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How Can Food Providers Improve Their Business Models In Order To Increase A Sustainable Consumption?

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BUSINESS SCHOOL

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Acknowledgements

The conclusion of this dissertation marks a turning point in my journey and represents the achievement of a much cherished goal. The conciliation between a full-time job and the hours spent in the elaboration of this work, even though not always easy, ended up being residual and completely worth it, considering all that I learned and grew professionally and personally.

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Abstract

In the current business environment, the concern with sustainability and food waste has gained high notoriety. Companies, in this case, restaurants, demonstrate, in fact, a concern with this issue and assume it to be a problem that needs to be solved or, at least, minimized.

This research demonstrates the importance of innovation in the business models in order to become more sustainable and also presents some solutions and suggestions of strategies to be applied in the restaurant sector.

Following a set of interviews carried out with professionals in positions of high responsibility in the catering industry, the results reveal that, although sustainability is on the management's mind, there is still little information in terms of strategies and tools that they can adopt in their day-to-day work. They already execute some of these strategies, but there is still a way to go.

On the other hand, the consumer is often the motivating agent that leads companies to act in a certain way, and according to the interviewees, their customers are not yet aware of the need to solve this problem, which becomes a major barrier.

From a general perspective, companies should educate consumers and should also seek more information in order to complete or restructure their strategies with the aim of becoming exemplary agents that promote responsible attitudes aimed at improving the planet.

Keywords: Sustainability, Food Waste, Strategies, Business Models, Sustainable Development Goals.

JEL Classification System Code: M14 - Corporate Culture; Diversity; Social Responsibility; Q01 - Sustainable Development

Resumo

No atual ambiente empresarial, a preocupação com a sustentabilidade e com o desperdício alimentar tem ganho elevada notoriedade. As empresas, neste caso, restaurantes demonstram, de facto, uma preocupação com este tema e assumem ser um problema que precisa de ser resolvido ou, pelo menos, minimizado.

Esta investigação demonstra a importância da inovação nos modelos de negócio de forma a tornarem-se mais sustentáveis e apresenta ainda algumas soluções e sugestões de estratégias a aplicar no setor da restauração.

Na sequência de um conjunto de entrevistas realizadas a profissionais com posições de elevada responsabilidade no ceio da restauração, os resultados revelam que, embora a sustentabilidade esteja na mente de gestão, ainda existe pouca informação em termos de estratégias e ferramentas que podem adotar no seu dia-a-dia. Já executam algumas dessas estratégias, mas há ainda um caminho a percorrer.

Por outro lado, o consumidor é, muitas vezes, o agente de motivação que leva as empresas a agir de determinada forma, e de acordo com os entrevistados, os seus clientes ainda não estão mentalizados para a necessidade de resolução deste problema, o que se torna numa grande barreira.

Numa perspetiva geral, as empresas devem educar os consumidores e devem ainda procurar mais informação de forma a completarem ou reestruturarem as suas estratégias com o objetivo de se tornarem exemplares agentes fomentadores de atitudes responsáveis que visem uma melhoria do planeta.

Palavras-chave: Sustentabilidade, Desperdício alimentar, Estratégias, Modelos de Negócio, Objetivos para o Desenvolvimento Sustentável.

Classificação JEL: M14 - Cultura Empresarial; Diversidade; Responsabilidade Social; Q01 - Desenvolvimento Sustentável.

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Glossary

FWL – Food Waste and Loss

FW – Food Waste

SDG – Sustainable Development Goals

FAO - Food and Agriculture Organisation

EU – European Union

BM – Business Model

SBM – Sustainable Business Models

WMH – Waste Management Hierarchy

IBM - Institute for Business Value

NGO – Non-governmental Organisations

GHG – Greenhouse gas

HACCP - Hazard Analysis and Critical Control Points

RQ – Research Question

CEO – Chief Executive Officer

Chapter 1. Introduction

1.1. Research Problem

According to the report "The State of Food Security and Nutrition in the World" (FAO, 2020) the number of people affected by hunger in the world continues to increase slowly. This trend started in 2014 and extends to 2019. There are nearly 60 million more undernourished people now than in 2014, when the prevalence was 8.6 percent – up by 10 million people between 2018 and 2019. Also, the prevalence of both moderate and severe levels of food insecurity (People who are moderately food insecure do not have regular access to nutritious and sufficient food, even if not necessarily suffering from hunger) is estimated to be 25.9 percent in 2019 for the world as a whole. This translates into a total of 2 billion people. Total food insecurity (moderate or severe) has consistently increased at the global level since 2014, mostly because of the increase in moderate food insecurity.

Contradictorily, according to the Food and Agriculture Organisation (FAO) about one third (1.3 billion tonnes per year) of all food for human consumption is lost or wasted between the place of production and consumption, and this food would be enough to feed two million people (FAO, 2011).

Given that food waste occurs at the last level of the food chain, at the retail level and at the level of the final consumer in general (FAO, 2019), the richer the country is, the higher will be its per capita rate of waste. The loss, on the other hand, occurs mainly at the beginning of the food chain (FAO, 2019) during production, post-harvest and processing and is much less prevalent in industrialized countries than in developing countries, where there tends to be a lack of infrastructure to deliver all food in a decent manner to consumers willing to eat it, as they lack adequate storage and transport facilities and products suffer from a lack of refrigeration, preservation, packaging, which leads them to lose their value much faster.

Also, the world's population is constantly growing and the United Nations points to a population growth in the planet that will reach 9.7 billion in 2050 and could peak at nearly 11 billion around 2100, it will be necessary to rethink the whole way of managing food by making changes in the entire supply chain in order to meet increasing human needs.

Feeding the world population in an environmentally sustainable manner will become increasingly challenging over the coming decades. The global demand for agricultural outputs is forecast to increase by 35–50 percent between 2012 and 2050 as a result of population and

income growth. Meeting this demand will further strain the world's natural resources and may cause considerable environmental damage, including climate change, land degradation, water scarcity, water pollution and loss of biodiversity (FAO, 2019).

Today, there is a growing concern about climate change and the impact that human pollution has on nature/environment. It is easy to turn on the television and hear news about Co2 emissions or cases of melting, among others. There are also more documentaries on this subject, such as David Attenborough's recent one: "A Life on Our Planet" launched in 2020, which gives the impression that it is something growing and worrying.

The increasing problems related to the environment are indeed of concern, especially in food production. This leads to disturbances in temperatures, dry seasons, changes in rainfall periods, worsening frequency and intensity of extreme weather events or the appearance of new pests and diseases.

Food production will not only suffer from climate change, but will also contribute to it through its environmental impact (Jesus & Pires, 2018). According to the research conducted by the Food & Agriculture Organization of the United Nations (FAO) from 2013, if food waste were a country, then it would be the third highest emitter of GHG emissions. Each year, there is wasted 1.3 gigatons of edible food which releases 3.3 gigatons of CO2 equivalent (without taking into account land use change). This means that 1kg of food waste equals to 2.5 kg of CO2 equivalent (or 2.53846 kg to be more exact).

These are more than enough reasons to draw attention to the need to make more conscious use of food and to the need to combat and reduce its waste, which beyond to put undue pressure on limited natural resources and the environment, has an important economic and social impact. The disparity between food waste on the one hand and food shortages on the other draws attention to the social and ethical implications of surplus food (Jesus et al., 2018).

In an effort to move towards the achievement of Sustainability, the United Nations launched in January 2015 the 2030 Agenda for Sustainable Development setting 17 goals and 169 targets. The 17 Sustainable Development Goals (SDGs) are an urgent call for action by all countries - developed and developing - in a global partnership (United Nations, 2015). Reducing food loss and waste is enshrined in SDG 12 on sustainable consumption and production – specifically in Target 12.3, which calls for the halving of food waste and reduction of food losses by 2030. […] The inclusion of food loss and waste reduction in the SDGs reflects the fact that producing food that is not eaten – whether lost in the field or wasted on a plate – not only diminishes the

quantity of food available, but also constitutes a waste of economic and environmental resources (FAO, 2019). Due to expected impacts on household and business costs, as well as on food security, nutrition, natural resources and the environment, reducing food loss and waste could have wider implications for other SDGs related to the food system. […] At the same time, progress on other SDGs could have beneficial impacts in terms of reducing food loss and waste. […] Figure 1 summarizes the potential linkages between reducing food loss and waste and various SDGs. The rounded boxes refer to the expected impacts on food security, nutrition, natural resources and the environment (FAO, 2019). As we can observe, contributing to responsible consumption and production affects many other crucial points in making the world more sustainable and a better place.

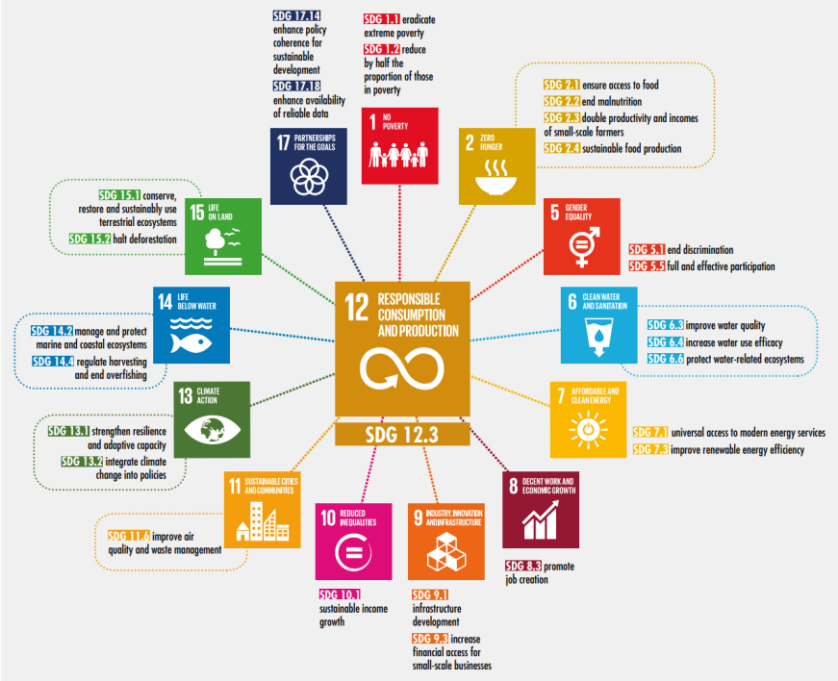


Figure 1.1: Food Loss and Waste and the Sustainable Development Goals; Source: The State of Food and Agriculture (2019); FAO

Although we have to look at all the points food waste and loss touches, consumption is globally recognized as being an element which leads to unsustainable development. Along the Food Supply Chain, the largest share of waste is generated at the consumption level, representing 46% of the total food waste. […] The consumption stage is responsible for the largest share of food waste generation for most food groups (Caldeira, De Laurentiis, Corrado, van Holsteijn, & Sala, 2019).

Food is one type of consumption that is absolutely indispensable, since it is a basic human need (Notarnicola, Tassielli, Renzulli, Castellani, & Sala, 2017). However, our current habits

of production and consumption are not sustainable and are responsible for 20-30% of the overall environmental impact on the planet (Notarnicola et al., 2017).

Business models appear as the motto for this change, starting from production and influencing consumption. A business model serves as a holistic approach to explain how firms do business and describes how organizations create and capture value (Zott, Amit & Massa, 2011). Typically, Business models are mainly driven by value creation and shareholder interests.

Pressing global changes are calling for new Business and Operating Models in order to address issues such as climate change, biodiversity loss, environmental degradation, and persistent global inequalities (Scherer & Palazzo, 2011).

While a Business Model is primarily designed to create economic value, sustainability creates value for society. If an organization wants to incorporate sustainability in its Business Model and contribute to the increase of the sustainable consumption and production, it needs to do a reconceptualization of its BM structure.

1.2. Research Objectives

This investigation focus in the concepts of Business Models, Sustainable and Innovative Business Models and Sustainability to understand in which way should food service providers go in order to improve their BMs to influence its customers to engage in sustainable consumption and, therefore contribute to the 12 goal of the 2030 Agenda for Sustainable Development: Ensure sustainable consumption and production patterns.

