Chapter 2
Factors and Behaviours Affecting Food Waste at Consumption Level: The Household Food Waste Journey Model

Abstract In this chapter a comprehensive literature review over a forty-year time span (1977–2017) will shed light on the multiple, complex facets of food waste at consumption level. Drawing from behavioural and marketing theories, a new theoretical framework is proposed with the aim of better explaining food waste behaviour at household level. Along with this, a conceptual framework will define the responsible actors and the correct behaviours that significantly tackle food waste during the *away from home* phase.

Keywords Food waste · Consumer behaviour · Behavioural change
Shopping list · Expiration dates · Culinary skills

2.1 Introduction

As we have seen in the previous chapter, food waste at consumption level can occur either within the households, or *away from home*.

In this chapter a comprehensive literature review over a forty-year time span (1977–2016) will shed light on the multiple, complex facets of food waste at consumption level. Indeed, as showed by several studies (Secondi et al. 2015; WRAP 2011; Quested et al. 2013), food waste happens for various reasons and could not be considered as the outcome of a single behaviour.

Drawing from behavioural and marketing theories, I will propose a new theoretical framework with the aim of better explaining food waste behaviour at household level. Starting from the study of Block et al. (2016) and on the analysis made by the Van Geffen et al. in 2016, I will identify a comprehensive framework that takes its roots on *consumer decision making* and *consumer food management processes*.

Concerning food waste *away from home*, I decided to approach it using a different perspective, that is, firstly pointing out the two responsible actors (restaurant managers/chef and the clients), and secondly analysing the behaviours that could significantly reduce it, and if the reduction is not possible, to reuse or redistribute it.

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2.2 The Household Food Waste Journey to Explain Wasteful Behaviours

As Quested et al. (2013) acknowledged, food waste is the result of multiple, complex factors. According to the literature, we should firstly mention some demographic and socio-economic factors that drive the phenomenon (for example, youths aged 16–24 waste over twice the amount of food wasted by 65 years old individuals). These descriptive elements are surely important, but to have a better framing of the issue and to draw possible solutions, it is fundamental to understand the theoretical roots of wasteful behaviour.

The study of food waste from a behavioural perspective is quite new and started few years ago drawing especially on the Theory of Planned Behaviour proposed by Ajzen in 1991 that adequately explain some behaviours towards food waste (Graham-Rowe et al. 2014; Stancu et al. 2016; Visschers et al. 2016, Mondejar-Jimenez et al. 2016; Block et al. 2016). According to this theory, intentions are demonstrated to be good predictors of human behaviour, and intentions are in turn influenced by three important factors: subjective norms, perceived behavioural control and attitudes. This theory has been widely used also for its adaptability for analysing different concept not included in the original model (Collins and Mullan 2011).

However, according to these studies, food waste could be seen as under the individual's volitional control and consumers are often consciously aware of why they waste food (like the intention to reduce food waste). Therefore, it is fundamental to research also on underlying factors that make individuals waste unintentionally, like habits and emotions, but not exclusively (Russell et al. 2017; Block et al. 2016).

Bearing this in mind, and according to a comprehensive literature review on the phenomenon made on a forty-year span (1977–2017), I believe it is possible to explain household wasteful behaviour drawing on marketing and behavioural theories that both explain conscious and subconscious waste. Therefore, I took into consideration the marketing *consumer decision making process* and modified it according to food waste peculiarities. Indeed, wasteful behaviour can be driven by some individual's influences like psychological, social, situational, and demographic and socio-economic factors. These factors influence both wasteful behaviours and every phase of what I called the *household food waste journey*, that is the various theoretical divers of wasteful behaviours drawing on the *consumer food management* process: planning, provisioning, storing, preparing, consuming, disposal (Van Geffen et al. 2016 based on Boyd and McConocha 1996); and the *consumer decision process*: planning, pre-acquisition, acquisition, preparation, consumption, disposition. Every phase of the *household food waste journey* could contribute to some extent to wasteful behaviour.

In the next sections I will analyse the various theoretical drivers according to this new framework (see Table 2.1).

