharing operations were not based on general reciprocity as claimed by a previous study (Guyader 2018). Rather, individual actors played the role of the donor or the recipient. The technology adopted for food sharing also illustrate the improvement in social relations between organisations, volunteers, and consumers (donors and recipients) due to the common marketplace through peer-to-peer networks, which also differs from the usual linear supply chain (Harvey et al. 2020).

3.3.7 Regulation

The regulation concept relates to the regulatory measures concerning health concerns about food sharing. Like in Europe where certain regulatory systems restrict producers and retailers from donating unmarketable food commodities, this has become a thing of the past with France leading the way by prohibiting hypermarkets from throwing away unsold food, but rather donating it to the food bank. Successful food sharing requires that regulation be seen as a means of contributing to the development of sharing economy in the food services sector in an attempt to reduce food waste and ensure a sustainable value chain (Zurek 2016).

3.4 Theoretical Framework

The theory of planned behaviour (TPB) is adopted as this study's theoretical framework and covered in detail in Section 2.8.1.2 above. Just to recap, the theory has been widely used to explain consumer behaviour (Ajzen 1991) and will be used to explain the consumer food behaviour in this research regarding food waste generation.

3.5 The Food Sharing -Theory of Planned Behaviour Model (FS-TPB)

The below figure shows the theory of planned behaviour (TPB) in the context of food sharing and food waste. The TPB constructs are replaced by the key concepts identified from the literature as mapped in Figure 3.3 below.

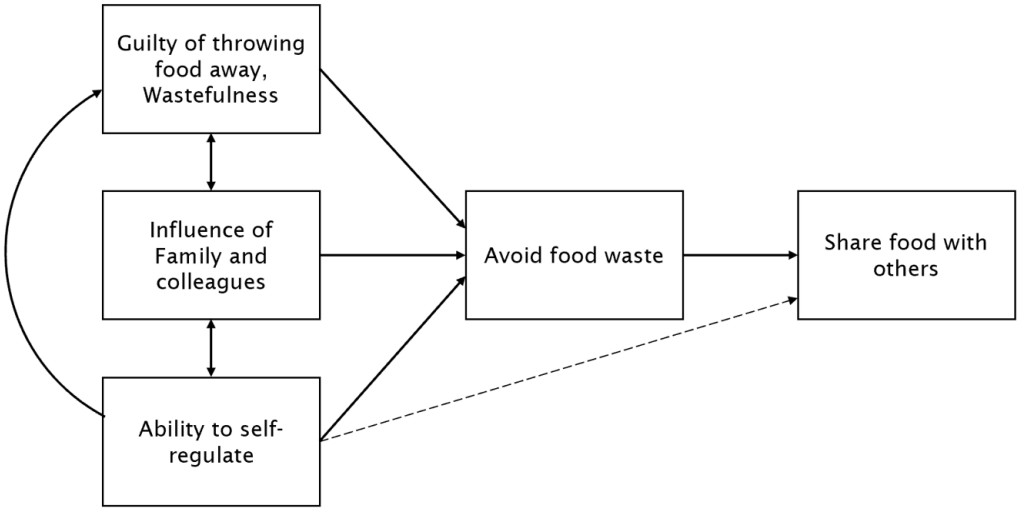

Figure 3.3: Modified Theory of planned behaviour (TPB) For Food Sharing & Food Waste – SOURCE: Author

The below table shows the mapping of the TPB constructs and the key concepts.

TPB Constructs	Key Concepts	Author(s)
Attitude toward behaviour	Guilty of throwing food away, wastefulness	Goh and Jie 2019; Werf et al. 2019
Subjective norm	Influence of Family and colleagues	Charlebois et al. 2015; Goh and Jie 2019
Perceived behavioural control	Ability to self-regulate	Papargyropolou et al. 2016; Goh and Jie 2019
Behavioural intention	Avoid food waste	Visschers et al. 2016
Behaviour	Share food with others	Sakaguchi et al. 2018

Table 3.1: TPB Constructs and Literature Key Concept Mapping

The below Figure 3.4 shows this thesis fully developed conceptual framework of the food sharing theory of planned behaviour (FS-TPB) based on the following rationale.

- Food sharing theory of planned behaviour (FS-TPB) is an outcome of the author's interpretation of literature and the theory of planned behaviour.
- The "Avoid food waste" construct is the behavioural intention and desire to share food with others, it is linked to the four key concepts derived from the literature: behaviour, culture, leftovers, and reuse/recycle.
- The solid lines between "Avoid food waste" and the four concepts (behaviour, culture, leftovers, and reuse/recycle) show that they are derived from the literature.
- The dotted lines between the four concepts (behaviour, culture, leftovers, and reuse/recycle) and the TPB constructs are based upon assumptions of relationship from the interpretation of the literature and understanding of the intersubjective reality that exists between them.
- The propositions that relate to each of the arrow relationships are depicted by PRx.
- The propositions PR1 to PR16 in below Table 3.2 describes the relationships between the key concepts and the modified TPB constructs of food sharing and food waste, based upon the interpretation of the literature, and described in section 3.5.1 below.

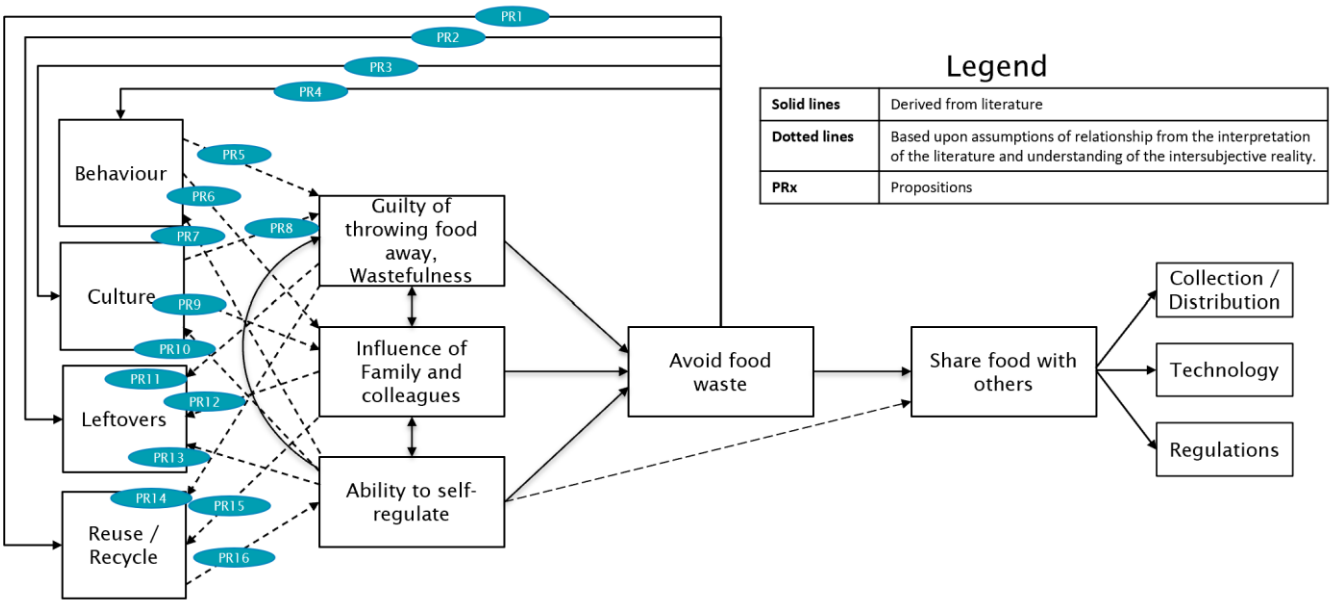

Figure 3.4: Developed Framework for Food Sharing (FS-TPB) – SOURCE: Author

The above Figure 3.4 comprises Five parts, the key concepts (behaviour, culture, leftovers, and reuse/recycle) identified from the literature and explained in section 3.3, the modified TPB constructs (the guilt of throwing food away, influence of family and colleagues, and the ability to self-regulate), the behavioural intention (avoid food waste), the behaviour (share food with others) identified from the literature and described in section 3.5, and the enablers (collection/distribution, technology, and regulations) identified from the literature and also explained in section 3.3. The propositions (PR1 to PR16) describe the relationships between the key concepts and the modified TPB constructs. The below table presents the propositions and the development described in section 3.5.1.

S/N	Proposition (PR)	Description
1	PR1	Not avoiding food waste leads to reuse/recycling.
2	PR2	Lack of avoidance of food waste leads to leftovers.
3	PR3	Lack of avoidance of food waste leads to negative food culture.
4	PR4	Not avoiding food waste leads to negative waste reduction behaviour.
5	PR5	Food behaviour leads to guilt of throwing food away.
6	PR6	Food behaviour leads to family & colleagues food waste influence.
7	PR7	Ability to self-regulate leads to food behaviour.
8	PR8	Food culture leads to guilt of throwing food away.
9	PR9	Food culture leads to family & colleagues food waste influence.
10	PR10	Ability to self-regulate leads to food culture.
11	PR11	Guilt of throwing food away leads to leftovers.
12	PR12	Food waste influence of family & colleagues leads to leftovers.
13	PR13	Ability to self-regulate leads to leftovers.
14	PR14	Guilt of throwing food away leads to reuse/recycle.
15	PR15	Food waste influence of family & colleagues leads reuse/recycle.
16	PR16	Reuse/recycle leads to the ability to self-regulate

Table 3.2: FS-TPB Proposition Mapping

Propositions one to four (PR1 to PR4) are derived from the literature as mentioned earlier and presented in Figure 3.2. Meanwhile, propositions five to sixteen (PR5 to PR16) are based upon assumptions of relationship from the author's interpretation of the literature and understanding of the intersubjective reality. Upon collection and analysis of this thesis research data, the findings will be integrated with the FS-TPB framework and will be presented in the discussion Chapter six.

3.5.1 Proposition Development

Propositions PR1 to PR16 describe the relationships between the key concepts and the modified TPB constructs of food sharing and food waste, based upon the interpretation of the literature.

PR1 to PR4

Food waste or leftovers may be fit or unfit for human consumption, to prevent food leftovers from ending up in the garbage. The reuse of food leftovers for people in need or affected by food poverty through either food banks or distribution centres is suggested as a prevention mechanism. Meanwhile, food leftovers that are not fit for human consumption can be recycled into animal feed or through composting and these are suggested as a prevention method for food waste (Papargyropoulou et al. 2014). Therefore, proposition One **(PR1)** assumed that not avoiding food waste will lead to reuse/recycling. Similarly, excessive food ordering by customers in restaurants which they cannot eat and end up with more leftovers also contributes to food waste generation (Bharucha 2018; Sebbane and Costa 2018). This supports the assumption made for proposition Two **(PR2)** that the lack of avoidance of food waste leads to leftovers.

Food culture has been identified by previous literature as one of the contributing factors to food waste generation (Sobh et al. 2013; Stefan et al. 2013). In Saudi Arabia, the high importation of food products, food subsidy, and the customary nature of hosting guests with large quantities of food also contributes to food waste generation (Al-Zahrani et al. 2019). This supports proposition Three **(PR3)** assumption that lack of avoidance of food waste leads to a negative food culture.

In a typical restaurant setting, consumer behaviour is one of the activities besides other operational activities such as food purchase, preparation, cooking, and serving, each of these activities contributes to food waste generation and consumer behaviour is identified as a critical determinant of restaurant food waste (Martin-Rios et al. 2018; Coşkun and Özbük 2020). Therefore, not avoiding food waste is assumed to lead to a negative food waste reduction behaviour, thus, proposition Four **(PR4)**.

PR5 to PR7

Previous studies indicated that consumers “feel bad”, “feel guilty” and are concerned about throwing food away which resulted from negative food behaviour (Goh and Jie 2019; Werf et al. 2019). This indication informed the assumption of proposition Five **(PR5)** that negative food behaviour leads to the guilt of throwing food away. Goh and Jie (2019) investigated the underlying motivations of Generation Z hotel workers in food and beverage outlets towards their food waste behaviour in the hospitality sector. Their findings suggested that family, friends, and colleagues are the strongest influence that Generation Z looks for approval for their food behaviour (Goh and Jie 2019). This, therefore, supports proposition Six **(PR6)** which states that food behaviour leads to family and colleagues’ food waste influence. Previous studies suggest that perceived behavioural control (which is contextualized in Figure 3.4 above as ‘Ability to self-regulate) had a significant effect towards food behaviour (Visschers et al. 2016; Aktas et al. 2018; Coşkun and Özbük 2020). Hence, the quantity of food wasted in restaurants will reduce if customers believe they have control, thus, the ability to self-regulate, the amount of food they order in restaurants. Therefore, this supports proposition Seven **(PR7)**, the ability to self-regulate leads to positive food behaviour.

PR8 to PR10

Consuming sub-optimal food is not common in many cultures, consumers believed that eating fresh food is hygienic and safe (Al-Zahrani et al. 2019). A previous study indicated that in Saudi Arabia 78% of food products purchased are thrown away every week to make room for new grocery purchases (Baig et al. 2018a). This supports proposition Eight **(PR8)** assumption that negative food culture leads to the guilt of throwing food away.

The customary gesture of lavishly hosting guests with more food than they can eat has a significant influence on the rest of the family members seeing that as adherence to the cultural norm (Mu’azu et al. 2018; Al-Zahrani et al. 2019). This supports proposition Nine **(PR9)** assumption that food culture leads to family & colleagues’ food waste influence.

The provision of food is considered part of a gesture of welcome to guests, and up to 70% of cooked food is wasted during events like wedding parties, Eid, etc. Even families with modest incomes will stretch themselves to host their guests with surplus food. It was also reported that in Arab culture, a person is seen as being inhospitable and a miser if he attempts to conserve food (Baig et al. 2018a). The ability to self-regulate becomes a challenge in such a heavily dominated cultural society. Therefore, proposition Ten **(PR10)** assumes that the ability to self-regulate leads to food culture.

PR11 to PR13

The inability of customers to self-regulate excessive food ordering in restaurants contributes to food leftovers generation (Bharucha 2018). Cultural practices of hosting guests lavishly with food much more than they can eat, which is a dominant societal norm to which families conform as a social-cultural norm also contribute to food leftovers generation (Baig et al. 2018a; Al-Zahrani et al. 2019). These are the bases of the assumption of Propositions Eleven **(PR11)** – the guilt of throwing food away leads to leftovers, proposition Twelve **(PR12)** – food waste influence of family and colleagues leads to leftovers, and Proposition Thirteen **(PR13)** – inability to self-regulate leads to leftovers.

PR14 to PR16

The guilt of throwing food away is an outcome of the following actions, purchasing food products, overcooking, and excessive food ordering, all attributed to negative food behaviour (Goh and Jie 2019; Coşkun and Özbük 2020), and thus, result in food leftovers either to be reuse or recycle. Therefore, this supports proposition Fourteen **(PR14)** assumption that the guilt of throwing food away leads to reuse/recycling.

Some previous studies added food taste as an additional predictor to the standard theory of planned behaviour constructs (Lorenz et al. 2017; Coşkun and Özbük 2020) and their studies indicated that food taste has a significant effect on food leftovers, invariable resulting in reuse or recycle. However, Goh and Jie (2019) suggested that family and colleagues' peer pressure are also attributed to negative food behaviour which results in food leftovers for reuse or recycling. This forms the basis of proposition Fifteen **(PR15)** assumption that food waste influence of family & colleagues leads to reuse/recycling.

Although, the reuse and recycling of food leftovers were suggested as prevention mechanisms for food waste (Papargyropoulou et al. 2014). Individuals are influenced by the behaviour of those close to them like family, friends, and colleagues, previous study indicated that the reuse/recycling culture developed because of such influence can lead to food behaviour (Morone et al. 2018). Thus, this informed the assumption of proposition Sixteen **(PR16)** that reuse/recycling leads to the ability to self-regulate.

3.6 Chapter Summary

This Chapter describes this DBA study's conceptual framework development which is based upon a widely used theory that explains consumer behaviour, thus, the theory of planned behaviour (TPB). According to Ajzen (1991), the theory is tied to behaviour and preceded by an intention to perform a behaviour. The intention, in turn, is based on attitude, subjective norm, and perceived behavioural control concerning the behaviour. The choice of this theory is considered appropriate to serve as this study's theoretical lens, due to this study's research objective to understand the behavioural factors contributing to food waste generation and because the theory has been widely used in previous and similar consumer behavioural studies as explained in previous sections above.

This study's conceptual framework was developed based on the following building blocks personal interest/experience, topical research, theoretical framework, and the developed conceptual framework, all described in the previous sections above. Key concepts of food sharing, food waste reduction, and the theory of planned behaviour were identified from the literature and mapped to a modified theory of planned behaviour in the context of food sharing and food waste. Thus, the food sharing theory of planned behaviour (FS-TPB). The relationships between the key concepts and the modified constructs of the theory of planned behaviour were represented by propositions PR1 to PR16, some were derived from the literature (PR1 to PR4), and the remaining (PR5 to PR16) were based upon assumptions of relationship from the researcher's interpretation of the literature and understanding of the intersubjective

reality that exists between them. This study's research findings will be integrated with the FS-TPB framework and will be presented in the discussion chapter.

4 Methodology

4.1 Introduction

The purpose of this qualitative hermeneutic phenomenological study was to explore the lived experiences of restaurants and food bank employees about food waste reduction through food sharing. The preceding chapter, a literature review of previous food waste and food sharing studies, globally and locally in the Kingdom of Saudi Arabia, established the need for better understanding, as such, a lack of research of this nature, to better explore how food waste reduction could be achieved through food sharing initiatives. Presently, we don't know enough about what aspect contributes to food waste. However, there seems to be an emergent area of behaviour around sharing food. Sharing food might alleviate food waste. This hermeneutic phenomenological research will explore how food sharing might reduce food waste in a cultural and community-based society like Saudi Arabia through the lived experiences of restaurants and food bank employees.

This chapter begins by describing the underpinning research philosophy of this thesis, the design, research methodology, theoretical framework guiding data collection, and data analysis of this study, based on the researcher's philosophical worldview. Beyond the description of the adopted method, the rationale behind the choice of the research methodology owing to the nature of the study (Crotty 1998) is also covered in this chapter. In addition, the researcher describes the sampling approach adopted for selecting participants along with the research procedures, also described as a step-by-step approach taken to analyse the collected data with ethical considerations.

This study seeks to gather meaningful understandings of the phenomenon of food waste reduction through food sharing initiatives, from the lived experiences of restaurants and food bank employees in Riyadh, the capital city of Saudi Arabia, and the researcher's union of analysis. The development of in-depth meaning may not be achieved through a statistical approach; for this reason, data will be gathered through a face-to-face semi-structured interview.

4.2 Research Philosophy

This research is rooted in social constructivism philosophy, which aligns with the author's philosophical view of the world. According to Creswell, individuals seek to understand the world in which they live. Rather than starting with a theory in social constructivism, they develop subjective meanings directed towards objects and through interaction with others. Hence, "…, the research goal is to rely as much as possible on the participants' views of the situation." (Creswell and Poth 2016: p.24). The philosophical stance underpinning research plays a significant role in knowledge development – epistemology, and goes all the way to selecting the research method (Crotty 1998). This thesis is not left out of potential knowledge development by adopting a proper philosophical stance that has guided and shaped the way data was collected and analyzed through the lived experiences of the participants of this research, the restaurants, and food bank employees who constantly experience food wastages. The profound philosophy behind meaning-making derived from the interplay between subject and object defines how knowledge was developed in this study and operationalized by exploring how food waste reduction could be achieved through food sharing by understanding the meanings of lived experiences of people working in the food industry. The Below figure depicts the philosophical stance guiding this thesis.

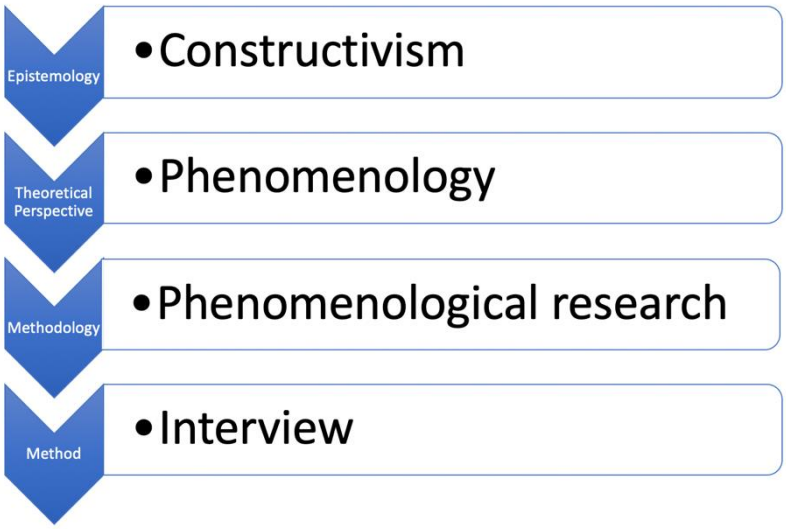

Figure 4.1: Research Philosophical Stance

This study is guided by the above four elements, starting with constructivism, the epistemic position of this research, which connects to the researcher's philosophical interest and view of carrying out this study to jointly create knowledge about food waste reduction through food sharing in collaboration with the participants of this research. Furthermore, the knowledge will be an outcome of the interactions between the researcher and the participants within the context of this study. However, as opined by Cater and Little, it is not expected to fully access the participant's internal state about a phenomenon (Carter and Little 2007), which is why an audio-recorded in-depth face-to-face interview was chosen as the specific method of collecting data for this study. This also allows the researcher to observe the dynamics and ways participants discuss issues around the phenomena, which in this study is food wastage.

Crotty describes constructivism (1998) as "…, the individual human subject engaging with objects in the world and making sense of them." he further added that "…, it requires us to engage with phenomena in our world and make sense of them." (Crotty 1998: p.79). There are several kinds of literature on food waste such as a general framework for food waste quantification (Eriksson et al. 2018), food loss and food waste in the Arab world (Abiad and Meho 2018), food waste posing a severe threat to sustainability in the Kingdom of Saudi Arabia (Baig et al. 2018a). Hence, this study seeks to understand the meaning of the lived experiences of the employees working in restaurants and food bank through an in-depth face-to-face interview to gather data and explain some insightful findings of food waste reduction through food sharing. The focus of this epistemic position was to engage participants with open-ended questions to foster interactions, which resulted in gathering data. The researcher carried out an interpretation of the meanings of participants' experiences of food waste reduction. As stated by Creswell, "…, the more open-ended the questioning, the better, as the researcher listens carefully to what people say or do in their life setting. As such, we see constructivist worldview manifest in phenomenological studies, in which individuals describe their experiences." (Creswell and Poth 2016: p.25).

4.3 Research Methodology

This research is aimed at exploring the lived experiences of restaurant and food bank employees about food waste reduction through food sharing initiatives, and this study will be conducted in Riyadh, the capital city of Saudi Arabia. Coşkun and Özbük (2020) suggested for future research a methodological approach through observation (ethnography) of consumers in the restaurant to seek the opinion of restaurant employees about consumer's food waste instead of self-reported food waste behaviour through surveys (Coşkun and Özbük 2020). Furthermore, considering the family & culture-oriented nature of Saudi society. Approval to collect data from restaurants through ethnography will be met with rejections. Therefore, the choice to explore this study through phenomenological methodology, which seeks to generate understanding through the lifeworld experiences of restaurant employees who have lived through the phenomenon of food waste generation and food-sharing initiatives is most appropriate (Beck 2019). In the context of this thesis, this approach would allow for an in-depth description of the lived experiences of restaurants and food bank employees about food waste reduction through food sharing initiatives. A qualitative approach, specifically phenomenological methodology, is uniquely suited for this research than a quantitative approach. The research questions do not seek to identify causal relationships or test some hypothesis; instead, they seek to explore lived experiences of front-line workers in selected restaurants and food bank in Riyadh about food waste reduction through food sharing. As opined by Peoples, "…, the purpose of phenomenological research is to generate the lifeworld experiences of certain populations." (Peoples 2020: p.47).

Based on this research's epistemological position described in the above section, phenomenological research is appropriately situated and homogeneous with the epistemic stance. As suggested by Creswell (2013), phenomenological study explicates the meaning of individuals' lived experiences of a phenomenon (Creswell and Poth 2016). The phenomenological design consistent with this research epistemic position aided the collection of data contained within the participants' perspectives engaged through an in-depth face-to-face interview. Phenomenology, as stated by Beck (2019), "…, targets gaining a deeper understanding of the meaning of experiences in everyday life." (Beck 2019: p.1). The understanding was achieved through iteration between the data and co-created with the research participants.

Edmund Husserl (2012), known as the father of the philosophy of phenomenology, opined that only knowledge that emerged from experience could be recognized and further emphasized that essence, and meaning, define a phenomenon (Husserl 2012). This research aims to uncover and understand food waste reduction through food sharing by gathering data through in-depth face-to-face interviews of participants. This understanding and meaning were inductively achieved through the lived experiences of people working in restaurants and food bank in Riyadh. Merriam and Grenier (2019) also postulated that the defining attribute of phenomenological research is the emphasis on describing the essence of a phenomenon from the viewpoints of people who lived the experience (Merriam and Grenier 2019).

In this hermeneutic phenomenological thesis, the researcher does not suppress his previous experience and knowledge about food waste reduction before engaging with restaurants and food bank employees about their lived experiences of food waste reduction through food sharing initiatives. Adopting phenomenological methodology for research implies that the researcher needs to start by examining their presuppositions about the phenomenon being investigated (Beck 2019). The evaluation of the researcher's experiences with the phenomenon of food waste reduction was done before starting the data collection of this thesis. Merriam and Grenier (2019) postulated that this is required to examine the proportion of the experience about the studied phenomenon. Moustakas (1994) referred to this as epoche and stated that "…, it is a Greek word meaning to refrain from judgment." (Moustakas 1994: p.33). Putting aside our assumptions and beliefs to avoid prejudgment of the meanings of phenomena is referred to as "Bracketing" in Husserl's philosophy of phenomenology (Beck 2019).

4.3.1 Phenomenological Framework

This thesis is framed through Martin Heidegger's hermeneutic phenomenological framework to fully understand how food sharing contributes to food waste reduction, explored through an engaged semi-structured face-to-face interview of selected restaurants and food bank employees in Riyadh. According to Peoples, phenomenological research can be framed by two theoretical frameworks, the

philosophies of Edmund Husserl (transcendental or descriptive phenomenological studies) and Martin Heidegger (1889-1976) (hermeneutic or interpretive phenomenological studies) (Peoples 2020). Edmund Husserl (1859-1938) believed phenomenology was presuppositional and "…, nothing should be assumed or taken for granted when trying to understand a phenomenon." (Peoples 2020: p.30). Following Heidegger's hermeneutic framework, researchers cannot suspend their judgments or prior experiences to get to the essence of a phenomenon. Instead, the pre-knowledge supports the interpretation of participants' lived experiences. Hence, this phenomenological thesis is explored through Heidegger's interpretive phenomenological framework. The researcher's prior knowledge about food waste reduction and food sharing acquired through literature reviews will not be suspended before data collection and analysis.

He is typically referred to as the father of the philosophy of phenomenology, Edmund Husserl. According to Smith, Husserl defines phenomenology as "..., the science of the essence of consciousness." (Smith 2013: p.54). Consciousness has been what we live through and experience in our lives; it stands as a medium of our existence as human beings who see, touch, imagine, think, judge, desire, and feel (Smith 2013). On the other hand, the essence characterizes a phenomenon as what it is; otherwise, it would not be called a phenomenon (Beck 2019). Hermeneutic phenomenological philosophy is considered suitable for this DBA thesis because it allows additional frameworks to frame a phenomenological study (Peoples 2020). Hence, the theory of planned behaviour and hermeneutic phenomenological frameworks will be used to frame this research. This doctoral research topic is deeply grounded in a social-cultural context. For this reason, adopting a theory such as TPB will provide more support towards understanding better the behavioural factors hindering food waste reduction.