Hence, this thesis intends to better understand the role of these economic actors in sustainable consumption and according to the theoretical knowledge gathered in the literature revision, three objectives were defined: (i) Understand if there is awareness on the part of the food service providers of the need to reduce FW; (ii) Understand if these economic agents feel that their consumers are alert and concerned about consuming in a more sustainable way and prefer businesses that apply SBMs; and (iii) Understand how are they, in fact, doing to minimize food waste and which are their main solutions and suggestions to do it.

The three objectives contribute to the perception of a real problem, understanding how existing literature can help these retailers in their daily tasks, as well as individuals or companies who wish to enter this area in a more sustainable way and giving real importance to food, not only its quality, but also its quantity and embracing a challenge of non-waste.

1.3. Dissertation Structure

This dissertation will begin with a literature review where all the above ideas will be further examined and investigated. After the literature review on these subjects, research will follow to answer the research questions. Initially, the methodology used to analyse the issue will be disseminated, in which a qualitative approach will be advocated. Finally, the discussion on the results and findings of the examination will be given and analysed.

Chapter 2. Literature Review

2.1. Sustainability

According to Agyekum-Mensah, Knight & Coffey (2012), the idea of sustainability is relatively recent. The most used definition of sustainable development is the "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987).

In 2015, the United Nations Sustainable Development Summit provided a plan of action for people, planet and prosperity. It presents the 17 Sustainable Development Goals, which are, in order, No Poverty; Zero Hunger; Good Health and Well-being; Quality Education; Gender Equality; Clean Water and Sanitation; Affordable and Clean Energy; Decent Work and Economic Growth; Industry, Innovation and Infrastructure; Reduced Inequality; Sustainable Cities and Communities; Responsible Consumption and Production; Climate Action; Life Below Water; Life on Land; Peace and Justice Strong Institutions and Partnerships to achieve the Goals. They seek to build on the Millennium Development Goals and complete what these did not achieve. They balance the three dimensions of sustainable development: the economic, social and environmental (United Nations, 2015).

Sustainability is the foundation for today's leading global framework for international cooperation - the 2030 Agenda for Sustainable Development and its SDGs (International Institute for Sustainable Development, 2020).

The Sustainability topic is, in fact, important in the current business scenario once the potential benefits to a company that implement sustainability projects include cost reduction, process organization, innovation generation, lower consumption of natural resources, brand enhancement and competitive advantage increases.

Consumption is globally defined as being an element which finally leads to unsustainable development (De Bernardi & Tirabeni, 2018). As stated before, the United Nations, in its development goals reinforced the importance to promote a sustainable consumption and suggested changes in the food systems worldwide, especially in the Sustainable Development Goal No. 12 of the 2030 Agenda for Sustainable Development where the need to ensure sustainable consumption and production patterns was highlighted. Worldwide consumption and production rest on the use of the natural environment and resources in a way that continues to have destructive impacts on the planet (United Nations, 2015).

It is time to change mindsets and embrace the goal of achieving more sustainable consumption. Tunn, Bocken, van den Hende & Schoormans, 2018 define Sustainable Consumption as shaping and satisfying consumer needs to continuously reduce negative impacts of consumption on the environment and the wider society. It includes sustainable use and requires sustainable production.

Out of all the things humans consume, food is the one that is absolutely indispensable, since it is a basic human need (Notarnicola et al., 2017). However, our current habits of production and consumption are not sustainable and are responsible for 20-30% of the overall environmental impact on the planet (Notarnicola et al., 2017). Current patterns of food production and consumption are increasingly considered to be unsustainable. On the one hand, there is the need to fulfil a fundamental human need for nutrition, and on the other hand this poses critical threats to the environment (Notarnicola et al., 2017).

The food consumption dilemma leads to the conclusion that there is a need that needs to be fulfilled with new solutions by the food service providers in order to change mentalities and patterns of consumption.

2.2. Business Models

The concept of business models has reached global impact, both for company's competitive success and in management science (Wirtz, Pistoia, Ullrich & Gottel, 2015). However, the term "business model" is not always consistently applied. Several authors have defined the concept differently and there have been comprehensive reviews of these definitions (Geissdoerfer, Morioka, de Carvalho & Evans, 2018).

According to Wirtz et al., 2015 a business model is a simplified and aggregated representation of the relevant activities of a company, it describes how marketable information, products and/or services are generated by means of a company's value-added component. In addition to the architecture of value creation, strategic as well as customer and market components are taken into consideration, in order to achieve the superordinate goal of generating, or rather, securing the competitive advantage.

The term can also be described as simplified representations of the elements of a complex organizational system and the interrelation between these elements. It determines the organization's value proposition, value creation and delivery, and value capturing and aims at

analysis, planning, and communication in face of increasing complexity (Geissdoerfer et al., 2018).

To conclude, Nosratabadi, Mosavi, Shamshirband, Zavadskas, Rakotonirainy & Chau, 2019 define business model as something that elucidates how a business makes money through value preposition, value creation, and value delivering. The core concept in the business model is "value", which is the value that the customer is ready to pay for it. Most of the marketing activities are dedicated to diagnosing the customers' needs for providing such value for them. […] Engaging the end users in the process of designing value is one of the approaches facilitating the businesses to consider customers' benefits and to design a sustainable business model.

In a global study of IBM Institute for Business Value, where 765 managing directors took part, it has been demonstrated that financially successful companies attach around twice as much importance to consequential and sustainable business model management as less financially successful companies (Giesen, Berman, Bell & Blitz, 2007). This, combined with the great environmental pressure to take more sustainable measures, raises the concern and need for the creation or adaptation of standard business models to sustainable business models.

The business model perspective is particularly interesting in the context of sustainability since it highlights the value creation logic of an organization and its effects and potentially allows (and calls) for new governance forms such as cooperatives, public private partnerships, or social businesses, thus helping transcend narrow for-profit and profit-maximizing models (Schaltegger, Hansen & Lüdeke-Freund, 2016).

Business models for sustainability must involve strategic decisions made at the organizational level, that is, defining sustainable values and company objectives as well as making decisions with regard to designing sustainable marketing activities (Belyaeva, Rudawska & Lopatkova, 2020).

A more complete definition of this term is given by Schaltegger et al., 2016 who states that a business model for sustainability helps describing, analysing, managing, and communicating (i) a company's sustainable value proposition to its customers, and all other stakeholders, (ii) how it creates and delivers this value, (iii) and how it captures economic value while maintaining or regenerating natural, social, and economic capital beyond its organizational boundaries. Extending the conventional view of a business model designed around a value proposition for customers, the authors acknowledge that no sustainable value can be created for

customers without creating value to a broader range of stakeholders. A business is carried by a stakeholder network and - in spite of the fact that a business model is a market-oriented approach - particularly a business that contributes to sustainable development needs to create value to the whole range of stakeholders and the natural environment, beyond customers and shareholders. This definition emphasises that sustainability is an integral part of a company's value creation and capture logics. It expands the traditional, firm-centric business model perspective by focusing on stakeholders, such as investors, managers, employees, and customers (Mattila; Merisanta & Heikkinen, 2020).

According to Belyaeva et al., 2020 the aim of this models is to create solutions that will enable companies to capture economic value while generating environmental and social value and this implies the necessity for a holistic approach to the value proposition, in which the benefits and costs to different stakeholders are considered and, as a result, so called shared value is created. Besides customers, these include employees, business partners, society, environment and so on.

Internationalization, along with the urge to keep up with sustainable development goals, has made the worldwide competition among firms more complex, with conventional business models struggling to find appropriate solutions (Nosratabadi et al., 2019). The authors agree that there are external pressures and motivations from international organizations and NGOs that encourage the organizations to be thrilled to shift toward sustainability. Therefore, the application of sustainable business models is increasingly widespread among different industries and sectors. […] Four main approaches have emerged in the literature for designing a sustainable business model: designing a sustainable value proposition, designing sustainable value creation, designing sustainable value delivering, and generating sustainable partnership networks for creating and delivering such sustainable value which can meet the social, environmental, and economic benefits at the same time.

Also, Schaltegger et al., 2016 defend that building bridges to generate real progress in sustainability management is key. The authors agree that one nexus of change inside the organization and a bridge that needs to be crossed, if existing business models are to become more sustainable, is business model transformation. Other bridges relate to the direct market environment of the organization, the consideration of market positions, and the coevolutionary interaction between business models of competitors in a market. Yet another bridge to society and the natural environment requires taking a strong sustainability perspective into account.

From a theoretical view, the entrepreneurial role needs to be reflected in the light of creating a normative business model aiming for strong sustainability and acknowledging system dynamics and the societal embeddedness of all business activities.

Nosratabadi et al., 2019 conclude that the process of Sustainable Business Model construction forms an innovative part of a business strategy. That explains why the constructs of Sustainable Business Model and Business Model Innovation are interconnected. Indeed, numerous authors are focusing their studies on sustainability as a true type of Business Model Innovation (De Bernardi et al., 2018).

Business Model Innovation has seen a recent surge in academic research and business practice. Changes to BMs are recognized as a fundamental approach to realize innovations for sustainability (Evans, Vladimirova, Holgado, Fossen, Yang, Silva, & Barlow, 2017).

User-driven innovation presents solutions to meeting the benefits of society and the business at the same time through an iterative process in which potential customers are engaged in the design of value preposition (Nosratabadi et al., 2019).

According to Geissdoerfe et al., 2018 there are four generic configuration types of business model innovations: 1) business model diversification: the current business model remains in place but also a new one is created; 2) business model acquisition: another business model is identified, acquired and integrated into the existing one; 3) business model transformation: the existing business model is transformed into another; 4) start-up: the development of a completely new business model.

Companies should start diversifying, acquiring, transforming their business models or even develop new ones in order to influence their customer in a sustainable way, especially when it is related with food waste and loss.

Modern sustainable concepts emphasize the need for enterprises to participate in social and environmental activities. In this context, sustainable business tools can be perceived as a component of global sustainable development (Belyaeva et al., 2020).

2.3. Food waste and loss

Food losses and food waste (FLW) occur throughout the food chain from farm to fork. It has become a worldwide concern in recent years and is widely identified as a key barrier to global sustainability, due to its adverse impacts on food security, natural resources (e.g., land, water, and energy), environment (e.g., greenhouse gas emissions), and human health (e.g., toxic

emissions from incineration) (Xue, Liu, Parfitt, Liu, Herpen, Stenmarck, O'Connor, Östergren & Cheng, 2017). That is why it is essential for the world to reduce the FWL that is produced.

According to FAO 2019, food loss concerns all stages of the food supply chain up to, but excluding, the point where there is interaction with the final consumer and thus excludes retail, food service providers e and consumers. Food waste is the result of purchasing decisions by consumers, or decisions by retailers and food service providers that affect consumer behavior. Still, the definition of food waste or food loss is not yet consensual and quantifying it is not easy either.

The food supply chain consists of the following segments: (i) agricultural production and harvest/ slaughter/catch; (ii) post-harvest/slaughter/catch operations; (iii) storage; (iv) transportation; (v) processing; (vi) wholesale and retail; and (vii) consumption by households and food services (FAO, 2019).

Food is wasted in many ways: fresh produce that deviates from what is considered optimal, for example in terms of shape, size and color, is often removed from the supply chain during sorting operations; foods that are close to, at or beyond the "best-before" date are often discarded by retailers and consumers and large quantities of wholesome edible food are often unused or left over and discarded from household kitchens and eating establishments (FAO, 2019).

There is a need to decrease food loss and waste across the supply chain, although waste arises at every stage of the food supply chain, for the relevance of this thesis, a focus on the Food Waste, has been done since it is the type that is related with the downstream of the food supply chain, only affecting the retail, food service providers and consumers.

There is not yet a common definition and a single methodology for distinguishing between food surplus and food waste but the few statistics that exist already give us an idea of the seriousness of the situation. It is estimated that some 88 million tonnes of food waste (180 kg per person) is produced annually in the European Union, a large proportion of which is still fit for human consumption. […] The production and disposal of this waste generates 170 tonnes of CO2 emissions and uses 26 million tonnes of resources, at an associated cost of 143 billion euros (EU FUSIONS, 2016).

Food loss and waste not only just affect the quantity of edible food available, but they also distress many natural resources that are requires in food production for the world's growing

population. Humans contribute to and increase the rate of global climate change through food production, consumption and food loss (Wunderlich & Martinez, 2018).

