

Chapter 10

Bringing a Sharing Economy Approach into the Food Sector: The Potential of Food Sharing for Reducing Food Waste

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Abstract According to the UN estimates, world population will increase to over 8 billion by 2030. Increasing demand for food and raw materials will place additional pressure on limited natural resources. In this context, the current levels of food waste in advanced economies are no longer economically, socially and environmentally sustainable over the long term. Structural changes will be needed along the whole supply chain as well as in consumers' attitudes and behaviours. The sharing economy is actually playing an important role in trying to achieve more sustainable patterns, also within the food sector. In particular, several initiatives and start-ups are being developed in the US and Europe, involving the collection and use of the excess of food from consumers and retailers and the promotion of collaborative consumption models. However, the correlation between food sharing practices and reduced food waste cannot be taken for granted. This chapter identified the literacy contours of this relationship, highlighting how food sharing is frequently undermined by social factors and that to make it effective specific skills are needed. Moreover, a major effort towards general routines and practices, which underpin individual-level behavior, is required to tackle food waste in a more effective manner.

Keywords Sharing economy · Sustainable consumption · Food waste · Food sharing

10.1 Introduction

In recent times, with global climate change challenges and its various consequences on ecosystems and on resource depletion, the socio-economic as well as the environmental impacts of the mass-consumption economy have become important

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issues gaining momentum in the international debate. Particularly, the amount of waste (especially in term of food waste) is expected to increase at an alarming rate unless effective policies and alternative production and consumption patterns are implemented to address the problem. According to the US Environmental Protection Agency (EPA), food waste currently represents the largest share of waste entering landfills. In this context, there is a unanimous viewpoint according to which a holistic approach to food waste prevention can bring to a reduction of GHG emissions, i.e. due to the reduction in the methane and carbon dioxide emissions arising from degradation of food in landfills (Hall et al. 2009), as well as the decrease of natural resources depletion used for food production and distribution.

While in developing countries food waste arise largely at early stages of the supply chain and can be due to financial, managerial and technical constraints in harvesting and storing practices, in developed countries food is wasted generally at later stages of the supply chain because of consumers' behaviour (FAO 2011b). Therefore, food waste reduction at the consumption level represents for medium and high income countries a key objective on the policy agenda of national and international institutions (e.g. Monier et al. 2010; Braun 2012).

Recently, several initiatives and practical solutions (e.g. packaging and alternative storage technics) have been proposed to moderate the waste of food by acting also on household behaviours through unconventional consumption models. In this context, attention has been paid to the sharing economy approach as many food sharing initiatives have been launched around Europe and the United States based on collecting and utilizing the excess of food from consumers and retailers and by promoting collaborative consumption models (e.g. Foodsharing, Growington, Feastly, etc.). As suggested by Belk, the sharing economy approach entails 'the act and process of distributing what is ours to others for their use and/or the act and process of receiving or taking something from others for our use' (2007: 126).

Against this background, the sharing economy principles could provide a new way of thinking based, essentially, on environmental effectiveness and economic efficiency by potentially offering a successful way to reduce food waste so as to accelerate the transition toward a more sustainable development. However, the assumption that this type of approach necessarily leads to food waste reduction, with benefits for the environment, local municipal bodies and household savings, is not a straightforward conclusion. In this chapter we aim at identifying the literacy contours of this theoretically beneficial relationship.

Section 10.2 highlights the theoretical background surrounding the sharing economy approach. Section 10.3 explores the link between sharing economy and sustainable development. Section 10.4 provides different definitions to analyses and understands food waste issues at macro (i.e. developed countries general trends) and micro level (i.e. households' food behaviours). Section 10.5 reviews different literature contributions on the impact of food sharing on food waste reduction. Finally, Sect. 10.6 concludes the chapter and provides some final thoughts on the topic under investigation.

10.2 Sharing Economy: A Theoretical Background

The term *sharing* usually refers to two different meanings. Typically, it denotes anything that is shared between or among two or more people. Moreover, it can imply that two or more people are characterized by something in common (Zvolska 2015). These two meanings of the word *sharing* actually represent what Tomalty (2014) identified as ‘zero-sum’ and ‘non zero-sum’. While the former represents a situation in which each person is left with less of something when he/she shares it (for instance, a cake), the latter implies a configuration in which the people who share something are left with the same amount of it (for instance, a genetic trait).