Martin Heidegger believed it is impossible to separate ourselves from being within the world. Therefore, no way to bracket our previous experiences or knowledge. He calls the state of being in the world Dasein. He refers to the preconceived understanding/knowledge as foresight or fore-conception. In Heidegger's philosophy, he believes we can get to the essence of a phenomenon by updating our foresight (preconceived knowledge) with new understanding, which comes through the interpretation of a phenomenon. He refers to the process of revising our foresight

(preconceived knowledge or biases) with a new understanding as a hermeneutic circle. Furthermore, as a researcher starts by interpreting a phenomenon, they already have a preconceived understanding of the phenomenon. As they receive new information through the interpretation of data, the pre-understanding gets revised. Thus, the hermeneutic circle helps us make sense of the phenomenon, and researchers understand a phenomenon better through constant revision of their pre-understanding (biases, preconceived knowledge), which occurs through the interpretation of a phenomenon (Peoples 2020).

Heidegger's framework key concepts

The following are Martin Heidegger's hermeneutic phenomenological framework key concepts.

Dasein: is the state of being in the world because there is no way to separate oneself from being within the world.

Fore-sight/fore-conception: these are the preconceived knowledge or biases or understanding about a phenomenon.

Hermeneutic circle: it is a process of incremental understanding of a phenomenon where the pre-understanding gets revised with new understanding as we interpret something.

Husserl's framework key concepts

The following are Edmund Husserl's transcendental phenomenological framework key concepts.

Bracketing/Epoché: this is the suspension of any presuppositions, judgments, or assumptions to concentrate on analyzing an experience. Having this position is bracketing which allows the researcher to approach research like a stranger in a strange land (Beck 2019). According to Husserl's philosophy, being in this bracketing state means also suspending any additional framework which does not apply to research.

Horizon: is the current experience that cannot be bracketed or suspended. The horizon is the only understanding left to reach the essence of a phenomenon despite suspending preconceived judgment. Hence, nothing can be seen entirely in its totality (Peoples 2020).

Intentionality: is the consciousness of something, in other words, our awareness. The intentional suspension will thus enable a researcher to approach a phenomenon as “a stranger in a strange land” (Peoples 2020: p.30) and uncover the meanings of the essence of the studied phenomenon (Smith 2013).

This research was framed by Heidegger’s phenomenology which allows additional framework. As such, this research is based on hermeneutic phenomenology and the theory of planned behaviour frameworks.

4.4 Research Design

4.4.1 Choice of Data Collection Method

Building on the discussion in the preceding section of the research methodology, this section discusses the author’s primary method to collect data for this study; the selected method for this thesis is the semi-structured interview. Creswell and Poth (2016) opined that qualitative interview is widely adopted as the primary source of collecting data in phenomenological study (Creswell and Poth 2016). Moreover, aligned with this study’s epistemic position, constructivism, and phenomenological research methodology, the choice of an in-depth semi-structured interview to gather data is considered suitable to produce richer data (Beck 2019) to answer the research questions and objectives. King et al. (2018) postulated that a semi-structured interview is ideal for a phenomenological study because it aids the interview process to explore the interviewee's lived experiences (King et al. 2018). The essence of interviews in qualitative research is mainly to gain focused awareness of the participant’s lived experiences by understanding how participants make sense of and create a reality concerning a phenomenon (Ravitch and Carl 2019).

There are other available qualitative research methods such as focus groups, observations (participatory and non-participatory), audiovisual materials and case study research for conducting studies, but this research is focused on describing food waste reduction through food sharing phenomenon and “…, from the perspectives of those who have experienced it.” (Merriam and Grenier 2019: p.87). The choice of collecting this study’s data through a face-to-face semi-structured interview method is not limited to investigating the participant’s lived experiences, but also “…, to articulate

their experiences." (Hycner 1985: p.294). Flexibility to further probe participants about their lived experiences wherever necessary during the interview was considered in choosing the semi-structured interview method, without subjecting participants to a set of pre-defined responses to select from or a formal setup of structured interviews. The focus group method, which involves interviewing more than one participant at the same time, would have produced richer data as well due to the high level of interactions among participants and likely to yield a variety of views (Bell et al. 2018), but it is challenging to organize in a restaurant setup due to the nature of their businesses. Exploring this intriguing phenomenon of food waste reduction through food sharing initiatives and delving into the cultural aspect through the ethnography method, participant or non-participant would have been an optimal way of collecting real-time data, but restaurants in Riyadh would highly reject this method because they would not want anyone to stand-by and be observing their customers. In addition, in a culturally conservative place like Riyadh, customers will object to anyone watching them or especially their families. Audiovisual is also inappropriate due to regulatory issues regarding customers and their families having their meals. A case study would have been an ideal qualitative research approach due to the in-depth level of exploration it provides through multiple forms of data collection like interviews, observations, and audiovisual (Creswell and Poth 2016), but most of those forms of data collection methods will be objected due to the culturally conservative nature of the country.

Quantitative methods like questionnaires are a preformulated group of questions that participants answer in a strictly defined alternative. It is not appropriate for collecting this research data, even though a questionnaire is a widely used research method in social sciences (Vogt et al. 2012). Smith's experiment method is mainly used to generate statistical data to investigate the cause and effect of a phenomenon (Sekaran and Bougie 2016) but is not suited to capture the lived experiences of this study's phenomenon. Generating this thesis data through semi-structured interviews seeks to develop comprehensive descriptions and experiences of the given phenomenon and understand multiple participant experiences (Ravitch and Carl 2019). Given this thesis's exploratory topic, which is based on understanding the lived experiences of restaurants and food bank employees about food waste reductions through food

sharing initiatives, the semi-structured interview is considered appropriate due to its non-standardized nature and ability to probe further wherever necessary (Gray 2014).

With the intent to understand the participants' lived experiences, an interview approach such as semi-structured, which provides the opportunity to expand on respondents' answers, is the most desirable way to collect data that can answer this thesis research questions. The data collection through semi-structured interviews commenced after the university ethics research committee granted the ethics approval. It was not anticipated that the interview protocols would be requested ahead of the interview sessions with the participants. However, a couple of the participant's human resource departments (HR) asked that the interview protocol be submitted along with the access approval request ethics-approved interview protocol/guide covering the lived experiences about food waste reduction and food sharing in restaurants and food banks were presented to participants HR departments and the access approval request. There were no major challenge in granting access to interview participants on this research topic, mainly because the experiences sorted to be explored are non-emotive, non-painful, and can be discussed freely with strangers (King et al. 2018). However, there were a few cases where participants were cautious of the possibility of revealing their trade secrets. The developed interview protocol/guide which aligns with this study's conceptual framework, the theory of planned behaviour is available in (Appendix I: Interview protocol). A structured interview which is another qualitative interview type is not considered suitable for collecting data for this study due to its standardized nature of the questions, almost similar to questionnaires used for quantitative research; interactions are kept minimal in structured interviews with a focus on following set of interview questions which does not give room to probe participants responses (Gray 2014) further.

The researcher conducted all the interviews at each participant's site (place of employment). Upon securing access approval to interview nominated participants, the researcher made a follow-up call to agree on a date and time with the respective participants. All except one of the interviews were conducted on time per the agreed day and time. The one interview was rescheduled due to some unforeseen heavy workload on the participant's side; on the appointment day, the participant excused himself, and the interview was scheduled for the next day. The research background

was explained in detail to each participant before each interview session. Two printed copies of the research consent forms were presented for signatures, and audio recording equipment was set up; this procedure was done before each interview. The audio recording provided a detail of the discussion, which field notes alone could not have provided.

It is worth mentioning the challenge of explaining that the researcher has no interest in the restaurants and food bank trade secrets or business information as a researcher. This was encountered in almost all the restaurants and food bank visited in seeking access to interview some of their experienced employees. The developed and approved participant information sheet presented on the University letter-headed paper was quite helpful in convincing and assuring the restaurants and food bank about the research motives. Steakhouse restaurant, which nominated three participants to be interviewed for this study, has the lengthiest access approval process. From the restaurant, the researcher was asked to submit the research access request at the headquarter (HQ), where it went through internal approvals from procurement, marketing, and the operations team. The chosen interview method of collecting data for this thesis is guided by this study's methodology and epistemic position is well suited and aligns with the research questions and is considered appropriate to generate appropriate data to answer the research questions. The following section describes the adopted sampling strategy for this thesis, which covers both sites and participants' selections.

4.5 Data Collection

4.5.1 Selection of Participants

Bell et al. (2018) postulated that sampling is a crucial element of social research, which needs to be planned based on the nature of an inquiry (Bell et al. 2018). A well-designed and thorough sampling strategy will consider the research questions and from whom will data with integrity be collected. A wide variety of perspectives will be collected to respond to the research questions. These considerations have an impactful role in selecting sites and participants and are the basis of the sampling strategy (Ravitch and Carl 2019). For this phenomenological study, purposive sampling, a non-probability type of sampling, was adopted to recruit participants for

data collection. The rationale behind this sampling choice is to recruit participants with relevant experiences about the phenomenon being investigated, which is an important consideration to obtain appropriate responses that could address the research questions. Secondly, to serve an exploratory research purpose instead of a statistical representation of a population (Ritchie et al. 2003). The choice of restaurants as a sample for this research was guided by the research to explore the effect of culture on hospitality food waste generation. The research questions also seek to reveal behaviour and cultural factors contributing to food waste generation and preventing food waste reduction in restaurants in Saudi Arabia and through the lived experiences of restaurant employees who are living with the phenomenon. As DBA research data cannot be collected from the entire population due to time constraints and to set a boundary around the selection of participants, criterion sampling (Creswell and Poth 2016) was applied in combination with purposeful sampling to recruit experienced participants who provided an insightful perspective about food waste and food sharing, through their lived experiences. The benefit of criterion sampling is that it enables the researcher to define specific criteria for selecting potential participants. For this thesis, purposeful and criterion sampling strategies aided the nomination of capable participants with good experiences and the ability to address this study's research questions. Both inclusion and exclusion criteria are detailed in the participant's information sheet (Appendix II: Participant information sheet), highlighted below.

The participant's selection strategy includes sites and participants (Bell et al. 2018). Thus, the selection of the places (restaurants and food bank) was guided by the research objectives and research questions. The following are the selected restaurants and food bank, Steakhouse, Fuddruckers, Apple Bees, Chili's, Piatto, Nino restaurants, and Saudi Food Bank, located in Riyadh, Saudi Arabia. The choice of the sites was based on the massive traffic in the restaurants, and food bank activities, which provides a suitable environment for their employees who would have lots of experience with this study's phenomenon. The inclusion and exclusion criteria are defined to ensure that personnel with relevant experience are selected to participate in this study's research interviews, and personnel with limited experience or who cannot communicate in English are exempted from the selection.

The inclusion criteria are the following.

- An employee of the above food bank or restaurant.
- A mid-level manager, senior waiter, restaurant manager, executive personnel, and operation manager from the organisation mentioned above.
- An employee of the mentioned organisation with about 5yrs of working experience in the industry.
- Adults from non-vulnerable populations meeting the above-listed criteria.
- Participants must be able to communicate in English.

The exclusion criteria are the following.

- Any participant not working in a Saudi food bank, or restaurant.
- A new employee of the organisation mentioned above, does not have sufficient experience.
- An employee of the mentioned organisation but not working in the core area of the business, i.e., food bank, restaurants, and food waste management.
- Any participant not fulfilling all inclusion criteria.

There are other forms of sampling in business research, such as random sampling, systematic and stratified sampling, probability-based, and ideal for a larger population to generalize their research findings (Bell et al. 2018). Contrary to qualitative studies, purposeful sampling strives to provide context-rich and detailed descriptions of specific populations and sites about a studied phenomenon (Ravitch and Carl 2019). Purposively selected participants who have lived through certain phenomena and can describe their experiences in a given phenomenon is a typical form of sampling in phenomenological studies (Gray 2014). Therefore, the choice of purposeful and criterion sampling for this thesis is aligned with the principle of phenomenological research.

As stated by Hycner, "…, phenomenon dictates the method (not vice-versa) including even the selection of participants." (Hycner 1985: p.294). This study's thoroughness will emerge from the types of participants selected and their ability to describe the researched phenomenon. This study's participant recruitment was initiated by visiting the selected sites (food chain restaurants and Food Bank), and human resource (HR) management, followed by phone calls. The ethics board approved participants'

information sheets, and consent forms describing the research background were submitted at each site. It is worth mentioning that the final nominated participants were provided after going through several rounds of approvals within their respective managements. A wide range of professionals was sourced for the research interview; they comprise Restaurant Managers, Senior waiters, Restaurant Chefs, Restaurant Operation managers, and Food Bank Operations, Managers. The research validity was strengthened by the cross-functional food experts interviewed. The interviews started on the 28th of October 2020, and it is of essence to mention that no compensation of any kind was given to any of the participants for taking part in the interview. All the interviews conducted were done in Riyadh, the capital city of Saudi Arabia.

A total of 18 participants were nominated to be interviewed for this research, but only a total of 15 participants accepted the invitation and were interviewed. A sample size of 15 may appear small, but as stated by Creswell, "…, qualitative research intends not to generalize the information" (Creswell and Poth 2016: p.157). However, "…, even with the limited number of participants, the result can be phenomenologically informative about the phenomenon being researched" (Hycner 1985: p.295). Moreover, the phenomenological research sample size ranges from "3 to 10" participants (Creswell and Creswell 2017). Each interview was recorded and lasted between 35 to 45 minutes, where the participants shared their experiences of the phenomenon. The researcher transcribed the recorded interview data using Amber script transcription software. Upon reaching data saturation, further interviews were not required, and no new information about the phenomenon is produced from the interview data (Sekaran and Bougie 2016).

The 15 participants interviewed represent a cross-section of food experts from various restaurant food chains in Riyadh, and their profile is presented in the below table. The various food experts, chefs, restaurants manager, senior waiters, etc. were selected to ensure wide experience within food management was covered to provide a much richer insight into food waste and food sharing experiences.

S/N	TITLE	AGE (est.)	RESTAURANT/INDUSTRY

PRT-1	Chef	30-35 yrs.	Piatto
PRT-2	Chef	35-40 yrs.	Piatto
PRT-3	Chef	30-35 yrs.	Piatto
PRT-4	Restaurant Manager	35-40 yrs.	Apple Bees
PRT-5	Senior Waiter	30-35 yrs.	Apple Bees
PRT-6	Operations Manager	40-45 yrs.	Steakhouse
PRT-7	Senior Waiter	30-35 yrs.	Steakhouse
PRT-8	Chef	35-40 yrs.	Steakhouse
PRT-9	Senior Waiter	35-40 yrs.	Nino
PRT-10	Operations Manager	40-45 yrs.	Chili's
PRT-11	Senior Waiter	25-30 yrs.	Fuddruckers
PRT-12	Restaurant Manager	35-40 yrs.	Fuddruckers
PRT-13	Operations Manager	50-55 yrs.	Food Bank
PRT-14	Restaurant Manager	35-40 yrs.	Apple Bees
PRT-15	Operations Manager	40-45 yrs.	Piatto

Table 4.1: Interview Participant's Profile

4.5.2 Access

Access to data collection sites is a significant milestone of any research; qualitative research requires gaining access from the university/institution and the participant's site/place of work (Creswell and Poth 2016). The topic of this research is considered very relevant by the participants due to the continuous occurrence of the phenomenon. Still, at the same time, they express caution not to reveal their business trade secret upon receiving the university's ethics committee approval after fulfilling the requirements of this research fieldwork.

As detailed in the sampling section above, this research participants were recruited from six famous restaurants and one food bank. Gaining access to the sites involved a lengthy and formal approval process in satisfying managerial concerns about the research (Bell et al. 2018). The author visited each of the sites and physically presented the research information sheet explaining the background and purpose of the study. The set of interview questions detailed in the interview protocol was requested at Steakhouse, and Piatto restaurants to have some ideas about the intended information sorted by the researcher. Due to the work schedule of the

restaurants and food bank employees, the interview was agreed to be held at their respective premises to avoid going from one location to the other.

Participants were nominated by the respective restaurants and food bank management based on the inclusion and exclusion criteria stated in the information sheet. In some cases, the interview date and time were communicated to the researcher via email and phone calls. The researcher met the nominated participants in their offices/restaurants. Having established some rapport with their management through previous visits while seeking interview approvals, the participants had arranged a meeting room to be used for the interview session. To ensure ethical research and ethics considerations (King et al. 2018) in conducting this research, an informed University of Bradford consent form covering the following outlines was provided and signed by each participant to participate as an interviewee voluntarily.

The consent form covers the following.

- Informed consent
- Consent to an audio recording
- Right to withdraw
- Data anonymity
- Storing of interview data

Consent for anonymized extracts/quotes from the interview to be used in the research thesis.

4.5.3 Interview Protocol

The interview protocol was designed to address the literature gaps as identified in section 2.8. According to Baig et al. 2018a, further research needs to explore the factors contributing to food waste and the underlying social and individual context (Baig et al. 2018a). Filimonau and De Coteau (2019) also indicated that the effect of national culture on hospitality food waste generation needs to be further explored (Filimonau and De Coteau 2019). For these reasons, this research interview protocol was designed and developed to capture enough data that addresses those key questions. The interview was conducted in Riyadh, so no travel was involved

throughout the entire data collection fieldwork. Participants were all interviewed in their offices (restaurants and food bank) in a conference room reserved for the exercise. In cases where more than one participant was nominated in a restaurant, they were interviewed one after another.

Similarly, and as detailed in the information sheet, background information about the research and the interview protocol, including what the data will be used for and how the data will be stored, was explained to each participant before commencing the interview. Two copies of the research consent form (Appendix III: Consent form) were provided to each participant for signature before starting the interview, a copy each for the participant and researcher. An audio recording device (Sony recorder) was tested before starting each interview to ensure smooth and uninterrupted recording was achieved. All interviews were conducted in English, following the stipulated inclusion selection criteria of the research participants.

4.5.4 Researcher Beliefs and Biases

In a phenomenological study, setting aside the researcher's personal beliefs, assumptions, and presuppositions about the researched phenomenon is essential before data collection and analysis. In Husserl's framework, this practice is also referred to as "bracketing" or "epoche" and does not apply to this research because this study is framed through Heidegger's phenomenological framework as explained in Section 4.3.1. This study was carried out by documenting the researcher's pre-knowledge about the phenomenon, which is expected to be updated with the new understanding acquired through the interpretation of the research interview transcript data.

Food wastage is a global phenomenon in which the world is still searching for ways to minimize or eradicate the problem, as detailed in Chapter two of this thesis from previous studies. Whenever food is wasted, water, energy, and other related resources are wasted, which leads to resource depletion on the one hand and contributes to climate change on the other through the emission of carbon dioxide. Continuous food wastage negatively impacts the whole world socially, economically, and environmentally, despite the global level of advancement politically, economically,

socially, and technologically. Independent individuals and well-established organisations are making continuous efforts to minimize the impact by picking up leftover foods which are still edible and attempting to distribute them to those in need.

Through this study, the researcher seeks to understand how food sharing initiatives contribute to food waste reduction if any and being hermeneutic phenomenological research; the study is approached by putting all that is known about the topic before data collection and analysis to gain an understanding and meaning of the phenomenon from the people who have lived the experiences.

4.6 Ethical Considerations

This section covers an essential aspect of conducting qualitative research. These ethical considerations govern a study's critical elements, such as designing interview protocols, recruiting potential participants, collecting data, and reporting research findings. There are three major ethical elements to be considered in research, which entails collecting data from participants. Firstly, issues related to getting informed consent from a potential participant. Secondly, issues related to possible harm could affect participants in the process of an interview. Thirdly, potential privacy issues that may affect participants (Peoples 2020). Ethical concerns related to informed consent while designing the protocols should ensure participation in the research is not compulsory. Despite signing a consent form, participants may withdraw at any given time. Participants also need to know how the collected data will be used in terms of detailed quotations. Depending on the research topic/area, participants may be distressed during the interviews when asked about specific topics. Similarly, the researcher needs to ensure appropriate ethics approval is secured before collecting data from vulnerable populations. The researcher's lack of ethical integrity could cause a privacy breach, either by concealing the audio recording device or sharing raw research data with other researchers (Vogt et al. 2012). The importance of adherence to ethical research can never be overemphasized. Data gathering in most qualitative research involves interaction with humans; a well-guided ethics procedure safeguards the research participants, the researcher, and the institution (Silverman 2013; Gray 2014). The researcher duly followed the University of Bradford ethics procedure for this thesis. All required supporting documents such as a consent form, participant's

information sheet, and interview guidelines were submitted to the university's ethics committee for review and approval. After a comprehensive study by the ethics committee, written permission was granted to proceed with this research fieldwork, thus data collection.

Being a researcher comes with ethical responsibilities to those from whom the research data was collected and the audience who will benefit from the generated knowledge. Researchers are expected to act responsibly and be conscious of how the developed knowledge will be read and interpreted. Therefore, transparency and honesty in various assumptions (epistemological, theoretical, or personal) made in carrying out the research have a significant ethical aspect (King et al. 2018).

Participants' concern about confidentiality was addressed by ensuring that their identity was anonymized, and pseudo names were used in places where their names were mentioned. Two printed copies of this research consent form and participant information sheet were provided to participants for signature before the interviews. A copy of the signed consent forms was given to the participant, and the second copy was kept for the researcher's record. Voluntary participation and the ability to withdraw from participating in the research were among the information provided in the consent form. Research background, inclusion and exclusion criteria, and the nature of storing the recorded interview data were among the details provided in the participant information sheet.

It is worth mentioning that compensation was not given to any participants for taking part in this research. The recorded interview data was stored correctly in a safe place and only accessible by the researcher. No part of the content was shared or discussed with any external party to this research. The following section describes how the collected research data was analyzed following Paul Colaizzi's approach.

4.7 Data Analysis

Having collected interview data from 15 participants from various restaurants and food bank in Riyadh, this section describes the process adopted to analyze this thesis research data. Qualitative research data analysis is not simply a narrative presentation

of text; it is more. It involves organizing the collected data, reading through transcribed data, coding it, identifying, and managing themes. Phenomenological research has a specific procedure to analyze data (Creswell and Poth 2016). The interview data were analyzed using Paul Colaizzi's (1978) data analysis steps, which provide a systematic and structural approach to the procedural steps involved in analyzing phenomenological data (Beck 2019). The goal of phenomenological research is to highlight the lived experience of a phenomenon, in this case, food waste reduction through food sharing initiatives. Therefore, the researcher immerses himself in the descriptive world of the participant's lived experiences.

Colaizzi's (1978) data analysis steps further increase the dependability and confirmability of the research result. The following steps were followed in adapting to Colaizzi's data analysis steps.

Steps	Description
1	Read and reread the transcribed interview data
2	Extract significant statement
3	Formulate meanings for each significant statement
4	Organize formulated meanings into clusters of themes
5	Integrate results into an exhaustive description of the phenomenon
6	Formulate an exhaustive description into a statement of identification of its fundamental structure
7	Return to participants for validation of findings
8	Relevant new data are worked into the final products of research (if necessary)

Table 4.2: Colaizzi's Procedure Steps for Analyzing Phenomenological Data (Beck 2019).

Due to iteration and overlap in some of the steps, such as steps 1 and 3, the researcher repeatedly returned to the transcribed interview data to develop formulated meanings for each significant statement. Step 4, which organizes formulated meanings into clusters of themes, also involves iterative movement to step 1, the transcribed interview data. The below figure shows Colaizzi's steps with the iterative flows.

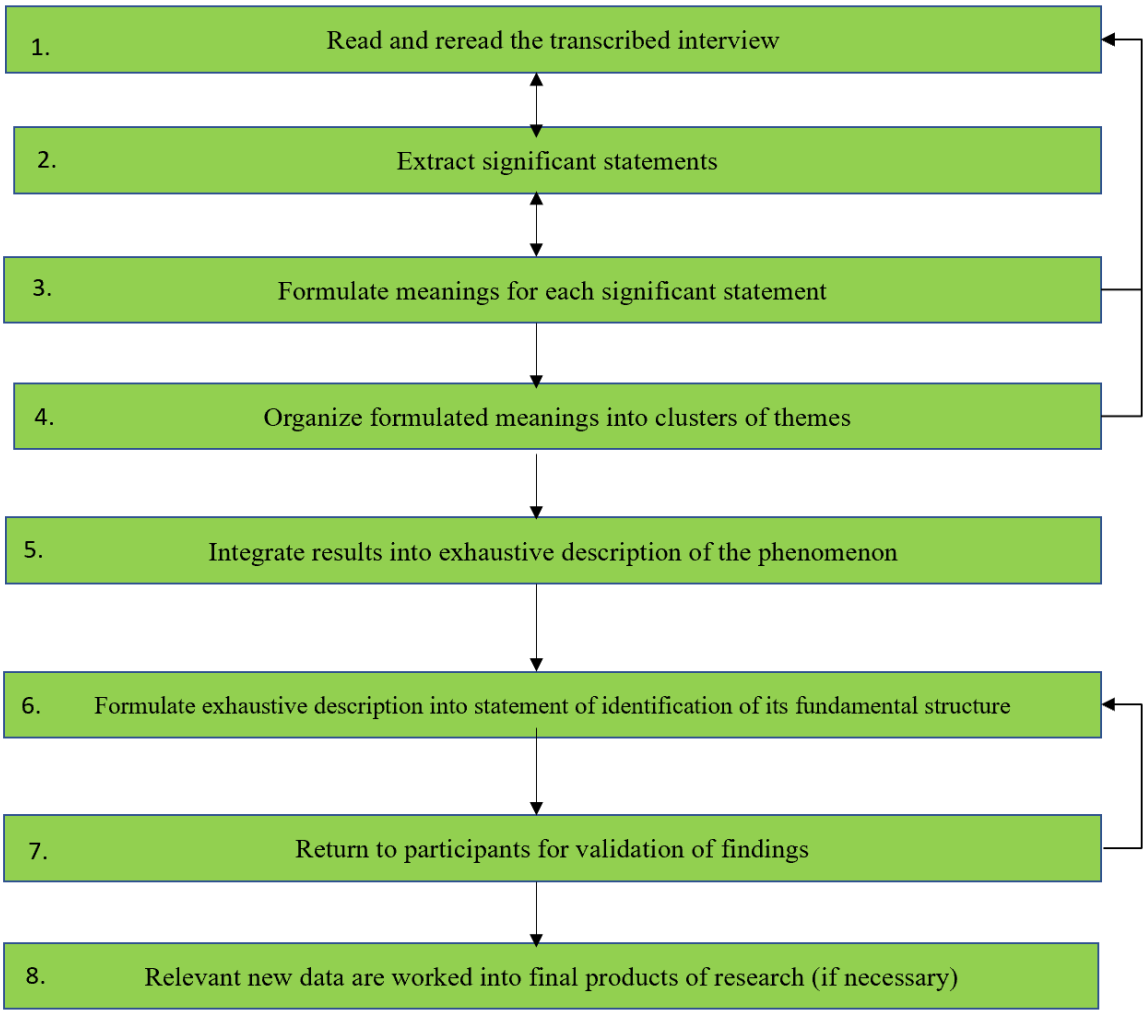

Figure 4.2: Colaizzi's Procedure Steps for Analyzing Phenomenological Data

4.7.1 Step 1: Read and reread the transcribed data

The recorded audio was replayed at the end of each interview and later in the same day to ensure clarity and mark the beginning of immersion into the data. Critical

thoughts and observations were captured in the field note. Each audio file represented a single interview and was stored in an encrypted folder in the researcher's folder. The interview audio files were then transcribed using Amber script transcription software, which converts the recorded audio files into a text file; the researcher reviewed the produced text to ensure completeness and both audio files and text matches (King et al. 2018).