Economic growth and the global economy have been built on a model of unsustainable growth, which has contributed strongly to the depletion of the planet's natural resources and to environmental degradation, which has made it increasingly urgent to change the paradigm to a model of sustainable development. […] We are consuming more resources than the planet can produce. Data released recently by the Global Footprint Network indicates that we are reaching Earth Overshoot Day earlier, the day from which the consumption of natural resources has exceeded what the planet is able to regenerate. The volume of waste we produce is also a consequence of our unsustainable way of life, so we will have to readapt the current production and consumption in order to minimize the pressures exerted on the Earth's non-renewable resources, making a paradigm shift essential (Jesus et al., 2018).

There is a clear urgency in reducing food waste, especially when we are in a race against time to achieve the SDG Target 12.3, which refers to "food waste at the retail and consumer levels" and "food losses along production and supply chains" (FAO, 2015). Consequently, this implies an adaptation or redesign of the food retailers and providers' Business Modes if companies aim to truly embrace sustainability.

2.4. Solutions

The reduction of food waste, as mentioned above, brings many benefits to the planet and to the population living on it. As consumers are a part of that population and therefore stakeholders, food service providers have to rethink or improve their BMs in order to meet what is increasingly expected of them: to provide more sustainable choices in the marketplace. For this to be possible, it is important that they focus not only on the consumption part itself, but also on everything that comes before that in the supply chain.

The principle of food chain suggests that food waste mitigation should focus on three main operational stages: pre-kitchen, kitchen and post-kitchen. At the pre-kitchen stage, managers should strive to optimise business procurement by investing into more accurate demand forecasting with subsequent more effective stock management. This is to avoid excessive amounts of food being stored, thus preventing it from spoilage. This can be achieved via, for example, close work with suppliers and careful menu design. At the kitchen stage, managers need to look at the processes of handling, cooking and serving food. At the post-kitchen stage food waste mitigation requires pro-active work with customers, use of advanced methods for

excess food redistribution (including technology innovations) and managerial and corporate openness to more effective approaches to food waste disposal, among others (Filimonau & De Coteau, 2019).

Food waste hierarchy is also an important tool in the fight against food waste in the food industry sector, especially in business models that cover the food service to its final consumer.

The waste hierarchy is built upon strategies introduced in the 1970s by the European Parliament's Directive on Waste (European Parliament Council, 1975) and the European Commission's Second Environment Action Program (European Commission, 1977), later refined into the waste hierarchy in the EU's legislation (European Parliament Council, 1989). […] This hierarchy follows the Waste Framework Directive adopted by the European Commission (2015). […] The aim of the waste hierarchy is to identify the options most likely to deliver the best overall environmental outcome (Papargyropoulou, Lozano, Steinberger, Wright & Ujang, 2014).

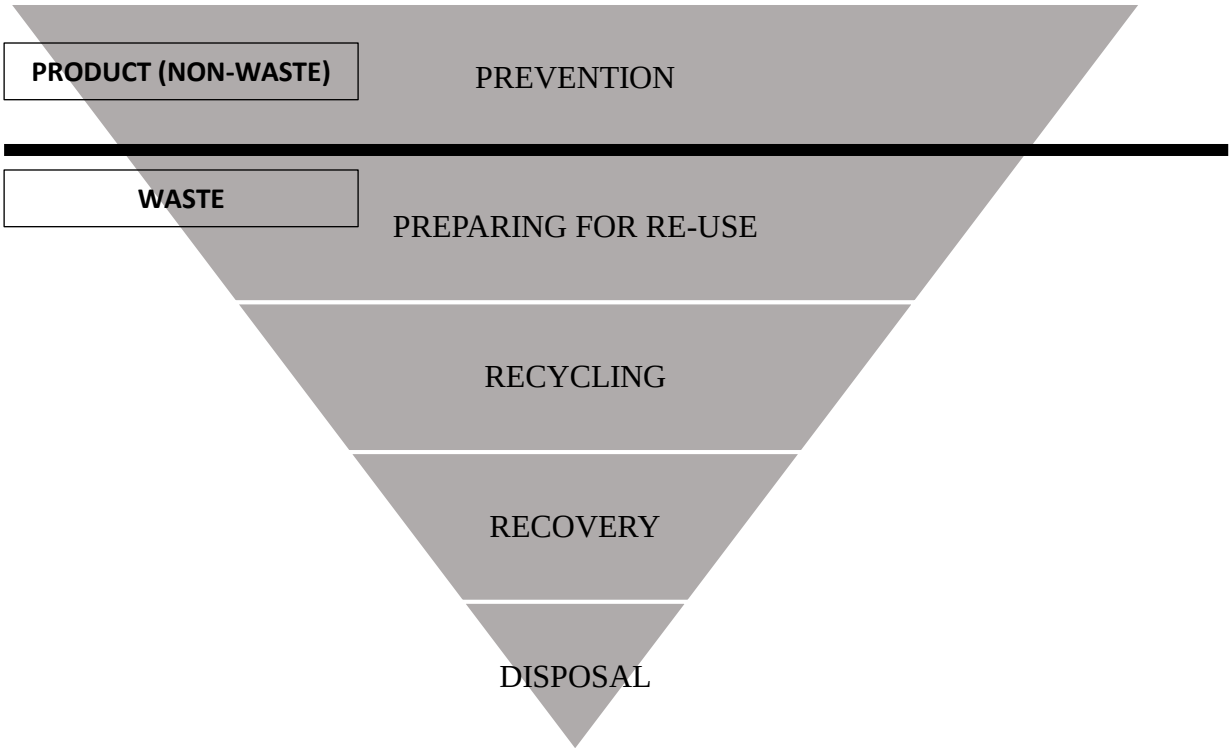


Figure 2.1: Adaptation of Waste Management Hierarchy.
Source: European Commission

Industry professionals should understand how the food waste hierarchy operates and should also aim to implement its specific stages in their operations as set by the hierarchy in order of priority (Filimonau et al., 2019), as can be observed in Figure 2.

Papargyropoulou et al., 2014 defend that the instant food surplus becomes unfit for human consumption it becomes food waste. At that point, the distinction between avoidable and unavoidable food waste becomes central in the decision making process for the most appropriate waste management options. This process is illustrated in figure 3.

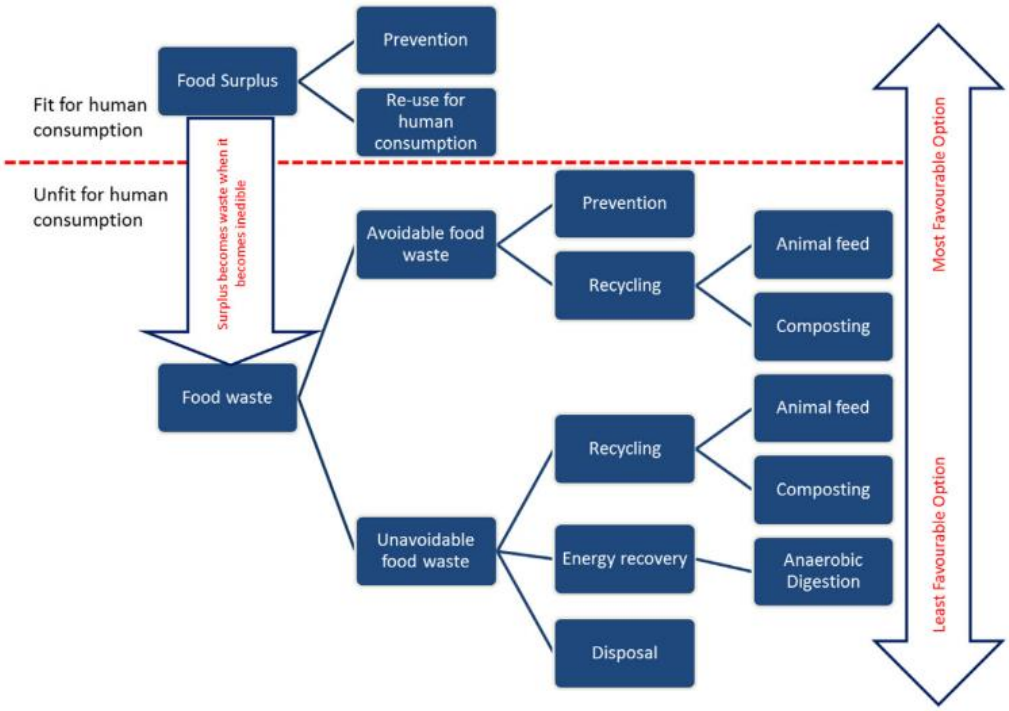


Figure 2.2: Food surplus and waste framework.

Source: Papargyropoulou et al., 2014

The first level of the WMH is about reducing food waste from production to final consumer and prevent it. To achieve this, new ways of producing and processing food and changing consumer behavior and eating habits should be adopted. According to Wunderlich et al., 2018 there is a significant environmental impact and cost savings that occurs when the top of the Food Recovery Hierarchy (or Waste Management Hierarchy) is prioritized. From an environmental perspective, the prevention of food waste is ten times more carbon emission saving than food redistribution.

The second level refers to the reuse of waste for consumption: excess food from commercial establishments, fit for consumption, can be donated to charitable persons/institutions or even for animal consumption. Even so, it is important to refer that as the animal feed sector has its own food safety rules, it is a distinct reuse category, coming after reuse for humans for obvious ethical reasons. In this perspective, the vision is that surplus food is reused exclusively for

humans, while food waste may be re-used by animals (and never by humans) (Teigiserova, Hamelin & Thomsen, 2020).

The third level has to do with industrial recycling, through options to relieve some environmental and economic issues associated with food waste, while increasing the use of sources of alternative energy or even composting, a process within everyone's reach (whether at household or community level), which transforms organic matter into humus (organic fertilizer) in order to improve soils, grow the subsequent generation of crops and improve water quality.

The forth level includes recovery by doing on-site anaerobic digestion and the last one corresponds to waste which cannot be recovered in any way, leaving no other option than incineration or landfill.

2.4.1. Prevention

Aschemann-Witzel, de Hooge, Amani, Bech-Larsen & Oostindjer, 2015 agree that sensitization in the form of collaboration among institutions; synergistic actions between governments, societal stakeholders, and retailers; suitable communication to consumers; and consumer education (best-before-date, expectations and perceptions, and consumer household food management behaviour) can lead to food waste decreases.

First of all, food providers should look at the source of their processes. In a research done by Jones, Hillier & Comfort, 2011, a number of major food retailers they interviewed drew attention to two elements often associated with sustainable consumption, namely Fairtrade range of products and the importance they attach to locally source produce. The authors also defend that food retailers might pursue choice editing, for example by not stocking environmentally damaging products or by continuing to develop labelling policies, for example, with labels indicating the carbon footprint of all products within their stores.

Then, as already mentioned before, the consumer behavior and the factors impacting consumer-related food waste should be reviewed. This can be potentially changed by providing information and knowledge repeatedly to some extent to the consumer, since costumers tend to forget, and to deliver the information via various sources, as they differ as to which information source they rely on most (Aschemann-Witzel et al., 2015). Only with a more informed (and nonconformist) citizen, more aware of himself and of his surroundings (poverty, inequalities and injustices, food waste) and available to intervene in public life, (whether in solidarity with

people or causes, or in putting political and economic pressure on governments and businesses to better manage resources), can we aspire to a sustainable, more democratic, fairer and less unequal society. Hence the extreme importance that knowledge and education (education for citizenship and environmental education) can play in the construction of a critical and reflective collective conscience, in the sense of an effective and participative citizenship (Jesus, et al., 2018).

According to Wunderlich et al., 2018 increasing awareness about the economic and health benefits related to reducing food loss among stakeholders, farmers, and the community is something necessary. The authors alert us to the fact that in developing countries, where natural resources may not be as abundant (i.e. drought), where food insecurity and malnutrition are widespread in many areas, reducing food loss is crucial.

Providing information can lead to the creation of attention and awareness. Also, by cleverly marketing the suboptimal food and targeting the communication at respective customer groups (communicating savings to one group, but ethical reasons to the other), retailers can make a crucial impact (Aschemann-Witzel et al., 2015).