Although *sharing* does not represent a new phenomenon—‘Sharing has probably been the most basic form of economic distribution in hominid societies for several hundred thousand years’ (Price 1975 cited by Belk 2010, p. 715) the *sharing economy* is a new form of sharing that is gathering attention in the last years. The foundation of the sharing economy is a ‘zero-sum’ type of sharing of people’s own assets and their reliance on the use of modern information technology. In this context, as emphasized by Zervas et al. (2015), the success of the sharing economy crucially depends on the existence of network platforms, enabled by the information and communication technologies (ICT), able to link consumers’ needs to the sharing economy activities. As a result, different economic initiatives based on new types of consumption models are gaining more and more influence in a large majority of developed countries. In particular, as emphasized by Botsman and Rogers (2010), business models based on *collaborative consumption*, also known as *sharing economy* activities, are growing in many sectors ranging from transportation (e.g. Car2go, Uber), accommodation (e.g. Airbnb) to finance (e.g. Indiegogo). Therefore, diffusion and uptake of Internet technologies, on the one side, and the growing crisis of traditional models based on consumerist society on the other,¹ have been key factors for the emergence and diffusion of this new economic models. Nowadays, consumer interest is no longer just on ownership. The aim is, rather, access to goods and services (Rifkin 2000). Sharing and collaborative practices are indeed characterized by temporary access to goods and services and dependence on Internet—mainly Web 2.0.

However, given its early developmental stage, there is still no harmonized definition of the sharing economy in the literature. As emphasized by Botsman (2013a), the academic debate over the sharing economy definition is still ongoing as the terms mentioned so far, such as *collaborative consumption*, *sharing economy* and *accessed based consumption* are frequently used synonymously.² Indeed, access-based consumption has been defined ‘as transactions that may be market

¹Especially after the global economic crisis of 2008.

²Europe Economics defined the sharing economy as ‘The use of digital platforms or portals to reduce the scale for viable hiring transactions or viable participation in consumer hiring markets (i.e. ‘sharing’ in the sense of hiring an asset) and thereby reduce the extent to which assets are under-utilised’ (Goudin 2016, p. 11).

mediated in which no transfer of ownership takes place' (Bardhi and Eckhardt 2012: 881). Collaborative consumption encompasses access based-consumption and is 'embedded within the sharing economy which involves access-based consumption of products or services that can be online or offline' (Barnes and Mattsson 2016: 200).

While a commonly agreed definition on the sharing economy seems still not to exist, researchers further disagree whether it is based on monetary or non-monetary exchanges, or both, and whether it includes *Peer-to-Peer* (P2P) models or also *Business-to-consumer* (B2C) and *Business-to-Business* (B2B) models (Zvolaska 2015).

Botsman (2013b) in distinguishing between the sharing economy and the peer economy uses an inclusive definition of the former. The former refers to both B2C and P2P models, while the latter involves only the P2P segment. In particular, the author outlines the sharing economy as 'an economic model based on sharing underutilized assets from spaces to skills to stuff for monetary or non-monetary benefits'. However, such demarcation of the sharing economy was not exempt from receiving criticisms. Especially, Belk (2014) stresses as it seems too general and thus, unable to stand out from a mere gift giving or sharing. Conversely, other authors adopt a more narrow definition. According to Frenken et al. (2015) the sharing economy includes only P2P initiatives, suggesting that businesses such as B2C (e.g. car rental), the second-hand economy and on-demand economy, should not be considered as part of the sharing economy. On the same wavelength, Schor provided the following definition of the sharing economy: 'an economic activity that is Peer-to-Peer, or person-to-person, facilitated by digital platforms' (2015: 14). Moreover, the author contends that when assets' owners make profit by sharing, they no longer share but rent. Therefore only, few non-profit platforms purely concern sharing. Finally, B2B sharing models refers to 'the sharing of services, utility, and by-product resources among industries' (Geng et al. 2014: 1). Such models represent certainly 'the next generation of the sharing economy' (Slagen 2014). Currently, some of the main B2B companies (e.g. WeWork, Floop2 etc.) are allowing firms to provide access to everything from shared office space to underutilized machinery in the supply chain. However, very little attention has been paid toward them to the present, resulting sometimes completely ignored from the sharing economy literature.