Familiarization and immersion into the interview data were deepened by reading and rereading the interview transcript data several times to obtain an overall feeling for them while correcting minor errors and highlighting potential significant statements for the next step. One of the complete interview transcripts is provided in Appendix D (Interview transcript).

4.7.2 Step 2: Extract significant statement.

This step involves identifying and extracting significant statements from the interview transcripts of participants' descriptions of their lived experiences of food waste reduction through food sharing.

NVIVO, a qualitative data analysis software, was used to identify and extract significant statements from each transcript about the lived experiences of restaurants and food bank employees in Riyadh. The interview transcript data was manually uploaded into NVIVO 12.0 software for data analysis. Upon uploading and carefully analyzing the interview transcript data, significant statements were identified and coded about attitudes (ATT codes) towards food waste reduction through food sharing, relevant reference groups (SN codes), and perceived behavioural control (PBC). Significant statements related to a culture that emerged from the interview data as a new construct were coded under (CLT codes). Beck (2019) suggested that identical extracted significant statements should be eliminated; therefore, the below figure shows the identification of the critical statements, and the table shows some of the extracted statements (Beck 2019). A sample list of significant statements is provided in Appendix E (Sample Significant statement).

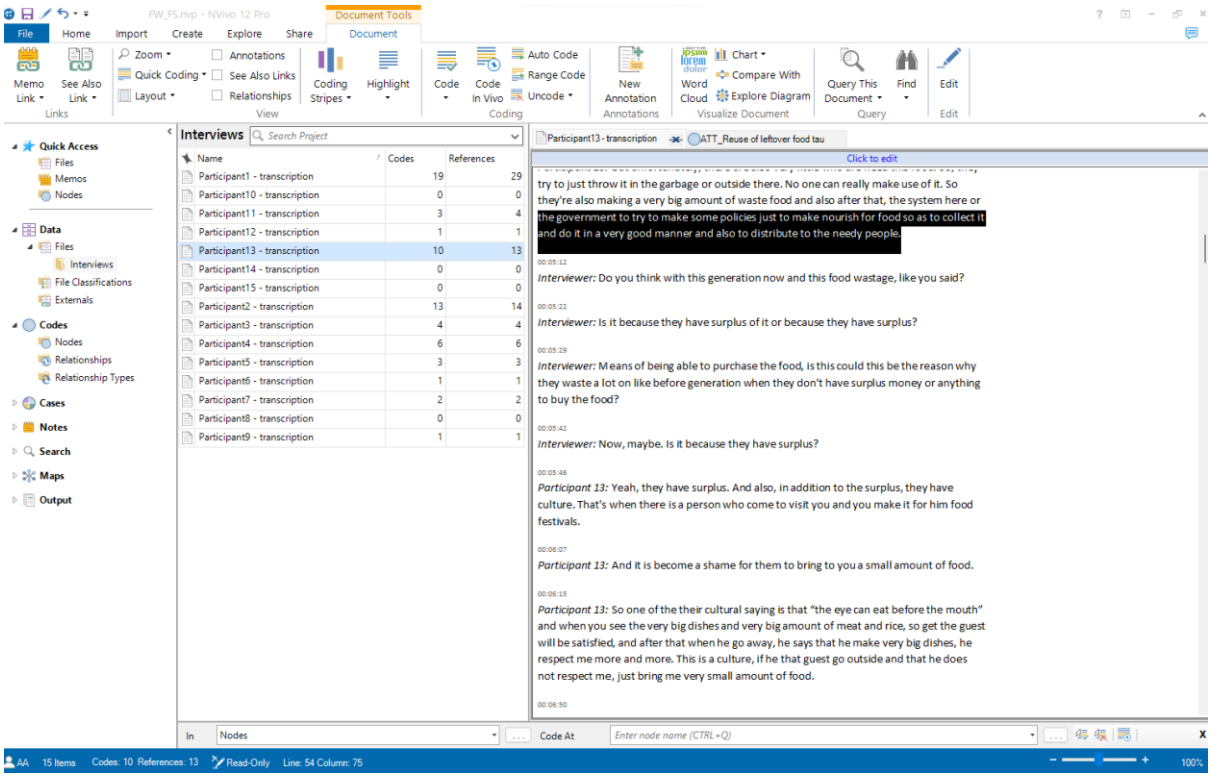

Figure 4.3: Identifying Significant Statement

S/N	Significant Statements
1	The government, the regulation, and they make this system for all restaurants, all hotels. No, you should make recycle system for your waste, not just throw it away. It should be like that.
2	Food is "Naama" which means like it's given from God. So, you should not waste is the first thing, because there are some people that need this one to survive. And it's something very bad.
3	From the restaurants, it is not allowed to give leftover food to someone else. So, the food that is touched or not touched by the guest is thrown in the garbage.
4	

	When I see my parents and this is a habit when I see my parents, they eat, they make the food one kind of food in one day and finish it. This is how our parents teach us, not to waste food, even the bread.
5	Yeah, they have a surplus. And, in addition to the surplus, they have culture. That's when there is a person who comes to visit you and you make it for him food festivals. And it is become a shame for them to bring to you a small amount of food.
6	The system here or the government to try to make some policies just to make nourish for food to collect it and do it in a very good manner and also to distribute to the needy people.

Table 4.3: Extracted Significant Statement

4.7.3 Step 3: Formulate meanings for each significant statement

As a continuation of the previous step, and to bring out hidden meanings from what participants said. NVIVO 12.0 software was used for the coding, as meanings were formulated from each significant statement identified from the interview transcript. The researcher ensured in this step that the formulated meanings remain connected to the significant statements.

The Figure 4.4 below presents a snapshot of the formulated meanings, while the Table 4.4 shows some significant statements with the corresponding formulated meaning.

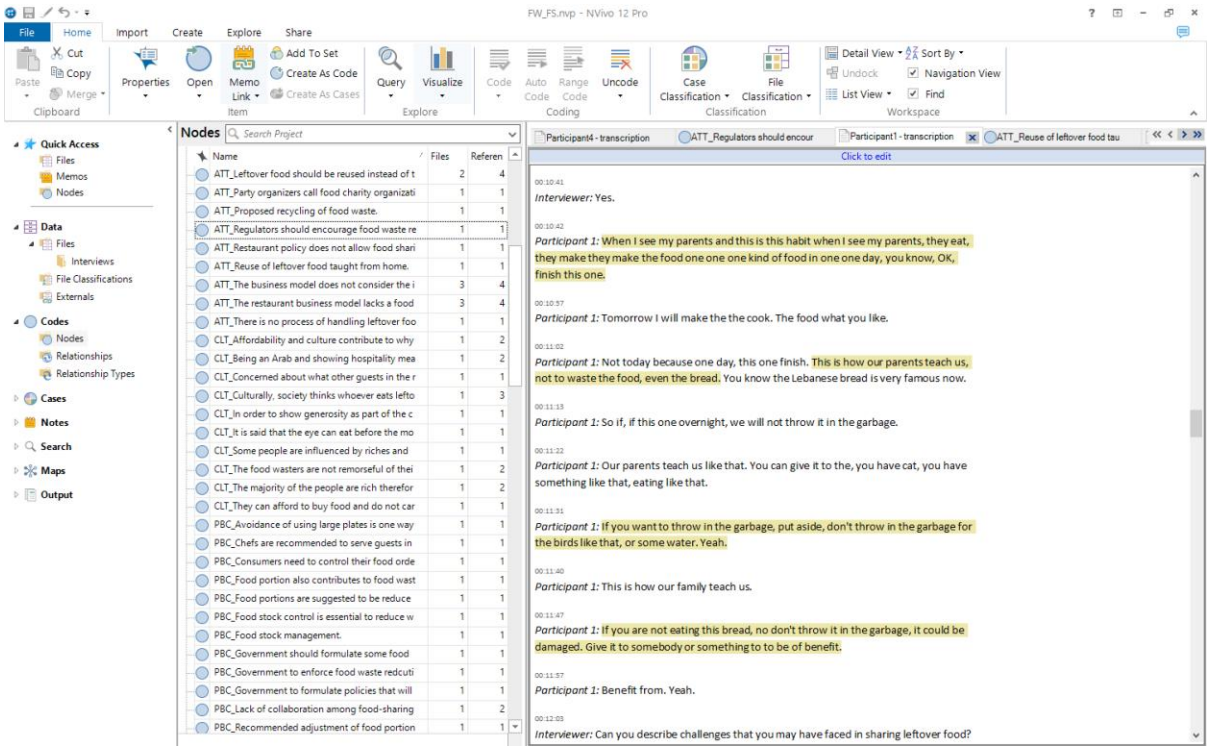

Figure 4.4: Formulated Meanings of Significant Statements

S/N	Significant Statements	Formulated Meanings
1	The government, the regulation, and they make this system for all restaurants, all hotels. No, you should make recycle system for your waste, not just throw it away. It should be like that.	Regulators should encourage food waste recycling, instead of throwing leftovers away.
2	Food is “Naama” which means like it's given from God. So, you should not waste is the first thing, because there are some people that need this one to survive. And it's something very bad.	Having food should be appreciated and not wasted.
3	From the restaurants, it is not allowed to give leftover food to someone else. So, the food that is touched or not touched by the guest is thrown in the garbage.	The business model does not consider the impact of food waste.

4	When I see my parents and this is a habit when I see my parents, they eat, they make the food one kind of food in one day and finish it. This is how our parents teach us, not to waste food, even bread.	Our parents prepare one type of food that can be eaten during a meal to avoid food wastage.
5	Yeah, they have a surplus. And, in addition to the surplus, they have culture. That's when there is a person who comes to visit you and you make it for him food festivals. And it is become a shame for them to bring to you a small amount of food.	Affordability and culture contribute to why guests are welcome with a large amount of food.
6	The system here or the government to try to make some policies just to make nourish for food to collect it and do it in a very good manner and to distribute to the needy people.	Government to formulate policies that will support leftover food collection and distribution, to reduce food waste.

Table 4.4: Formulated Meanings of Significant Statements

4.7.4 Step 4: Organize formulated meanings into clusters of themes

At this stage, having identified and extracted significant statements from the interview transcript, and formulated meanings from each statement. In this step, systematic coding of the data continues, and the formulated meanings are organized into clusters, and themes are created from the clusters.

The below Figure 4.5 shows the clusters of formulated meanings and themes created.

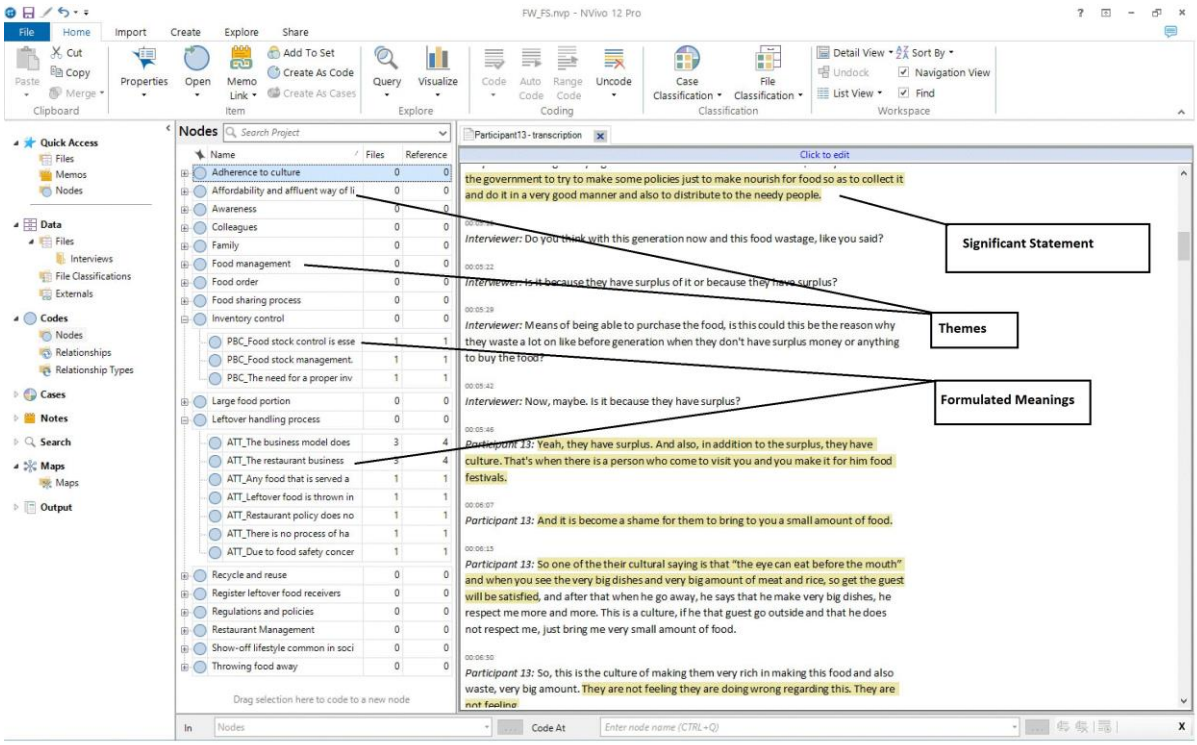

Figure 4.5: Cluster of Themes - Formulated meanings

The below table shows some formulated meanings organized into clusters and the themes created.

S/N	Themes	Clusters of Formulated Meanings
1	Family	Our parents prepare one type of food that can be eaten during a meal to avoid food wastage.
2	Food sharing process	There is a lack of new innovative ways of sharing leftover food.
		Lack of collaboration among food-sharing organisations for sharing vital information about the collection of leftover food from event places.
3	Food management	The appropriate temperature needs to be maintained to avoid food from getting spoiled which will lead to food wastage.
4	Regulations and policies	Government to formulate policies that will support leftover food collection and distribution, to reduce food waste.

		The government can introduce policies that will address consumers' bad food behaviour.
		Government should formulate some food waste reduction policies.
		Government to enforce food waste reduction.
5	Colleagues	Resist sharing leftover food for fear of being challenged by colleagues.
6	Adherence to culture	To show generosity as part of the culture, surplus food is expected to be served.

Table 4.5: Cluster of Themes - Formulated meanings

4.7.5 Steps 5 to 8

Having organized the formulated meanings into clusters and created themes from the clusters. The themes were validated with the original interview transcripts. The remaining steps involve using the clusters and themes to exhaustively describe the restaurants and food bank employees' experience of food waste reduction through food sharing.

A detailed description is provided in the next chapter and validated with the participants. Any relevant new data considered missing and provided by the participant will be added and worked into the final research (Beck 2019).

4.8 Chapter Summary

This chapter explained the methodological approach used in this research; it started by providing the philosophical stance underpinning this study. Having been phenomenological research seeking to understand the meaning of lived experiences of the employees working in restaurants and food bank in Riyadh, data was collected through an in-depth face-to-face interview at each participant's premises. The rationale behind the choice of the data collection method was clearly explained and justified as suited for phenomenological research and consistent with the study's epistemology. Before embarking-fieldwork work, ethics approval was requested and granted upon providing relevant documentation, including the research consent form, interview guidelines, and participant's information sheet.

The collected interview data were analyzed following Paul Colaizzi's structured analysis method of phenomenological data. In total, 17 themes were elicited from the transcript data analysis and will be described in the next chapter.

5 Findings And Analysis

5.1 Introduction

Before conducting this research, how restaurants in Riyadh, Saudi Arabia managed food waste reduction through food sharing was unknown. Food waste is a rising global phenomenon that impacts the environment, society, and economy, costing countries like Saudi Arabia billions of dollars to manage (Baig et al. 2018b). There are an increasing number of empirical research confirming the impact of food waste, and researchers have suggested various ways of managing food waste, through prevention from the source, reuse and recycling (Papargyropoulou et al. 2014). But despite these suggestions, literature has shown that food waste generation is a continuous problem in society (Falcone and Imbert 2017; Michelini et al. 2018; Morone et al. 2018; Sakaguchi et al. 2018; Filimonau and De Coteau 2019). Therefore, there was a need to explore the lived experiences of restaurants and food bank employees about food waste reduction through food sharing initiatives and to fill an important literature gap.

The purpose of this qualitative hermeneutic phenomenological study was to explore the lived experiences of restaurants and food bank employees about food waste reduction through food sharing. Given that food sharing does not automatically lead to food waste reduction (Morone et al. 2018), this DBA research provided important insight into the behavioural and cultural factors contributing to increasing food waste generation, and factors impeding effective food sharing initiatives. This research used phenomenological methodology which was necessary to obtain an in-depth understanding of the participant's lived experiences of the phenomenon under study (Beck 2019). The research questions do not seek to identify causal relationships or test some hypothesis; instead, they seek to explore lived experiences of front-line workers in selected restaurants and food bank in Riyadh about food waste reduction through food sharing.

This study was guided by research questions which were intended to address the problem that presently, we do not know enough about what aspect contributes to food waste. However, there seems to be an emergent pattern of behaviour around sharing

food. Current research suggests that sharing food might alleviate food waste (Morone et al. 2018). This research included the following research questions.

RQ1: What are the factors hindering food waste reduction in restaurants in Saudi Arabia as experienced by restaurant employees?
RQ2: To what extent do behaviour and culture affect food waste reduction in restaurants in Saudi Arabia as experienced by restaurant employees?
RQ3: What are the factors preventing food bank organisations from operating effective food sharing as experienced by food bank employees?

The researcher conducted a face-to-face semi-structured in-depth interview with 15 participants to answer the above research questions. Appropriate University ethics committee approval was secured before carrying-out fieldwork to collect the research data.

In this chapter, the researcher presents the findings of this study under two broad domains. Firstly, culture towards food waste reduction. Secondly, the behaviour towards food waste reduction. This chapter explains the data analysis method that was used for the analysis of the gathered interview data. This research explores food waste reduction through food sharing initiatives from the lived experiences of restaurants and food bank employees in Riyadh. This interpretive phenomenological research analysis and findings description was done with methodological consideration to gain a deeper understanding of the phenomenon lived by the participants. This was only possible through a blend of the researcher's pre-understanding of the phenomenon and participants' description of food waste reduction through food sharing initiatives as lived by them.

In gathering data for this study, 15 participants were purposefully selected based on their experiences of the studied phenomenon, plus their ability to provide relevant inputs to answer the research questions. Considering the ongoing COVID-19 pandemic, necessary precaution was taken to conduct face-to-face semi-structured interviews with the participants. As described in the data collection section above, the interviews were conducted at the participant's premises and audio recorded with the consent approval of each participant. When conducting the interviews, the government

stipulated COVID-19 guidelines were adequately adhered to, like wearing a face mask and adhering to seating arrangement guidelines. The use of hand sanitisers and ensured that the desk and tables were clean enough before the interview.

A total of 17 themes were elicited through analysis and coding of the transcript data using NVIVO 12.0 software. The themes were developed through clustering of formulated meanings of extracted significant statements from the participant's descriptions of their lived experiences of food waste reduction through food sharing initiatives. Following the transcript data analysis described above, the table below provides a list of the themes that emerged from the analysis of the interview data.

Themes	Description
Theme 1	Adherence to culture
Theme 2	Affordability and affluent way of life
Theme 3	Recycle and reuse
Theme 4	Leftover handling process
Theme 5	Register leftover food receivers
Theme 6	Throwing food away
Theme 7	Awareness
Theme 8	Show-off lifestyle common in society
Theme 9	Restaurant Management
Theme 10	Family
Theme 11	Colleagues
Theme 12	Food order
Theme 13	Regulations and Policies
Theme 14	Food sharing process
Theme 15	Large food portion
Theme 16	Inventory control
Theme 17	Food management

Table 5.1: Table of Themes

Following Heidegger's phenomenological framework, the researcher maintained his preconceived knowledge about food waste reduction through food sharing initiatives

gained through the reviews of literature. An iteration of the researcher's pre-understanding of the phenomenon and the analysis of the interview transcript data, a process known as the hermeneutic circle (Peoples 2020), produced the emerged themes. Against Heidegger's phenomenological philosophy tenets, the researcher's presupposition and existing knowledge about the phenomenon were not bracketed but used to develop a deeper understanding of participants' lived experiences. The transcript data were scrutinized during data analysis without passing over details of participants' descriptions of their lived experiences.

5.2 Culture Towards Food Waste Reduction

The themes discussed in this section are adherence to culture and affordability and affluent way of life as perceived by the research participants. The textual description incorporated relevant quotes from the interview transcript data. To ensure credibility, interviewees' names are not used, instead, they are referred to as participant 1,2,3 etc. The findings description addressed the central research question to explore the lived experiences of restaurants and food bank employees about food waste reduction through food sharing initiatives.

5.2.1 Theme 1 - Adherence to Culture

Culture is highly valued among Arabs, and it cut across almost every aspect of their daily activities, such as eating, dressing, and entertaining guests. Participants described culture as the heartbeat of their way of life, regardless of their status in society. A person of modest means will go overboard to host guests with an ample amount of food just to comply with cultural norms and appear to welcome their guests honourably. Therefore, the lavish ways of hosting guests are considered an essential part of the culture, one of the participants stated that there is a saying that:

"The eye needs to eat before the mouth."

Rich or poor, the food culture concerning hosting guests with enormous food is deeply rooted among the Arabs and dated way back to the Bedouin days. Participants' descriptions of their lived experiences described culture as playing a significant role in the way people behave towards food, which contributes to increasing food wastage.

A reminder about the teaching of Islam not to waste food was suggested to be raised in the form of awareness and educating the public about the impact of culture on food wastage. These were recommended by some of the interviewees while addressing questions about how food waste can be reduced.

Most of the interview participants expressed a solid linkage for cultural adherence in the way guests are welcome. The Arabs have always been known to have a great sense of hospitality and generosity. A visit to an Arab family will be met with a lavished welcome, and an enormous quantity of food will be served. Usually, more than the guest can take. This is, although considered, part of hospitality. Participant 2 described the situation as follows,

"Like in Arab country, people are very, uh, uh, like where we are. We are famous. We are very generous, like, uh, OK, I cannot let's say, you know, two persons come I cannot bring food for only two persons like this. The people will think uh what is this. This is the culture here."

Culture has its way of sticking to people's way of life, regardless of their level of education, exposure, where they live, cities, or villages. In this case, too much is considered normal in hosting a guest because it demonstrates a high regard for the guest. In Arab culture, a host does not want to be looked upon as cheap or a miser. Therefore, hosting guests with surplus food presents the host as a hospitable and generous person. It is more about maintaining a specific image of how the host is perceived by the guest rather than being concerned about the consequences of food wastage. Some of the participants added that the self-image is not limited to when hosting a guest, but even if they are alone, having their meals, the mind is set on having a large quantity of food as a sign of doing well. The level of consciousness about how others see them dominates their thoughts rather than the consequences of their actions. According to participant 4, they believe that:

"The table should be full of food. If anyone sees me or saw me, he will tell me I am a poor person if my table only 1 or 2 plates. This is one culture, especially in Arab countries like Saudi Arabia, Kuwait, the Emirates, like that. They think like that, especially if they go outside of their countries, for example, go to

Egypt, go to any other country during the summer holidays, or that they would like to make the table full of food just in case some relatives or some friends. He passed by and they saw his table. He should see a lot of food."

Inclination towards culture is deeply ingrained in the way people live their lives, according to most of the interviewees. This is commonly displayed by welcoming guests, by giving the impression that serving surplus food to guests is part of the culture and generosity. When preparing to host guests, the focus is mainly on the host's image, being able to provide an ample amount of food, and not being considered a cheap person. However, these are done under the pretence of being generous and upholding the culture. Seeing a large quantity of food is fulfilling to the host. In one of the participant's words,

"One of their cultural sayings is that "the eye can eat before the mouth" and when you see the very big dishes and very big amount of meat and rice, so get the guest will be satisfied, and after that when he goes away, he says that he makes very big dishes, he respects me more and more."

Cultural dominance is deepening more and more because of affordability, people can purchase food, and in large quantities, as said by the participant 1:

"Here in the Gulf countries, you know, the people or the majority of people here rich."

The combination of affordability and cultural behaviour towards food, especially while hosting guests, is therefore not a surprise to see food products are the majority of the solid waste in the country. The wasteful behaviour does not mean anything to most people; providing surplus food to their guests is instead seen as upholding the culture. Participant 13 stated,

"They are not feeling they are doing wrong regarding this. They are not feeling, … But they are just saying that this is one of our cultures, and we are proud of that."

With this cultural dominance, an effort to reduce food waste will hardly make much impact until people begin to have a change of mindset, as suggested by participant 13,

> *"They are making this huge amount of food for guests. So, we need to raise their understanding of the culture, change their culture a little bit to modernize them."*

The participant highlights the importance of awareness and cultural, and behavioural changes, a lack of which is contributing to food waste by the way people uphold the culture. Therefore, culture plays a significant role in Arab food culture, especially when hosting visitors or even having meals alone. Fulfilling the desire of upholding the culture has more priority over any action that could lead to the generation of wasted food. Participants have lived through and still live with the impact of cultural dominance, and wasted food is continuously being generated.

5.2.2 Theme 2 - Affordability and Affluent way of life

A country with a growing economy and rising gross domestic product (GDP) of about 7% which is backed by a massive oil reserve. For a very long time, the citizens and residents of Saudi Arabia have enjoyed the subsidized food products which are provided by the government to soften the economic burden on the people due to the rising price of food products. This provision which is intended to improve the standard of living of the people, socially, culturally, and economically, has rather led to affluent ways of life through the affordability of food products. Most of the interview participants experienced affluent behaviours by some of their customers, which are demonstrated by how they place their food orders in the restaurants. Participants cited occasions where customers knowingly order food, much more than they can consume. A society dominated by affluence due to affordability and poor behaviour towards food waste reduction tends to contribute to the generation of more food waste. Participants noted that their customers spend money without caring about the subsequent waste of the purchased surplus food. As stated by one of the participants,

“They have money. Their life is very simple and very easy, and they can buy food and they are not worried about the waste.”

The availability of a source of income affects how people perceive waste; it does not appear to most people as a problem, economic or environmental. People only want to spend money simply because they have it. The continuous flow of income and affordability of food products is reassuring for most people to spend as much as they can, without minding the consequences of wasted food. Participant5 described the situation as,

“We here in Saudi Arabia, we thought is we have too much money. So that's why we spend a lot of money, and we don't care about the food. So, we don't care about where the food goes, the wastage.”

Lack of awareness about the social, economic, and environmental impact of food waste together with food product affordability continuously feeds the affluent behaviour of the majority of the people. The affluent way of life has become a way of living, significantly contributing to the increase in food wastage. Whatever it cost, people are willing to pay, as mentioned by the participant 8,

“Because you know here in the country he didn't care even if he pays too much.”

As described by most of the interview participants that in most cases, the impression created because of spending too much is more important to some customers than the concern about waste. In the participant’s description, he said it is,

“Just to show off. I'm buying something or ordering something special. Yeah. Like that.”

Another participant described his experience with customers that in most cases, they tend to justify the need to order more food than they can finish. According to participant 11, the size of the food,

“It should be too much.”

It is acceptable in society and people become embarrassed if they fail to comply with the cultural norm. The reputation of the host is more important, especially when hosting visitors, and it should not be affected by not providing more than enough food to the guests. As mentioned by the participant 13,

> *“It is become a shame for them to bring to you a small amount of food.”*

The central focus when hosting visitors has completely shifted to the perception of self-image and coupled with the affordability of food products. As described by participant3, the host:

> *“Just want to show off. That's it.”*

In many cases, as reported by the participants, the restaurant waiters attempt to advise and provide guidance to their customers when ordering food, just to avoid possible food wastage. Such a kind gesture by the waiters is met with a response as stated by participant 8,

> *“No, I will pay. Then after that, he didn't eat, only talking.”*

On the contrary, in the absence of surplus food or money. In places where affluent is not the way of life, as stated by the participant 3,

> *“The people who don't have money waiting for one time meal they will think twice before throwing food away.”*

Most participants experienced the affluent behaviour of spending too much money on food products, ordering an excessive quantity of food, or serving guests an enormous amount of food just to appear generous. The lack of concern about food wastage and its related consequence. Such a way of life only generates more wasted food and poses a great challenge to food waste reduction.