Moreover, Aschemann-Witzel et al., 2015 agree that consumers might be crucially influenced by their surroundings. This can be general social norms that they might learn from the debate in the media, the appearance of leftover cookbooks in bookstores or the restaurant waiter prompting whether they would like a doggy bag […] This also speaks in favour of initiatives that allow signaling ethical statements through the purchase of products, for example products that are positioned and communicated as tackling food waste (e.g., produced with surplus food). Thus, actions that influence these norms to create the potential to signal behavior or to trigger peer influence can be successful directions.

Retailers' business models should also focus on segmenting and targeting consumer groups. Consumer segments differ in their motives to reduce food waste. Their characteristics or background therefore will predispose their behavioral responses or determine their abilities and priorities of concern (Aschemann-Witzel et al., 2015). Some consumers have the motivation to avoid food waste for money-saving reasons, others by values, beliefs, ethical reasons or environment concerns.

There are very different type of costumers going to one restaurant. This means that not everyone eats the same portion of food which can lead to waste. The suggestion to restaurants

could be to offer a small, medium and large portion size for the same dish at different prices (Secondi & Mattia, 2019).

Regarding the fresh products, this ones face uncertainty in both demand and supply. A solution is to freeze the product when possible (Lemaire et al. 2019). This can lead to a loss in the value of this type of products but it is seen as an essential sustainability measure in the food supply chain (Bourlakis, Maglaras, Aktas, Gallear and Fotopoulos, 2014). Retailers ought not to "blame" the consumer for wastage in-store, but incentivize the purchase of suboptimal food by lowering prices or by selling it in separate classes (Aschemann-Witzel et al., 2015).

Then, a good Inventory management and lot sizing problem solving can also prevent food lost and waste. Lot sizing is a lever for action in food management (Lemaire & Limbourg, 2019).

The advance in technology can be another good help in the path to achieve sustainability. From a producer viewpoint, smartphone apps have been developed to assist industry professionals in quantifying the volume and characterizing the content of food wasted with the design of subsequent mitigation measures, as for example the app "Wise Up on Waste" that allows chefs to measure, monitor and manage food waste in commercial kitchens (Filimonau et al., 2019).

The applications can increase the meaningfulness of work in food services and in restaurants, as they provide concrete methods of reducing food waste by modifying food preparation and serving processes […] The digital platforms for reducing food waste provide opportunities for different stakeholders to work collaboratively towards achieving sustainability (Mattila et al., 2020).

There is also another type of technology besides the one mentioned above that can help reducing waste. The authors Martin-Rios et al., 2018 inform us that there are other technological developments and this ones deal with new kitchen appliances and social media for waste management solutions. Many of these innovations have now become central elements in food service sustainability strategies. […] Technology can help in reducing or recycling packaging waste include smart trash cans. […] Intelligent trashcans are able to sort and compact several types of packaging waste linked to beverages. Some models can sort up to 30 items per minute, the material is stored in the machine and regularly collected by the company to be recycled. Other kinds of trash cans do not sort waste by material, but separate liquids from the solid waste, thus enabling better waste treatment and recycling practices. These trash receptacles are

especially suited to fast food restaurants and self-service cafeterias. As an incentive for customers to recycle, some of these devices reward users, for example by offering vouchers for free or discounted drinks. This authors provide us another example of technology that could be used by food services which is the implementation of electrolyzed water. This results in two kinds of water: alkaline water, which is an effective cleanser, and acidic water, which can be used as a disinfectant/sanitizer. These two types of water can be used for very different purposes: in a restaurant, they can be used to clean and disinfect floors, work surfaces, utensils, food products, or to wash hands.

2.4.2. Re-use and Redistribution

A solution that is also being very known is the donation of unsold products. The rise of the sharing economy has revealed opportunities for redistributing unsold food as a means of food waste mitigation (Filimonau et al., 2019). This donation to undernourished people is a possible solution to reduce food waste (Lemaire et al. 2019). When there are food surpluses, the best destination is their redistribution for human consumption, a process in which surpluses food which might otherwise be wasted, are recovered through donations, collected and provided to citizens, in especially those most in need. The EU guidelines on gender donation are governed by the principles of legislation General Food 10. Excess food can be redistributed free of charge, provided that it is suitable for human consumption and compatible with all food safety and hygiene requirements, and therefore all operators involved in the redistribution of food must apply good hygiene practices and have an automatic control system HACCP (Hazard Analysis and Critical Control Points) that identifies, evaluates and controls significant safety risks food. (Jesus et al., 2018). Some companies adhere to this movement since it also contributes positively to their image and may create customers' engagement. Nevertheless, one must be careful with this food donation. Filimonau et al., 2019 alert us to the fact that, on the one hand, donations cannot only reduce the amounts of wasted food, thus minimising operational costs, but also alleviate poverty. On the other hand, food donations can just shift responsibility for managing excess from food providers businesses to the charities and food banks. There are further resource implications for the charities and food banks that do not always possess the necessary equipment, labour and time to safety store and redistribute unsold food.

According to Martin-Rios, Demen-Meier, Gössling & Cornuz, 2018 an example of another innovation is the offer of "doggy bags" (to take-away whatever is left on plates at the end of the meal): a successful practice to reduce waste which is common in North America, but largely

unknown in most European countries. In France, where seven million tons of food are thrown away every year, the government passed new legislation in 2016, and restaurants are now legally obliged to provide doggy bags if requested by costumers. Also, the authors agree that restaurant staff can reuse parts of products that are traditionally considered waste. By means of reusing waste in the kitchen, for example, it is possible to use banes and seafood shells to make broth and to tum some peelings and trimmings into soups, juices, compotes or purees.

The advance in technology can, once again, and now in a consumer perspective, be a great advantage in the path to achieve sustainability. More and more there are appearing new applications for smartphones that might also be a solution to reduce food waste. Increasing awareness toward food waste impact can stimulate the integration into existing smartphone apps (or when implementing a new app) of instant pop-ups or quizzes to inform (to survey on) the impact of waste. This novelty could help to increase awareness on the phenomenon by also promoting re-use of their own restaurant plate leftovers (if edible) (Secondi et al., 2019). This applications bring more customers to the restaurants' physical location, which might encourage them to visit the restaurant again. For the consumers, the application (for example "Too good to Go") offers economic benefits, as they are able to purchase restaurant meals cheaper than their "usual" prices. The consumers can also save time, as they do not need to cook (Mattila et al., 2020).

Digital platforms make often-invisible food waste more visible in society. […] Through this real-time data production, those engaging in food waste-related practices in their daily work in food services can become more motivated and dedicated to innovating new practices for food waste reduction (Mattila et al., 2020).

2.4.3. Recycling and Composting

Recycling or composting is very important since it is the process of giving new life to food waste that has not been prevented or redistributed (with the suggestions in the two previous points).

Composting food waste is preferable to landfill disposal as it minimises costs and environmental impacts once executed effectively […] it can reform the composition of food waste for subsequent use as a fertilizer (Filimonau et al., 2019).

The food service provider should do on-site food waste separation as well as on-site composting in the third step towards becoming more sustainable and environmentally friendly.

Also here, the innovations in technology have an important role. There are a variety of possible innovations ranging from transforming coffee grounds into hair care products, food waste transformed into ingredients and additives, LEDs or fertilizers (through means other than anaerobic digestion) to organic waste transformed into fodder additive or into gasoline (Martin-Rios, 2018).

2.4.4. Recovery and Disposal

The last two steps of the hierarchy include on-site anaerobic digestion and food waste sent to landfill. This steps should be used only when the first three are not possible and the food service providers should take into account that they are contributing to the emission of very damaging gases from our planet and not contributing to its sustainability, and should try to avoid the last step to the maximum.

Concluding, the more proactive a business is, the more solutions it may find. Proactive businesses can also use their expertise to encourage sustainable consumption patterns (Bocken, 2017).

The solutions mentioned above contribute to the more efficient use of natural resources which leads to the reduction of carbon dioxide ending up in the landfills. A summary of the actions that food service providers should consider in their business models can be found in Table 1. Food production and preparation have significant environmental footprints and produce harmful emissions because they use various resources, such as nutrients, water, and energy, which are wasted when produced and prepared food is discarded. (Mattila et al., 2020).

Table 2.1: Food Waste Hierarchy and Strategies

Level	**Strategies**
Prevention	- Synergistic actions between governments, societal stakeholders, and retailers; - Suitable communication to consumers and consumer education; - Fairtrade; - Give importance locally source produce; - Avoid stocking environmentally damaging products; - Develop labelling policies; - Marketing the suboptimal food; - Targeting the communication at respective customer groups; - Inventory management; - Offering different portion size for the same dish at different prices; - Freezing the products;

	- Incentivize the purchase of suboptimal food; - Using new technology;
Preparing for Re-use	- Donation of unsold products; - Animal feed; - Offering “doggy bags”; - Reusing waste in the kitchen; - Using new technology (apps like Too Good to Go);
Recycling	- Recycling; - Composting;
Recovery	- On-site anaerobic digestion;
Disposal	- Sending food waste to landfill

Source: Own elaboration

The most logical approach for the customer and business is to drive sustainable consumption as part of the business model. […] Nevertheless, businesses need to deliberately set up their business models to encourage the right behaviours (Bocken, 2017).

Concluding, in order to implement food waste innovations organizational changes must be made regarding not only what is managed, or how it is managed but the goals the organization is seeking to achieve […] effective waste treatment and reduction requires a comprehensive approach to foodservice waste management that may include process, technological and radical innovative actions (Martin-Rios et al., 2018).

2.5. Research Gap

The development of tools that aim at using business model innovation as a leverage to help companies/restaurants to meet their sustainability ambitions is a relatively recent phenomenon.

The existing literature offers only little guidance through most of the sustainable business model innovation process.

The different articles analysed mention the potential at the level of application of the suggestions found, as well as their potential for application and improvement of business models, however, they do not analyse concretely at which stage of the process there is, in a more persistent way, food waste. Hence the importance of understanding where most of this waste comes from.

Several articles give examples of solutions that can be applied to the business models of food service providers, however, there is no detailed analysis of how to put them into practice. Therefore, it is extremely important to understand how these economic agents who already apply at least some of the suggestions found are effectively performing their daily tasks in a more sustainable way, or even what kind of changes they have had to make in their operational models.

The authors also study the impact of reducing food waste, as well as the interest on the part of the United Nations and other entities in the path to achieving certain targets in this reduction. Still, it remains to be seen whether economic agents are aware of the impact that these measures can have, not only on their business but also on all their stakeholders, and whether they are aware of the need to do so. It is necessary to understand whether they are willing to do so.

This indicates that there are still some questions that are not sufficiently addressed in the literature, which confirms a research gap and justifies the need for more detailed research with professionals within the area who have already adopted sustainable measures in their business models, or who, even if they have not yet done so, can justify their motives.

Table 2.2: Identification of research questions and objectives.

Literature Review Issue	**Autor Reference (Date)**	**Research Question**	**Research Objective**
The authors studied the importance of reducing food waste, as well as the interest on the part of the United Nations and other entities in the path to achieving certain targets in this reduction. Still, it remains to be seen whether economic agents are aware of the impact that these measures can have, not only on their business but also on all their stakeholders, and whether they are aware of the need to do so.	Jesus & Pires, (2018) Notarnicola, Tassielli, Renzulli, Castellani, & Sala, (2017) Scherer & Palazzo, (2011) Wunderlich & Martinez, (2018)	**RQ1:** Is there awareness on the part of the economic agent of the need to reduce FW?	Understand if the economic agents are actually engaged in driving their business models through sustainability and if they understand the need to do so.
The different articles analysed mention the increasing importance in turning BMs more sustainable and innovative and how this two constructs are related, however,	Geissdoerfer, Morioka, de Carvalho & Evans, (2018) Wirtz, Pistoia, Ullrich & Gottel, (2015)	**RQ2:** Do food service providers really feel that their consumers are alert and	Analyze food service providers' opinion regarding their customers engagement through sustainability and

they do not explain if the food providers feel that their customers are really concerned and engaged with sustainability.	Nosratabadi, Mosavi, Shamshirband, Zavadskas, Rakotonirainy & Chau, (2019) Schaltegger, Hansen & Lüdeke-Freund, (2016) Belyaeva, Rudawska & Lopatkova, (2020)	concerned about consuming in a more sustainable way? What is their perception?	preference in consuming from businesses that apply SBMs.
Several articles give examples of solutions that can be applied to the business models of food service providers, however, there is no detailed analysis of how to put them into practice. There is not a conclusion regarding the ones that the economic agent is actually applying neither their constraints in doing such progress in their BMs.	Papargyropoulou, Lozano, Steinberger, Wright & Ujang, (2014) Filimonau & De Coteau, (2019) Aschemann-Witzel, de Hooge, Amani, Bech-Larsen & Oostindjer, (2015) Wunderlich & Martinez, (2018) Secondi & Mattia, 2019) Mattila, Mesiranta & Heikkinen, (2020).	**RQ 3:** How are, in fact, the food service providers doing to minimize food waste and which are their main solutions and suggestions to do it? Do they believe that the suggestions found are feasible, or is there some kind of constraint?	Understand how these economic agents who already apply at least some of the suggestions found are effectively performing their daily tasks in a more sustainable way, or even what kind of changes they have had to make in their operational models. Analyse if there are barriers to the adoption of SMBs.