10.3 Sharing Economy and Sustainable Development

Beyond the theoretical debate over the sharing economy boundaries, a number of relevant and controversial questions in the environmental as well as in the social and economic fields are gathering attention. In particular, this topic is of great interest as it brings new perspectives to today's debate on the effects of the sharing economy approach on sustainable development. It is well recognized that sustainable development, to be thought jointly from an economic, social and environmental point of view, occupies a central role in the global agenda. While, on the one hand, as regards its social and economic dimension, some benefits coming from the

sharing economy have been pointed out³ (see for instance Goudin 2016), on the other hand, there is a growing interest in the sharing economy as a model for sustainable consumption practices. On this ground, Heinrichs (2013) sees the sharing economy as a ‘potential new pathway to sustainability’, Botsman and Rogers (2010) perceive it as a potential way out from the unsustainable consumption practices on which current developed economies are based. Their central argument is founded on a beneficial transition of culture from a ‘consumer’s own assets’ (i.e. traditional linear economy) towards a ‘consumers share access to assets’ (i.e. sharing economy) able to connect consumers and allow them to make a more efficient use of underutilized available goods and services. However, although several successful experiences (i.e. Airbnb, Uber, etc.) positively contributed to the debate surrounding the sharing economy approach, the stakeholders’ discourses and opinions concerning the link between sharing economy and sustainability are, oftentimes, framed in contrasting and contradictory way. In particular, by examining the actors sharing discourses Martin (2016) found that, although the sharing economy can be seen as a socio-technical niche able to foster more sustainable consumption and production practices, at same time it could paradoxically strengthen the current unsustainable economic paradigm making unlike the transition towards a more sustainable consumption and production practices.

In this context, Goal n.12 of the 2030 Agenda for Sustainable Development aims to ensure sustainable consumption and production patterns. The sustainable consumption and production (SCP) concept, introduced in the early Nineties and in 2002 during the World Summit on Sustainable Development (WSSD), is recognized as one of the three essential requirements for sustainable development. ‘SCP aims at doing more and better with less, by reducing resource use, environmental degradation, waste and pollution along the whole life cycle of goods and services, while at the same time increasing quality of life for all’ (UNEP 2011: 10). Therefore a key issue is the extend to which an increase in environmental awareness and related effects can be attained through:

- a resource efficiency in the production processes (i.e. less resource inputs to achieve the same or improved output)
- a transition towards greener consumption and production patterns (e.g. more efficient and less polluting goods and services)
- a transition towards more efficient consumption models (i.e. consumers share access to their own goods and services).

Specifically, looking at the consumption side, ‘Sustainable consumption is not just about buying the more sustainable products. Refusing to consume when not necessary and engaging in alternative means of satisfying needs are also important. Sustainable product design, switching from products to services and collaborative

³Likewise, concerns have been raised. As reported by Martin et al. (2015) recovering Morozov’s view of the sharing economy as a ‘neo liberism on steroids’, a strong criticism has been put forward by the literature with a focus on the sharing economy ability to bypass environmental and social laws.

consumption are examples of approaches to sustainable lifestyles' (UNEP 2015: 118). In this context, Geels et al. (2015) provide a critical review about the SCP literature and propose a new view focusing on transitions in socio-technical systems and daily life practices. In particular, beside the well-known *reformist SCP-position* (see Lebel and Lorek 2008) and *revolutionary SCP-position* (see among the others: Belk 2010; Schor 2014), the authors offer a new position (*reconfiguration SCP-position*), focusing either on macro-contexts or on individuals' attitudes and behaviors. Specifically, transition towards new SCP systems and practices (i.e. transport, electricity, heat, food, etc.) is viewed as a multilevel process in which heterogeneous actors engage by going beyond individual consumers and firms behaviors to involve social movements, media, public opinion, advisory bodies, researchers, and special-interest groups as well. Such *reconfiguration SCP-position* concentrates mainly on the adjustments in existing sociotechnical systems and related (re)alignments among different new and old elements rather than the development of a technological niche. A particular example in the transport domain concerns a transition towards a reconfigured system in which vehicle utilizes alternative fuels, the cities are characterized by a more developed and environmentally friendly public transport, consumers share vehicles, and so on.