5.3 Behaviour Towards Food Waste Reduction

In this section, the remaining themes related to various aspects of behaviour, attitudes and social influence toward food waste reduction are discussed and supported with participant quotes. Similarly, the interviewee's real name will not be used, instead, they are referred to as participants 1,2,3 etc. Some of the themes indicate negative and some positive attitudes towards food waste reduction, but generally point to a lack of effective policies, awareness campaigns and interventions around effective food sharing.

5.3.1 Theme 3 - Recycle and Reuse

Exploring values from food waste is not a new concept globally, and participants of this research also identify with the idea of exploring alternative ways to reuse leftover food which are not fit for human consumption. Emphasis was continuously placed on looking for an alternative use for food waste by some of the participants.

Participant 4 noted that the government has a significant role to play in encouraging food waste recycling in the hospitality industry like restaurants and hotels. He stated that:

> *"The government, the regulation, and they make this system for all restaurants, all hotels. No, you should make recycle system for your waste, not just throw it away. It should be like that."*

The recycling of food which is considered waste because they are no longer fit for human consumption is a better way to reduce carbon emission to the atmosphere if they are dumped in landfills. Food waste recycling has been a success in some far eastern countries such as Singapore and Japan where a record high of about 70% of their food industry leftovers are recycled.

Another participant stressed the point of slowing down the act of throwing leftover food in the garbage, he noted that the food may be useful to other people and if not, it may be consumed by animals. In his own words, he stated:

“If you want to throw in the garbage, put aside, don't throw in the garbage, put aside for the bird or cat to eat.

If you are not eating this bread, no don't throw it in the garbage, it could be damaged. Give it to somebody or something to be of benefit.

For example, you can feed the animals, you can feed the poor people, you can feed the poultries, whatever, whatever, you can use it for this one.”

Participant 6 added that considering the nature of restaurant businesses where once the food is served to one guest and not consumed or touched, it cannot be served to another guest, for food safety concerns. This is contributing to food waste, and he suggested that to benefit from recycling, the leftover food should be segregated before being thrown into the garbage to ease the recycling process. To this point he stresses that:

“In our industry food are made together one time and mixed up, and they put it in the garbage altogether. In this case, we cannot recycle those things anymore because food is mixed with plastic and not segregated. Because there's also no waste management, someone should collect and segregate everything. Likewise in the streets, you should not have one big garbage altogether. But there should be garbage for biodegradable, not biodegradable plastics and people will throw it according to these kinds of garbage, it would be helpful.”

Participant 4 highlighted that money is also wasted whenever leftover food is not put to other use and thrown away, he suggested that every restaurant needs to have a recycling process for leftover food.

“It's very important actually for every restaurant to make a system for the food waste and recycle food waste. It's very important for everyone to make this because if we don't have this culture in this system for the waste, it will go for nothing and it will be thrown in the garbage. No, no, no benefit from this one. And it is money.”

5.3.2 Theme 4 - Leftover handling process

The participants of this research highlighted the lack of any kind of process for handling leftover food whether fit for human consumption or not, every leftover food is meant to be thrown into the garbage. The restaurant's business model does not have any provision for managing leftover food of any kind, so long as the food is paid for, touched or not, eaten or not, leftovers end up in the garbage. Participant1 stressed that:

> *"It's good for us, as sales. Ok, we are happy. We sell something good. But after that, he takes one bite, one bite, one bite, and eh throw it in the garbage."*

When asked a further question about what the restaurants do with the unfinished leftover food, here is the response from the same participant 1:

> *"We throw in the garbage, no system to keep it aside, to give it to someone or some association, or something like that, no."*

In some cases, guests request waiters to pack their leftover food so they can take it away, but in some other cases according to participant 2:

> *"If the guest is not asking to take away, we are throwing it away."*

The restaurant's business model does not consider the social impact of food waste, even on their employees. According to participant 3:

> *"They won't eat, maybe one bite two-bite, then they just throw that food away, we cannot use anywhere."*

When asked why the leftovers cannot be reused, he stated confidently that:

> *"Because customer already touched it. So, once the customer touch or once the food is served to the table, then that food is wasted.*

From our part as business people, we already sold it. But that food cannot be used. It will automatically go to the garbage only."

The above expressions reflect his understanding of how to handle leftover food, based on the business model of the restaurant he is working for. If there are processes in place that support the handling of leftover food, fit, or not fit for human consumption, the employees would have learnt to manage leftovers through such processes.

From another restaurant, participant 5 emphasized the lack of a process for handling leftover food, but to be thrown in the garbage.

"If a guest doesn't like the food, but he touches it already. So, the food is considered a waste. From the restaurants, it is not allowed to give leftover food to someone else. So, the food that is touched or not touched by the guest is thrown in the garbage."

Participant 7 from a different restaurant also noted a similar absence of any leftover food handling process:

"Company rule does not allow to give leftover food away it has to be thrown in the garbage."

5.3.3 Theme 5 - Register leftover food Receivers.

Food sharing comprises two major stages, first is the collection of the leftover food to be distributed. The other stage is the actual distribution to people in need of food. Participant 2 suggested that with the restaurant's management approval, they may be able to re-heat and prepare leftover food ready for distribution, but the recipients need to be identified for ease of distribution:

"We need to have contacts of people who need this food, they can give it to them. It will be less quantity compared to the big dish, but uh it's ok. It looks nice and has a good texture and, uh, you will not worry about sickness or bacteria and viruses or whatever."

Participant 13 from the food sharing organisation explained that according to their policy, they have targeted people who were registered earlier. They also continue to conduct a new survey for new recipients of food support. He stated that:

> *"According to our policy here, we have some target of people. We make a survey before that, and we feel they are in need of the food. So, those who are workers in downtown and some people who make cleaning those who are in need.*
> *So, this sharing we make, after survey we just eh there are places and sometimes register their names, and after that make our plan to distribute this leftover."*

5.3.4 Theme 6 - Throwing food Away.

The concern about the increase in food waste was described by most of the interview participants as a phenomenon that requires government intervention. Some participants even cited the way people abide by government regulations on the recent COVID-19. They believe food waste will be reduced with firm policies and regulations. Food is continuously being wasted despite some of the known initiatives like the placement of fridges in public spaces and food banks. Efforts are also made using technology, like running campaigns on various social media. Most people do not seem to understand the impact of food waste on the economy, environment, and society. Even though the social impact is evident, while food is being wasted, many people, individuals, and families need to survive. Participant 2 emotionally expresses below about food waste,

> *"In the world on one side, people are dying from hunger and some people are just throwing the food, … as Arab person, food is "Naama" means like it's given from God. So, you should not waste is the first thing, because there are some people that need this one to survive."*

Participants could not hold themselves back in describing their experiences even though their restaurant businesses do not have any process for handling leftover food.

This alone, if in place, would have reduced the amount of food being thrown away, and those in need would have benefitted from it. Participants' description of the increase in food waste points to behavioural attitudes towards food. The lack of understanding that excess food that is not consumed due to over-ordering ends up in the garbage is frequently experienced, as described by most of the interviewees. Participant 9 expressed this frustration as below,

> *"People order more food. And they're wasting the food, that is, many people are suffering outside for the food."*

Another participant described the wasteful behaviour as,

> *"They won't eat then maybe one bite two-bite, then they just throw that food."*

The description of the experiences of restaurant employees regarding food waste occurrences is homogenous and points in the same direction, behavioural attitudes. Customers place food orders, take a few bites, and the rest are thrown in the garbage without any concern about the consequences of their actions. Even if the waiters attempt to advise the customers about the size of the food being ordered, in some cases, the customers respond that they will pay for the food. Participant8 could not hold himself back and said:

> *"it's bad because as a supervisor we have too much food going to the garbage."*

Food waste occurs mostly by customers and in some cases by the restaurant's employees. Participants noted lack of proper training and shortage of employees also lead to an increase in food waste in restaurants. As described by the participant 7,

> *"Sometimes our mistake in over doneness. For example, guests give orders for steak medium-well, so sometimes our grill men during the busy time he made well done. So, this is our waste."*

There is no process on how to handle leftovers in restaurants, they always end up in the garbage, and there are no supporting policies or regulations. In either case, food is being wasted. Some of the wealthier customers order food and eat very little or do not even touch the food, but in the absence of a process for handling leftover food and policies, they all end up being thrown away. According to participant 5:

"The food that he did not touch or touch from the guest we throw in the garbage."

He further added,

"For the food industry from as I know, food leftover is thrown directly into the garbage."

Another participant confirmed the continuous food waste which is also attributed to earlier reasons.

"From my experience as a restaurant manager or and working in this career since more than 16 years. We actually have food waste."

Most of the participants expressed disappointment and sadness over experiencing daily food wastage while there are many families and individuals in need of food. It is an awful experience for most of the participants. In participant 13 own words,

"When I saw this very huge amount or big amount of waste food, … from inner in my heart, I can say am bleeding, I am crying."

"It hurt my heart, … eats something a little bit and throw the remaining.*"*

"We are throwing it away, … actually it is something hurting."

"We throw it in the garbage, … Actually, feel disappointed."

“We throw this away, … For me, of course, am very sad. A lot of people are hungry.”

“Very bad, because this is the food.”

“It feels very bad.”

Those are some of the disappointing expressions from the front-line workers, and employees in selected restaurants in Riyadh, living daily with these unpleasant experiences they have no control over. They witness how edible food, fit for human consumption, goes straight to the garbage. For whatever reason, food is still being wasted.

Most participants recommended that it is preferable to provide leftover food to families or individuals in need rather than throwing it away. Participant 2 describes throwing food away while there are people in need as inhumane behaviour. He noted,

“And it’s something very bad, … there’s no humanity when some people need to eat, and there are some people just throw.”

He further emphasizes the need to pay attention to food waste, instead of focusing only on the money-making aspect of the food business.

“let’s say you have two guests, and they order two pizzas, he can inform them that one pizza is enough for two persons. This is bad for the business, but it’s good for humanity and not waste any food.”

Participant 2 expresses his concern about leftover food getting thrown away while many are in need, guests should be properly informed about food portions and their orders to ensure only what is required is ordered. But also suggested the use of social media with some video campaigns to increase awareness and prevent people from throwing food away.

"You can mention and at each end of this video that, uh, not to waste food. And mentioned that people need this food."

Several people, individuals, and families are going through a hard time, lack of steady income to provide food for themselves or their families is adding to the challenges of life. As described by participant 13 through their food bank charity organisation, where leftover food is collected and distributed to families or individuals. He described some of their field experiences when they are out to distribute leftover food:

"We have no work, majority of them are women. We say ok, we register them, take their telephone number. So, we deliver to them."

"There are some families, some individuals, so they become very happy once we share this food with them."

The charity act of distributing leftover food to those in need brings joy to their lives as described. The collection and distribution of leftovers are mostly done by food bank organisations, the situation is not the same in restaurants. Such policies do not apply to restaurants, but even though most restaurants do not have a process in place to provide leftover food to people in need, participant 4 suggested to his team not to throw leftover food away,

"I advise my team in case we have waste like that, we can put it in there. For example, a package, take away boxes after you can give it to the people need food."

Several people in the society can benefit from leftovers if the food is still fit for human consumption. He stresses the need to help people in need with leftover food rather than throwing it away. This is of course not a regular practice because it is neither supported by the restaurant's management nor government policies.

"…, cannot earn the money, cannot eat every day, three meals, whatever, like that. Some people are very poor actually. In any country, there are some people

very poor. So, better to use this waste even for them. Even for them, it will be a very big help actually."

Participant 9 noted in his description of the challenges of life many people are going through,

"…, many people are suffering for the food and the daily needs."

Even though there are no supporting processes for giving out leftovers, most of the participants who are constantly experiencing the phenomenon strongly support the idea of giving out leftover food to those in need. Participant 9 also suggested that food leftovers should be given to people who need them.

"If there is any leftover, just give it to the people who are suffering people."

Even though there is no process in place in restaurants for handling leftover food, the humane part of the participants does not prevent them from expressing what they believe is the right thing to do and could lead to food waste reduction. The interviewees who are mostly restaurant employees strongly believe that giving out leftover food to those in need will greatly alleviate their suffering and reduce food wastage.

5.3.5 Theme 7 – Awareness

Having experienced and lived with enormous and frequent food wastage, participants suggested the need for awareness on two fronts. Firstly, food waste management. Secondly, in food waste recycling, awareness in these two areas is strongly recommended by most participants. According to participant4 awareness programs should start from early school age.

"They should keep this as a subject for the kids to study in the KG kindergarten or grade 1, grade 2 to study as a subject about the food waste and recycle the food waste, how we can recycle the food waste to get the benefit from this one and how we can use anything not to throw out the garbage."

Educating people about recycling food waste that is not fit for human consumption to derive other beneficial use from the food leftovers. The awareness is not limited to education in schools but also campaigns through different mediums such as social media. This should be possible considering the country's Information Communication and Technology (ICT) maturity level. This will raise people's awareness about food waste and its impacts. As stressed by some of the participants:

> *"On the social media awareness campaign campaign campaign about this issue."*

> *"Actually, for me, the best way to do this is in the social media, ... Like in each video to mention the last five seconds, please, to avoid throwing food or avoid eating too much."*

The importance of raising public awareness about the menace of food waste can never be over-emphasized. An impactful campaign about food waste and its related consequences needs to be launched, many participants suggested this. An increased level of awareness about the social, economic, and environmental impact of food waste will help set the stage for additional policies and regulations for controlling food waste.

> *"We can make advertising about the waste food. So just to inform the people"*

> *"We need to raise understanding of the people."*

Awareness covering the second aspect of food waste management is also critical. As mentioned earlier, educating people on how to reuse and recycle leftover food will reduce food being thrown away, even if it is not fit for human consumption. Some customers may be unaware of food sizes and portions in restaurants, leading to food wastage. Therefore, waiters have a significant role in advising customers on food sizes and quantities. Although it was noted by some participants that some customers, especially the wealthier customers, may not accept such advice, they order whatever

pleases them. Nevertheless, waiters still need to properly advise the customers whenever they observe that food is being requested in excess.

Awareness about food waste and the reuse of leftovers at an early age in life seems to resonate with some of the participants. Teaching younger ones not to waste food is said to be taught by the parents as indicated by participant 1.

> *"This is how our parents teach us, not to waste the food, even the bread, … Our parents teach us like that. You can give it to the, you have a cat, you have something like that, eating like that."*

When customers cannot finish their meal, they should be advised to take the leftover food as a takeaway. Similarly, when food is served openly as a buffet, customers still need to be informed about taking food as much as required only. As noted by most participants, if customers adhered to this advice, food waste reduction will be achieved to some extent. The interview participants, who are restaurant employees, are fully aware of the possibility that customers may reject their advice. One of the participants noted that they could not force the customer to make a specific order or take a certain quantity of food in the case of the buffet. Still, they can only speak to them about food sizes to avoid excessive food orders, resulting in food waste.

Awareness campaigns either through education in schools or advising customers while placing their orders in restaurants are some of the ways food waste may be reduced, as suggested by most participants. These ideas are from their experiences of living with food waste regularly.

5.3.6 Theme 8 - Show-off lifestyle common in society

Behaviour is one of the factors several participants spoke specifically about as the main contributing factor to food waste, most of the participants share some of their experiences of how wasteful behaviour is continuously increasing food waste. Food products that are still fit for human consumption end up in the garbage because some customers prefer to order food in excess just to impress their guests or people around. Participant 2 noted,

“Let's say they are five persons. So, he ordered for eight persons why because he want to show off so that those people will be talking that he was very generous he paid a lot of money for us and those things.”

The wasteful behaviour towards food plus affordability only leads to more food wastage. One of the participants described a common incident at the restaurant where, after placing an order, customers decided to eat salad and soup from the buffet, but they serve themselves the salad and soup at the same time. On finishing the salad, the soup is already cold, they don’t care they abandoned it and take another bowl of soup. The mindset is that they paid for the food, and they will do whatever they choose to do with it, this behaviour only contributes to food wastage. The participant1 then added in a frustrated manner:

“…, the behaviour of some communities or society here, … I cannot change it. I am a chef here, I'm one of the millions I cannot change it. I will go back again to the government.”

The behaviour is so subtle and has become a way of life for most people in society, they see nothing wrong in what they are doing. Because they can afford to buy food, they are not worried about waste, this has become a norm in society. In one participant’s words,

“Making this food and also waste very big amount. They are not feeling they are doing wrong regarding this.
…, they have money. Their life is very simple and very easy, and they can buy food and they are not worried about the waste.”

Another participant described a similar experience he has encountered several times about some customers’ wasteful behaviour and show-off all under the impression of being generous to their guests. Participant 2 further illustrated the subtleness of the wasteful behaviour, an excerpt from his description is below.

“Waste lots of food, especially in an Arab country, the people who let's say you, who want to show off like I want to invite some people to do lunch, so they just like order many items and to show that he's very generous and the take care of them.”

The combination of the way most people spend money easily on food products, simply because it is available and affordable, plus the desire to impress their guests or people around. These two elements are undermining the efforts of reducing food wastage. Addressing these deeply rooted issues which have become a way of life for many people, should be among the topmost priorities in reducing food waste in society. A lot of people believe it is ok to host their guests with surplus food because it is part of the culture. According to one of the interviewees, it has become a habit that the table must be filled with food, as by participant6:

“They are getting food more than their limit, … They like their plate to be full.”

The affluent, show-off and wasteful behaviour are predominantly common only among the wealthy countries, according to participant1 in comparison to Arabs from countries with limited means. Their behaviour towards food is different, he stated that:

“They go to a restaurant, they eat what they want, and they order what they want. One plate, two plates as much as they like. They know ehh, they know there is budget.”

5.3.7 Theme 9 - Restaurant Management

Due to a lack of supporting regulations and policies, customers’ leftover food that is not even touched is thrown away into the garbage. To restaurant management, it is all about business. So long as the customer paid for his meal, the restaurant does not care about the food afterwards.

The concept of food sharing as a strategy for reducing food waste generated in restaurants does not exist in most restaurants, either due to a lack of government regulations and policies supporting food sharing or food safety concerns about the

well-being of the recipients of leftover food. To most participants, food sharing means platter sharing, a standard business term, and process in the restaurant business. Therefore, food waste is continuously generated, and restaurant employees are genuinely concerned and empathetic about the phenomenon but lack a supporting process for handling the leftovers.

Here is what food sharing means to some of the participants, which is a clear indication that the concept does not exist in restaurants.

> *“Actually, we mention our menu some plates that are going to be sharing.”*
>
> *“Food sharing between two persons on the restaurant. Like a guest, they make food sharing.”*
>
> *“Like there are few guests on the table. They have mean one platter as sharing.”*
>
> *“Sharing is a good idea because if two or three people are two people are going to the restaurant, then you don't need to order each one for you, for you also. One meal for me, one meal. If we could share one meal, that would be much enough.”*
>
> *“Food sharing to share the food with each other’s.”*
>
> *“Food sharing, the people sit together, and they place order less food and share.”*

The restaurant’s employees are critical stakeholders if food waste is going to be reduced through food sharing initiatives. Therefore, they need to understand food sharing and its relation to food waste reduction, a shared responsibility of the restaurant’s management. In addition to that, there is a need for supporting policies and regulations on how to handle leftover food in restaurants.

The lack of processes for handling leftover foods enables restaurant business models to be strictly focused on profit. There is no social or any form of accountability for food waste generated in restaurants. The absences of such processes offload the social responsibility off the shoulders of restaurants. As one of the participants described, any food sold cannot be reused by the restaurants. Whatever the condition of the food is, touched, untouched, or not entirely consumed by the customer, it will end up in the garbage.

> *"From our part as business, we already sold it. But that food cannot be used. It will automatically go to the garbage only."*

Few of the participants choose not to comment on the focus of their restaurant business as it relates to food waste handling. Their opinion was respected because it was voluntary participation, of which they have the absolute right to respond or not to any interview questions.

In societies where policies and regulations guide food leftovers across the hospitality industry, including restaurants, those businesses tend to take some responsibilities possible because regulations support them. The awareness and measures of food waste control would be in place and ready to be acted upon whenever required.

5.3.8 Theme 10 – Family

One participant from the restaurant shared his experience of family influence on the good habit of avoiding food waste. The excerpt summarizes his experience:

> *"When I see my parents and this is a habit when I see my parents, they eat, they make the food one kind of food in one day and finish it. This is how our parents teach us, not to waste the food, even the bread."*

5.3.9 Theme 11 – Colleagues

The lack of a standard process for handling leftover food in restaurants left a vacuum of uncertainty among restaurant employees and everyone stays cautious despite their dislike of throwing away leftover food. Participant 1 stressed that:

“But sometimes I have this problem with the community here. What you take with you. What's in the bag, I don't want to put myself in trouble. If you take a bag with you outside and rest of the restaurants looking what you take. They will talk, if not talk in front of you, they will talk behind.”

One of the participants was concerned about the possibility of people taking extra things with them if they are allowed to give away leftover food. According to the participant 7:

“If our company also allowed to give, I will verify this is a long process because maybe some people would take a steak and put another steak inside, other things inside.”

5.3.10 Theme 12 - Food order

According to one participant, some guests do not know how to evaluate their food needs which leads to ordering food in excess and eventually wasted. An excerpt from the particiant 1:

“Some people here, have a different mentality, people request five shawarma. Give me one one one one one like this, and they ehh, they throw in the garbage.”

On the contrary, some guests have good control of their food needs and order.

“Some people the middle and high income, go to a restaurant, eat what they want, and they order what they want. One plate, two plates as much as they like. They know ehh, they know there is budget. If they order over budget maybe end of the month there is a problem.”

Meanwhile, some guests would simply order food in excess because they can afford to pay for it.

"As a waiter, I go to the guest, ladies. I told her you can buy like this as a salesman. What does she say to me? No, no, no. To pay the bill would be 2000 riyals. Oh, we would eat what we want like this, like this, like this."

5.3.11 Theme 13 - Regulations and policies

According to most participants, this theme has a significant role in food waste reduction and food sharing initiatives. Policies and regulations to prevent food wastage and support food sharing initiatives in places like restaurants are required to further control waste and get edible leftover food to people in need.

The impact of increasing food waste can never be overemphasized, and participants highlighted the need for government intervention like COVID-19 intervention. Through regulations and policies, food waste may be controlled to some level. In one of the participant's own words,

"This comes from the government like covid-19 now with government… They need strict rules and regulations from the government."

Citing the example of how government regulation on COVID-19 was impactful and people abide by the regulations. If enforced by the government, similar success may be achieved in food waste control. This may be in the form of launching more awareness programs and permitting the sharing of leftover food, which complies with food safety regulations from restaurants or the hospitality industry in general. Leftover food can be reused in many ways, yet much food is still being wasted.

Presently, restaurants cannot share their leftover food and do not have any process for fear of being penalized by the government. Regulations and policies that will allow and encourage the collection, distribution, and sharing of leftover food by restaurants, hotels, or food banks will significantly reduce food waste. One of the participants stated:

"The system here or the government to try to make some policies just to make nourish for food so as to collect it and do it in an excellent manner and also to distribute to the needy people."

With the support of government regulations and policies. Leftover food that is still fit for human consumption and heading to the garbage will be saved and provided to individuals and families in need. A ban on throwing food in the trash in restaurants and hotels will reduce food waste, as mentioned by another participant. An enormous quantity of food is thrown away in restaurants for what most of the participants described as,

"Here not allowed to be giving to other people outside people. So, the remaining one throw in the garbage."

Alternative ways of using leftover food will also benefit from government regulations and policies. Instead of trashing foods that are considered unsuitable for human consumption, they may be put to other useful needs through recycling. One interviewee highlighted that:

"The government, the regulation, and they make this system for all restaurants, all hotels. No, you should make recycle system for your waste, not just throw it away. It should be like that."

Most of this study's participants strongly emphasize the need for government regulations and policies to control food waste and permit more food sharing, especially in restaurants where an enormous amount of food is wasted.

5.3.12 Theme 14 - Food sharing process

Lack of supporting regulations to give away leftover food in restaurants, and lack of adequate infrastructure are significant hindrances to sharing leftovers in restaurants or party venues.

Food sharing is one of the many ways of reusing leftover food rather than leaving it to be wasted. There are also many sharing initiatives, notably as mentioned in the literature review section, where a big refrigerator is kept in public spaces or outside homes. This is where leftover food is deposited for individuals or families to collect. An alternative way of sharing leftover food is by directly distributing the food after collection. This method of sharing food is associated with challenges, as described by one of the interview participants. He highlighted the lack of proper coordination among food bank charity organisations as one of the challenges. As described in his own words:

> *"We have no harmony, or we have no coordination as food companies with each other. Maybe we are here in Riyadh. But everyone is working with his mind or policy, individually. There is no joint coordination with other food companies."*

The participant emphasizes the importance of having information on time and coordinating with other food bank organisations to share relevant information about planned weddings, parties, or other celebrations to make proper logistic arrangements for collecting leftovers and ready for distribution to individuals or families in need.

Time is of significant essence in food bank operations, according to participant 13, the impact of which could lead to other food-related issues, like food safety issues. From his experience, he observed that sometimes they could not distribute collected leftover food because it was too late, and most of the recipients must have gone to bed. But the actual cause, according to the participant, could be due to the late collection of the food, due to a late call received from the party venue. He stated that due to,

> *"Sometimes this hour of festival become late night, early morning or next day. So, when we collect and want to distribute to the needy people or the target of our people. Maybe that is very not suitable time because maybe they are sleeping or even, they are taking their dinner and sometimes you knock the door, and no one responded. So, it becomes very hectic for us. We bring it back and put it in the refrigerator here."*

He described situations where they receive calls from the party venue to collect leftover food, a couple of hours after the party is over. At that time, the food is already at risk due to exposure, leading to food contamination. In some cases, they may not be able to collect the food due to other ongoing food collections and limited resources. In such cases, they realized the importance of proper coordination with other food bank organisations. A common platform to share information about food collection and distribution would benefit food bank operations.

According to the interview participant, distributing collected leftover food needs proper planning. The food collected by their food bank is targeted to be distributed to recipients registered on their system during the initial survey. Although, he confirmed distribution is not limited to the registered recipient only.

> *"So, this sharing we make, after survey we just eh there are places and sometimes register their names, and after that make our plan for distributing this leftover."*

At some point, they go to remote locations in Riyadh city, where they believe there will be individuals and families in need of leftover food. They also have some categories of registered people in their food bank operations. Registration is done by obtaining their contact details, including name, home address, and phone number, for ease of distributing leftover food directly to their homes. Even though the food banks operate in this manner, the participant believes they could do better. According to him,

> *"There is no enhancing for the Project for Food sharing; we are stuck on some very narrow-minded. There are no new ideas, new visions for our work. Also, we need some very intellectual and those who have very good experience in this field."*

The research participants highlighted inefficiency in food bank operations and the lack of food waste management professionals who can make valuable contributions to the entire food sharing operations. The food bank organisations seek improved ways of sharing information about upcoming celebrations, such as weddings or parties. This

will enable early and proper preparation for the collection and distribution of leftover food, which will significantly improve the food sharing initiative.

5.3.13 Theme 15 - Large food portion

This section mainly focuses on restaurant operations and businesses. Food waste reduction needs to be tackled from all perspectives; food portions in restaurants and the nature of their businesses were identified as areas of focus by some participants. Interviewees of this research stressed the importance of reducing food portions to achieve food waste reduction. This observation came from their lived experiences about how large food portions directly end up in the garbage if not consumed or taken away by the customer.