Source: Own elaboration

Chapter 3. Methodology

The methodology for this study was firstly a thorough review of existing literature on the themes of sustainability, business models, food waste and solutions for its reduction in order to understand the perspectives of different authors and gather information on related work already developed on the subject. This data came from relevant and high-quality journals, from ISCTE university databases and Google Scholar. As the topic is studied in the context of sustainability and the SDGs, the key words used to search for literature were: sustainability, business models, global food waste, global food waste in the food service sector, and food waste hierarchy. Reliability of content and sources was ensured where possible by triangulating data. This review allowed the identification of gaps and areas for further work on the subject.

In order to fill the gaps of the literature review and to answer to the research questions, a qualitative research was applied. Qualitative methods, such as interviews, are believed to provide a 'deeper' understanding of social phenomena than would be obtained from purely quantitative methods, such as questionnaires (Silverman, 2005). This study draws a qualitative data collected from semi-structured interviews in Portugal. Interviewees included owners and managers in independent restaurants based in Lisbon. The restaurant types represented were the ones with a full service, fast food and take away, excluding café/bars, self-service cafeterias (hospitals, schools, corporate), foodservice chains, catering, canteens and events. The selection procedure applied was a mix of convenience sampling, as well as snowball sampling, i.e. where possible, respondents are asked to provide contact details of other food service providers and experts (Martin-Rios et al., 2018).

For the preparation of interviews, a pre-test was done. The objective was to test the interview guideline done previously for its suitability and to check the interview length. In Annex A, the interview guidelines for the restaurants' managers/owners can be found. The interview was tested and reviewed by two different random professionals with a management position within a restaurant. Those tests estimated that the interviews would take 18-36 minutes.

The pre-test was comprising fourteen questions, the first three being personal, so as to know exactly the interviewee's position in the company, their area of study and experience and their personal concern for the issue of sustainability. After the pre-test analysis, some adjustments were made given that the last question "What are your long term sustainability objectives? What do you want to improve? " became too repetitive and the decision was taken to remove it.

Interviews were carried out online, through Zoom application due to the Covid-19 pandemic and there were a total of 25 semi-structured interviews which were conducted in March 2021. Interview procedures ensured anonymity and confidentiality, were digitally recorded, and transcribed verbatim[1], conducted through a semi-structured interview template, and lasted 15-30 min.

Each interview began with an introductory question requesting background and experience information from each manager/owner. The next section was designed to get answers to the research questions. The questions are content related and aim to understand if there is awareness on the side of the economic agent, to get consumer-related answers and to understand their strategies to mitigate food waste.

The table below provides a connection between the interview questions and the research objectives.

Table 3.1: Interview Prototype.

Research Objective	Question	Type of Question
Understand if the economic agents are engaged in driving their business models through sustainability.	Do you consider that sustainability is something relevant for the company? Why? **(RQ 1)**	Exploratory Question
Understand if restaurant managers perceive the need to reduce food waste.	Do you consider food waste as an important issue that needs to be minimized? If so, do you consider that all the employees of the restaurant you work in, are worried about this problem? **(RQ 1)**	Exploratory Question
Understand if restaurant managers perceive the need to reduce food waste.	Is food waste a problem for the food service sector, respectively restaurants? Please elaborate. **(RQ 1)**	Exploratory Question
Understand if the economic agents are engaged in driving their	How does your company/restaurant see sustainability? As a competitive advantage or as	Exploratory Question

[1] Interviews scripts are available upon request

business models through sustainability.	something that you should apply in your strategy since its getting more and more awareness? **(RQ 1)**	
Analyze food service providers' opinion regarding their customers engagement through sustainability.	Do you feel that your customers are more and more worried about food waste? What is your opinion? **(RQ 2)**	Exploratory Question
Analyze differences between national and international customers regarding sustainability.	Since your restaurant is stablished in the capital of Portugal and since it is a city full of tourists, can you make a distinction between Portuguese and Foreign customers regarding their concern about sustainability and food waste? **(RQ 2)**	Exploratory Question
Investigate how are restaurants applying sustainable measures.	Which were the strategies your company/restaurant already adopted in order to combat food waste? **(RQ 3)**	Exploratory Question
Understand the major constraints.	Which ones were the most difficult to apply and why? **(RQ 3)**	Exploratory Question
Understand the major constraints.	Is there a willingness to adopt more strategies? If so, why don't you do it? Is there any constraint? **(RQ 3)**	Exploratory Question
Add more strategies to the ones found in the literature review.	Which other strategies or suggestions do you know/have in order to improve sustainability in this camp? **(RQ 3)**	Exploratory Question
Add more strategies to the ones found in the literature review.	What are your long term sustainability objectives? What do you want to improve? **(RQ 3)**	Exploratory Question

Source: Own elaboration

Chapter 4. Data Analysis

This chapter will present the data processing and qualitative analysis of the interviews and the respective results and comments. All the analysis was carried out using the KH Coder 3 software and Excel.

4.1. Sample Characterization

The focus of this research was on a group of interviews with Portuguese professionals working in restaurants placed in Lisbon, with a management or leadership position.

The characterisation of the sample is an important aspect in data analysis as it can influence the final results and aid a broader understanding of the facts. Thus, the sample used for this research focuses on four main aspects: gender, role in the company, academic qualifications and professional area or study and concern with sustainability in personal life.

4.1.1. Gender

One aspect that should be mentioned is the gender of the 25 respondents, 20 are male and 5 are male. There were no selection criteria that influenced this difference, so it is a random factor but it could be explained by a possible majority presence of the male gender in the restaurant sector.

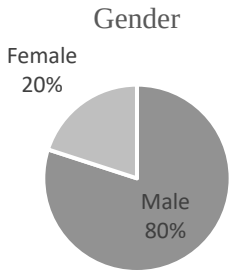


Figure 4.1: Gender.

Source: Self-elaborated

4.1.2. Role in the company

Regarding the professional position the interviewees hold, it was decided to group them into ten different categories. These are Owner, Manager, Managing partner, CEO, Chef, Executive chef, Partner, Head chef, Responsible of the project and Operational Director. It is possible to see from the chart below that about 48% of the interviewees are the owners, however the other 52% also hold administrative and decision-making positions.

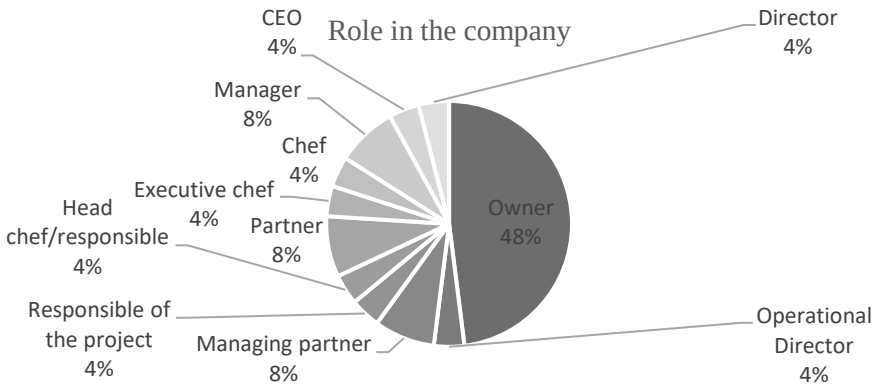


Figure 4.2: Role in the company.

Source: Self-elaborated

4.1.3. Professional/Study Area

Regarding the professional/study area, both were chosen since there are some of the interviewees that do not have more than the High school, 36% has background and experience in the Catering industry, 16% in Management, 16% in Hotel Management and Catering, 8% in Gastronomy, 8% in Engineering, 4% in the Food industry, 4% in Tourism, hospitality and culture, 4% in Management and industrial engineering and 4% in International relations.

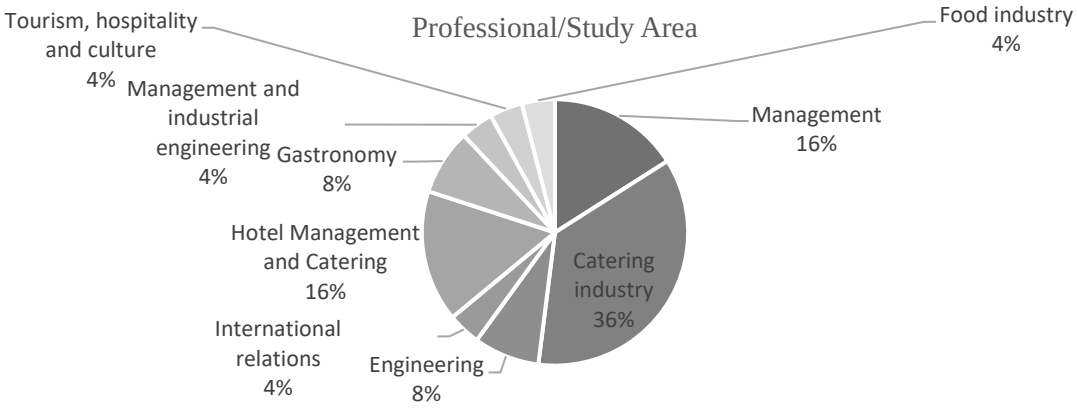


Figure 4.3: Professional/Study area.

Source: Self-elaborated

4.1.4. Concern for sustainability in personal life

In terms of concern for sustainability in personal life, all the interviewees said they were adopting strategies in their daily tasks, even at home, in order to adopt more sustainable choices.

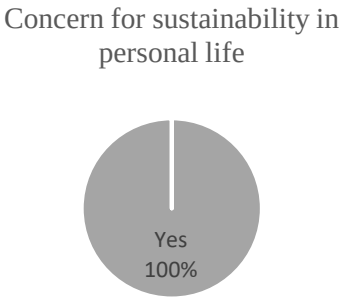


Figure 4.4: Concern for sustainability in personal life.
Source: Self-elaborated

4.2. Google Trend Analysis

In the last years, the theme of sustainability is gaining a greater global importance. Therefore, it is imperative that companies adopt strategies that take this issue into account and adopt more sustainable management methods. In the catering sector, reducing food waste is a step on the way forward. This was something that was easily proven through the content of the interviews that were conducted and where it was also possible to infer that the managers or owners of these restaurants greatly ally the reduction of food waste, as well as other more sustainable measures, to economic balance and cost reduction.

Thus, it makes perfect sense to relate the themes of sustainability, food waste and sustainable strategies. The charts below demonstrate the relative popularity of these topics under analysis.

4.2.1. Relative Popularity of Sustainability in the last 5 years worldwide:

The line graph below shows the relative popularity of sustainability globally where a similar shape can be seen over the years. In 2021 there is clearly a significant increase, probably due to the evolution of the pandemic that is being experienced, there being more awareness for this topic, which proves the continuity of the growth trend.

Figure 4.5: Relative Popularity of Sustainability in the last 5 years worldwide. Source: Google Trends

4.2.2. Relative Popularity of Sustainability in the last 12 months worldwide:

Looking closely at the popularity of sustainability in the last year, the trend is very regular, except during the period between December and January when it decreases. This can be explained as it is a festive season when the tendency is for people to relax. There is also a significant increase in the month of April which may unravel the continuation of this growth. Overall, it can be noted that sustainability is a relevant topic that is gaining popularity.