Table 2.1 The household food waste journey model to understand wasteful behaviour

Pshycological Factors	Social Factors	Situational Factors	Demographics and SES variables
Attitudes Perceived behavioural control FW Knowledge FW involvement Habits, emotions	Social norm	Level of Urbanization Perception of the amount of litter	Age Level of education Household composition

HOUSEHOLD FOOD WASTE JOURNEY				
Planning	**In-store**	**Pre-consumption**	**Consumption**	**Disposition**
		STORAGE		
Lack of Planning	Impulsive purchases	Sub-optimal storage	Leftovers	Do not separate kitchen waste
Lack of a Shopping list	Presence of children	Misinterpratation of expiration dates	Lack of a proper storage of leftovers	
Lack of meal planning	Marketing strategies (3x2 promotions)	Food freshness fear	Food preferences	
	Visual merchandaise strategies	Food safety fear		
		Lack of sensory skills		
		PREPARATION		
		Sub-optimal culinary skills		
		Cooking or serving too much food		
		Inability to cook leftovers into new meals		

→ WASTEFUL BEHAVIOUR

2.2.1 Psychological Factors

Among these factors we can cite some non-cognitive determinants of food waste behaviour like emotions and habits, but also food waste knowledge, and food waste involvement intended as the level of concern regarding its impacts, along with perceived behavioural control intended as the degree to which people perceive their ability, and possibility to perform a particular behaviour, in this case an example would be: "I am able to reduce my food waste".

Some recent work acknowledged attitudes and perceived behavioural control (PBC) as predictor for consumer food waste behaviour (Visschers et al. 2016; Principato et al. 2015).

Drawing on marketing field, two important psychological factors that influence the consumer purchase decision are product knowledge and product involvement. Similarly, according to the framework presented in this book, food waste knowledge and food waste involvement, intended as the level of concern regarding food waste issues, are demonstrated to influence wasteful behaviours. Concerning the knowledge factor, Barr (2007) found that people knowledgeable about food waste issues are more likely to avoid the phenomenon. Other research has shown that the more aware youths are about food waste the more likely it is that they can reduce their wasteful behaviour (Principato et al. 2015). If we consider food waste involvement, it has been demonstrated that individuals with high environmental and civic sense waste less food (Williams et al. 2012; Parfitt et al. 2010; Barr 2007).

Since food waste behaviour is also driven by more automatic and less-conscious routines, we should definitely take into account habits (Steg and Vlek 2009; Verplanken and Holland 2002), as well as emotions (Bamberg and Möser 2007; Quested et al. 2013; Triandis 1977). A recent study conducted in the UK acknowledged habits and emotions as important determinants of intentions to reduce food waste behaviour (Russell et al. 2017).

As written before, it is important to say that these psychological factors not only influence wasteful behaviour directly, but also indirectly through their effect on some phases of the *household food waste journey*. To make an example, a greater awareness on the consequences of food waste phenomenon increases the likelihood that youths will draw a shopping list (Principato et al. 2015).

2.2.2 Social Factors

According to the food waste literature (Graham-Rowe et al. 2014; Mondejar-Jimenez et al. 2016; Visschers et al. 2016; Stancu et al. 2016), considering among social factors, social norms play an important role in influencing wasteful behaviour and the *household food waste journey*. For social norms we intend the social pressure to engage in a particular behaviour, or in other words, they represent the extent to which individuals perceive wasting food as a behaviour disapproved by people important for them (Lapinski and Rimal 2005). For instance: "my family does not like to throw away food".

2.2.3 Situational Factors

For the purpose of this framework, I consider situational factors as external variables that influence in some way an individual's behaviour towards food waste. In particular according to recent research (Secondi et al. 2015) that consider for the first time how contextual variables are associated with food waste, I took into account the geographical environment and the perceptions of the place where

individuals reside. The first situational factor to be considered, is the level of urbanization where individuals live, since it has been seen that people living in urban areas tend to waste more than people living in rural areas (Secondi et al. 2015). Another interesting situational factor highlighted by the same study, is the perception of the amount of litter where people reside, that is the perception of living in a clean area is associated with a virtuous behaviour of the residents. This has relevant impacts in terms of policy implications that I will discuss later in the book.