In considering the role played by the sharing economy in accelerating sustainable consumption and production patterns in cities worldwide Cohen and Munoz (2015) provide an integrated framework for theorizing five ideal sharing categories: energy, food, goods, mobility and transport and space sharing. Particularly, the food sector is indeed recognized as a strategic area for sustainable consumption and production implementation (Tukker et al. 2008). In principle and both from a macro and micro perspective, food sharing may have a positive impact on all three dimensions of sustainable development by boosting savings, helping to create and/or consolidate existing social relations and by reducing waste generation. Currently, numerous initiatives and start-ups are springing up in the US and Europe, concerning the collection and use of the excessing food from consumers and retailers and the development of collaborative consumption models (e.g. Foodsharing, Growington, Feastly, etc.). On these types of new models we will be focusing in Sect. 10.5.

10.4 Food Waste in Higher Income Countries: Conceptualization and General Trends

Roughly one third of the food produced in the world for human consumption annually gets lost or wasted of which about 30% are cereals, 40–50% are root crops, fruits and vegetables, 20% are oilseeds, meat and dairy and 35% are fish.⁴ In the EU-28 alone it has been estimated that, on average, 173 kg of food waste is

⁴See <http://www.fao.org/save>, <http://www.fao.org/save-food/resources/keyfindings/en/-food/resources/keyfindings/en/>.

produced per person per year (FUSIONS 2016). An enormous loss of resources with long-lasting detrimental effects on global nutrition, environment and savings.

The food sector, in general, contributes significantly to environmental degradation, accounting for about 30% of the world's total energy consumption and for more than 20% of total Greenhouse Gas emissions (FAO 2011a). Specifically, regarding its waste food wastage ranks as the third top GHG emitter after USA and China (FAO 2013). Such an environmental impact is owing to the waste of resources employed for its production (e.g. land and water), transport and for its final disposal.

Also considering food waste economic impact, costs are very high. For example, Lipinski et al. (2013) stress that in China alone US\$32 billion worth are lost due to food waste. Further, food waste has a significant social impact since it reduces food security in developing countries (Kummu et al. 2012; Foley et al. 2011; Godfray et al. 2010).

Accordingly, international institutions as well as national governments treat food waste as a serious problem to be tackled with multiple types of interventions at different levels of the food supply chain. However, these institutions themselves are faced with a pressing issue related to food waste measurement. Definitions of food waste are indeed still not harmonized (Lebersorger and Schneider 2011) as the terms *food waste* and *food loss* are frequently used synonymously and/or defined in different ways. This obviously affects food waste quantification, hampering international comparisons (Monier et al. 2010) and effective sustainable development strategies.

HLPE report (2014) identified three main approaches to food waste definition in the literature. The first definition, to which this contribution refers to, is based on the stage in which losses and waste materially occur. Although food is lost and wasted along all levels of the food chain, affecting all countries, a distinction has been made since food losses concern mostly developing countries occurring at early stages of the supply chain⁵ while food waste is more specific to developed countries, taking place at downstream phases⁶ (Parfitt et al. 2010, FAO 2013).

On the other hand, the second definition relates to the origin of loss or waste, distinguishing from behavioral/deliberate waste and involuntary losses while the third utilizes food waste (or wastage) as an all-encompassing term.

In Table 10.1 we report a summary of the most referenced definitions of food waste pinpointing for each definition quantified and not-quantified elements.

Looking at Table 10.1, we can observe that definitions developed by the UK Waste and Resources Action Programme (WRAP) and the European-funded food waste prevention project (FUSIONS) refer only to the term food waste while the Food and Agriculture Organization of the United Nations (FAO) definition includes three notions, i.e. food loss, food waste and food wastage. Additionally, FAO's report in 2013 included both edible and nonedible parts of food while the estimations of the 2011 report (Gustavsson et al. 2011) were based only on edible parts of

⁵Mainly due to underdeveloped infrastructures, premature harvesting and poor storage.

⁶At retail and consumption stages.