Most participants suggested that food portioning in their respective restaurants should be reduced to minimize food waste. Some customers are unaware of the sizes of dishes and place orders, only to realize later when the food is served that it is too much for them to finish. One participant highlighted that:

> *"Some guests come here, he doesn't know my restaurant, or they don't know what kind of this food, how is the size, what kind of quantity, big, small."*

Some customers may not be familiar with the food sizes even if it is indicated on the menu, or they may even overlook the food portion information on the menu and place their order based on their need for food. As in the case described below:

> *"He will come, I need this dish because he's hungry. Then he's surprised, too much food."*

The participant emphasizes that informing customers about food portions is not limited to minimizing or avoiding food waste but also retaining the restaurant's credible image. From his experience, he noted that customers sometimes feel cheated and disappointed if they were not advised while making their food orders, only to realize it is a significant portion when the food is served.

Most of the interview participants from other restaurants also support the idea of food portion adjustment, that customers can always have more food if required. But the adjustment will serve as a food waste control measure that will significantly impact food waste reduction.

Some participants strongly believe adjusting food portions is one quick approach that could be implemented in restaurants with anticipated acceptance by the customers if the food price is correspondingly adjusted. Besides the business goals, restaurant management should also make effort toward food waste reduction.

The participants observed that large food portions and a lack of customer awareness about food sizes or portions contribute to food waste. Some are convinced that food portions can be reduced if introduced gradually and with transparency.

5.3.14 Theme 16 - Inventory control

Some of the food waste generated by restaurant employees can be related to a lack of adequate training on storage and effective stock management, for example, by using FIFO (first in, first out) techniques for stock controls. Newer employees need to be adequately trained in stock management. Otherwise, older unused ingredients will be thrown away, while newer ones will always be used. Participant 2 described how poor stock management leads to wastages in restaurants:

> *“To avoid wasting like that, we need to monitor the ordering of stocks like your consumption and let's say of potatoes 10 kilos. We need to buy only ten kilos, not more. Because what will happen after we order extra, those extra will be damaged, rotten, and have many issues. And here we will be wasting this food.”*

> *“Need to have inventory for your stock so you know what you have before you make your orders.”*

5.3.15 Theme 17 - Food management

The role of food in the lives of human beings can never be overemphasized, as it is one of the significant needs for survival. The importance of nutrition was passionately expressed by all participants, especially when describing their experiences of seeing food being wasted without the ability to stop the wastage.

Most of the participants reflected on the dual experiences of knowing that there are people in serious need of food, and at the same time, experiencing food wastage right in front of their eyes due to the nature of their job. Even among the restaurant's employees, many people are unaware of how their actions lead to food wastage. Whether it's hot or cold food, it can become contaminated and no longer fit for human consumption if exposed for a long time or kept outside allowable temperatures.

Most of the participants expressed a lot of concern about food safety regarding sharing leftover food, especially with the ongoing COVID-19 pandemic. Customer concerns are also growing about food safety and services in restaurants. It was noted by the particpant1 that:

> *"Because now you know Covid-19 here like that, … So, very danger now. If the guest sees us touch anything, … They make problem, even if we touch some piece of a small piece of bread."*

Participants are concerned about the well-being of whomever food leftovers will be given to. Even in the absence of a process for handling leftover food in restaurants, some employees attempt to save some food, but due to food safety concerns and ongoing pandemics, they are hesitant to share leftover food and rather throw away the leftovers or untouched food. Participant 8 stated that:

> *"For now, we have a pandemic. So, we avoid this one and throw all the food waste because of the pandemic."*

Some of the leftover food is ending up in the restaurant's garbage due to food safety concerns and ignoring the consequences of food safety may result in food hazards. This is a valid safety concern also echoed by the participant 6,

“The contamination of food you know will cause us food safety hazards.”

Besides the possibility of food getting contaminated if it was touched or due to an ongoing pandemic. Food exposure outside a certain range of specific temperatures can cause food contamination. Participant 2 described this as,

“You need to pay attention to the temperature of your chillers and your cabinets and your, uh. Uh, because the. As you know, from zero to five for the chiller if there's a temperature increase, or you would have more bacteria and the food would be spoil.”

One participant expressed other food safety concerns which also pose challenges to sharing leftover food. Hot or cold food that is kept outside recommended temperature tends to grow bacteria, making it not safe for human consumption. The participant noted that:

“The challenge that faces, uh, always like I'm thinking because the food you cannot keep it outside for a long time, like once the food, the temperature will go below 63 and it’s not chill, bacteria will start to grow, and this food will be spoiled.”

Food safety and the well-being of customers are a top priority in the restaurant’s business, for this reason, proper care is taken not to do anything that will damage the restaurant’s reputation. This reason and lack of supporting policies lead to restaurants’ reluctancy to share leftover food, according to participant 6:

“The most important thing that we need to take care of especially for transferring food to other people.”

Restaurant standards also stipulate that any food served and touched by the customer is to be considered a waste. Although the decision is based on food safety concerns, a lot of food waste generated in restaurants falls under this category. Participant 11 stressed that:

“This is the standard because of any food that is touched the meaning not to use it again.”

Another participant interviewed from a different restaurant also stated:

“Once the customer touches or the food is served to the table, then that food is waste.”

Most of the participants highlighted concerns about food safety and its importance to restaurant businesses. For this reason, food that is touched or untouched, if it is served and not eaten entirely by the customer, is considered a waste. In all the restaurants where this research interview was conducted, such leftovers are thrown away because there is no reuse, recycling, or sharing policies. However, this does not mean the leftover cannot be reused or recycled for other purposes. But to ensure a healthy operation and maintain a good reputation as a restaurant, the leftovers are considered unsafe and thrown in the garbage. This is also hindering sharing of leftover food, and while this concern persists, food is continuously being wasted.

5.4 Themes Intersectionality

This section describes the intersection between some of the themes with respect to behaviour and culture which were identified as major contributors to food waste generation (Baig et al. 2018a). Table 5.2 below presents the themes intersection matrix where each theme is examined against the corresponding theme. The seventeen themes were identified through Paul Colaizzi’s data analysis detailed in section 4.7.

Themes Intersectionality																					
S/N	Themes	Adherence to culture	Affordability and affluent way of life	Recycle and reuse	Leftover handling process	Register leftover food receivers	Throwing food away	Awareness	Show-off lifestyle common in society	Restaurant Management	Family	Colleagues	Food order	Regulations and Policies	Food sharing process	Large food portion	Inventory control	Food management			
1	Adherence to culture																				
2	Affordability and affluent way of life																				
3	Recycle and reuse																				
4	Leftover handling process																				
5	Register leftover food receivers																				
6	Throwing food away																				
7	Awareness																				
8	Show-off lifestyle common in society																				
9	Restaurant Management																				
10	Family																				
11	Colleagues																				
12	Food order																				
13	Regulations and Policies																				
14	Food sharing process																				
15	Large food portion																				
16	Inventory control																				
17	Food management																				

Table 5.2: Themes Intersectionality

The highlighted themes' intersections are explained in the next section.

Intersection 1 – Adherence to culture X Affordability and an affluent way of life.

Most participants of this study highlighted that food culture is one of the major contributors to food waste generation and this is also supported by Mu'azu et al. (2018) that culture is attributed to the larger amount of food wasted. As an act of generosity, it is customary for an Arab family to host their guests with large quantities of food and not to be perceived as being cheap. Quoting one of the participants about his experience, he stated that they believe that "*The table should be full of food. If anyone sees me or saw me, he will tell me I am a poor person if my table only 1 or 2 plates"*. There is no report of any barrier when it comes to cultural practices in society, hence, it cuts across all ages. According to Baig et al. (2018a), social culture is responsible for enormous food waste in the country, as stated by a charity organisation chairperson (Baig et al. 2018a). Food products importation rises following the phase-out of wheat production in 2016 as detailed in Section 1.2. While in the international market food products prices increase, the country continues to provide food commodities at a subsidised rate. Food products have become available and affordable due to the low prices and are taken for granted. Cultural practices and economic affluence have a significant impact on food waste generation. The

intersection of adherence to culture and affordability and an affluent way of life may result in a culture of more food waste or less display of affluence, the impact can be on either theme. But with high purchasing power, more food is likely to be consumed and thus, waste will also increase.

Intersection 2 – Adherence to culture X Food ordering.

The intersection of adherence to culture and food order relates to the way cultural traditions affect how food is ordered. As mentioned in the above section, in a society with high cultural influence, where guests are vastly welcomed with large quantities of food in a demonstration of generosity. More food ordering may be the resultant outcome of this intersection, thus resulting in more food waste. The impact of adherence to culture on food ordering depends on the level of affordability, the stronger the level of cultural adherence, the more impact it may have on food ordering.

Intersection 3 – Adherence to culture X Regulations and Policies.

Within the research context, this intersection relates to how cultural practices affect regulations and policies. Culture and regulation and policies can shape the way food is consumed, distributed, and reused. According to Baig et al. 2018a ", … there is no current regulation in the Kingdom against throwing away food." (Baig et al. 2018a: p.7). The absence of food waste regulations and policies creates a significant opportunity for regulators to formulate sustainable food waste management regulations and policies. Cautions may need to be taken in newly formulated regulations and policies to accommodate cultural adherence and practices of welcoming guests in an Arab customary manner and yet cater for sustainable food waste management, redistribution, and reuse policies.

Intersection 4 – Recycle and Reuse X Adherence to culture.

The intersection of recycling and reuse and adherence to culture relates to food waste management sustainable practices and how they are influenced by adherence to culture. According to Morone et al. (2018), practical recycling and reuse knowledge can be developed through a family's waste management behaviour. Thus, cultural traditions, which is part of an environmentally friendly attitude (Morone et al. 2018). This demonstrates how cultural practices and home behaviour influences recycling and reuse. However, some consumers throw away leftover food instead of recycling

or reuse, thinking it is unhealthy to be consumed (Baig et al. 2018a). Like the customary culture of lavishly hosting guests, if recycling and reuse practices are embraced in society, they may become part of the cultural traditions that may have influenced food waste reduction. Government and community joint efforts can help develop cultural practices with a focus on sustainable waste management practices through recycling and reuse.

Intersection 5 – Show-off lifestyle common in society X Adherence to culture.

Adherence to culture has a significant influence on show-off lifestyle, this intersection relates to the extravagant manner of using food products as a form of generosity which is influenced by cultural traditions of society. Consumers love to set up luxurious food tables during special events such as Eid festivals, wedding parties, or informal social gatherings. The abundant availability of food items at subsidized rates makes food products be taken for granted (Al-Zahrani et al. 2019). In a highly culture-oriented society like Saudi Arabia, cultural practices have a significant influence on the show-off lifestyle common in society. Although age and geographical regions may also influence this intersection of show-off lifestyle on adherence to culture.

Intersection 6 – Family X Adherence to culture.

This intersection relates to the impact of adherence to culture on family behaviour and practices. According to Al-Zahrani et al. (2019) “, … the culture in the Kingdom of Saudi Arabia is based on festivals. The citizens have a welcoming attitude towards guests and are hospitable and food lovers.” (Al-Zahrani et al. 2019). Large quantities of food are served during festivals and ceremonies, and the majority ends up in the garbage. Family values and practices and impacted and shaped by the cultural traditions which are keenly practised. The outcome of the intersection of family and adherence to culture will vary, even though customary practices around hosting guests with food appeared to be largely uniform, but family values and practices depend on social status, regions, and level of conservativeness.

5.5 Chapter Summary

Chapter five presented this study's research findings based on the analysis of the collected data. The researcher followed Paul Colaizzi's (1978) data analysis eight steps, which provide a systematic and structural approach to the procedural steps involved in analyzing phenomenological data. Step 1 involves reading and rereading the transcribed interview data. Step 2 was to extract significant statements. Step 3 was to formulate meanings for each significant statement. Step 4 involves organizing formulated meanings into clusters of themes. Step 5 integrates results into an exhaustive description of the phenomenon. Step 6 formulates an exhaustive description into a statement of identification of its fundamental structure. Step 7 involves returning to participants for validation of findings. Step 8 involves obtaining and working relevant new data into the final products of research (if necessary).

The data analysis in this research produced 17 major themes, which expressed meaning in the data related to the study research questions. The first research question of this DBA study was: What are the factors hindering food waste reduction in restaurants in Saudi Arabia? With careful analysis of the collected data of this study, nine major themes were elicited through the data analysis and addressed this research question. The first theme was adherence to culture. The second theme was affordability and an affluent way of life. The third theme was recycling and reuse. The fourth theme was the leftover handling process. The fifth theme was restaurant Management. The sixth theme was food order, and the seventh theme was large food portions. The eighth theme was inventory control, and the ninth theme was food management.

The second research question of this DBA study was: To what extent do behaviour and culture affect food waste reduction in restaurants in Saudi Arabia? With careful analysis of the collected data of this study, five major themes were elicited through the data analysis and addressed this research question. The first theme was throwing food away. The second theme was awareness, and the third theme was the show-off lifestyle common in society. The fourth theme was family, and the fifth theme was colleagues.

The third research question of this DBA study was: What are the factors preventing food bank organisations from operating effective food sharing? With careful analysis of the collected data of this study, three major themes were elicited through the data analysis and addressed this research question. The first theme was to register leftover

food receivers. The second theme was regulations and policies, and the third theme was the food sharing process.

A potential limitation of this research is related to data collected in the peak year of COVID-19, which affected the seating arrangement of the face-to-face interview conducted. In complying with healthcare safety regulations, both researcher and participants had to wear face masks throughout the interview session, which prevented some facial cues from being observed by the researcher. Another limitation of this study related to gender diversity in this research, all the participants were male. Therefore, this study is limited in terms of answering questions by female participants.

The intersectionality between some of the themes was also covered in this chapter, looking at influences and possible out of their intersections.

In the next chapter, the findings will be discussed in more detail and synthesized with previous studies.

6 Discussion

6.1 Introduction

The previous chapter presented the findings of this research and a detailed description of participants' experiences of food waste reduction through food sharing initiatives. Previous literature examined food waste reduction through food sharing and found that food waste reduction does not automatically occur due to the adoption of food sharing practices. Furthermore, three factors were identified as enablers to make food sharing more effective, (i) environmentally friendly behaviour, economic awareness, (ii) domestic skills, and (iii) collaborative behaviour (Morone et al. 2018). Michelini et al. (2018) studied the food sharing approach and identified three food sharing models, sharing for money, sharing for charity, and sharing for the community. However, previous research has shown that food waste reduction through food sharing initiatives is still not achieved (Falcone and Imbert 2017; Michelini et al. 2018; Morone et al. 2018; Sakaguchi et al. 2018; Filimonau and De Coteau 2019). So far, no specific empirical research has addressed the behavioural and cultural factors enhancing food waste generation, and factors impeding effective food sharing initiatives. The purpose of this qualitative hermeneutic phenomenological study was to explore the lived experiences of restaurants and food bank employees about food waste reduction through food sharing.

Food waste management has cost many countries so much money, in the case of Saudi Arabia, food waste management costs the country about $13 billion annually (Baig et al. 2018b). This qualitative hermeneutic phenomenological study was necessary to address the behavioural and cultural factors enhancing food waste generation, and factors impeding effective food sharing initiatives. It also contributed to the existing body of knowledge. This DBA research addressed the problem statement that we do not know enough about what aspect contributes to food waste. However, there seems to be an emergent pattern of behaviour around sharing food. To address the research problem, it was essential to examine the phenomenon from the perspective of restaurant employees (Sakaguchi et al. 2018). Restaurant employees in Saudi Arabia are involved with food products inventory management, preparation, and leftovers discarding. Therefore, they were most suitable and qualified

to make valuable contributions to the studied phenomenon. This research included the following research questions.

RQ1: What are the factors hindering food waste reduction in restaurants in Saudi Arabia as experienced by restaurant employees?
RQ2: To what extent do behaviour and culture affect food waste reduction in restaurants in Saudi Arabia as experienced by restaurant employees?
RQ3: What are the factors preventing food bank organisations from operating effective food sharing as experienced by food bank employees?

A total of 15 employees of selected restaurants and food bank participated in this research by contributing interview data through face-to-face interviews. The transcript data were carefully reviewed and analyzed using Paul Colaizzi's (1978) data analysis steps with the qualitative analysis software NVIVO 12.0. After analysis of the interview data, 17 major themes emerged which addressed the research questions of this study.

In this chapter, the findings presented in the preceding chapter which covers participants' experiences with food waste reduction through food sharing initiatives are discussed in the context of previous literature. This chapter will present a revised food sharing theory of planned behaviour (R-FS-TPB) framework. This study's findings in relation to previous literature will be discussed in more detail under factors preventing food waste reduction and factors hindering food sharing. The revised framework is an integration of the established FS-TPB in chapter three and this study's findings. Following the author's philosophical worldview, rooted in constructivism. Through reliance on participants' lived experiences, the framework seeks to provide more understanding of factors contributing to food waste and hindering food sharing. Due to the enormous amount of food wastage, despite all that is known about food waste management and global technological advancement. Food waste is still on the rise, and Saudi Arabia in the Middle East is not an exception to this worldwide phenomenon which has an estimated economic impact of more than $13 billion per year (Visschers et al. 2016). Several local food sharing initiatives, such as a large refrigerator outside of homes for the collection and distribution of food leftovers, food banks, etc., were established to reduce the impact of food wastage.

6.2 The Revised Framework

The revised framework is an integration of the established FS-TPB in Chapter three and this study's findings. Upon completion of the review and analysis of the interview data following Colaizzi's structured approach. Where in step 2 of the approach, the extracted significant statements were coded based on the theory of planned behaviour construct. Table 6.1 shows the elicited themes, mapped into the constructs of the theory of planned behaviour to produce the revised food sharing theory of planned behaviour (R-FS-TPB) framework. Details of the data analysis were presented in Section 4.7 of Chapter four.

TPB Constructs	**Themes**
Attitude toward the behaviour	Recycle and reuse
	Leftovers handling process
	Register leftovers food receivers
	Throwing food away
	Awareness
	Adherence to culture
	Affordability and affluent way of life
Subjective norm	Show-off lifestyle common in society
	Restaurant Management
	Family
	Colleagues
Perceived behavioural control	Food order
	Regulations and policies
	Food sharing process
	Large food portions
	Inventory control
	Food management

Table 6.1: Research Findings Mapping to TPB Constructs

The main idea of the revised framework Figure 6.1 below, is to highlight factors hindering food waste reduction and food sharing. The food sharing theory of planned behaviour (FS-TPB) framework developed in Chapter three, was integrated with this

thesis research findings and presented in this section. Propositions which are based upon assumptions of relationship from the author's interpretation of the literature and understanding of the intersubjective reality, are all explained in this chapter. The below figure shows the revised food sharing theory of planned behaviour (R-FS-TPB).

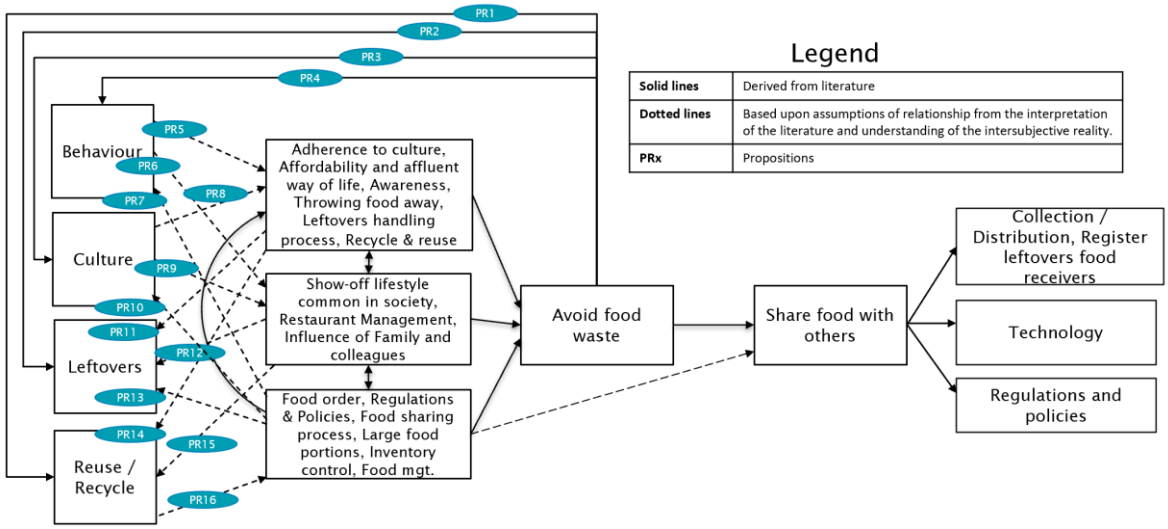

Figure 6.1: Revised Food Sharing Theory of Planned Behaviour Framework (R-FS-TPB) – SOURCE: Author

The revised food sharing theory of planned behaviour (R-FS-TPB) framework serves to contextualize the research findings and provide explanations for the propositions. All of the propositions will be discussed under the factors preventing food waste reduction in Section 6.3 below. Propositions one (PR1) to four (PR4) relate to previous study's (Papargyropoulou et al. 2014; Sebbane and Costa 2018; Al-Zahrani et al. 2019; Coşkun and Özbük 2020) major factors contributing to food waste generation. Propositions five (PR5) to sixteen (PR16) are discussed in relation to those major factors in the next section.

6.3 Factors Preventing Food Waste Reduction

In this section, the research findings are discussed and synthesized with previous literature and under each proposition as they appear in the conceptual framework. Avoid food waste construct is linked to the four key concepts (behaviour, culture, leftovers, and reuse/recycle) through propositions one (PR1) to four (PR4). The four key concepts are in turn linked to the modified theory of planned behaviour constructs through propositions five (PR5) to sixteen (PR16). In this research, participants living

with the dreadful experience of constant food waste observed how behaviour and culture towards food among other factors have continuously led to food wastage. When confronted by the phenomenon according to some of the participants, their initial response was to take the initiative and give leftovers to individuals and families in need. But food safety concerns, which are looming over the food industry, are a clear hindrance in preventing participants from taking such action.

The revised food sharing theory of planned behaviour (R-FS-TPB) framework is based on the participant's shared lived experiences of the phenomenon. The propositions one (PR1) to four (PR4), lack of avoidance of food waste leads to negative food behaviour, culture, an increase in leftovers, and reuse/recycle these propositions are consistent with the FS-TPB framework and previous studies. Food wasted in social events, special occasions, celebrations, and restaurants are enormous (Baig et al. 2018a). Participants felt disheartened about the food waste issue, knowing that many families and individuals are in dire need of food just for survival. Consistent with Al-Zahrani et al., "…, people in KSA prefer to throw away the leftover food as they think it's unhealthy to eat or don't care." (Al-Zahrani et al. 2019: p.89). A participant echoed a similar comment when describing his experience, saying, "…, *here in the country he didn't care even if he pays too much money*". Food waste is a global issue, and Saudi Arabia is not an exception, as reported by Al Zahrani et al. In the Kingdom of Saudi Arabia (KSA), more than 15 million tons of solid waste are generated per year, making KSA one of the top food wasters in the Middle East (Al-Zahrani et al. 2019). Participants share their experiences as restaurant employees involved in the day-to-day activities of the food business. They continuously experience an increase in food waste daily, customers seldom finish their meal, with a bite here and there, and the leftover ends up in the garbage. The increasing food wastage, according to the Saudi Ministry of Environment Water & Agriculture, was estimated to cost the Kingdom about $13 billion, and an environmental impact of contributing a significant amount of methane, a potent greenhouse gas, from decomposition as a result of landfilled with wasted food (Baig et al. 2018b).

6.3.1 Behaviour

With reference to Figure 6.1, propositions PR5 which relates to attitude construct, PR6 which relates to subjective norm construct, and PR7 which relates to perceived behavioural control construct will be discussed in this section.

Proposition Five (PR5)

This proposition which relates food behaviour to adherence to culture, affordability an affluent way of life, awareness, and throwing food away is consistent with the revised framework and previous research. Excessive value is placed on generous hospitality by providing ample food as a gesture of welcome. Families with modest means will go the extra mile to offer their guests surplus food to welcome and abide by the culture. Generosity is a crucial aspect of Arab hospitality; therefore, their guests are often fed with surplus food, more than they could consume. This is considered as being hospitable to the visitor. An informal get-together, Eid celebrations, or wedding parties are often accompanied by a lavish food table, all to comply and adhere to the cultural values. Previous studies found societal behaviour and attitude toward food, among other factors, as contributing to the increasing food wastage in the country (Baig et al. 2018b; Al-Zahrani et al. 2019). That was substantiated by this research finding, adherence to culture by hosting guests with surplus food. For many of the participants in this research, the one factor that is carrying a larger share of contributing to food waste is the culture, which has a direct effect that trickles down to other factors like behaviour, lack of shopping planning, and awareness, all together are hindering the efforts towards minimizing food waste. Some participants, who are front-line employees, observing frequent food waste, have high expectations about food waste reduction due to the culturally ingrained society. But instead, it is the same culture that is playing a significant contributing role in continuous food waste. One of the participants, while describing his experiences, he mentioned a commonly used phrase in society: the "*eye should eat before the mouth*." This implies that, when receiving a guest, there should be so much food displayed for welcoming the guest. He added that "…, *and when you see the very big dishes and very big amount of meat and rice, so get the guest will be satisfied, and after that when he goes away, he says that he makes very big dishes, he respects me more and more.*". Hosting visitors with this mindset does not give any indication or consideration to food waste, or its impacts

because the sole motive was to appear generous, which means providing lavish food tables.

The affordability of food and its availability are contributing factors to the continuous rise in food waste. One thing leads to the other and understanding the linkages could be highly important in providing awareness to society. Surplus food products and their affordability directly result from high subsidies on food items, making them affordable. The ability to absorb the increasing cost of importing food products, provide subsidies to food producers, and regulate the prices of food items in the country is possible in an oil-rich country like Saudi Arabia (Al-Zahrani et al. 2019). Restaurants and food bank employees living with the experiences and cleaning up wasted food frequently find the experience mind-boggling, so many people need food, while a considerable amount of food is being wasted in front of their eyes. The affluent lifestyle concerning food products contributes to more wastage, with little or no concern by the citizens/customers generating the waste due to their negative food behaviour. One of the participants expressed this as "*…, they have money. Their life is very simple and very easy, and they can buy food and they are not worried about the waste.*". However, citizens and customers need to be made aware of these interrelationships and government gestures and act prudently in making good use of the opportunities and affordability of food products, especially with recent initiatives to diversify from oil dependency.

Most of the participants believe there is a need to introduce food waste management awareness in schools and focus on educating society about food waste management and its triple impacts on the economy, society, and environment, as participants grapple with the menace of frequent food wastage. This finding, awareness, is aligned with Baig et al., who noted that lack of awareness is one of the major factors hindering food waste reduction (Baig et al. 2018a). Participants suggested that food waste management awareness should be taught in early schools to educate citizens/residents and build a society that is informed about the impacts of food waste and develop positive food behaviour. The need to embark on an effective campaign and launch awareness programs across the country can never be overemphasized, considering the country's apparent challenges, such as low arable land, diminishing water resources, climate change, increasing population, and high import cost of food

(Al-Zahrani et al. 2019). Such awareness programs will provide wakefulness and an informed society capable of controlling and maintaining wastages at individual and societal levels. Therefore, a society that is well informed about the impact of food waste considers food leftovers healthy for consumption rather than thrown away (Baig et al. 2018a).

Proposition Six (PR6)

This proposition relates food behaviour to show-off lifestyle, restaurant management, and family & colleagues' food waste influence which is also consistent with previous research. One of the new findings is the elicitation of a show-off lifestyle as mentioned by some respondents. The uniqueness of this finding was echoed by one of the participants "…, *let's say they are five persons. So, he ordered for eight persons because he wants to show off so that those people will be talking that he was very generous*". Their inclination towards cultural adherence influences the behaviour of most people; keeping up with cultural norms is nudging the majority into "showing off" all in the name of culture and being generous to their guests. Most of the participants of this study had a share of this experience, the behaviour has almost become second nature to most customers as described by another participant that they "*…, want to show off like I want to invite some people to do lunch, so they just like order many items and to show that he's very generous*".