2.2.4 Demographic and Socio-Economic Factors

The last variables that influence food waste behaviour are the demographic and socio-economic (SES) ones. From a demographic perspective, most of the literature agrees that youths tend to waste more than elders (Osner 1982; Hamilton et al. 2005; Lyndhurst 2007; Eurobarometer 2014a, b). Concerning the SES variables, the more the level of education of individuals, the more the quantities of wasted food (Visschers et al. 2016; Secondi et al. 2015). Household composition also pay a role: bigger household tend to waste more than smaller households (Quested et al. 2013), although it has been seen that the number of food waste per capita decreases as the members of a family grow (Parizeau et al. 2015). In any case, it has been seen that due to picky eating and food safety reasons, families with children tend to waste more than all-adult households of equal size (Quested and Luzecka 2014). Instead, regarding gender and income the debate in the literature is still open. Indeed, some studies revealed that females waste more than males (Visschers et al. 2016), however a number of researches stated that men waste more than women (Gallo 1980; Buzby and Guthrie 2002). Concerning income, the majority of the studies agree that higher-income households tend to waste more than lower-income ones (Lyndhurst 2007; Buzby and Guthrie 2002; Van Garde and Woodburn 1987; Osner 1982; Koivupuro et al. 2012; Stefan et al. 2013), but there are also others that proved the opposite (Cox and Downing 2007; Stancu et al. 2016). That is why for the moment, it is not worthy to include them in the framework.

2.2.5 Household Food Waste Journey

Planning

The first phase of the *household food waste journey* is pre-shopping planning that if lacking has been demonstrated to influence wasteful behaviours (Exodus 2006; WRAP 2007; Gustavsson et al. 2011). Indeed, a lack of planning can result in buying too much food that what is needed, therefore increasing the likelihood of

spoilage (Quested et al. 2013; Chandon and Wansink 2006). Meal-planning consists of deciding what food to eat in a determined period (e.g. a week) and could be useful in reducing wasteful behaviour (Van Geffen et al. 2016). Along with this, checking storage spaces, and drawing a shopping list have been demonstrated to be effective practice in reducing food waste (Principato et al. 2015; Stefan et al. 2013).

In-store

In this phase we should put all the incorrect behaviours and influences that drive consumer to waste food at the point of purchase. In particular, it has been demonstrated that impulsive purchases, which are often spurred on by marketing strategies—like the so-called 3for2 promotions that push the consumer to buy more than what he needs—result in an increase in food waste levels (Mondejar-Jimenez et al. 2016; Exodus 2006; WRAP 2007). Or again, the presence of children demanding unnecessary items, as well as the layout and positioning of foods in stores (visual merchandising strategies) may influence wasteful behaviours (Exodus 2006).

Pre-consumption

For the sake of this framework, I decided to divide this phase into two sub-phases: storing and preparation. Indeed, it has widely been acknowledged the importance of correct storing in preventing wasteful behaviours. Some people store products sub-optimally for healthy eating purposes, in fact Evans et al. (2012) demonstrated that certain parents use a bowl of fruit instead of putting it in the fridge in order to instil to children healthy eating. However, the majority of people have a lack of knowledge on how to better store food to prolong its shelf life and they are not aware of the different fridge shelves that can be effectively used in order to avoid food damage (Aschemann-Witzel et al. 2015; Graham-Rowe et al. 2014; Cox and Downing 2007). Along with this, it is necessary to understand the difference between the use by and best before dates, and it has been seen that some people misinterpret the expiration date labels (FSA 2008). The Food Standards Agency[1] clarified the distinction between 'use by' date, which refers to food safety, meaning that foods get harmful if consumed after a certain date; and 'best before' date relates to product quality, which will inform consumers that before a certain date the product is in the best condition for consumption, but can be consumed even after that date. Indeed, it has been shown that food close to the expiration date is erroneously perceived as less acceptable for consumption (Sen and Block 2009; Wansink and Wright 2006); similarly, food safety fear is indicated as a top reason of wasteful behaviours (Neff et al. 2015). On this research streaming, another important aspect of food storage refers to the so-called sensory skills, that is the ability of people to understand the freshness of food using their taste, smell and touch. It has been seen that elderly people, that have better sensory skills than