Table 10.1 Most referenced definitions of food waste

	Quantified elements	Not-quantified elements
Food waste is any food that had the potential to be eaten, together with any unavoidable waste, which is lost from the human food supply chain, at any point along that chain (WRAP 2015)	<ul style="list-style-type: none"> – Food produced for human consumption – All food and drink types, all disposal routes, and all sectors of the supply chain – Avoidable (edible) and unavoidable (inedible) food waste 	<ul style="list-style-type: none"> – Food or food surplus used as animal feed
Food waste is any food, and inedible parts of food, removed from the food supply chain to be recovered or disposed (including composted, crops ploughed in/not harvested, anaerobic digestion, bio-energy production, co-generation, incineration, disposal to sewer, landfill or discarded to sea (Fusions 2014)	<ul style="list-style-type: none"> – Edible and inedible food and drink waste – Fish discarded to sea 	<ul style="list-style-type: none"> – Edible and inedible food used as animal feed – Edible and inedible food for bio-material processing or other industrial uses
Food loss refers to a decrease in mass (dry matter) or nutritional value (quality) of food that was originally intended for human consumption. These losses are mainly caused by inefficiencies in the food supply chains, such as poor infrastructure and logistics, lack of technology, insufficient skills, knowledge and management capacity of supply chain actors, and lack of access to markets. In addition, natural disasters play a role Food waste refers to food appropriate for human consumption being discarded, whether or not after it is kept beyond its expiry date or left to spoil. Often this is because food has spoiled but it can be for other reasons such as oversupply due to markets, or individual consumer shopping/eating habits Food wastage refers to any food lost by deterioration or waste. Thus, the term wastage encompasses both food loss and food waste. (FAO 2013)	<ul style="list-style-type: none"> – Edible and inedible food waste – Food that was originally meant to human consumption which fortuity gets out even if it is then directed to a non-food use (feed, bioenergy...) 	<ul style="list-style-type: none"> – Feed and parts of products which are not edible
Food losses refer to the decrease in edible food mass throughout the part of the supply chain that specifically leads to edible food for human consumption. Drawing on Parfitt et al. (2010) food waste relates to food losses occurring at the end of the food chain, i.e. retail and final consumption (FAO 2011b)		

food.⁷ Moreover, the FUSIONS food waste definition logic is driven by the final destination of food. For example, when food is reused for bio-material processing it is considered to be exploited in a productive way so it is not accounted as waste, but instead, as ‘valorisation and conversion’ (FUSIONS 2014). Garcia-Garcia et al. (2015) highlighted, however, that the unplanned use of food originally thought for human consumption but subsequently devoted to other uses such as for bio-material processing is still accounted as waste by FAO. Once again, it should be noted that a major challenge is to ensure common definitions and measurement methods to generate more accurate and comparable data. Currently, FAO, FUSIONS, WRAP, together with the World Resources Institute (WRI), Consumer Goods Forum (CGF), UNEP, World Business Council for Sustainable Development (WBCSD) are jointly working toward reaching this ambitious goal.⁸

At the regional level, America, Oceania and the European Union have been identified as the greatest wasters (Gustavsson et al. 2011) and despite the above mentioned limitations, country and regional level studies (e.g. Mason et al. 2011; Quedstedt et al. 2011; Ventour 2008; FUSIONS 2016) have helped to identify most critical issues. Thus, prevention and mitigation measures have been put in place in recent years⁹ and specific laws at country level, such as in France and Italy, have been enacted. The United States, for which food waste has been estimated at 40% of the entire food supply (Hall et al. 2009), launched in 2013 the U.S. Food Waste Challenge which has been adopted at all levels of the food supply chain.¹⁰

Overall, Kummu et al. (2012) estimated that, roughly, food supply losses could be reduced by half and that, potentially, the best results could be achieved in agricultural losses and at consumption waste which will be the focus of the following paragraph.

10.4.1 Food Waste at Consumption Level: Households’ Food Behavior

Although in wealthy countries there is empirical evidence of consistent quantities of food waste at upstream stages (e.g. Fine et al. 2015), it is widely agreed that in high and medium income countries food is largely wasted at retail and, especially, at the consumer level due to households’ attitudes and behaviors (Parfitt et al. 2010; Gustavsson et al. 2011). This latter tendency seems to be more prevalent in western countries when comparing data with countries such as China where food waste has

⁷The 2013 report outlined that since its main objective was to calculate food waste environmental impact, caused by both edible and non edible parts of food, the two components were quantified.

⁸http://www.wri.org/sites/default/files/uploads/FLW_Standard_Executive_Summary_PrePublication_Version_2016_April.pdf.

⁹However, these measures themselves may entail economic and environmental costs. ‘Obviously, from the environmental point of view, the negative impacts of measures to reduce food loss and waste should be lower than the benefits’ <http://www.fao.org/3/a-i4068e.pdf>.