The act of showing off is increasing as well as food waste, participants are living with this dilemma which continuously leads to food wastage. The food behaviour of restaurant management (operation) does not appear to cater for food waste. They have no control over food waste due to a lack of leftovers handling process, other than to abide by their business operating model and submit to the municipality regulations. None of the restaurants visited has a process for handling food waste or leftovers. Instead, they are thrown straight into the garbage. It appears that the focus in most of the restaurants is to make more sales and as much as possible. This is particularly echoed by one of the participants "*…, to be honest with you and the food, the sector, it's I don't suggest that. No. I mean, the owners don't suggest doing it for the customer because this one, the owner he cares for the money*". The lack of a process for handling food leftovers directly results in throwing away leftovers, and it is business

as usual for restaurants. The power of family and colleagues' influence is not to be undermined due to the dominance of the cultural approach of hosting guests in society.

Proposition Seven (PR7)

This proposition relates to the ability to self-regulate which tends to lead to food behaviour. Food ordering is one of the findings that relate closely to the ability to self-regulate. Participants shared two different types of experiences, firstly where customer seems to have some level of control over their food need, for example, *"Some people the middle and high income, go to a restaurant, eat what they want, and they order what they want. One plate, two plates as much as they like. They know ehh, they know there is a budget. If they order over budget maybe end of the month there is a problem."* The second type of experience, however, tends to lead to wastage. According to the participant, for example, *"Some people here, have a different mentality, people request five shawarma. Give me one one one one one like this, and they ehh, they throw in the garbage."* The food behaviour of either of the two types of experiences depends on their ability to self-regulate. Consistent with previous research, a large food portion limits the ability to self-regulate (Papargyropoulou et al. 2016). According to one respondent, some customers are unaware of the food portion sizes, they only realize once they are served, stating that *"Some guests come here, he doesn't know my restaurant, or they don't know what kind of this food, how is the size, what kind of quantity, big, small."*

Participant expresses how frustrating it is when trying to advise customers to order minimal food they can finish. The type of responses they usually receive does not indicate any consideration for food waste or its impacts. The implication of the ability to self-regulate food behaviour is thus quite significant, either through self-effort of ensuring to always order moderate size food or through restaurant-assisted operations where customers are properly advised about food portion sizes. A negative or positive food behaviour will tend to be developed, depending on the negative or positive ability to self-regulate.

6.3.2 Culture

With reference to Figure 6.1, propositions PR8 relates to attitude construct, PR9 relates to subjective norm construct, and PR10 relates to perceived behavioural control construct will be discussed in this section.

Proposition Eight (PR8) & Nine (PR9)

These two propositions are closely related by having culture in common. The food culture leads to adherence to culture, affordability and affluent way of life, show-off lifestyle, family & colleagues food waste influence. The two propositions are significant due to the impact of culture on the listed findings.

Most of the participants described how their customers passionately defended the idea of providing surplus food to their guests and not wanting to appear cheap to their guests. Participants are living in situations where wasteful behaviour is culturally justified, all in the name of generosity. Consistent with Baig et al., he reported that a Charity Organisation Chairperson blames the enormous food waste in the country due to social culture (Baig et al. 2018a). A similar opinion was made by Mu'azu et al. that culture is attributed to a large amount of food waste and failure to encourage people about the usefulness of conserving food (Mu'azu et al. 2018).

It is a matter of integrity in Arab society way back to the Bedouin days, rich or poor. Guests visiting an Arab family will be met with a lavish dish, which is considered a way of showing generosity. The inclination to culture is deeply ingrained in the way people live, so much that it has a negative impact on the adherence to culture, show-off lifestyle, and family & colleagues' food waste influence findings. According to one of the participants, they believe that *"The table should be full of food. If anyone sees me or saw me, he will tell me I am a poor person if my table only 1 or 2 plates. This is one culture, especially in Arab countries like Saudi Arabia, Kuwait, and the Emirates, like that. They think like that, especially if they go outside of their countries, for example, go to Egypt, go to any other country during the summer holidays, or that they would like to make the table full of food just in case some relatives or some friends. He passed by and they saw his table. He should see a lot of food."* As part of generous hospitality and culture, families with moderate means will often feed their guests with surplus food in showing their generosity (Al-Zahrani et al. 2019).

Indeed, food culture has a significant impact on adherence to culture and show-off lifestyle findings, due to the cultural dominance in society. One participant added that *"They are not feeling they are doing wrong regarding this. They are not feeling, … But they are just saying that this is one of our cultures, and we are proud of that. They are making this huge amount of food for guests. So, we need to raise their understanding of the culture, change their culture a little bit to modernize them."* The negative implication of food culture to the findings is more food waste generation. Family and colleagues' social influence has a significant impact on individuals around them (Hornik et al. 1995). As can be seen in the case of adherence to culture in the case of hosting guests generously. If recycling becomes a culture developed in society, then it will have a significant impact on food waste overall.

Proposition Ten (PR10)

This proposition relates to the ability to self-regulate which was assumed to have an impact on food culture. However, the research data has shown that due to the dominance of culture in society, the ability to self-regulate when it comes to food ordering, is negatively impacted. Similarly, restaurants tend to be appealing to their Arab customers by serving food in large portions, which is customary in society. Due to the common food culture in society, most of the participants have the opinion that a positive food culture would have an impact on the ability to self-regulate. This can be supported if appropriate policies and regulations are formulated to support food leftovers, especially in restaurants. The effect could trickle down to a proper food management and inventory control in restaurants.

6.3.3 Leftovers

With reference to Figure 6.1, propositions PR11 relates to attitude construct, PR12 relates to subjective norm construct, and PR13 relates to perceived behavioural control construct will be discussed in this section.

Proposition Eleven, Twelve, & Thirteen (PR11, PR12, & PR13)

These propositions, adherence to culture, affluent way of life & affordability, show-off lifestyle, restaurant management, reuse/recycling, policies, and regulations supporting

the leftovers handling process leads to increasing leftovers. More food leftovers are generated due to cultural dominance and adherence to culture and lifestyle (Baig et al. 2018b; Al-Zahrani et al. 2019). More leftovers are also generated and participants are constrained to operate within the restaurant's operation mode, due to a lack of supporting policies from the restaurant (Goh and Jie 2019). The strict business nature of restaurants also demonstrates the impact on leftovers, according to one participant *"Because customer already touched it. So, once the customer touch it or once the food is served to the table, then that food is wasted. From our part as businesspeople, we already sold it. But that food cannot be used. It will automatically go to the garbage only."* This could be avoided if there are supporting regulations to share food leftovers in restaurants.

Food leftovers will significantly be impacted by being reduced through proper reuse and recycling activities developed in society, along with supported leftover handling process policies and regulations. A lot of food leftovers are thrown away by event hosts partly due to a lack of proper coordination among food bank organisations. This was also echoed by one of the participants "*We have no harmony, or we have no coordination as food companies with each other. Maybe we are here in Riyadh. But everyone is working with his own mind or policy, individually. There is no joint coordination with other food companies.*" Therefore, an enhanced registration platform for food bank charity organisations and for registration of leftovers food receivers will prevent the throwing away of food leftovers. An impactful awareness program could lead to a positive reduction in food leftovers, according to one participant the government should run an awareness campaign "…, *on social media awareness campaign about this issue.*" A society dominated by positive food culture and food behaviour through an impactful awareness program could serve as an enabler for a positive social influence.

6.3.4 Reuse & Recycle

With reference to Figure 6.1, propositions PR14 relates to attitude construct, PR15 relates to subjective norm construct, and PR16 relates to perceived behavioural control construct will be discussed in this section.

Proposition Fourteen, Fifteen, & Sixteen (PR14, PR15, & PR16)

These propositions, adherence to culture, affordability, and affluent way of life, throwing food away, show-off lifestyle, restaurant management, and influence of family & colleagues leads to reuse/recycle. Some participants of this study believe that recycling food leftovers is a better alternative use of leftovers instead of throwing them away into the garbage. Following the concept of circular economy described in great detail in the literature review Chapter two, waste can be considered as a resource, and a lesser Greenhouse Gas (GHG) could be achieved through effective resource management (Papargyropoulou et al. 2014). Due to the staggering amount of food that is frequently wasted and being at the forefront of observing the wastage, one participant stressed that *"…, it's essential actually for every restaurant to make a system for the waste food and recycle food waste. Everyone needs to make this one because if we don't have this culture in this system and the waste, it will go for nothing and throw in the garbage. No, no, no benefit from this one"*. But despite the desires of the employees, there is no process or system in place in all restaurants visited to either recycle food leftovers or donate them for recycling. The participants understand the benefits and possibilities of recycling food leftovers. But constrained by a lack of supporting regulations, as opined by one participant *"…, it should come from actually the country the government, the regulation, and they make this system for all restaurants, all hotels. No, you should make recycle system for your waste, not just throw it away. It should be like that"*. An enormous amount of food that can be reused for other purposes ends up in the garbage or landfill, adding to the emission of Greenhouse Gas (GHG) into the atmosphere (Baig et al. 2018a; Mu'azu et al. 2018; Al-Zahrani et al. 2019). Some of the participants passionately expressed the importance of taking the path of recycling food leftovers, they are convinced that the approach, if supported by regulations will reduce the amount of food that is constantly thrown away.

Furthermore, consistent with recent literature on using the principles of circular economy and the development of necessary policies for using circular economy for reducing waste production (Borrello et al. 2017). It can be seen from previous research that the use of a circular economy as a way to reduce food waste requires supporting policy regulations (Teigiserova et al. 2020). The social, economic, and environmental

threat of food waste is global and significant efforts are made in other parts of the world, like the formulation of the European Union Circular Economy Strategy (EUCES), which is directed at increasing resource efficiency through closing product life cycle loop and transitioning towards a circular economy (Principato et al. 2019; Lehtokunnas et al. 2020). Encouraging the reuse and recycling of food leftovers does not imply that more food should be wasted to generate resource for reuse or recycling. But leftovers should be put to alternative use rather than ending up in the garbage. Through an effective awareness campaign, reuse and recycling can be inculcated into the culture which could later become part of the dominant behaviour in society.

6.4 Factors Hindering Food Sharing

The sharing of food has been part of human civilization from hunter-gatherer societies to the present day to secure sustenance and strengthen social relationships (Davies et al. 2017b). With the increasing global socioeconomic disparity and diminishing resources, food sharing supports several opportunities for sustainable development due to its ability to serve multiple purposes like providing those in need, families, and individuals with consumable and nutritious food, reducing the social, economic, and environmental impact of food waste (Hultén et al. 2016). Sharing food leftovers with those in need alone provides opportunities to reduce waste and the emission of Greenhouse Gas (GHG) due to landfills with wasted food.

The emergence and introduction of technology in the food industry can disrupt the lifecycle of food commodities throughout the entire food supply chain, from production to waste (Harvey et al. 2020). Technology may help in dealing with food leftovers, thereby reducing the quantity of food waste a restaurant needs to manage, and promoting the restaurant's image and profitability (Martin-Rios et al. 2018). Technology facilitation plays a significant role in food sharing in most developed countries, as highlighted by previous studies, through the emergence of food sharing websites and mobile applications (Davies et al. 2017b; Davies et al. 2017a). With a high level of internet penetration worldwide and digital technologies' role in everyday life and transforming businesses. Technology-facilitated food sharing is expected to tackle the paradox of many people living with hunger, while in contrast, billions of tons of food are wasted annually worldwide (Harvey et al. 2020). One of this study's

findings, the food sharing process, shows how a lack of coordination and cooperation is making food sharing ineffective among food banks in Riyadh. In one of the participant's descriptions of his experience of food sharing, *"…, we have no harmony, or we have no coordination as food companies with each other…, everyone is working with his mind or policy, individually. There is no joint coordination with other food companies"*. Operating food banks in a silo mode and lack of coordinated information sharing with other food banks results in food waste from celebrations like wedding parties, special occasions, and Eid Festival celebrations. According to participants, sometimes, calls are received late from party organizers to pick up food leftovers from celebration venues. But due to other ongoing or planned food leftovers pick-ups, new schedules/calls end up not being attended to, and no means of passing the information to other food bank organisations. In such situations, the leftovers which are already exposed, end up not being picked up and eventually wasted.

Sharing, facilitated by digital technologies such as websites, apps (computer applications designed to run on mobile devices), and social media, is not new and has gained significant ground in mobility and accommodation sectors, in the likes of Uber and Airbnb. These mediators provide new ways to extend sharing beyond immediate friends and family and networks conveniently, as long as they are accessible to the users (Davies 2019). Information and communication technologies (ICT) continue to evolve and reshape the ways people share; the adoption of this technologically facilitated sharing may be appropriate to tackle the abhorrence of food waste (Davies et al. 2017a). According to Harvey et al., digital technology has enabled an innovative way of sharing surplus food through several food sharing platforms, for example, OLIO, FoodShare.de, Ampleharvest.org, etc., where edible food finds its way to those in need than being thrown away (Harvey et al. 2020). In contrast to previous studies, participants of this research highlighted that their current food-sharing technique is sometimes not leading to food waste reduction due to operational challenges. When food leftovers are collected late at night, they can hardly be distributed because recipients would have either had their dinner or gone to bed. The inability to distribute the collected leftovers makes the overall collection and distribution hectic for those involved in the process. The leftovers will have to be returned to the food bank premises, and refrigerated, and by then the food is likely no longer fit for human consumption. A participant described one of the challenges related to collecting food

leftovers as "…, *people do not give you the information before enough time to be ready. For example, they call you one hour after they finish their festival"*. This typically indicates a lack of proper coordination between party organizers and food banks. Another participant stressed the risk of keeping food exposed "…, *the food you cannot keep outside for a long time…, bacteria will start to grow, and this food will be spoiled"*. Warm food is supposed to be kept under a certain temperature. Otherwise, the food becomes unhealthy for human consumption. In the instance described by the participant, the food is already at risk even before receiving the call to collect the leftovers.

The locals make continuous efforts here in Riyadh to share food leftovers to contribute to food waste reduction. Alternative food distributions are spawning all over the place. For example, the case presented in the literature review Section 2.6.3 where a family placed a refrigerator outside their home to collect and distribute food leftovers (Baig et al. 2018a). The concept is a straightforward initiative with open accessibility and anonymity to share food with the desire of reducing food waste freely. Although, previous research pointed out that the idea of public fridges may lead to food risk and safety (Zurek 2016). The ease of sharing through such a channel (shared fridge) may be excellent. But the experience may not be a happy ending if contaminated food is consumed due to the anonymous nature of the sharing. Traceability through ownership is a significant concern of the public fridge concept. The fridge is accessible to everyone, and the food is owned by no one; who will be held accountable if someone gets sick due to consuming food from the public fridge? The adoption and use of technology may facilitate traceability, as highlighted by previous research, but this is left to be fully explored (Davies 2019). Several participants of this study raised concern over food safety when it comes to sharing food leftovers. Especially with the COVID-19 pandemic, almost all food leftovers end up being thrown away according to one of the participants *"…, for now, we have a pandemic. So, we avoid this one and throw all the food waste because of the pandemic"*. The issue of food safety is hardly avoidable in food bank operations, as described by one of the participants, sighting example of one incident that occurred in the past where collected food leftovers were not distributed on time due to lateness of the collection and lack of proper management, which leads to a food poisoning incident.

Participants of this study, especially employees of the food bank, expressed frustration with the overall operating model of the food bank. These employees are living with the experiences of collecting and distributing food leftovers from party venues to reduce food waste, they are longing for innovative ideas that could improve the food bank operations. In one of the respondent's words, *"…, there is no enhancing for the Project for Food sharing, we are stuck on some very narrow-minded. There are no new ideas or new visions for our work. Also, we need some very intellectual and those who have very good experience in this field"*. The food sharing process finding of this research revealed gaps in the local food sharing initiatives of food bank operations in Riyadh. In comparison to contemporary food sharing initiatives in some other part of the world, which has gone through decades of evolution in facilitating capabilities, improving the collection and distribution of edible surplus food going to landfills and redirecting such food to individuals and families in need (Davies et al. 2017b). As highlighted by previous research, a record-keeping of donors and recipients of surplus food was required to ensure food risk and safety governance. This was achieved through the use of technological systems such that beneficiaries of food leftovers are accorded similar protection as commercial food sectors like restaurants (Davies 2019). One of the new findings of this study, registering leftovers food receivers is in alignment with the previous study. Where one respondent indicated that some record-keeping is occurring in their food bank organisation for ease of distribution, in his own words. *"…, so, this sharing we make, after survey we just eh there are places and sometimes register their names, and after that make our plan for distributing this leftover"*. Although those records are presently manually kept, which provides an opportunity for the application of technology to facilitate improvement of the operations.

Food sector regulations and policies covering the prevention of food waste and permission to donate food leftovers in commercial food industries like restaurants are considered necessary by participants of this research. Edible food leftovers are not allowed to be given out in restaurants due to a lack of supportive government policies, as such, a considerable amount of food that is fit for human consumption ends up in the garbage. Most participants of this study believe that strict regulations will make a big difference in the reduction of food waste and improvement in food sharing. This belief was supported by citing examples of how the citizens abided by government regulations during the COVID-19 pandemic. In one of the participants' words, "*…, like*

covid-19 now with government… They need strict rules and regulations from the government". The need for government regulations and policies is also called for in food charity organisations like food banks, even though both entities (commercial and charity food organisations) fall under different food sector regulations. This difference was also noticed in previous research, as stated by Zurek that "…, contrary to restaurants that are subject to regular food safety and hygiene inspections, food sharing 'host' may not comply with commercial regulations." (Zurek 2016: p.681). However, concern about the increasing food waste is all over society, and the need to reduce wastage through effective food sharing initiatives is needed by employees of both restaurants and food banks in Riyadh.

Food sharing operation is considered part of regular food business operations in most developed countries. As such standard food safety regulations apply to such food-sharing activities, as noted by Hultén (2016) stated in a previous study. Food safety regulation guidelines covering, the registration of a new food sharing organisation, control, and inspections are put in place for the safety of the recipient of the food leftovers. Hultén (2016) also notion that for food safety reasons, hot or cold food leftovers can be donated to people in need as long as the hot food will be distributed within four hours of cooking and still maintain a heat level of 60 degrees Celsius, and cold food 6 degrees Celsius (Hultén et al. 2016). This concern was also shared by one of the participants, while describing why food leftovers in restaurants are not donated to individuals or food bank organisations, in the participant's words *"…, if there's a temperature increase, you would have more bacteria, the food would spoil"*. Food safety regulations and policies with controls over hot and cold food will serve as a mechanism to prevent throwing away edible food leftovers and mark the beginning of donating leftovers from restaurants to individuals and food bank organisations.

6.5 Context Oriented Findings

In this research, there were two unique findings which emerged from the analysis of the research data and influenced by the dominance of society culture.

- The show-off lifestyle common in society was an unexpected result considering the union of analysis of this research, which is Riyadh, Saudi Arabia. Being an

Arab and Islamic country and knowing that the act of pride and boastfulness is not permitted in the religion. It was surprising to find the show-off lifestyle which is said to be prevalent in society as described by most respondents. Food waste is a global phenomenon, but wasting food is clearly against the teachings of Islam, as stated in the Holy Qur'an "*…, eat and drink (freely), but do not waste verily He (Allah) does not love the wasters*" (Qur'an Chapter 7, verse 31). People will refrain from any act that will lead to wastefulness if they heed this teaching. The show-off lifestyle which is practised by many people in society to impress others and lead to more food waste generation was one of the unexpected findings of this study.

- Another unexpected finding was the restaurant management, it appears like it is all about business in most of the restaurants. Food that is served, touched or untouched if left unconsumed by the guests/customer ends up in the garbage. As a restaurant which belongs to the food industry, a global industry. The expectation was that restaurant management will participate in addressing global phenomena like food waste which is well known to have an economic, social, and environmental impact. But what has been described by some of this research respondents indicated the focus is more on the business rather than attempting to solve the problem of food waste. The concept of food sharing as a restaurant operation strategy to reduce generated food waste does not exist in all the restaurants visited, partly due to a lack of supporting regulations to share food leftovers and concern over food safety. Until regulations are formulated to enforce restaurants to participate in food waste reduction.

6.6 Chapter Summary

This chapter presents participants' everyday experiences with food waste reduction and food sharing initiatives synthesized with previous research. The revised food sharing theory of planned behaviour (R-FS-TPB) framework was presented along with the propositions post the research data analysis, where the research findings were integrated into the conceptual framework (food sharing theory of planned behaviour (FS-TPB)). Based on the respondent's lived experiences with food waste reduction and food sharing initiatives, many factors were highlighted as factors preventing food waste reduction. Among the factors highlighted are awareness about food waste and

its triple impact, socially, economically, and environmentally. The behaviour, which is another hindering factor, could be improved with a well-informed awareness campaign about food waste management. The affluent way of life, which has become a norm in society, also contributes hugely to food wastage. Despite the country shifting its economic focus and diversifying away from oil dependency, most of the people are still stuck to an affluent lifestyle which is found to be a contributing factor to food waste generation. Consistent with previous research is the adherence to culture by serving guests with surplus food much more than they can finish. Also discussed in this chapter is the unique finding of this study, the show-off lifestyle to impress guests and to appear generous.

The lack of a food sharing process was apparent as described by some of the participants, although facilitating the capabilities of food sharing operations using technology was also presented in this chapter. Food leftovers recycling was emphasized as an essential approach to the reduction of food waste. There are no supporting regulations and policies in place to encourage the donations of food leftovers from restaurants to charity organisations or individuals in need. Food leftovers that are not fit for human consumption can still be put to an alternative use. Therefore, closing, the product life cycle loop through the adoption of a circular economy as it is adopted in some parts of the world like Europe will play a significant role in putting leftovers to other beneficial use.

7 Conclusions

The preceding chapter presented the revised food sharing theory of planned behaviour (R-FS-TPB) framework which is an integration of this study's research findings, and the food sharing theory of planned behaviour (FS-TPB) framework. Factors hindering food waste reduction, behavioural and cultural, as well as factors preventing food sharing, were all discussed in the previous Chapter which also addresses this study's research questions. In this Chapter, which is the concluding Chapter of this study, the overall summary of this research, starting with the research rationale, the methodology adopted for carrying out this research, and the findings of this research will be presented.

This study's Chapter 1 provided information which includes the research background and rationale, the country context, the research questions, the aim, and the research objectives. The chapter also provided information about the research methodology, contributions, and thesis outline. Chapter 2 described in detail a review of the following body of literature, food waste, food behaviour, food culture, food systems, food sharing, and the research gap. Chapter 3 presented the development of this study's conceptual framework which guided the research. Chapter 4 described the research methodology, research design used to conduct the study, data collection approach and rationale. The chapter also provided in detail the data analysis approach. Chapter 5 presented the research findings in detail. Chapter 6 presented a synthesis of the research findings in relation to previous studies. This was described under the revised food sharing theory of planned behaviour (R-FS-TPB). Chapter 7, the last chapter focuses on the research contributions to knowledge, practice, and recommendations. The research limitations and future research were also presented in this chapter.

It seems like a never-ending problem; despite the advancement in knowledge and technology, the world is still suffering from the menace of the food waste phenomenon. One-third of the food produced globally is wasted (Lucifero 2016; Chaboud and Daviron 2017; Schanes et al. 2018). Here in Riyadh, the capital city of Saudi Arabia, and the union of analysis of this research. According to the Saudi Ministry of Environment Water & Agriculture, the wasted food is estimated to be about $13 billion annually, with about 30% of food produced in the country ending up in the garbage and contributing to environmental pollution through the emission of greenhouse gas

into the atmosphere. Previous studies globally and locally suggested several approaches to reduce food waste, with food sharing being one of such initiatives (Al-Zahrani et al. 2019; Mackenzie and Davies 2019). Food sharing seems to be an opportunity for local communities to mitigate food waste, with the growing number of restaurants. Food sharing initiatives are rapidly becoming of interest to communities in countries such as Saudi Arabia, where food waste is a significant component of solid waste overall. Therefore, this research aims to explore restaurants and food bank employees' lived experiences to understand the behavioural and cultural factors enhancing food waste generation and factors impeding effective food sharing in Riyadh, Saudi Arabia.

The literature reviewed for this study showed the previous academic work carried out in the food industry sector, quantifying food waste, explaining the driving factors behind food waste at the consumption stage, illuminating various approaches to reduce food waste, and sharing food leftovers. Multiple food cultures were highlighted in previous research, from Arab to European food cultures. However, there were limited studies on food waste reduction, especially through the lived experiences of employees working in restaurants and food banks. Thus, the study was conducted in Riyadh, Saudi Arabia, about food waste reduction through food sharing initiatives, through the lived experiences of employees, being at the forefront of the food industry business. Following the literature review chapter, a conceptual framework was developed with theory and concepts and relationships established as derived from the literature and based upon the researcher’s assumptions from the interpretation of literature and understanding of the intersubjective reality.

To answer the research questions, a semi-structured face-to-face interview was conducted with 15 purposefully selected participants who are working in the food industry business and are experienced enough to provide responses which addressed the research questions. Necessary precautions and stipulated healthcare guidelines were followed in conducting the interviews due to the COVID-19 pandemic. The collected data were transcribed and analyzed using Colaizzi’s (1978) approach, being a phenomenological study. The fundamental concepts of the hermeneutic or interpretive theoretical framework were adhered to, such as the hermeneutic circle. This implies updating our foresight (preconceived knowledge acquired through

literature or experience) with new understanding, which comes through the interpretation of a phenomenon. In this case, through interpretation of the research data gathered about food waste reduction and food sharing initiatives.

Seventeen themes were elicited from the data analysis, with some findings, unique to this research, like the show-off lifestyle common in society and becoming a way of hosting guests. Another striking finding of this research is the restaurant management, which is due to the lack of supporting policies and regulations for donating restaurants' food leftovers. Most of the leftovers are thrown away in the garbage, fit or not fit for human consumption. The research findings were integrated with the conceptual framework to produce the revised food sharing theory of planned behaviour (R-FS-TPB) which was presented in the discussion chapter. This research included the following research questions.

RQ1: What are the factors hindering food waste reduction in restaurants in Saudi Arabia as experienced by restaurant employees**?**

In response to the first research question and with careful analysis of the collected data of this study, nine major themes were elicited through the data analysis and addressed this research question. The first theme was adherence to culture. The second theme was affordability and an affluent way of life. The third theme was recycling and reuse. The fourth theme was the leftover handling process. The fifth theme was restaurant Management. The sixth theme was food order, and the seventh theme was large food portions. The eighth theme was inventory control, and the ninth theme was food management. More details were provided in Section 6.3.

RQ2: To what extent do behaviour and culture affect food waste reduction in restaurants in Saudi Arabia as experienced by restaurant employees**?**

Answering the second research question and with careful analysis of the collected data of this study, five major themes were elicited through the data analysis and addressed this research question. The first theme was throwing food away. The second theme was awareness, and the third theme was the show-off lifestyle common in society. The fourth theme was family, and the fifth theme was colleagues. More details were provided in Section 6.3.

RQ3: What are the factors preventing food bank organisations from operating effective food sharing as experienced by food bank employees**?**

In response to the third research question and with careful analysis of the collected data of this study, three major themes were elicited through the data analysis and addressed this research question. The first theme was to register leftover food receivers. The second theme was regulations and policies, and the third theme was the food sharing process. More details were provided in Section 6.4.

7.1 Contributions

The purpose of this qualitative hermeneutic phenomenological study was to explore the lived experiences of restaurants and food bank employees about food waste reduction through food sharing. To address this research purpose, the researcher explored restaurant and food bank employees' experiences related to food waste reduction through food sharing. The researcher used a phenomenological methodology and phenomenology design to conduct this study (Beck & peoples, Creswell 2013). This approach allowed the examination of the participants' lived experiences related to the studied phenomenon. The findings of this research advanced the understanding and knowledge about the behavioural and cultural factors enhancing food waste generation and factors impeding effective food sharing. The following section describes the contribution to knowledge and practice.