Figure 4.6: Relative Popularity of Sustainability in the last 12 months worldwide. Source: Google Trends

4.2.3. Relative Popularity of Food Waste in the last 12 months worldwide:

Looking closely at the popularity of food waste over the last year, it is possible to see that the trend is very similar to the popularity of sustainability. It is very regular, except during the period between December and January, and there is also a significant increase in the month of April which may unveil the continuation of this growth. In general, it can be noted that food waste is a relevant topic which, being related to sustainability and hence its similarity in the relative popularity charts, is gaining importance.

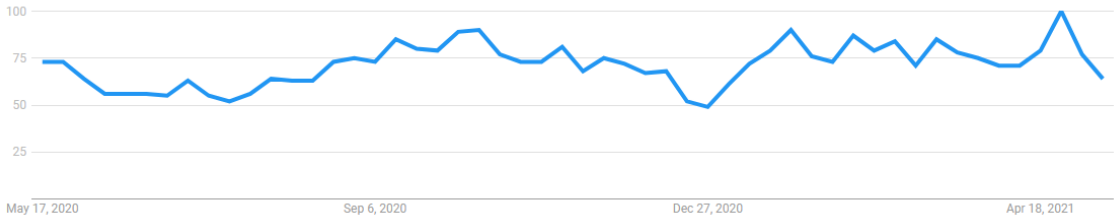


Figure 4.7: Relative Popularity of Food Waste in the last 12 months worldwide. Source: Google Trends

4.2.4. Relative Popularity of Sustainable Strategies in the last 5 years worldwide:

The line graph below represents how the relative popularity of Sustainable strategies has changed over time. Still, it is possible to see that over the last few years, although small, this popularity has increased and this will be the trend if you look at the last few months where the decreases have been smaller.

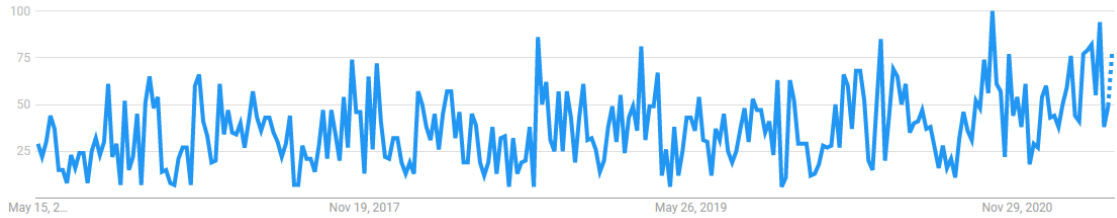


Figure 4.8: Relative Popularity of Sustainable Strategies in the last 5 years worldwide. Source: Google Trends

4.3. Text Mining

From the 25 interviews carried out, it was possible to obtain relevant information that allowed the differences and similarities between the interviewees' opinions to be identified and analysed, allowing interesting conclusions to be drawn. All interviewees assumed that sustainability is something they take into account. Still, not all are able to adopt effective strategies in their businesses due to constraints and barriers or even lack of knowledge. Thus, and in order to organize all the information and understand the connections between the topics addressed, several tools were used for data treatment.

Next, all qualitative results collected from this analysis will be compared with the literature review carried out previously.

4.3.1. Word frequency

The first tools used were the Word Frequency List and the Word Cloud as they are a quick way to give an overview of what respondents talked about in the interviews. They can also reveal some surprises in the data that prompt further investigation. They are therefore a quick and easy visualisation option to highlight the frequency of keywords in the data and spark ideas and conversations.

#	Word	POS / Conj.	Frequency
1	waste	Noun	862
2	food	Noun	808
3	restaurant	Noun	692
4	sustainability	Noun	386
5	product	Noun	382
6	company	Noun	320
7	strategy	Noun	312
8	people	Noun	304
9	customer	Noun	240
10	thing	Noun	208
11	term	Noun	206
12	something	Noun	202
13	problem	Noun	198
14	concern	Noun	192
15	lot	Noun	184
16	example	Noun	162
17	order	Noun	156
18	everything	Noun	143
19	issue	Noun	140
20	way	Noun	136
21	year	Noun	124

Figure 4.9: Word Frequency List.

Source: KH Coder 3

Figure 4.10: Word Cloud.

Source: Tag Crowd

In both analyses, one can observe the weights attributed to the words according to the number of occurrences they have in the interviews' content. It is thus easily perceptible the theme of the conversations held as well as the clear connection existing between certain themes, such as sustainability, restaurants, food, waste, strategies, among others.

It can be observed that the most used words were “waste” and “food”. This fact is not surprising considering that the main topic of this dissertation allies sustainability with food waste. As one had the opportunity to observe in the graphs extracted from Google Trends, food waste is undoubtedly a topic that is gaining importance, having a growth very similar to that of the word “sustainability”, which was also one of the most addressed words in the interviews.

In fact, all respondents answered that food waste is something they take into account and virtually all stated that this is a problem or an issue for the catering sector. Thus, it is easily perceptible that the words “problem” and “issue” also take relevant positions in the analysis of these two tools.

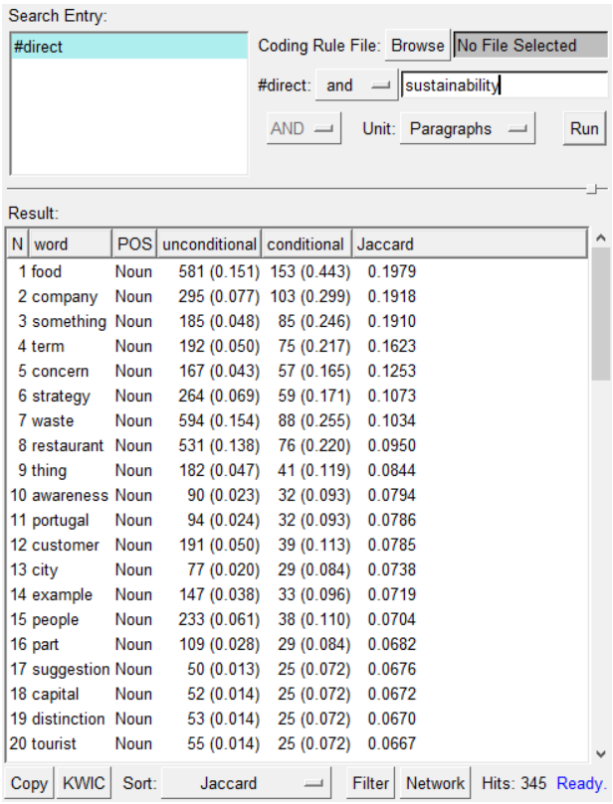
Considering other important words present in the graphs, it is possible to mention that "people", “customers” and "concern" are clearly interconnected and represent two things: the fact that people, in this case, the restaurants' clients, are not yet concerned with this theme and with this problem and hence the interviewees, in general, do not consider that the adoption of sustainable strategies can be seen as an advantage in terms of marketing for their customers and, also, the fact that they consider that the adoption of these measures not only helps the environment but can improve the quality of existing products and the health of the population/people.

Another relevant words are "product" and “example” since whenever respondents talked about their strategies, they talked about different types of products, some being more perishable than others, and used plenty of examples to explain the measures they take so that these products do not spoil or have to be thrown away.

4.3.2. Words Association

The second method used in text mining was Word Association in order to understand which words were most frequently associated with each other and to be able to map the most relevant concepts and themes for the interviewees. Three of the most discussed words and concepts during the interviews were chosen as objects of analysis, these being sustainability, food waste and strategy.

Table 4.1: Sustainability Word Association.



N	word	POS	unconditional	conditional	Jaccard
1	food	Noun	581 (0.151)	153 (0.443)	0.1979
2	company	Noun	295 (0.077)	103 (0.299)	0.1918
3	something	Noun	185 (0.048)	85 (0.246)	0.1910
4	term	Noun	192 (0.050)	75 (0.217)	0.1623
5	concern	Noun	167 (0.043)	57 (0.165)	0.1253
6	strategy	Noun	264 (0.069)	59 (0.171)	0.1073
7	waste	Noun	594 (0.154)	88 (0.255)	0.1034
8	restaurant	Noun	531 (0.138)	76 (0.220)	0.0950
9	thing	Noun	182 (0.047)	41 (0.119)	0.0844
10	awareness	Noun	90 (0.023)	32 (0.093)	0.0794
11	portugal	Noun	94 (0.024)	32 (0.093)	0.0786
12	customer	Noun	191 (0.050)	39 (0.113)	0.0785
13	city	Noun	77 (0.020)	29 (0.084)	0.0738
14	example	Noun	147 (0.038)	33 (0.096)	0.0719
15	people	Noun	233 (0.061)	38 (0.110)	0.0704
16	part	Noun	109 (0.028)	29 (0.084)	0.0682
17	suggestion	Noun	50 (0.013)	25 (0.072)	0.0676
18	capital	Noun	52 (0.014)	25 (0.072)	0.0672
19	distinction	Noun	53 (0.014)	25 (0.072)	0.0670
20	tourist	Noun	55 (0.014)	25 (0.072)	0.0667

Source: KH Coder 3

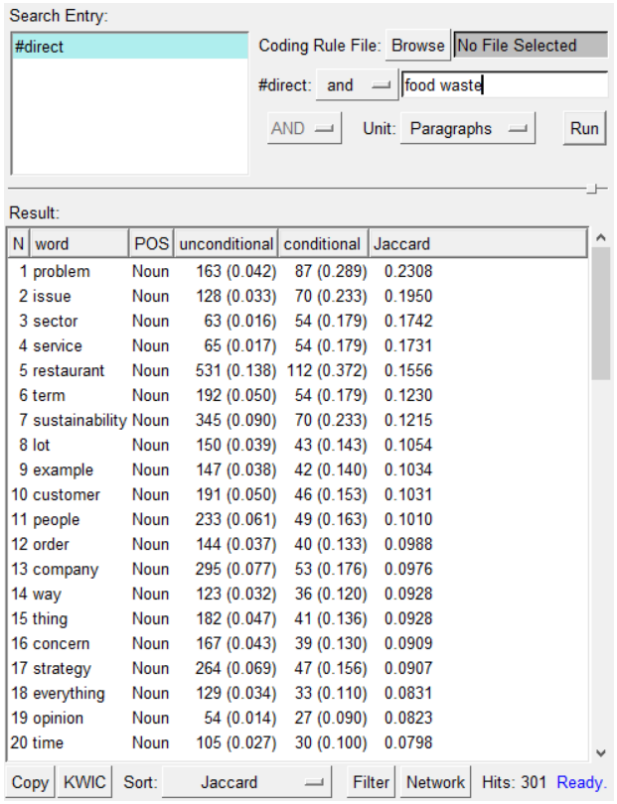
First, and explaining how the table presented works, it is possible to observe in the left column called "word", the words that were most used in conjunction with the word sustainability, which is the word under analysis in this case. The third column "unconditional" tells us the number of times this word was said during all the interviews and the column "conditional" depicts the number of times it was said in conjunction with the word under analysis. Finally, the "Jacquard" column represents a coefficient that, due to its little relevance to this study, will not be analyzed.

The first word most commonly said in conjunction with the word sustainability was "food", which again makes perfect sense given the subject of this dissertation and the objectives of this study. Other words like "waste" and "restaurant" also highlight the aim of the analysis.

Other words present in the table presented are "company", "term", "concern" and "strategy", and during the interviews there was clear evidence that the owners/responsible of these restaurants and, consecutively, companies, are concerned about the issue of food waste and know that to be successful in their business, they have to adopt strategies aimed at combating it.

The explanation for the fact that the words "Portugal", “capital" and “tourist” are also present in this table is due to the fact that in the interviews done, questions were asked about the difference that the interviewees felt regarding the concern with food waste between Portuguese and foreign customers, and the answers were quite ambiguous, with the opinion that foreigners are much more advanced when it comes to adopting strategies against waste, especially those from Northern Europe, but also opinions that they don't think there are differences or they don't have enough foreign customers to be able to answer.

Table 4.2: Food waste Word Association.