¹⁰This initiative is jointly coordinated by USDA and EPA.

been found mostly at restaurant and catering sector rather than in domestic settings (Liu 2014).

Households account for 53% of EU-28 food waste in 2012 (FUSIONS 2016). In the UK, food waste costs the average household £470 a year (WRAP 2013). The Waste and Resources Action Programme (WRAP) and the Global Commission on the Economy and Climate report (2015) estimated that a decrease in consumer food waste by 20–50% could save the global economy between US\$120 and 300 billion per year by 2030. However, in considering reasons for food waste at household level, Segrè et al. (2014: 31) outlined that consumers are ‘influenced by a number of cultural, psychological and social aspects that do not always follow criteria related to economic rationality’.

The literature identified several reasons among which poor knowledge and understanding of food date labels (Halloran et al. 2014), inadequate purchase planning and insufficient home economic skills and food knowledge (Moomaw et al. 2012) as well as the influence of promotional offers and packaging (Williams et al. 2012) and the careless attitude of wealthy consumers (Gustavsson et al. 2011). As stated by Woolley et al. (2016: 374) ‘the management of food inventory is difficult in domestic environments’.

Aschemann-Witzel et al. (2015) emphasized the impact on the amount of food waste of both psychographic factors and socio-demographics. In fact, food waste at individual level could also be influenced by a wide range of factors including household composition and size, income, age, level of education and type of employment.

Most studies found, as was expected, that the larger households’ components, the greater the amount of waste becomes; even though this result does not hold on a per capita basis as single households waste more in proportion (see for instance Ventour 2008, Koivupuro et al. 2012). Additionally, as outlined by Ventour (2008) it is important to pay attention to household composition, since families with children under 16 years old, for example, tend to waste more.

On the other hand, establishing correlation with households’ age is more challenging (Jorissen et al. 2015). Some studies suggested that old people waste less (especially for their austerity experiences during the Second World War) while other empirical evidence (e.g. Ventour 2008) found this correlation not so strong.

Also the correlation between income and food waste is rather problematic. Although some studies have found that low income households produce less food waste compared to the wealthiest (e.g. Monier et al. 2010; Secondi et al. 2015) this is not always valid (see for example Porpino et al. 2015). Several studies found little or no correlation (Parfitt et al. 2010). For example, Koivupuro et al. (2012) outlined that no correlation was found even though they observed more waste in consumers with little sensitivity to promotional offers, indicating a tendency to waste by wealthy households. Lastly, as regards gender correlation women have been found to be, in general, more sensible to sustainable consumption initiatives (Oecd 2008).¹¹ The overall variety of the methods used for the analyses and the

¹¹For further readings on the relationship between women and food waste, see among others.

heterogeneity of the samples, both in regards to the size and the composition, still makes it difficult, however, to make comparisons so as to establish assured and statistically significant correlations (Katajajuuri 2013).

One of the targets of the above mentioned UN Sustainable Development Goal 12 aims at halving per capita global food waste at the retail and consumer level. According to the United States Environmental Protection Agency (EPA), food waste can be tackled on several levels in decreasing order of effectiveness to reach best environmental results. Firstly, by reducing it at the source through prevention activities. Secondly, by reusing it within the human food chain through food recovery activities (e.g. donations) and finally, when all these options may not be possible, by recycling it (EPA 2015). The so-called hierarchy of the three R's: Reduce-Reuse-Recycle. In suggesting to consider the waste hierarchy as 'a flexible guideline for formulating waste policies', Rasmussen et al. (2005) stress that this approach, in general, is too much focused on environmental aspects (neglecting the socio-economic aspects), yet it has the benefit of highlighting the importance of prevention activities in achieving food waste minimization.

Over recent years, targeted initiatives have been put in place at the household level and the results have been encouraging especially for countries that have benefited from well-structured awareness campaigns. For example, in the UK, avoidable food waste was reduced by 21% between 2007 and 2012, saving around £13 billion (WRAP 2013).

Among the most concrete initiatives developed at national level, the EU reported about the German Food sharing movement.¹² Surplus food management by introducing a sharing economy approach deserve, therefore, special attention since food sharing initiatives may be important pathways for more sustainable food waste behaviors.