7.1.1 Contribution to Knowledge

The theory of planned behaviour (TPB) (Ajzen 1991) provided the conceptual framework for this research. Previous studies on food waste reduction through food sharing have shown that food waste generation is on the rise (Falcone and Imbert 2017; Michelini et al. 2018; Morone et al. 2018; Sakaguchi et al. 2018; Filimonau and De Coteau 2019). Particularly, Saudi Arabia is experiencing a huge food waste generation which is costing the country about $13 billion annually to manage the waste generated (Baig et al. 2018b). Therefore, the purpose of this research was to explore the lived experiences of restaurants and food bank employees about food waste reduction through food sharing.

The theory of planned behaviour (TPB) was chosen to provide the conceptual framework for this research because previous literature has adopted TPB and added various predictors to increase the understanding of consumer behaviour. Such as the consumer behavioural approach to food waste (Aktas et al. 2018), what influences consumer food waste behaviour in restaurants (Coşkun and Özbük 2020), waste or not to waste, exploring motivational factors of Gen Z hospitality employees towards food wastage (Goh and Jie 2019), or determinants of consumers food-management behaviour (Soorani and Ahmadvand 2019). The revised food sharing theory of planned behaviour (R-FS-TPB) has provided much insight into the effect of behaviour and culture on modified constructs of the TPB which are the findings of this research. The study's findings show that food behaviour and culture contribute to adherence to culture, affordability, an affluent way of life, and throwing food away. Managing food waste generation depends on consumer food behaviour (Ajzen 1991). The themes of adherence to culture, and affordability, an affluent way of life, aligned with the theory of planned behaviour (TPB) guidance that an individual may succeed in carrying out a particular behaviour under a given circumstance to perform the behaviour (Ajzen 1991).

Several scholars have conducted research in Saudi Arabia on the causes and impacts of food waste. But none has explored the lived experiences of the frontline workers in the food industry about food waste reduction through food sharing through phenomenological research. The adopted research methodology is an essential contribution to the study of food waste reduction considering the cultural conservativeness of the society. Another significant contribution made by the study is the unique findings. Firstly, the show-off lifestyle of hosting guests with surplus food just to appear generous. Secondly, the restaurant management finding, whereby food leftovers are thrown away if the customer pays for them, due to a lack of supporting regulations to share or donate food leftovers. The uniqueness of these two findings could provide opportunities for a remedy to the phenomenon. By developing a new business model which accommodates cultural practices and well-formulated regulations that allows the sharing of food leftovers in restaurants.

This study also provided valuable insights into how food banks collect and distribute food leftovers from parties and other event venues. Despite the level of technological

adoption in the Kingdom of Saudi Arabia, there are still ample opportunities made known through this study to leverage the capabilities of technology to facilitate an effective and efficient food-sharing initiative. It is worth mentioning that this study also contributes to knowledge by reinforcing previous research, the findings on the impact of culture on food waste, and the need for an awareness program as a way to enlighten citizens and customers on the impact of food waste, socially, economically and environmentally (Baig et al. 2018a; Baig et al. 2018b; Al-Zahrani et al. 2019).

7.1.2 Recommendations For Practice

Food is continuously wasted, and an enormous amount of food leftovers are distributed to the needy by food bank organisations. This whole process of food wastage, collection, and distribution has become mechanical and routine. Volunteers are making continuous efforts, in private sectors, countries, and at the global level through the likes of the Food and Agriculture Organisation (FAO), to curb the increasing food waste. Knowing the paradoxical nature of the phenomenon, where food waste is increasing in some places, and people are starving due to a lack of sufficient food in other places. These entities' efforts are yet to yield a positive outcome in terms of food waste reduction. This research produces findings that are unique and findings that corroborate previous studies. The following are the practical recommendations of this study, which address some of the findings hindering effective food sharing that could lead to food waste reduction.

7.1.2.1 Adjusting Food Portioning

Despite all that is known about food waste management, one of the popularly adopted food waste reduction measures is still behavioural change (Strotmann et al. 2017). Due to human behaviour's automatic and intuitive nature, the provision of information that requires cognitive effort and deliberation is often found not enough to alter behaviour (Lehner et al. 2016). Changes in customer/citizen behaviour are not only complementary to strategic food waste reduction solutions but essential for a successful outcome of any given strategy. Meanwhile, nudging, a practical approach for stimulating changes in "context-specific behaviour" (Lehner et al. 2016: p.166), is said to "…, primarily tap into the context model of behavioural change." (Närvänen et al. 2020: p.65). Adjusting food portions in restaurants can significantly impact food

waste reduction, but only if introduced systematically, which is where a behavioural approach through nudging can lead to an impactful strategic change.

One of the findings of this research emphasized that adjusting food portions in restaurants is one way of reducing food wastage and echoed by many respondents of this research. A predictable outcome triggered by a change in the environment that stimulates people's choices and behaviour is said to be a nudge (de Visser-Amundson and Kleijnen 2020). In restaurants today, customers are used to being served with big plates or having an extensive buffet or big salad bowls. These can be changed by altering the customers' behaviour by nudging them towards a new way of being served in restaurants. Business owners will need to make an impactful contribution to food waste reduction. Part of such a decision is to introduce the use of smaller plates in serving customers and tray-less restaurants to avoid stacking food that ends up in the garbage.

7.1.2.2 Incentivizing Food Waste Prevention

There are various types of loyalty programs targeted to specific customer segments; according to Berman, "…, loyalty programs are offered by both retailers and manufacturers to stimulate continued patronage among consumers through discounts, cash, free goods, or special services." (Berman 2006: p.123). Businesses over several decades have used loyalty programs to increase sales and retain loyal customers.

Loyalty programs also exist in the food industry with the same purpose of increasing sales and retaining customers. Practitioners in the food industry can play a significant role in food waste reduction by shifting away from the legacy loyalty program of spending more and earning more points to a loyalty program focused on incentivizing their customers to make efforts toward food waste reduction.

7.1.2.3 Optimize Food Sharing Initiatives

The Kingdom is said to have benefitted from information and communication technologies (ICT) in transforming business organisations and positioning the country on the global world economic map (AlBar and Hoque 2019). The benefit of technology-facilitated sharing can be seen in other parts of the world. It facilitates information

dissemination about the collection and distribution of food leftovers and connects donors to charity organisations of food sharing activities (Davies et al. 2017a).

In this research finding, the food-sharing process represents empirical data to aid business practitioners in leveraging technological capabilities to facilitate a fully functional food-sharing operation. This will essentially provide broader coverage in terms of overall food-sharing activities. Using technology as an enabler, faster food sharing operations will be realized, where party or wedding venues will easily be identified for food leftovers collection and locating people in need by using digital technology will extend the overall food sharing activities. Thus, changing the destination of food toward the people in need instead of garbage (Davies 2019). Another essential aspect to consider is creating a food centre, a single point for distributing food leftovers, although some people may feel embarrassed to be seen in such centres (Harvey et al. 2020). Therefore, proper arrangements need to be made to protect the dignity of the food recipients.

7.1.2.4 Awareness Program

Participants of this study opined that food waste management awareness needs to begin from early school, emphasizing that the earlier the younger generation becomes aware of the impact of food waste, the sooner it becomes part of their way of life to prevent it from happening. It may be easy to launch an awareness campaign, but an awareness program that lacks effective measures directed toward behavioural change may not produce the expected outcome (van Geffen et al. 2020). Awareness campaigns intended to address food waste reduction need to target the right audience with the right message.

Islamic teachings should be included in the awareness campaign, being an Islamic country. Such as the verse of the Holy Quran [7:31], where Allah says

> *"O children of Adam! Wear your beautiful apparel at every time and place of prayer: eat and drink: but waste not by excess for Allah loveth not the wasters" Quran [7:31]*

This study's awareness finding empirically supports practitioners to develop a comprehensive food waste reduction awareness campaign that should be delivered through multiple channels, like mass media, social media, websites, exhibitions and talks in schools and through third parties (Zamri et al. 2020).

7.1.2.5 Regulations and Policy

Government regulations and policies especially regarding food waste management and sharing food leftovers in restaurants will significantly impact the actualization of all of the above business contributions. One of this study's participants suggested that like how COVID-19 was handled, a huge impact will be made in food waste reduction and the distribution of food leftovers if the government formulates well-developed policies and regulations.

One of the unique findings of this research is restaurant management, which lacks the necessary policies that will allow restaurants to share edible food leftovers. Therefore, if the customer pays, the food leftovers are still fit for human consumption. The leftovers will still be thrown away in good condition because restaurants do not have municipality permission to donate food leftovers to individuals or organisations.

The objective of a policy is to authorize and grant permission; a policy on food waste reduction and food leftovers donation is highly required. The regulations and policies findings of this study could have a potential impact on restaurants and charity food organisations (food banks), as such practitioners in the food industry need to push for the inclusion of the following into food waste management regulations and policies:

Registration: registration systems should be mandatory for food donors, recipients, and charity organisations involved in food-sharing activities to facilitate control and traceability of food collection and distribution activities.

Control: Regular inspection of food business operators by government food authority organisation, and ready to penalize any food business operator if found violating food safety regulations.

Cooked food: Donors (restaurants, party/wedding venues) and distributors (food banks) of hot or cold food need to abide by food safety standards of ensuring that the heat/cold level is within an acceptable range of 60 degrees Celsius for hot food and 6 degrees Celsius for cold food (Hultén et al. 2016).

7.2 Limitations and Further Research

This DBA research was intended to address the problem of increasing food waste generation despite available food sharing initiatives by seeking to understand the behavioural and cultural factors enhancing food waste generation and factors impeding effective food sharing. This study contributed to knowledge by addressing the gap in research regarding behavioural and cultural factors enhancing food waste generation, and factors impeding effective food sharing initiatives. The findings of this research provide opportunities to practitioners through the application of some of this study's recommendations to achieve effective food sharing to reduce food waste generation. Similarly, the findings uncovered in this research could be further examined by researchers to achieve reduced food waste generation.

Due to the highly culture-oriented nature of society, caution needs to be taken in formulating sustainable food waste management regulations and policies and the effect on culture should be explored in future research. Furthermore, leveraging the family-oriented nature of society in developing sustainable food waste management practices, the role of culture on recycling and reuse should be examined in future research. This research has demonstrated that culture has a significant influence on food waste generation and a show-off attitude is one of the resultant outcomes. Other important factors to explore are age, geographical regions, and social status influence on the intersection of show-off lifestyle on adherence to culture. Affordability and an affluent way of life are having a strong purchasing power and displaying it, the intersection with adherence to culture and the effect on food waste reduction should be examined in future research.

The data collected in this research revealed the impact of behaviour and culture on rising food waste generation. The themes of adherence to culture, affordability, an affluent way of life, and a show-off lifestyle are very revealing findings of this study,

which provided more insight into how people are holding on to culture while living their lives. Through these findings, practitioners may explore a way for people to retain their culture and reduce food waste generation. This study's data was collected in the peak year of COVID-19, which affected the seating arrangement of the face-to-face interview conducted. In complying with healthcare safety regulations, both researcher and participants had to wear face masks throughout the interview session, which prevented some facial cues from being observed by the researcher. It is also worth mentioning that the access challenges to interview participants could be due to ensuring no physical contact as COVID-19 was still ongoing at the time of data collection.

There was no gender diversity in this research because all the participants were male. Therefore, this study is limited in terms of collecting data from female participants. The findings are based on a limited sample size of 15 participants. Even though, a sample size range of "3 to 10" participants is considered appropriate for phenomenological research (Creswell and Creswell 2017). Furthermore, phenomenological research is not seeking to generalize findings but to illuminate the human experience of phenomena (Hycner 1985).

Being hermeneutic phenomenological research, with a theoretical framework that supports preconceived knowledge not to be bracketed during data analysis. Caution needs to be considered not to weigh in too much on preconceived knowledge. Food waste occurs in many places, in restaurants, hotels, at home, retail shops, etc., this research data was collected from employees working in restaurants and food banks only, further research could explore the lived experiences of workers from other sources of food waste to gain more understanding of the phenomenon.

Further research about food sharing initiatives in a comparative manner among the Gulf Cooperation Council (GCC) to gain more insight into the countries' behavioural differences. Finally, the findings of this study are based on the lived experiences of the participants, being a phenomenological study. Further research could use other research approaches to further deepen the understanding of food waste reduction through food sharing initiatives.

8 References

Abdelradi, F. (2018) Food waste behaviour at the household level: A conceptual framework. *Waste Management* 71, 485-493.

Abeliotis, K., Lasaridi, K. and Chroni, C. (2014) Attitudes and behaviour of Greek households regarding food waste prevention. *Waste Management & Research* 32 (3), 237-240.

Abiad, M. G. and Meho, L. I. (2018) Food loss and food waste research in the Arab world: a systematic review. *Food Security* 10 (2), 311-322.

Acquier, A., Carbone, V. and Massé, D. (2019) How to Create Value(s) i n the Sharing Economy: Business Models, Scalability, and Sustainability. *Sharing* 9 (2), 5-24.

Ajzen, I. (1991) The theory of planned behavior. *Organizational behavior and human decision processes* 50 (2), 179-211.

Ajzen, I. (2015) Consumer attitudes and behavior: the theory of planned behavior applied to food consumption decisions. *Italian Review of Agricultural Economics* 70 (2), 121-138.

Aktas, E., Sahin, H., Topaloglu, Z., Oledinma, A., Huda, A. K. S., Irani, Z., Sharif, A. M., van't Wout, T. and Kamrava, M. (2018) A consumer behavioural approach to food waste. *Journal of Enterprise Information Management*.

Al-Zahrani, K. H., Baig, M. B. and Straquadine, G. S. (2019) Food Waste in the Kingdom of Saudi Arabia: Implications for Extension Education. *Climate Change, Food Security and Natural Resource Management.* Springer. 73-101.

AlBar, A. M. and Hoque, M. R. (2019) Factors affecting the adoption of information and communication technology in small and medium enterprises: A perspective from rural Saudi Arabia. *Information Technology for Development* 25 (4), 715-738.

Alexandratos, N. and Bruinsma, J. (2012) World agriculture towards 2030/2050: the 2012 revision.

Allahyari, R. A. and Poppendieck, J. (1999) *Sweet Charity? Emergency Food and the End of Entitlement*. Washington, American Sociological Association.

Allen, T. and Prosperi, P. (2016) Modeling sustainable food systems. *Environmental Management* 57 (5), 956-975.

Allwood, J. M. (2014) Squaring the circular economy: the role of recycling within a hierarchy of material management strategies. *Handbook of recycling.* Elsevier. 445-477.

Askegaard, S. and Madsen, T. K. (1995) *European food cultures: An exploratory analysis of food related preferences and behaviour in European regions.* Markedsstyret Proces- og Produkt Innovation i Fødevaresektoren, Institut for ….

Askegaard, S. and Madsen, T. K. (1998) The local and the global: exploring traits of homogeneity and heterogeneity in European food cultures. *International Business Review* 7 (6), 549-568.

Ayres, R. U. and Kneese, A. V. (1969) Production, consumption, and externalities. *The American Economic Review* 59 (3), 282-297.

Baig, M. B., Al-Zahrani, K. H., Schneider, F., Straquadine, G. S. and Mourad, M. (2018a) Food waste posing a serious threat to sustainability in the Kingdom of Saudi Arabia – A systematic review. *Saudi Journal of Biological Sciences*.

Baig, M. B., Gorski, I. and Neff, R. A. (2018b) Understanding and addressing waste of food in the Kingdom of Saudi Arabia. *Saudi Journal of Biological Sciences*.

Baig, M. B. and Straquadine, G. S. (2014) Sustainable agriculture and rural development in the Kingdom of Saudi Arabia: implications for agricultural extension and education. *Vulnerability of agriculture, water and fisheries to climate change.* Springer. 101-116.

Bajželj, B., Quested, T. E., Röös, E. and Swannell, R. P. J. (2020) The role of reducing food waste for resilient food systems. *Ecosystem Services* 45, 101140.

Barnes, S. and Mattsson, J. Understanding Current and Future Issues in Collaborative Consumption.

Barrett, J. and Scott, K. (2012) Link between climate change mitigation and resource efficiency: A UK case study. *Global Environmental Change* 22 (1), 299-307.

Beck, C. T. (2019) *Introduction to Phenomenology: Focus on Methodology.* SAGE Publications, Incorporated.

Belk, R. (2014) Sharing versus pseudo-sharing in Web 2.0. *The Anthropologist* 18 (1), 7-23.

Bell, E., Bryman, A. and Harley, B. (2018) *Business research methods.* Oxford university press.

Berman, B. (2006) Developing an effective customer loyalty program. *California management review* 49 (1), 123-148.

Bharucha, J. (2018) Tackling the challenges of reducing and managing food waste in Mumbai restaurants. *British Food Journal* 120 (3), 639-649.

Blake, L. I., Halim, F. A., Gray, C., Gray, N. D., Mair, R., Manning, D. A. C., Sallis, P. and Hutchinson, H. (2017) Evaluating an anaerobic digestion (AD) feedstock derived from a novel non-source segregated municipal solid waste (MSW) product. *Waste Management* 59, 149-159.

Block, L. G., Keller, P. A., Vallen, B., Williamson, S., Birau, M. M., Grinstein, A., Haws, K. L., LaBarge, M. C., Lamberton, C. and Moore, E. S. (2016) The squander sequence: understanding food waste at each stage of the consumer decision-making process. *Journal of Public Policy & Marketing* 35 (2), 292-304.

Borrello, M., Caracciolo, F., Lombardi, A., Pascucci, S. and Cembalo, L. (2017) Consumers' Perspective on Circular Economy Strategy for Reducing Food Waste. *Sustainability* 9 (1), 141.

Bowen, W. H. (2014) The History of Saudi Arabia.

Brand, K.-W. (2010) *Social practices and sustainable consumption: Benefits and limitations of a new theoretical approach.* Springer.

Béné, C., Oosterveer, P., Lamotte, L., Brouwer, I. D., de Haan, S., Prager, S. D., Talsma, E. F. and Khoury, C. K. (2019) When food systems meet sustainability–Current narratives and implications for actions. *World Development* 113, 116-130.

Caraher, M. and Furey, S. (2017) Is it appropriate to use surplus food to feed people in hunger? Short-term Band-Aid to more deep rooted problems of poverty.

Carter, S. M. and Little, M. (2007) Justifying knowledge, justifying method, taking action: Epistemologies, methodologies, and methods in qualitative research. *Qualitative health research* 17 (10), 1316-1328.

Cassell, C., Cunliffe, A. L. and Grandy, G. (2017) *The SAGE handbook of qualitative business and management research methods.* Sage.

Chaboud, G. and Daviron, B. (2017) Food losses and waste: navigating the inconsistencies. *Global Food Security* 12, 1-7.

Ciaghi, A. and Villafiorita, A. Beyond food sharing: Supporting food waste reduction with ICTs. 2016. IEEE.

Codagnone, C., Biagi, F. and Abadie, F. (2016) The passions and the interests: Unpacking the'sharing economy'. *Institute for Prospective Technological Studies, JRC Science for Policy Report*.

Coşkun, A. and Özbük, R. M. Y. (2020) What influences consumer food waste behavior in restaurants? An application of the extended theory of planned behavior. *Waste Management* 117, 170-178.

Creswell, J. W. and Creswell, J. D. (2017) *Research design: Qualitative, quantitative, and mixed methods approaches.* Sage publications.

Creswell, J. W. and Poth, C. N. (2016) *Qualitative inquiry and research design: Choosing among five approaches.* Sage publications.

Crotty, M. (1998) *The foundations of social research: meaning and perspective in the research process.* London: SAGE.

Cucciniello, R. and Cespi, D. (2018) Recycling within the Chemical Industry: The Circular Economy Era. *Recycling* 3 (2), 22.

Davies, A. R. (2019) *Urban food sharing: Rules, tools and networks.* Policy Press.

Davies, A. R., Cretella, A. and Franck, V. (2019) Food Sharing Initiatives and Food Democracy: Practice and Policy in Three European Cities. *Politics and Governance* 7 (4), 8-20.

Davies, A. R., Edwards, F., Marovelli, B., Morrow, O., Rut, M. and Weymes, M. (2017a) Creative construction: crafting, negotiating and performing urban food sharing landscapes. *Area* 49 (4), 510-518.

Davies, A. R., Edwards, F., Marovelli, B., Morrow, O., Rut, M. and Weymes, M. (2017b) Making visible: Interrogating the performance of food sharing across 100 urban areas. *Geoforum* 86, 136-149.

De Boeck, E., Jacxsens, L., Goubert, H. and Uyttendaele, M. (2017) Ensuring food safety in food donations: case study of the Belgian donation/acceptation chain. *Food Research International* 100, 137-149.

de Visser-Amundson, A. and Kleijnen, M. (2020) Nudging in food waste management: Where sustainability meets cost-effectiveness. *Food waste management.* Springer. 57-87.

Djekic, I., Djekic, S., Miloradovic, Z. and Tomasevic, I. (2019) Household food waste in Serbia – Attitudes, quantities and global warming potential. *Journal of Cleaner Production* 229, 44-52.

El Hanandeh, A. (2013) Quantifying the carbon footprint of religious tourism: the case of Hajj. *Journal of Cleaner Production* 52, 53-60.

Elshaer, I., Sobaih, A. E. E., Alyahya, M. and Abu Elnasr, A. (2021) The Impact of Religiosity and Food Consumption Culture on Food Waste Intention in Saudi Arabia. *Sustainability* 13 (11), 6473.

Eriksson, M., Eriksson, E., Persson Osowski, C., Björkman, J., Hansson, E., Malefors, C. and Ghosh, R. (2018) The tree structure — A general framework for food waste quantification in food services. *Resources, Conservation & Recycling* 130, 140-151.

Eriksson, M., Strid, I., Hansson, P.-A. and Sveriges, l. (2015) Carbon footprint of food waste management options in the waste hierarchy – a Swedish case study. *Journal of Cleaner Production* 93, 115-125.

Esmaeilian, B., Wang, B., Lewis, K., Duarte, F., Ratti, C. and Behdad, S. (2018) The future of waste management in smart and sustainable cities: A review and concept paper. *Waste Management* 81, 177-195.

Evans, D. M. (2014) *Food waste: Home consumption, material culture and everyday life.* Bloomsbury publishing.
Falcone, P. M. and Imbert, E. (2017) Bringing a sharing economy approach into the food sector: The potential of food sharing for reducing food waste. *Food waste reduction and valorisation.* Springer. 197-214.
FAO (2012) *Global Trends and Future Challenges for the Work of the Organization*. USA: Food and Agricultural Organization of the United Nations (FAO).
Fieldhouse, P. (2013) *Food and nutrition: customs and culture.* Springer.
Filimonau, V. and De Coteau, D. A. (2019) Food waste management in hospitality operations: A critical review. *Tourism Management* 71, 234-245.
Filimonau, V., Krivcova, M. and Pettit, F. (2019) An exploratory study of managerial approaches to food waste mitigation in coffee shops. *International Journal of Hospitality Management* 76, 48-57.
Frenken, K. and Schor, J. (2019) Putting the sharing economy into perspective. *A research agenda for sustainable consumption governance.* Edward Elgar Publishing.
Gaiani, S., Caldeira, S., Adorno, V., Segrè, A. and Vittuari, M. (2018) Food wasters: Profiling consumers' attitude to waste food in Italy. *Waste Management* 72, 17-24.
Galbraith, J. K. (1998) *The affluent society.* Houghton Mifflin Harcourt.
Galli, F., Cavicchi, A. and Brunori, G. (2019) Food waste reduction and food poverty alleviation: a system dynamics conceptual model. *Agriculture and Human Values* 36 (2), 289-300.
Ganglbauer, E., Fitzpatrick, G., Subasi, Ö. and Güldenpfennig, F. Think globally, act locally: a case study of a free food sharing community and social networking. 2014. ACM.
Garnsey, P. (1999) *Food and society in classical antiquity.* Cambridge University Press.
Garrone, P., Melacini, M., Perego, A. and Sert, S. (2016) Reducing food waste in food manufacturing companies. *Journal of Cleaner Production* 137, 1076-1085.
Geissdoerfer, M., Savaget, P., Bocken, N. M. P. and Hultink, E. J. (2017) The Circular Economy – A new sustainability paradigm? *Journal of Cleaner Production* 143, 757-768.
Ghisellini, P., Cialani, C. and Ulgiati, S. (2016) A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner production* 114, 11-32.
Gjerris, M. and Gaiani, S. (2013) Household food waste in Nordic countries: Estimations and ethical implications. *Etikk i praksis-Nordic Journal of Applied Ethics* (1), 6-23.
Godfray, H. C. J. and Garnett, T. (2014) Food security and sustainable intensification. *Philosophical transactions of the Royal Society B: biological sciences* 369 (1639), 20120273.
Goh, E. and Jie, F. (2019) To waste or not to waste: Exploring motivational factors of Generation Z hospitality employees towards food wastage in the hospitality industry. *International Journal of Hospitality Management* 80, 126-135.
Gomiero, T. (2016) Soil degradation, land scarcity and food security: Reviewing a complex challenge. *Sustainability* 8 (3), 281.
Gori, P., Parcu, P. L. and Stasi, M. (2015) Smart cities and sharing economy. *Robert Schuman Centre for advanced studies research paper no. RSCAS* 96.
Graham-Rowe, E., Jessop, D. C. and Sparks, P. (2014) Identifying motivations and barriers to minimising household food waste. *Resources, Conservation & Recycling* 84, 15-23.

Graham-Rowe, E., Jessop, D. C. and Sparks, P. (2015) Predicting household food waste reduction using an extended theory of planned behaviour. *Resources, Conservation & Recycling* 101, 194-202.
Grant, M. (2015) A food systems approach for food and nutrition security. *Sight and Life* 29 (1), 87-90.
Gray, D. E. (2014) *Doing research in the real world.* Vol. Third. London: SAGE Publications Ltd.
Grindle, A. K., Siddiqi, A. and Anadon, L. D. (2015) Food security amidst water scarcity: Insights on sustainable food production from Saudi Arabia. *Sustainable Production and Consumption* 2, 67-78.
Grosso, M., Motta, A. and Rigamonti, L. (2010) Efficiency of energy recovery from waste incineration, in the light of the new Waste Framework Directive. *Waste Management* 30 (7), 1238-1243.
Gustafsson, J., Cederberg, C., Sonesson, U. and Emanuelsson, A. (2013) *The methodology of the FAO study: Global Food Losses and Food Waste-extent, causes and prevention"-FAO, 2011*. SIK Institutet för livsmedel och bioteknik.
Guyader, H. (2018) No one rides for free! Three styles of collaborative consumption. *Journal of Services Marketing*.
Haddad, L., Hawkes, C., Waage, J., Webb, P., Godfray, C. and Toulmin, C. (2016) Food systems and diets: Facing the challenges of the 21st century.
Hadidi, L. A. and Omer, M. M. (2017) A financial feasibility model of gasification and anaerobic digestion waste-to-energy (WTE) plants in Saudi Arabia. *Waste Management* 59, 90-101.
Halloran, A., Clement, J., Kornum, N., Bucatariu, C. and Magid, J. (2014) Addressing food waste reduction in Denmark. *Food Policy* 49, 294-301.
Hamari, J., Sjöklint, M. and Ukkonen, A. (2016) The sharing economy: Why people participate in collaborative consumption. *Journal of the association for information science and technology* 67 (9), 2047-2059.
Hargreaves, T. (2011) Practice-ing behaviour change: Applying social practice theory to pro-environmental behaviour change. *Journal of consumer culture* 11 (1), 79-99.
Harvey, J., Smith, A., Goulding, J. and Illodo, I. B. (2020) Food sharing, redistribution, and waste reduction via mobile applications: A social network analysis. *Industrial Marketing Management* 88, 437-448.
Hebrok, M. and Boks, C. (2017a) Household food waste: Drivers and potential intervention points for design – An extensive review. *Journal of Cleaner Production* 151, 380-392.
Hebrok, M. and Boks, C. (2017b) Household food waste: Drivers and potential intervention points for design–An extensive review. *Journal of Cleaner Production* 151, 380-392.
Heinzelmann, U. (2008) *Food culture in Germany.* Greenwood Publishing Group.
Hermansen, M. E. T. (2012) Creating Terroir.. An Anthropological Perspective on New Nordic Cuisine as an Expression of Nordic Identity. *Anthropology of food* (S7).
Hong, I., Park, S., Lee, B., Lee, J., Jeong, D. and Park, S. (2014) IoT-Based Smart Garbage System for Efficient Food Waste Management. *Scientific World Journal* 2014, 646953-13.
Hornik, J., Cherian, J. and Madansky, M. (1995) Determinants of recycling behavior: A synthesis of research results. *The Journal of Socio-Economics* 24 (1), 105-127.