[1]The Food Standards Agency is an independent government department of the United States of America formed in 2000 under an Act of Parliament for the purpose of protecting public health and consumer interests in relation to food products.

youths, tend to use their senses in order to understand the edibility of a food, while youths refer more on date labels or the period of time the food has been stored for (Terpstra et al. 2005). According to this study, it has been demonstrated that the sensory skills relate to less waste. Also, since Principato et al. (2015) showed that the fear of food freshness and food-borne illness increases waste, it is fundamental to educate people, and in particular youths, about the reliability of their senses in assessing the edibility of a food.

Food cooking and preparation is mostly driven by culinary skills, that has been seen as important in reducing food waste behaviours (Van Geffen et al. 2016; Principato et al. 2015; Cox and Downing 2007). Among these skills we can mention: (i) avoiding some preparation mistakes due to suboptimal culinary skills that could end up in wasting food (like food burned during preparation), (ii) cooking too much food that what is needed, together with the (iii) ability to prepare leftovers into new meals (Williams et al. 2012; Evans 2011; Exodus 2006; Lyndhurst 2007).

Consumption

During this stage, food waste occurs if individuals leave food scraps on the plate, or if they do not correctly store or reuse their leftovers later (Porpino et al. 2016). Indeed, sometimes consumers forget there are leftovers in the fridge and end up throwing away them (Evans et al. 2012). Another aspect refers to food preferences that vary within the household (Block et al. 2016). For instance, families with kids struggle to make them eat some type of food like fruit and vegetables, which could result in wasteful behaviour. In order to avoid this, Evans (2011), suggests the routine of deciding a preferred dish to make sure that every day the food is be consumed as well by the picky eaters that some kids are.

Disposition

This stage refers to food waste management, that is how to dispose food thrown away: giving it to animals, sorting practice (like home composting), etc. Concerning this stage, the only relevant study that links sorting practices to food waste behaviour is the one by Secondi et al. (2015) that states that individuals who separate kitchen waste tend to throw away less food than those who do not recycle or compost any part of their kitchen waste.

BOX 2.1—Exogenous factors that influence food waste behaviour

One study (Secondi et al. 2015) starts to investigate about how exogenous factors can play a role in influencing food waste behaviour. Using the representative sample of the 2013 Flash Eurobarometer survey, it proposes to model along with some variables related to food waste behaviour at individual stage, an additional level represented by the context (in terms of economic, social and cultural characteristics) in which the individuals reside. Thus, several dimensions can be considered concerning individuals' standard of living in the country (area) of residence. Cultural, governmental, technological, economic and industrial variables have been identified as being

potential characteristics, which can influence household food waste. This multi-level statistical perspective enabled the researchers to jointly consider factors at both individual and contextual level as potential variables associated with food waste.

Previous results are interesting and can foster new research paths on food waste behaviours and policies to address it. In particular, by analysing territorial variability it was possible to identify groups of countries characterized by similar behaviour patterns and therefore target them according to the need and exigency of public policy interventions.

2.3 Factors and Behaviours Influencing Food Waste *Away from Home*

Understanding food waste phenomenon *away from home* is a fairly new research topic. Indeed, research in the field has focused more on household behaviour since the larger amount of spoilage happens in this phase, although food waste *away from home* still represents a good 21% of the total wastage. According to a study made in the UK (WRAP 2013), food waste in restaurants happens during the preparation phase (45%), or for food deterioration (21%), or due to client's leftovers (34%).

As seen in Chap. 1, for food waste in the *away from home* phase, I will focus on: avoidable and possibly avoidable food waste that occur: (i) in the restaurant industry, which includes restaurant, bars and cafeterias that offer table service; along with (ii) catering services, that is food served within private or public canteens, catering and hotels; and (iii) within counter service and fast food.