Source: KH Coder 3

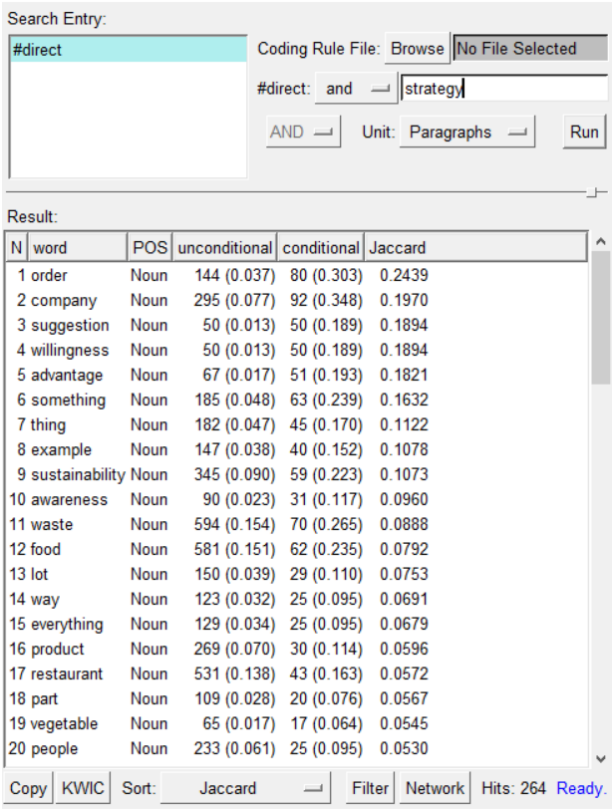
Looking at the table above, one can once again see how the words “food waste” and “sustainability” relate to each other since they are the focus of this study.

The words "sector" and "service" are also related, which makes sense, since there is a question related to the food service sector, where respondents had to give their opinion and justify why they thought food waste is a problem in their sector. “Problem” is another word that can be explained by this question, which is extremely relevant and reinforces the fact that food waste is really a big problem for humanity.

Many of the respondents said that they feel that consumers are not yet very concerned about the issue of food waste, responding to a question asked in the sense of understanding whether there is awareness on the part of the consumer or not, hence the word “customer” is also quite related.

So, again, the restaurant managers are all "concerned" about this issue and used the word "lot" to explain that they are indeed very worried about this issue but also to express that they feel that there is still a lot of work ahead that has to be done in order to change mindsets, attitudes and "strategies".

Table 4.3: Strategy Word Association.



Source: KH Coder 3

Firstly, it is important to mention that the most associated word to “strategy” is “order”. The respondents are aware that more can be done in terms of strategies in "order" to combat the food waste and make their businesses more sustainable. Many say that they are already at the limit of what they can do, but of course there is always something they can miss and something more can be done.

One of the last three questions of the questionnaire done during the interviews was about what strategies had been adopted by the “companies” in which the interviewees worked in order

to reduce waste and be more sustainable and which were their suggestions, hence the fact that the words "sustainability" and "suggestion" are present in the table above. To answer this question, the managers used a lot of "examples", which may mean a lack of knowledge of specific names of strategies.

Finally, the word "advantage" can be explained by the question asked in the questionnaire with the objective of understanding whether the managers adopted sustainable strategies and considered it a competitive advantage or if it was just part of their business strategy taking into account the general increase in awareness of this issue, to which the majority replied that they could only make it a competitive advantage in terms of cost reduction and not in terms of vision for the customers and that it would therefore be more of a business strategy that contributed to a better planet.

4.3.3. Bigrams and Trigrams

One of the text mining techniques used is bigrams and trigrams, which is a tool that allows us to look at words in a context and not just by themselves. This is because the characteristics of multiple words can provide information that is sometimes more relevant to draw objective conclusions than analyzing single, isolated words.

Table 4.4: Bigrams.

N-gram	**Frequency**
Food waste	464
The restaurant	206
Your company	150
Of food	124
About sustainability	108
The food	102
A problem	96
Waste as	84
Waste and	82
Difficult to	76

Table 4.5: Trigrams.

N-gram	**Frequency**
Of food waste	80
Of the restaurant	78
A competitive advantage	68
Terms of food	64
Food waste as	60
And food waste	60
About food waste	56
Combat food waste	54
Sustainability and food	54
For the company	54

Source: Self-elaborator based on N-Gram Generator

Starting with the analysis of the Bigrams table, the two most used words together were undoubtedly "food" and "waste", which makes perfect sense since this is the topic of the dissertation.

Sequences such as "the restaurant" and “your company” appear several times taking into account that the interviewees addressed topics about their business, their restaurants, and often encompassed their entire team when talking about topics of strategies and actions taken in the day to day of their business.

During the interviews, the subject of food waste incorporated within sustainability was broached and it was mentioned how this is really “a problem" that is "difficult to” solve, which reveals that the managers are really aware that the subjects broached are extremely relevant.

Analysing the second table, again, the theme of the study is easily evidenced, being present in seven sequences, out of a total of ten. The companies and their respective restaurants are portrayed in this table and are, in fact, very important agents in the fight against food waste and would affect and influence on a large scale and in a positive way, by adopting the right strategies, indicator number twelve of the Sustainable Development Goals established by the United Nations.

Finally, the sequence “sustainability and food” describes perfectly everything that has been addressed.

4.3.4. Text Correlation, Mind Mapping and Cluster Analysis

The mind map below was extracted from the KH Coder 3 software in order to allow an analysis of the relationship between concepts. Its subdivision into small graphs allows one to easily identify the interviewees' lines of thought when answering certain questions asked.

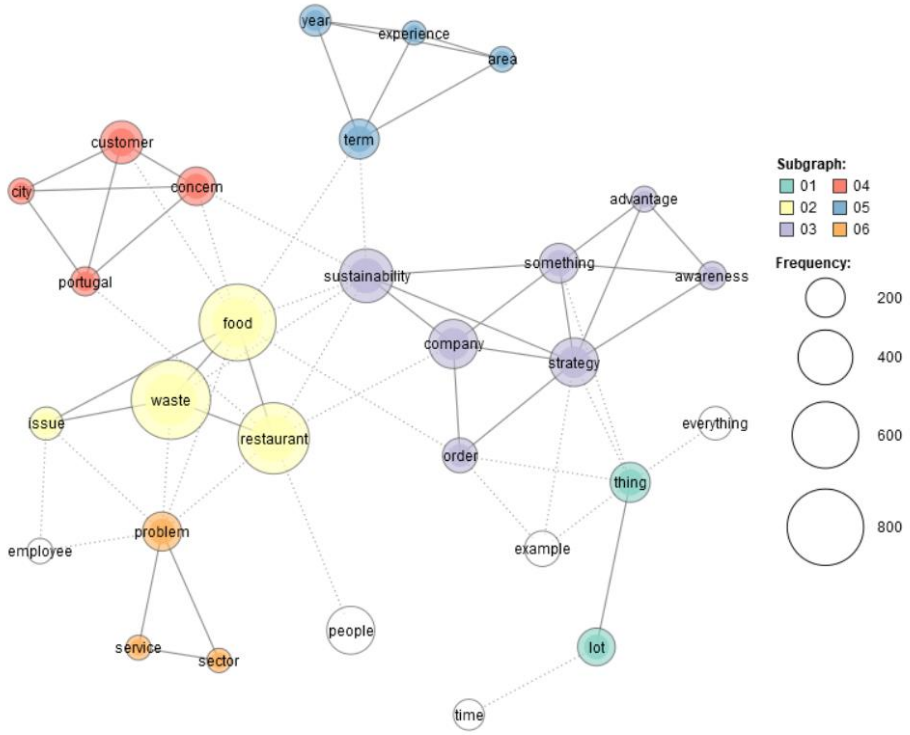


Figure 4.11: Text Correlation and Mining Mapping.

Source: KH Coder 3

The first graph analyzed will be the one colored yellow. Food waste had to be the most used words and they had to be related to "restaurant", otherwise we wouldn't even be talking about the same study. Everything revolves around waste in restaurants and therefore, these had to be the words with the most focus.

One can easily see that the graph in blue corresponds to the first three questions of the questionnaire, which in turn were the most personal. The respondents answered what their position was in the company, how long they had been working there and what their area of experience was. They also answered whether in their personal lives they are concerned with sustainability in terms of food waste, and all said yes.

The graph in orange when related with the word “employee” is a mirror image of two questions asked. All the interviewees stated that fighting food waste was present in their business and that, being a company policy, all employees had to act this way as well. Still, many admitted that it is not always possible to have total control over what goes on, and that they don't know if their employees in their life outside work also apply measures to meet this reduction. The other question is related to food waste in the restaurant sector, to which a large majority admitted that they consider it a problem for the sector since there is still a lot of

misinformation and very little help from customers. They feel that many consumers still prefer to see a food-rich establishment, with many products on offer, and that they don't understand that everything left over will probably end up in the trash.

The graphs in yellow and red, represent the interviewees' concern about the topic, with all of them stating that it is something that concerns them but that it is still far from what could be implemented in Portugal. Many agree that changing behaviors in order to contribute to the fight against food waste is something cultural and Portugal still has a lot to change and to do in order to reach a good level of awareness for the topic. As mentioned before, some managers don't have enough foreign customers to say anything, because they are located in more residential areas of Lisbon, but those who do, either say that awareness is the same, or that foreigners are already more advanced in this path to a life without food waste. The lack of support and means existing in the city of Lisbon was also clear. Many affirm that the existing infrastructures and the size of the spaces they can have inside the city are quite small, which sometimes makes it impossible to have a simple ecopoint inside the restaurant, where they can separate the garbage. Another difficulty encountered by some managers was the harmonization of supply and demand, something that is quite unpredictable and difficult to manage. Many use prevention systems or sales forecasts, but even so, there are always discrepancies.

To explain the strategies already adopted by their companies, the managers used several examples, hence the word "example" with the sub-graph were "strategy" is represented. Many use food scraps, be they animal body parts that are no longer fit for a dish, or shells, or lumps to make other kinds of products or even broths to enrich other dishes. Some even reuse the frying fat from one product to another in order to enrich the products and give them more flavor. Only two respondents said they had a vegetable garden or a partnership with a vegetable garden, but many of the rest agreed that it is something they would also like to adopt but do not do so for lack of space. There is also a large adherence to platforms such as "Too Good To Go" or "Phoenix", which help restaurants at a residual price to dispose of the leftovers of the day. Composting was also a topic that was discussed a lot, but it is still not very often put into practice since they don't have a place to use the compost. Two other strategies were the reduction of the menu and the products available, as well as the use of the same product for several dishes. All this is represented in the grey graph.

4.3.5. Text Clustering

The last technique used to finish the data analysis was text clustering. Through this tool, it is possible to visualize the various concepts addressed in the interviews and their relationship through the analysis of the numbers. The type of information is similar to the mind map, but here it is possible to see more detailed information.

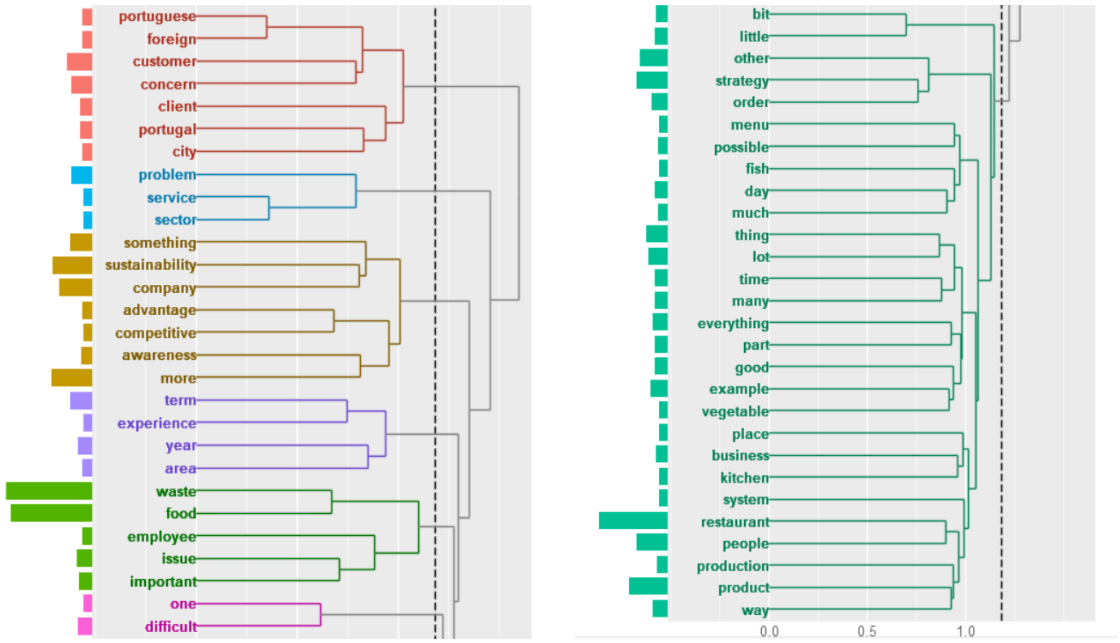


Figure 4.12: Text Clustering.