Huang, C.-H., Liu, S.-M. and Hsu, N.-Y. (2020) Understanding global food surplus and food waste to tackle economic and environmental sustainability. *Sustainability* 12 (7), 2892.
Hultén, J., Hanssen, O. J., Stenmarck, Å., Silvennoinen, K., Aare, A. K., Werge, M. and Gram-Hanssen, I. (2016) *Food Redistribution in the Nordic Region.* Nordic Council of Ministers.
Husserl, E. (2012) *Ideas: General introduction to pure phenomenology.* Routledge.
Hycner, R. H. (1985) Some guidelines for the phenomenological analysis of interview data. *Human studies* 8 (3), 279-303.
Jr, B. D. (2018) Middle East becoming more aware of food waste impact, survey shows. *Arabianbusiness.com*,
Kibler, K. M., Reinhart, D., Hawkins, C., Motlagh, A. M. and Wright, J. (2018) Food waste and the food-energy-water nexus: A review of food waste management alternatives. *Waste Management* 74, 52-62.
King, N., Horrocks, C. and Brooks, J. (2018) *Interviews in qualitative research.* SAGE Publications Limited.
Larsen, H. G. and Adu, P. (2021) *The Theoretical Framework in Phenomenological Research: Development and Application.* Routledge.
Lawrence, L. (2008) *Making Art and Commerce Thrive In The Hybrid Economy*.
Lazell, J. (2016) Consumer food waste behaviour in universities: Sharing as a means of prevention. *Journal of Consumer Behaviour* 15 (5), 430-439.
Leal Filho, W. and Kovaleva, M. (2015) *Food waste and sustainable food waste management in the Baltic Sea Region.* Springer.
Lehner, M., Mont, O. and Heiskanen, E. (2016) Nudging–A promising tool for sustainable consumption behaviour? *Journal of Cleaner Production* 134, 166-177.
Lehtokunnas, T., Mattila, M., Närvänen, E. and Mesiranta, N. (2020) Towards a circular economy in food consumption: Food waste reduction practices as ethical work. *Journal of Consumer Culture*, 1469540520926252.
Leray, L., Sahakian, M. and Erkman, S. (2016) Understanding household food metabolism: Relating micro-level material flow analysis to consumption practices. *Journal of Cleaner Production* 125, 44-55.
Lieder, M. and Rashid, A. (2016) Towards circular economy implementation: a comprehensive review in context of manufacturing industry. *Journal of cleaner production* 115, 36-51.
Lorenz, B. A., Hartmann, M., Hirsch, S., Kanz, O. and Langen, N. (2017) Determinants of plate leftovers in one German catering company. *Sustainability* 9 (5), 807.
Lorenz, S. (2012) Socio-ecological consequences of charitable food assistance in the affluent society: the German Tafel. *International Journal of Sociology and Social Policy*.
Lovelle, M. (2015) Food and water security in the Kingdom of Saudi Arabia. *Future Directions International* 28.
Lucifero, N. (2016) Food loss and waste in the EU law between sustainability of well-being and the implications on food system and on environment. *Agriculture and Agricultural Science Procedia* 8, 282-289.
Lèbre, É., Corder, G. and Golev, A. (2017) The role of the mining industry in a circular economy: a framework for resource management at the mine site level. *Journal of Industrial Ecology* 21 (3), 662-672.
MacArthur, E. (2013) Towards the circular economy. *Journal of Industrial Ecology* 2, 23-44.

MacDonald, R. and Reitmeier, C. (2017) *Understanding Food Systems: Agriculture, Food Science, and Nutrition in the United States.* Academic Press.
Mackenzie, S. G. and Davies, A. R. (2019) SHARE IT: Co-designing a sustainability impact assessment framework for urban food sharing initiatives. *Environmental impact assessment review* 79, 106300.
Mair, J. and Reischauer, G. (2017) Capturing the dynamics of the sharing economy: Institutional research on the plural forms and practices of sharing economy organizations. *Technological Forecasting & Social Change* 125, 11-20.
Mak, T. M. W., Yu, I. K. M., Tsang, D. C. W., Hsu, S. C. and Poon, C. S. (2018) Promoting food waste recycling in the commercial and industrial sector by extending the Theory of Planned Behaviour: A Hong Kong case study. *Journal of Cleaner Production* 204, 1034-1043.
Marovelli, B. (2019) Cooking and eating together in London: Food sharing initiatives as collective spaces of encounter. *Geoforum* 99, 190-201.
Martin-Rios, C., Demen-Meier, C., Gössling, S. and Cornuz, C. (2018) Food waste management innovations in the foodservice industry. *Waste Management* 79, 196-206.
Matus, K. J. M., Xiao, X. and Zimmerman, J. B. (2012) Green chemistry and green engineering in China: drivers, policies and barriers to innovation. *Journal of Cleaner Production* 32, 193-203.
Maxwell, J. A. (2012) *Qualitative research design: An interactive approach.* Sage publications.
McCusker, K. and Gunaydin, S. (2015) Research using qualitative, quantitative or mixed methods and choice based on the research. *Perfusion* 30 (7), 537-542.
Merriam, S. B. and Grenier, R. S. (2019) *Qualitative research in practice: Examples for discussion and analysis.* John Wiley & Sons.
Michelini, L., Principato, L. and Iasevoli, G. (2018) Understanding Food Sharing Models to Tackle Sustainability Challenges. *Ecological Economics* 145, 205-217.
Miles, M. B., Huberman, A. M. and Saldaña, J. (2018) *Qualitative data analysis: A methods sourcebook.* Sage publications.
Mirabella, N., Castellani, V. and Sala, S. (2014) Current options for the valorization of food manufacturing waste: a review. *Journal of Cleaner Production* 65, 28-41.
Misra, D., Das, G., Chakrabortty, T. and Das, D. (2018) An IoT-based waste management system monitored by cloud. *Journal of Material Cycles and Waste Management* 20 (3), 1574-1582.
Mondéjar-Jiménez, J.-A., Ferrari, G., Secondi, L. and Principato, L. (2016) From the table to waste: An exploratory study on behaviour towards food waste of Spanish and Italian youths. *Journal of Cleaner Production* 138, 8-18.
Morone, A., Morone, P., Falcone, P. M. and Imbert, E. (2018) Does food sharing lead to food waste reduction? An experimental analysis to assess challenges and opportunities of a new consumption model. *Journal of Cleaner Production* 185, 749-760.
Morrow, O. (2019a) Sharing food and risk in Berlin's urban food commons. *Geoforum* 99, 202.
Morrow, O. (2019b) Sharing food and risk in Berlin’s urban food commons. *Geoforum* 99, 202-212.
Moult, J. A., Allan, S. R., Hewitt, C. N. and Berners-Lee, M. (2018) Greenhouse gas emissions of food waste disposal options for UK retailers. *Food Policy* 77, 50-58.

Mourad, M. (2016) Recycling, recovering and preventing “food waste”: competing solutions for food systems sustainability in the United States and France. *Journal of Cleaner Production* 126, 461-477.
Moustakas, C. (1994) *Phenomenological research methods.* Sage publications.
Muthu, S. S. (2018) *Circular Economy in Textiles and Apparel: Processing, Manufacturing, and Design.* Woodhead Publishing.
Mu’azu, N. D., Blaisi, N. I., Naji, A. A., Abdel-Magid, I. M. and AlQahtany, A. (2018) Food waste management current practices and sustainable future approaches: a Saudi Arabian perspectives. *Journal of Material Cycles and Waste Management*.
Mylan, J., Holmes, H. and Paddock, J. (2016) Re-introducing consumption to the ‘circular economy’: A sociotechnical analysis of domestic food provisioning. *Sustainability* 8 (8), 794.
Nellemann, C. and MacDevette, M. (2009) *The environmental food crisis: the environment's role in averting future food crises: a UNEP rapid response assessment.* UNEP/Earthprint.
Nelson, S. (2018) ONE MAN'S TRASH: HOW BLOCKCHAIN CAN TARGET FOOD WASTE TO HELP END WORLD HUNGER. 73(3), 28.
Ng, B. J. H., Mao, Y., Chen, C.-L., Rajagopal, R. and Wang, J.-Y. (2017) Municipal food waste management in Singapore: practices, challenges and recommendations. *Journal of Material Cycles and Waste Management* 19 (1), 560-569.
Närvänen, E., Mesiranta, N., Mattila, M. and Heikkinen, A. (2020) *Food Waste Management.* Springer. 3030205614.
Ouda, O. K. M., Raza, S. A., Nizami, A. S., Rehan, M., Al-Waked, R. and Korres, N. E. (2016) Waste to energy potential: a case study of Saudi Arabia. *Renewable and Sustainable Energy Reviews* 61, 328-340.
O’Donnell, T. H., Deutsch, J., Yungmann, C., Zeitz, A. and Katz, S. H. (2015) New Sustainable Market Opportunities for Surplus Food: A Food System-Sensitive Methodology (FSSM). *Food and Nutrition Sciences* 6 (10), 883-892.
Palgan, Y. V., Zvolska, L. and Mont, O. (2017) Sustainability framings of accommodation sharing. *Environmental Innovation and Societal Transitions* 23, 70-83.
Papargyropoulou, E., Lozano, R., K. Steinberger, J., Wright, N. and Ujang, Z. b. (2014) The food waste hierarchy as a framework for the management of food surplus and food waste. *Journal of Cleaner Production* 76, 106-115.
Papargyropoulou, E., Wright, N., Lozano, R., Steinberger, J., Padfield, R. and Ujang, Z. (2016) Conceptual framework for the study of food waste generation and prevention in the hospitality sector. *Waste Management* 49 (March 2016), 326-336.
Parfitt, J., Barthel, M. and Macnaughton, S. (2010) Food waste within food supply chains: quantification and potential for change to 2050. *Philosophical Transactions: Biological Sciences* 365 (1554), 3065-3081.
Pearce, D. W. and Turner, R. K. (1990) *Economics of natural resources and the environment.* London;New York;: Harvester Wheatsheaf.
Peoples, K. (2020) *How to write a phenomenological dissertation: A step-by-step guide.* Vol. 56. Sage Publications.
Porpino, G. (2016) Household food waste behavior: Avenues for future research. *Journal of the Association for Consumer Research* 1 (1), 41-51.

Porpino, G., Parente, J. and Wansink, B. (2015) Food waste paradox: antecedents of food disposal in low income households. *International Journal of Consumer Studies* 39 (6), 619-629.
Prieto-Sandoval, V., Jaca, C. and Ormazabal, M. (2018) Towards a consensus on the circular economy. *Journal of cleaner production* 179, 605-615.
Principato, L. (2018) *Food waste at consumer level: A comprehensive literature review.* Springer.
Principato, L., Mattia, G., Di Leo, A. and Pratesi, C. A. (2020) The household wasteful behaviour framework: A systematic review of consumer food waste. *Industrial Marketing Management*.
Principato, L., Ruini, L., Guidi, M. and Secondi, L. (2019) Adopting the circular economy approach on food loss and waste: The case of Italian pasta production. *Resources, Conservation & Recycling* 144, 82-89.
Puschmann, T. and Alt, R. (2016) Sharing Economy. *Business & Information Systems Engineering* 58 (1), 93-99.
Quested, T. E., Marsh, E., Stunell, D. and Parry, A. D. (2013) Spaghetti soup: The complex world of food waste behaviours. *Resources, Conservation and Recycling* 79, 43-51.
Ravitch, S. M. and Carl, N. M. (2019) *Qualitative research: Bridging the conceptual, theoretical, and methodological.* Sage Publications.
Ravitch, S. M. and Riggan, M. (2016) *Reason & rigor: How conceptual frameworks guide research.* Sage Publications.
Rehan, M., Nizami, A. S., Shahzad, K., Ouda, O. K. M., Ismail, I. M. I., Almeelbi, T., Iqbal, T. and Demirbas, A. (2016) Pyrolytic liquid fuel: A source of renewable electricity generation in Makkah. *Energy Sources, Part A: Recovery, Utilization, and Environmental Effects* 38 (17), 2598-2603.
Richter, B. and Bokelmann, W. (2017) Explorative study about the analysis of storing, purchasing and wasting food by using household diaries. *Resources, Conservation & Recycling* 125, 181-187.
Ritchie, J., Lewis, J. and Elam, G. (2003) *Designing and selecting samples.* London: Sage.
Rohm, H., Oostindjer, M., Aschemann-Witzel, J., Symmank, C., L Almli, V., De Hooge, I. E., Normann, A. and Karantininis, K. (2017) Consumers in a sustainable food supply chain (COSUS): understanding consumer behavior to encourage food waste reduction. *Foods* 6 (12), 104.
Sahakian, M. and Wilhite, H. (2014) Making practice theory practicable: Towards more sustainable forms of consumption. *Journal of Consumer Culture* 14 (1), 25-44.
Sakaguchi, L., Pak, N. and Potts, M. D. (2018) Tackling the issue of food waste in restaurants: Options for measurement method, reduction and behavioral change. *Journal of Cleaner Production* 180, 430-436.
Salemdeeb, R., zu Ermgassen, E. K. H. J., Kim, M. H., Balmford, A. and Al-Tabbaa, A. (2017) Environmental and health impacts of using food waste as animal feed: a comparative analysis of food waste management options. *Journal of Cleaner Production* 140, 871-880.
Sauvé, S., Bernard, S. and Sloan, P. (2016) Environmental sciences, sustainable development and circular economy: Alternative concepts for trans-disciplinary research. *Environmental Development* 17, 48-56.

Schanes, K., Dobernig, K. and Gözet, B. (2018) Food waste matters - A systematic review of household food waste practices and their policy implications. *Journal of Cleaner Production* 182, 978-991.
Schmidt, K. (2016) Explaining and promoting household food waste-prevention by an environmental psychological based intervention study. *Resources, Conservation and Recycling* 111, 53-66.
Scholliers, P. (2008) *Food culture in Belgium.* ABC-CLIO.
Sebbane, M. and Costa, S. (2018) Food leftovers in workplace cafeterias: An exploratory analysis of stated behavior and actual behavior. *Resources, Conservation and Recycling* 136, 88-94.
Sekaran, U. and Bougie, R. (2016) *Research methods for business: A skill building approach.* John Wiley & Sons.
Setti, M., Falasconi, L., Segrè, A., Cusano, I. and Vittuari, M. (2016) Italian consumers' income and food waste behavior. *British Food Journal*.
Sillanpää, M. and Ncibi, C. (2019) *The circular economy: case studies about the transition from the linear economy.* Academic Press.
Silverman, D. (2013) *Doing qualitative research: A practical handbook.* Sage.
Singh, R. K., Kumar, A., Garza-Reyes, J. A. and de Sá, M. M. (2020) Managing operations for circular economy in the mining sector: An analysis of barriers intensity. *Resources Policy* 69, 101752.
Smith, D. W. (2013) *Husserl.* Routledge.
Sobh, R., Belk, R. W. and Wilson, J. A. J. (2013) Islamic Arab hospitality and multiculturalism. *Marketing Theory* 13 (4), 443-463.
Soorani, F. and Ahmadvand, M. (2019) Determinants of consumers' food management behavior: Applying and extending the theory of planned behavior. *Waste Management* 98, 151-159.
Spiering, M. (2006) Food, phagophobia and English national identity. *Food, drink and identity in Europe.* Brill Rodopi. 31-48.
Stefan, V., van Herpen, E., Tudoran, A. A. and Lähteenmäki, L. (2013) Avoiding food waste by Romanian consumers: The importance of planning and shopping routines. *Food Quality and Preference* 28 (1), 375-381.
Strotmann, C., Göbel, C., Friedrich, S., Kreyenschmidt, J., Ritter, G. and Teitscheid, P. (2017) A participatory approach to minimizing food waste in the food industry—A manual for managers. *Sustainability* 9 (1), 66.
Su, B., Heshmati, A., Geng, Y. and Yu, X. (2013) A review of the circular economy in China: moving from rhetoric to implementation. *Journal of cleaner production* 42, 215-227.
Sun, J., Yan, J. and Zhang, K. Z. K. (2016) Blockchain-based sharing services: What blockchain technology can contribute to smart cities. *Financial Innovation* 2 (1), 1-9.
Sundararajan, A. (2017) *The sharing economy: The end of employment and the rise of crowd-based capitalism.* Mit Press.
Teigiserova, D. A., Hamelin, L. and Thomsen, M. (2020) Towards transparent valorization of food surplus, waste and loss: Clarifying definitions, food waste hierarchy, and role in the circular economy. *Science of The Total Environment* 706, 136033.
Tendall, D. M., Joerin, J., Kopainsky, B., Edwards, P., Shreck, A., Le, Q. B., Krütli, P., Grant, M. and Six, J. (2015) Food system resilience: defining the concept. *Global Food Security* 6, 17-23.

Thi, N. B. D., Kumar, G. and Lin, C.-Y. (2015) An overview of food waste management in developing countries: Current status and future perspective. *Journal of Environmental Management* 157, 220-229.
Timmermans, A. J. M., Ambuko, J., Belik, W. and Huang, J. (2014) *Food losses and waste in the context of sustainable food systems.* CFS Committee on World Food Security HLPE.
Torstrick, R. L. and Faier, E. (2009) *Culture and customs of the Arab Gulf States.* ABC-CLIO.
van Geffen, L., van Herpen, E. and van Trijp, H. (2020) Household Food waste—How to avoid it? An integrative review. *Food Waste Management*, 27-55.
Vanham, D., Bouraoui, F., Leip, A., Grizzetti, B. and Bidoglio, G. (2015) Lost water and nitrogen resources due to EU consumer food waste. *Environmental Research Letters* 10 (8), 084008.
Visschers, V. H. M., Wickli, N. and Siegrist, M. (2016) Sorting out food waste behaviour: A survey on the motivators and barriers of self-reported amounts of food waste in households. *Journal of Environmental Psychology* 45, 66-78.
Vittuari, M., De Menna, F., García-Herrero, L., Pagani, M., Brenes-Peralta, L. and Segrè, A. (2019) Food systems sustainability: The complex challenge of food loss and waste. *Sustainable Food Supply Chains.* Elsevier. 249-260.
Vogt, W. P., Gardner, D. C., Haeffele, L. M. and ProQuest (2012) *When to use what research design.* Design: Guilford Press.
von Kameke, C. and Fischer, D. (2018) Preventing household food waste via nudging: An exploration of consumer perceptions. *Journal of Cleaner Production* 184, 32-40.
Warshawsky, D. N. (2016) Food waste, sustainability, and the corporate sector: case study of a US food company. *The Geographical Journal* 182 (4), 384-394.
Wen, Z., Hu, S., De Clercq, D., Beck, M. B., Zhang, H., Zhang, H., Fei, F. and Liu, J. (2018) Design, implementation, and evaluation of an Internet of Things (IoT) network system for restaurant food waste management. *Waste Management* 73, 26-38.
Werf, P., Seabrook, J. A. and Gilliland, J. A. (2019) Food for naught: Using the theory of planned behaviour to better understand household food wasting behaviour. *The Canadian Geographer / Le Géographe canadien* 63 (3), 478-493.
Wilson, T. M. (2006) Introduction: Food, drink and identity in Europe: Consumption and the construction of local, national and cosmopolitan culture. *Food, drink and identity in Europe.* Brill Rodopi. 11-29.
Winans, K., Kendall, A. and Deng, H. (2017) The history and current applications of the circular economy concept. *Renewable and Sustainable Energy Reviews* 68, 825-833.
Wuttke, J. (2018) The Circular Economy Package of the European Union. *Factor X.* Springer. 251-262.
Zamri, G. B., Azizal, N. K. A., Nakamura, S., Okada, K., Nordin, N. H., Othman, N., Akhir, F. N. M. D., Sobian, A., Kaida, N. and Hara, H. (2020) Delivery, impact and approach of household food waste reduction campaigns. *Journal of Cleaner Production* 246, 118969.
Zervas, G., Proserpio, D. and Byers, J. W. (2017) The Rise of the Sharing Economy: Estimating the Impact of Airbnb on the Hotel Industry. *Journal of Marketing Research* 54 (5), 687-705.
Zurek, K. (2016) Food sharing in Europe: between regulating risks and the risks of regulating. *European Journal of Risk Regulation* 7 (4), 675-687.

Appendix A: Information Sheet

UNIVERSITY of BRADFORD

Faculty of Management & Law

PARTICIPANT INFORMATION SHEET

Project title: *Food Waste Reduction Through Food Sharing Initiatives: The Lived Experiences of Restaurants and Food Bank Employees in Riyadh*

Researcher: Abdulwasih Abdur-Rahim

Dear Participant,

You are invited to participate in the research project described below, please take some time to read through the following information. If you have any question at any point, please do not hesitate to ask the researcher, Abdulwasih, or contact him at A.I.Abdur-Rahim@bradford.ac.uk

Background and aim of the research
This research is aimed at exploring food waste reduction strategies on food sharing initiatives in Riyadh, the capital city of Saudi Arabia. The research requires gaining meaningful understanding of existing food sharing initiatives, and based on the uncovered gaps, to come up with alternative ways of sharing food through new Business models and policy regulations.

Why have I been invited to take part
You have been invited because of your knowledge and experience in food waste management which will help in gaining more insight about how to reduce food wastage and improve food sharing.

Do I have to take part?
Your participation is voluntary and even after accepting to participate you may withdraw your participation and data without any consequences after a period of 1 week.

What will happen in the research
Participating in this research will include a voluntary face-to-face interview which will last 45-60 minutes in duration. This will be arranged for a time, date and location of your convenience, prior to end of October 2020. You will be asked about your role and experience in food waste management which also includes food sharing. Upon your acceptance to participate in the research, you will be asked to sign a consent form which details the conduct of the interview.

Are there any potential risks in taking part?
The intent of this research is to come up with food waste reduction strategies through food sharing initiatives, and not accessing trade secrets or intellectual property of any kind. Any concerns about intellectual property rights or trade secrets should be openly expressed in the interview.

What will happen to the research data provided
For the purpose of enhancing the accuracy of the qualitative analysis from our interview session, with your consent I will record the audio of the session and the data will be stored in an encrypted folder. Also with your permission, I may include selective quotes from the transcription to illustrate points in

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my thesis and any resulting publications. These will be anonymised and great care taken to ensure that any quotes cannot be attributed to you as an employee of your current organization.

Inclusion Criteria

The inclusion criteria for nominating the participants are;

- An employee of a food bank, or restaurants.
- A mid-level manager, senior waiter, restaurants manager, executive personnel from a food bank or restaurant organization.
- An employee of a food bank or restaurant organization with about 5yrs of working experience in the industry.
- Adults from non-vulnerable population meeting the above listed criteria.
- Participants must be able to communicate in English.
- At the restaurants, an adult customer who can communicate in English.

Exclusion Criteria

The exclusion criteria include;

- Any participant not working in a Saudi food bank, or restaurants.
- A new employee of the above-mentioned organization, not having sufficient experience.
- An employee of the mentioned organization but not working in the core area of the business i.e. food bank, restaurants, and food waste management.
- Any participant not fulfilling all inclusion criteria.

Appendix B: Consent Form

UNIVERSITY of BRADFORD

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CONSENT FORM

Project title: *Food Waste Reduction Through Food Sharing Initiatives: The Lived Experiences of Restaurants and Food Bank Employees in Riyadh*

Researcher's Name and email: Abdulwasih Abdur-Rahim A.I.Abdur-Rahim@bradford.ac.uk

Dear Participant,
Please state 'Yes' or 'No' to the following statements:

Please circle as appropriate

1. I have been informed about the purpose for which my interview will be used if I give my consent and I have been given the opportunity to ask questions. YES/NO
2. I give my consent for the interview to be audio-recorded YES/NO
3. I understand that I can withdraw my consent 1 week before or after taking part in the interview without giving a reason why leading to my data not being used in the research. YES/NO
4. I understand that any information that would identify me will be removed from the research data. YES/NO
5. I am aware that my anonymised data will be stored in an encrypted folder for audit purposes. YES/NO
6. I give my consent for anonymised extracts/quotes from my interview to be used in the research thesis or resulting publications reporting on the findings from the research. YES/NO

I give my consent for my interview data to be used as described in the information sheet.

Interviewee:
Signed .....

Name in BLOCK CAPITALS.....

Date.....

Researcher:
Signed.....

Name in BLOCK CAPITALS.....ABDULWASIH ABDUR-RAHIM.....

Date.....

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Appendix C: Interview Guide

UNIVERSITY of BRADFORD
Faculty of Management & Law

Interview Guidelines - B

Thank you for accepting my invitation to participate in this Doctorate research study which focuses on *Food Waste Reduction Through Food Sharing Initiatives: The Lived Experiences of Restaurant and Food Bank Employees in Riyadh*. As a part of the educational requirements for fulfilling the Doctor of Business Administration Degree, the identity and information will be kept confidential without any disclosure. The interview will last for about 45-60 minutes and will be audio recorded.

- Please help me better understand what food waste is
- How do you carry out food sharing?
- What has living with collecting wasted food been like for you?
  - How often?
  - Where do you collect the most, at wedding parties, conferences, Ramadan period, or Eid celebrations?
- How Can you improve your present food sharing approach, and why?
- What have you found to be helpful in dealing with food sharing?
- What are the challenges of your current food sharing approach?
- Why is a lot of food being wasted?
- What advice do you have for people/consumers wasting food?
- How do you think food waste can be reduced?
- What role do you think culture is playing in food waste?
- How can current food sharing practices be improved?
- What do you think can be done locally to reduce food waste?
- What else would you like to share with me about food sharing practices?

Appendix D: Sample Interview Transcript

(Not included for confidentiality reasons)

Appendix E: Sample Significant Statements

Extracted Significant Statements

S/N	Code	Significant Statements
1	ATT	The government, the regulation, and they make this system for all restaurants, all hotels. No, you should make recycle system for your waste, not just throw away. It should be like that.
2	ATT	For example, you can feed the animals, you can feed the poor people, you can feed the poultries, whatever, whatever, you can use it for this one.
3	ATT	This is how our parents teach us, not to waste the food, even the bread.
4	ATT	So, this sharing we make, after survey we just eh there are places and sometimes register their names, and after that make our plan for distribute this leftover.
5	ATT	It's good for us, as sales. OK, we are happy. We sell something good for him. But after that, he take one bite, one bite, one bite, and eh throw it in the garbage.
6	ATT	What we do with eh leftover, we throw in the garbage.
7	ATT	If you want to throw in the garbage, put aside, don't throw in the garbage, put aside for the bird or cat to eat. This is how our family teaches us.
8	ATT	If you are not eating this bread, no don't throw it in the garbage, it could be damaged. Give it to somebody or something to to be of benefit.
9	ATT	If I have authority, I would write in the center of the menu order what you need and what you want.
10	ATT	Food is “Naama” which means like it's given from God. So you should not waste is the first thing, because there are some people that need this one to survive. And it's something very bad.
11	ATT	There's no humanity when some people need to eat and there are some people just throw anyhow.
12	ATT	The waiter should inform the guests to take his leftovers together with him.
13	ATT	If the guest is not asking to take away, we are throwing it away.
14	ATT	Well, I think the best way is to recycle all of this food