The theoretical framework used to explain food waste at restaurant level was built based on the knowledge made by the most relevant studies on the theme that focus on the two levels where the phenomenon occurs: food preparation and consumption phases (Risku-Norja et al. 2010; Papargyropoulou et al. 2016; Betz et al. 2014; Marthinsen et al. 2012; Pirani and Arafat 2015; Heikkilä et al. 2016; Sustainable Restaurant Association 2010). Indeed, food waste at *away from home* level is composed by (i) avoidable food waste discarded during the preparation/processing of the meals as well as spoilage and expiration and I will call it *kitchen food waste* (KFW); and by (ii) leftover food from the food user and I will call it *client food waste* (CFW) (Marthinsen et al. 2012; Pirani and Arafat 2015).

KFW happens during the preparation phase for reasons related to "overproduction, peeling, cutting, expiration, spoilage, overcooking, etc." (Papargyropoulou et al. 2016, p. 4); while CFW represents "customer plate leftover waste" that is "food wasted by customer after the food has been served to them" (Papargyropoulou et al. 2016, p. 4). Thus, as seen in the picture 2.2, it is clear that the responsibilities related to the phenomenon rests with the restaurant or catering manager or to the chef for KFW, and to the clients for CFW. Moreover, our

conceptual framework considers not only the food waste reduction behaviours, which represent the tip of the waste hierarchy (EPA 2013), but once the phenomenon happens and despite all the arrangements made, we should also consider which would be the best behaviours in order to reuse it.

Therefore, starting from an analysis of the literature spanning seven years (2010–2017), the main aim of this paragraph is to understand the factors and incorrect behaviours that are associated to food waste *away from home* by focusing on food waste generated in the kitchen (KFW) and those generated by clients (CFW).

2.3.1 Kitchen Food Waste

Considering the managers' and chefs' perspective, according to the literature, these are the behaviours that significantly reduce food waste: careful ordering and menu planning (Sustainable Restaurant Association 2010), avoiding spoilage waste by monitoring used-by-dates and storage conditions (WRAP 2013), offering different portion sizes according to client's needs and educating the client to carefully order to avoid leftovers (WRAP 2013; Sustainable Restaurant Association 2010).

Concerning food waste reuse and redistribution, it has been seen that the best behaviours rest on the possibility of reusing edible food items for making other recipes (WRAP 2013; Sustainable Restaurant Association 2010); on the donation of kitchen surplus food; and on offering the customer the chance to take the leftovers home through the adoption of a doggie bag (WRAP 2013).

2.3.2 Client Food Waste

Considering the clients' perspective, the main behaviour in order to reduce waste would be not to leave food scraps on the plate. One of the biggest factors that influences clients' leftovers is serving too big portions of food (WRAP 2013; Sustainable Restaurant Association 2010). Therefore, going back to the manager's perspective, it is fundamental to adapt portion sizes to the client's needs. Indeed, according to a study conducted in the UK which focus on CFW, 2/5 of the interviewed stated that among the potential solutions to reduce waste there should be the customization of portion sizes, various food choices and price, and that they would agree to eat smaller portions for a minor cost (WRAP 2013).

Concerning food waste reuse, from the clients' perspective, the adoption of the doggie bag made available by the restaurant manager is fundamental for them to be able to consume their leftovers at a later time (WRAP 2013; Sustainable Restaurant Association 2010). In Anglo-Saxon countries (like in the US and UK) and in the Northern European countries this practice is widely embraced at any social level, while in the Mediterranean countries the majority of the people still don't ask for it, especially for cultural reasons. To give an example, although 90% of Italians

Table 2.2 Food waste away from home. The conceptual framework

	Responsibilities	FW Reduction Behaviours	FW Reuse or Redistribution Behaviours
Kichen food waste Food wasted during the preparation phase, due to overproduction, peeling, cutting, expiration, spoilage, overcooking, etc.	**Restaurant's managers and chefs**	Careful ordering and menu planning; Avoiding spoilage waste by monitoring used by dates and storage ; Offering different portion sizes. Educate the client to carefully order to avoid leftovers.	Reuse edible food items for making other recipes; Donation of surplus food; Offering a doggy bag to the client.
Client food waste Food wasted by the client after the food has been served to them	**Restaurant's clients**	Avoid leftovers	Doggie bag adoption