Source: KH Coder 3

Once again, the central theme of this dissertation is quite clear. During the interviews, certain subjects were addressed, such the state of food waste in Portugal, the existing barriers in the country and in general, the importance given by consumers to the topic, their level of awareness and the position of the interviewed companies in relation to this issue. All this is shown in the figure on the left with the color red.

Certain questions also organized the topics more clearly and one can see from the groups of words that there were questions about the food service sector, about the "role" of the interviewee in the company, what is his/her experience and years in the position, what do they do for sustainability, whether they consider their employees interested in the topic, among others.

It is also possible to see from the image on the right that many specific examples have been given, hence the presence of words like "kitchen", "vegetable", "menu", "fish", "example" and "system". This may mean that not all respondents have theoretical knowledge about possible

strategies to adopt, but only revealed a lived experience that they have learned along their journey.

To conclude, this data analysis allowed us to realize that in recent years, although issues such as sustainability, environmental awareness and social responsibility have gone from marginalized concepts to very important to the community at large, it is necessary to continue working to change the mindset on the side of consumers, who are not yet prepared to help organizations to effectively adopt their more sustainable strategies. Restaurant managers know that the adoption of this type of measures is crucial for their performance and have shown clear perception that they are not only helping the environment but also improving their business taking into account that it also affects their costs in a positive way, even though it may have results only in the long term.

Chapter 5. Discussion and Findings

The results will be discussed in this chapter and confronted with existing literature, enabling confirmations, evolution and new findings.

Starting by the first research question “Is there awareness on the part of the economic agent of the need to reduce FW?” it was possible to see from the 25 interviews that the restaurant managers are effectively aware of this issue and that there is a general concern, hence all of them have stated that they already implement or are in the process of implementing more sustainable measures even in their own personal lives, which are then transferred to their businesses and influence their production methods and activities. This confirms that the people in charge of the restaurants are in line with what Notarnicola et al., 2017 states, that the current patterns of food production and consumption are increasingly considered to be unsustainable.

Giesen, et al., 2007 when mentioning that a study done by the IBM Institute for Business Value revealed that financially successful companies attach around twice as much importance to consequential and sustainable business model management as less financially successful companies, is in line with what was admitted by most of the interviewees, who assume that they often adopt more sustainable strategies, not only for environmental and social reasons, but also to reduce costs, considering that by throwing away food or having to find second alternatives for food that could have been sold, they are losing money.

Regarding the second research question "Do food service providers really feel that their consumers are alert and concerned about consuming in a more sustainable way? What is their perception?", although agreeing with Notarnicola et al., 2017 who state that there are external pressures and motivations from international organizations and NGOs that encourage the organizations to be thrilled to shift toward sustainability, the interviewees' view of their customers was somewhat different, which means that even though there may be external motivations from certain entities, the restaurant managers feel that they still have to be the ones to teach their consumers and that they have to be the ones to take the first step so that then their customer also adopts measures that go towards waste reduction. This means that consumers have not yet adopted a position of preference for more sustainable businesses and they are not exactly the ones who motivate food service providers to adopt sustainable strategies. The respondents, in general, admit that there is still a long way to go in this direction. This can be explained by the fact that economic growth and the global economy have been built on a model of unsustainable growth, which has contributed strongly to the depletion of the planet's natural

resources and to environmental degradation (Jesus et al., 2018) and that people have not yet significantly changed their attitudes, at least as far as Portugal is concerned. As mentioned before, some of the managers admitted that certain types of foreign customers are already much more advanced in this topic than Portuguese customers. This is totally in line with what Jesus, et al., 2018 stated, that only with a more informed (and nonconformist) citizen, more aware of himself and of his surroundings (poverty, inequalities and injustices, food waste) and available to intervene in public life, [...] can we aspire to a sustainable, more democratic, fairer and less unequal society.

The analysis of the last research question "How are, in fact, the food service providers doing to minimize food waste and which are their main solutions and suggestions to do it? Do they believe that the suggestions found are feasible, or is there some kind of constraint?" showed that there is still a great lack of information on the subject by the food service providers. They have the right motivation, but there are still many aspects and strategies that they don't apply, and there were several who said that they were already doing as much as they could to reduce their waste, but they didn't address many strategies, leaving some doubts. Clearly this does not cover all managers, but is only a generalization based on the majority of responses. Based on the Waste Management Hierarchy, on the first level of “prevention”, respondents mostly apply measures such as give importance to locally sourced produce, inventory management, freezing the products and using new technology. Regarding the “preparing for re-use” phase, the most used strategies are the donation of unsold products, offering "doggy bags", reusing waste in the kitchen and using new technology (apps like Too Good To Go). Almost all mentioned that they recycle and some are already thinking of starting composting, but it is something that they still encounter some barriers.

Some respondents stated that they do not need to adopt more strategies because they say they already have very low levels of waste, but the others, to justify the lack of adoption of more strategies, indicated barriers, one of them being the lack of support from the state and city councils, in this case the one in Lisbon, which also highlights the argument of Aschemann-Witzel et al., 2015 when they state that sensitization in the form of collaboration among institutions; synergistic actions between governments, societal stakeholders, and retailers can lead to food waste decreases. The respondents also affirmed that they have little space in their establishments, since in the city of Lisbon there is little chance of getting bigger spaces and therefore they have to go to the garbage several times, being difficult to separate it. They affirm that the city has few means. It was also indicated the difficulty in obtaining the exploration of

a community garden due to the fact that the restaurant's location is not near any community park, and therefore they have no place to put their compost, if by chance they would start the composting process. They also assume that there are poorly qualified staff in this regard and that they have difficulty finding the right people. The pandemic that is going on in the world also does not help the adoption of measures since the fact that they are always opening and closing doors makes the process of forecasting sales difficult and, finally, financial barriers were indicated, as certain strategies require investments.

From the data analysis and the discussion of the results themselves it was possible to discover some important key findings to mention:

- Food service providers are aware of the general relevance of the concept of sustainability. It is a topic that is gaining notoriety over the years;

- When restaurant managers adopt certain strategies, they make sure that these are instilled in the business and that all employees are involved;

- Most of the interviewees assume and are aware that food waste is a problem in their sector;

- They assume that they adopt more sustainable strategies in a strategic way, to reduce costs and for reasons of increasing awareness of the issue in society;

- There is still a lot of thinking that they already have very low levels of waste, but they do not address certain key issues and strategies;

- Many strategies are based on lower levels of the Waste Management Hierarchy than “prevention”;

- There are still several barriers that do not help respondents to act more.

Chapter 6. Conclusion

As it could be concluded throughout this research, sustainability in general is present in the consciousness of food service providers. When talking about food waste, those responsible for restaurants in general assumed its relevance and that it is a problem present in their sector that still has a long way to go to be solved, or at least in a partial way, taking into account that waste is something very difficult to eliminate in totality and is dependent on several factors and players. However, despite assuming its relevance, only a minimum percentage of the interviewees carry out most of the strategies found through the literature review of this dissertation. This means that there is still a lot of lack of information in the industry and there is still a great deal of room for progress.

The importance of a change in the industry and the way of consuming was unanimously identified by the interviewees as essential. This means that consumers are not yet prepared or as aware of this problem as food service providers. According to the interviewees, customers still prefer to go to establishments with a lot of supply and do not have the perception that everything that is left over ends up being thrown in the garbage.

Several barriers to the adoption of strategies to combat food waste were also found that hinder the adoption of good ideas coming from restaurant managers.

Still, the food service providers interviewed in a general perspective revealed to be improving their behavior towards sustainability in the past years. This revealed a strong tendency for a positive evolution.

This research is contributing to the literature as it was possible to go a step ahead in the knowledge of the topic of sustainability, more specifically food waste, in the restaurant sector from the perspective of restaurant managers. It was also possible to analyze in a more practical way the studied theory and make interesting comparisons.

For further research it would be relevant to deeply analyze also the consumer side to understand their motivations and what is missing for the consumer/restaurant relationship to have common goals regarding the adoption of sustainable strategies and that aim to combat food waste, taking into account that consumption is globally defined as being an element which finally leads to unsustainable development (De Bernardi et al., 2018).

Our current habits of production and consumption are not sustainable and are responsible for 20-30% of the overall environmental impact on the planet (Notarnicola et al., 2017) and this

reinforces the fact that something has to be done towards increasing the level of information of both producers and consumers in this field. Informed and educated consumers and food service providers are key for improvement.

Limitations

During the elaborate study, some limitations emerged. First, the interviews were only made to managers or owners of restaurants, not listening the consumer side, which can lead to results influenced by this factor.

Next, it would have been more relevant and a greater or broader reality would have been obtained if the sample had been larger. Only 25 people were interviewed, which may not be a mirror image of society in relation to the subject studied.

Due to the fact that we were going through a pandemic, it was not possible to do face-to-face interviews, which may have affected the quality of the answers. Also for this reason, when answering the question about how they felt about their customers' concern about food waste, the interviewees had to remember what was happening a year ago, when they had their establishments fully open and more contact with customers.

In the data analysis chapter there was also a major limitation. The results from the KH coder were not as detailed as expected. There is a feeling that many aspects said in interviews were not portrayed since they were not often addressed, but which are considered quite pertinent and important and ended up being missed.

Finally, it is important to mention that another limitation is the fact that this research focused only on Portuguese restaurants, with establishment in Lisbon, being an extrapolation of the data to a global analysis or conclusions not recommended.

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Annexes

A. Interview Script

INSTITUTO
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DE LISBOA

Interview Guideline

Master thesis: How can Food Service Providers improve their Business and Operating Models to increase Sustainable Consumption?

Semi-structured interview for the Master thesis presented in order to complete the degree in International Management

Contacts in case of doubts: Mtgca1@iscte-iul.pt or leandro.pereira@iscte-iul.pt

1. Introduction

- Personal introduction;
- Introduction to research objective;
- Obtain permission to record interview;
- Request to answer unbiasedly;
- Provide anonymization if needed.

2. The interviewee

- What is your job role in your company/restaurant?
- For how long have you been working in your current position? What is your background in terms of academia and experience.
- Do you personally care about sustainability, especially in terms of food waste?

3. Awareness of the Economic Agent - **RQ1:** Is there awareness on the part of the economic agent of the need to reduce FW?

- Do you consider that sustainability is something relevant for the company? Why?

- Do you consider food waste as an important issue that needs to be minimized? If so, do you consider that all the employees of the restaurant you work in, are worried about this problem?

- Is food waste a problem for the food service sector, respectively restaurants? Please elaborate.

- How does your company/restaurant see sustainability? As a competitive advantage or as something that you should apply in your strategy since its getting more and more awareness?

4. Consumer-related questions - **RQ2:** Do food service providers really feel that their consumers are alert and concerned about consuming in a more sustainable way? What is their perception?

- Do you feel that your customers are more and more worried about food waste? What is your opinion?

- Since your restaurant is stablished in the capital of Portugal and since it is a city full of tourists, can you make a distinction between Portuguese and Foreign customers regarding their concern about sustainability and food waste?

5. Strategies against Food Waste - **RQ 3:** How are, in fact, the food service providers doing to minimize food waste and which are their main solutions and suggestions to do it? Do they believe that the suggestions found are feasible, or is there some kind of constraint?

- Which were the strategies your company/restaurant already adopted in order to combat food waste?

- Which ones were the most difficult to apply and why?

- Is there a willingness to adopt more strategies? If so, why don't you do it? Is there any constraint?

- Which other strategies or suggestions do you know/have in order to improve sustainability in this camp?

- What are your long term sustainability objectives? What do you want to improve?