Author elaboration based on an idea by Principato, Pratesi, Secondi, 2017

believe that restaurants waste a large amount of food, as many as 41% are embarrassed to ask for a doggie bag (Last Minute Market, SWG 2016). Indeed, only one out of three Italians brought leftovers home from restaurants at least once (36%), and 22% believe that asking for a doggie bag represent a rude behaviour and they feel ashamed to do so (Coldiretti 2017; similar results were found by Sirieix et al. 2017) (Table 2.2)

BOX 2.2 Food Waste at Workplace level: an exploratory study in company canteens

To the best of our knowledge, until now, no study has focused on the main factors that influence food waste within the workplace. Also from a practical standpoint, the main initiatives against food waste in this sector are concentrated on food waste redistribution, and not on the prevention of it. Thus, the main aim of this research[2] was to identify food waste drivers in company canteens, and secondly elaborate some guidelines for canteens operators in order to prevent it.

"Canteens food waste" can be defined as all the wasted food that occur in the kitchen and leftovers made by canteen's clients. In Europe food waste in this sector represents the 14%[3] of total.

The research methodology is structured as follows:

[2]Research made by Ludovica Principato and Monica Maria Cuccurullo.

[3]European Commission (DG ENV), *Food Waste in the EU: a study by the European Commission, Workshop on Municipal Waste Prevention*, Barcelona, 24th of November 2011.

1. In-depth interviews addressed to seven canteen operators, with the aim of deepening the knowledge of this phenomenon;
2. Interviews have been analysed using a qualitative methodology (content analysis);
3. Data have been interpreted and compared.

The decision of using the in-depth interviews has been guided by the following factors: (i) it is based on a flexible and non-standardized scheme of interrogation; (ii) it can explore a new phenomenon and identify the latent critical variables; (iii) it allows subjects to establish a direct relationship without conditioning and mediation.

Interviews have been conducted inside the canteens, because people feel more comfortable in their natural place, they give genuine answers and they are not distracted by external stimuli.

During the interview it was used a semi-structured form consisting of twelve open-ended questions.

In the first phase of the analysis, "word clouds" were built on some of the key questions, in particular those related to the causes of food wasting, the initiatives taken to reduce it and the management of surplus food.

According to this analysis, the most popular causes of food waste are: the number of clients present that is not always easy to forecast, and the preparation of greater quantities of food (supply higher than the demand). Concerning the actions put in place to reduce the phenomenon, these are the most relevant: a careful estimation of costs and the preparation of portion sizes on the base of specific needs.

In the second stage of the analysis, a content analysis has been conducted, following these phases: (i) the transcriptions of the interviews have been decomposed in constitutive elements; (ii) the constitutive elements have been encoded in categories; (iii) a contingency table has been created to show the most frequent categories.

According to the analysis, 18 categories have emerged: 13 of these cover the phases before the food waste occur, such as the causes or factors that have strong influence on the phenomenon manifestation, four concern the management of surplus food and the category "generation of food waste", which is the central theme of the analysis.

The categories identified are variables that affect the phenomenon of food waste.

Therefore, according to our results, the food waste drivers of company canteens are the following:

1. The flow of guests;
2. The inventory planning;
3. The kitchen management;
4. The consumer behaviour;

5. The level of control implemented by canteens' manager on suppliers and staff;
6. The choice of ingredients used to prepare the dishes;
7. The staff training;
8. The menu planning;
9. The size of the portion of the dishes;
10. The cooking;
11. The attention paid to the costs;
12. The attention not to waste food;
13. The level of communication between the different company areas.

The variables that have more impact on the generation of food waste are related to the management perspective, rather than to the client's behaviour itself.

Thanks to these results, it was possible to define guidelines for the prevention of food waste addressed to canteen managers.

These guidelines have been developed for all the canteens activities, therefore to reduce food waste we need to revise these "canteen routines":

1. Inventory planning:
   - make daily purchases,
   - select carefully the ingredients to use,
   - check the suppliers carefully.
2. Menu planning:
   - create different menus to meet all preferences (vegetarian menu, gluten-free menu, healthy menu, etc.),
   - create a menu based on the most "popular" dishes,
   - promoting the "second life menu", i.e. a menu made up of easily reusable ingredients in case of surpluses.
3. Production:
   - apply the "just in time" logic to the production phase, prepare the food when is requested by the customers,
   - freeze food after cooking,
   - prepare different portion sizes.
4. Management of customer flow:
   - correctly forecast the number of customers considering factors like: weather, public transport strikes, staff leave, etc.
   - develop an application that can inform guests about the day's menu and that gives customers the chance to book meals for the next day.

5. The service:
   - use marketing nudging to change guests' behaviour towards less waste,
   - self-service can minimise food waste, as it has been demonstrated that guests eat 92% of the food they serve themselves,
   - defining the price according to the weight of the portions,
   - use beverage distributors with the aim of reducing drink waste and waste production.
6. Sensitize the staff and guests regarding food waste:
   - make poster campaigns,
   - organize events on food waste,
   - use tablecloths for food waste prevention, as they are the first things that guests see under the plates and during the queue,
   - create a leftover recipes book.
7. Staff training:
   - staff training activities on sale techniques to guide guests in the choice of dishes,
   - incentives,
   - highlight the work of staff.
8. Food waste monitoring:
   - periodic monitoring of surplus food,
   - leftover accounting system,
   - place a monitor that controls waste production and that people make the separate collection in the right way.
9. The management of food surpluses:
   - increase the doggie bag adoption among clients,
   - food donation to charitable associations,
   - food donation to canteen staff,
   - animal feed.

BOX 2.3—Kitchen food waste: an interview with the chefs

Concerning the away from home phase, we have seen that chefs, responsible for food preparation and cooking in the kitchen, play an important role on food waste phenomenon. However, up to now, a specific study does not exist that seeks to understand how the chefs' category is moving to reduce the phenomenon in the kitchen and in the restaurant room.

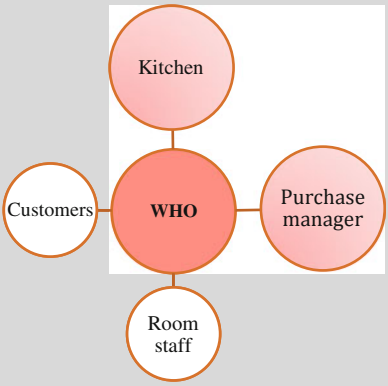
That is why in 2016 we decided to interview 11 relevant Italian chefs in order to understand their attitudes and behaviours on the phenomenon.[4]

The open-ended interviews consist of a set of 10 questions, the first three to define the chef's profiles, and the others more specific on food waste issue and the actions put forward by the chef in order to tackle it. Responses have been recorded and transcribed. The chefs were interviewed in their restaurants, via Skype calls, and also through face to face mode, during the Fourth Edition of Taste of Excellence, an Italian event that brought together producers, chefs, cooking schools, operators, and institutions about the most relevant innovations and trends at restaurant and catering level.

The responses were analysed through a categorization process: six macro-categories were drawn from a summary of the statements and the answers of the interviews, as follows:

1. WHO waste in restaurants;
2. What are the CAUSES leading to Food Waste;
3. What are the ACTIONS made by the Chefs and/or the restaurants' managers;
4. What are the INTERNAL PROBLEMS related to the phenomenon;
5. What are the EXTERNAL PROBLEMS related to the phenomenon;
6. How, effectively, the phenomenon is MANAGED within restaurants;

In order to group them into the six macro-categories radial cyclical charts were used.



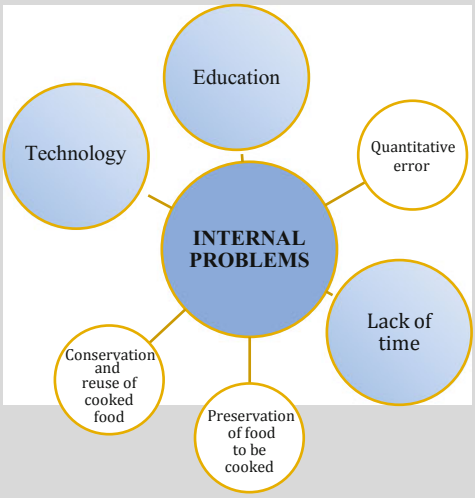
From these statements, we can notice that all chefs, even if seeking waste avoidance, feel that the greatest amount of waste in the Italian restaurants takes place in the kitchens, followed by waste generated by the managers devoted to purchasing; therefore the most significant waste builders are the Chefs themselves, followed by the restaurant's managers and the room staff.

[4]Research made by Ludovica Principato and Chiara Vizzini.

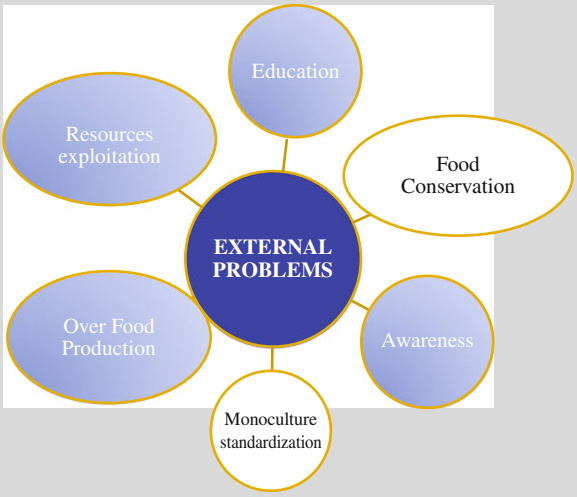
Customers also contribute to the generation of waste into the restaurants, but less than the above-mentioned actors.

Considering the causes, time, education and professionalism are the three keywords that most frequently appear in Chef's responses. Time could be considered as the rush that characterizes cooking activity that often causes staff mistakes in managing food, thus resulting in waste. The lack of education of most of those who work in restaurants is the cause of the lack of professionalism and consequent superficiality in daily actions that lead to a huge growth of food waste within the kitchens, if not in the entire restaurant.

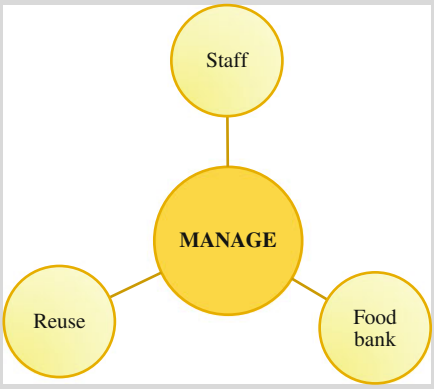
Among the main actions to adopt to limit the waste, the most obvious is the internal education in restaurants, so that almost all chefs interviewed talked about the importance of making team aware, in particular through training courses. It is therefore fundamental to educate the kitchen staff about the respect for food first, by teaching how to better handle raw materials.



Regarding the internal problems, we should mention the lack of technology awareness, that is the inadequate knowledge of how to make the best use of the innovative technology in food conservation and preparation (refrigerators, freezers, temperature cutter, HiTech ovens, etc.) often leads to a bad preservation of cooked and non-cooked food, resulting in food spoilage and ultimately in an economic loss for the restaurant.



Also in the category of external issues related to the phenomenon, a lack of client's education and awareness of food waste and its related issues need to be addressed.



The concrete actions that some restaurants are already implementing are represented by the use of tasty leftover recipes that allow the chef not to waste food scraps, and the redistribution of still edible cooked meals to people in need.

2.4 Discussion and Future Research

This chapter proposed a new theoretical framework to explain the multiple, complex food waste behaviour at household level. It is nevertheless important to say that the different influences and incorrect behaviours highlighted in the model could not be seen as exhaustive. Yet, researchers are encouraged to fill the framework with other factors and influences that impact on wasteful behaviour.

Similarly, since the *away from home* phase represents a fairly new research stream within the food waste literature, I believe that the conceptual framework proposed in this book could be expanded by new reduction and reuse behaviours useful to tackle the phenomenon.

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