10.5 Food Sharing and Food Waste Reduction

The concepts of food recovery and food redistribution have gained, in recent times, increasing influence within food waste reduction strategies of industrialized countries¹³ (see Gram-Hanssen et al. 2016). At the same time, the food sector in general has drawn growing attention also from consumers, leading to the development of new food movements among which food sharing (Rombach and Bitsch 2015).

Beyond being recognized as an everyday inter-family practice, the sharing of food among different households has been firstly described by anthropological studies on primitive and contemporary hunter gatherer societies (e.g. Hunt 2000; Jaeggi and Gurven 2013; Ziker and Schnegg 2005). Over the last few years, there

¹²[http://www.europarl.europa.eu/RegData/bibliotheque/briefing/2014/130678/LDM_BRI\(2014\)130678_REV1_EN.pdf](http://www.europarl.europa.eu/RegData/bibliotheque/briefing/2014/130678/LDM_BRI(2014)130678_REV1_EN.pdf).

¹³Food is redistributed for example through national food banks and local charity organizations.

has been a growing body of literature examining this practice from another perspective, since food sharing initiatives have also been rising in most developed societies through a variety of forms such as web food networks, underground restaurants, public refrigerators or simply private initiatives within specific households consisting of nonrelated people like students (e.g. Kera and Sulaiman 2014; Morone et al. 2016). Therefore, food sharing can take the form of selling as well as donating and bartering initiatives.

Most often, they are start-ups aimed at exchanging leftovers. Examples of these include Foodsharing¹⁴; LeftoverSwap¹⁵; S-Cambia Cibo,¹⁶ even though there are also many initiatives whose main goal is to cook and eat together (e.g. Cookening; Feastly). As a result, food sharing practices have been investigated also from a social perspective with a particular focus on the relationships that may be built in urban settings where more and more citizens live in alienating conditions (e.g. Kera and Sulaiman 2014). It should be noted, indeed, that many of these initiatives are developing in big cities. This is an important point since the level of urbanization is positively associated with food waste production (Secondi et al. 2015).

As emphasized in the above paragraphs on the sharing economy, new internet communication tools have been key drivers as, in most cases, it is the online platform enabling consumers to reach each other (Kera and Sulaiman 2014). In parallel, internet technologies are also playing an important role through a rising number of mobile apps specifically designed to reduce domestic waste by improving households' food management efficiency (Farr-Wharton et al. 2014).

Saving of money is among the main objectives of people participating in food sharing initiatives. However, as stated by Ganglbauer et al. (2014) in their qualitative analysis of the German community platform foodsharing.de, few members acknowledged their economic motivation. Yet, this finding is consistent with a number of studies which found that respondents, both from low and middle income classes, are generally ashamed of telling about their concerns over their economic needs (e.g. Cappellini 2009). Overall, despite a growing public awareness over environmental issues and the focus by many scholars on the environmental impact, empirical evidence showed that, in general, consumers choosing sharing economies initiatives are mostly driven by economic rather than environmental reasons (e.g. Barnes and Mattson 2016). Also concerning the specific context of food waste reduction efforts from households, the influence of ecological motivations appears to be less relevant (Quested et al. 2013; Graham Rowe et al. 2014).

Despite food sharing initiatives have attracted in recent years enthusiastic media and public attention, there have been also many criticisms. A number of weaknesses have also been identified by the literature. In testing a food sharing practice as a preventive way to reduce food waste in a University setting, Lazell (2016) found that the socio-cultural context in which food is perceived is a critical factor.

¹⁴See <https://foodsharing.de/>.

¹⁵See <http://leftoverswap.com/>.

¹⁶See <http://www.scambiacibo.it/>.

A finding in line with several studies (e.g. Evans 2012; Papargyropoulou et al. 2014). Specifically, the lack of social relationships and, consequently, of trust have shown to have the most negative impacts on food sharing practices (Lazell 2016; Farr-Wharton et al. 2014). For example, many consumers stated they do not know how the food was stored and, therefore, whether was safe. In general, leftovers 'are perceived as food that has lost its original qualities and aura' (Cappellini 2009: 370). There is, indeed, a conflicting relationship between food waste and food safety (Watson and Meah 2013; Kera and Sulaiman 2014).

Moreover, as Evans (2012) outlines, recirculation of food surplus is particularly complicated when sharing takes place outside the intimacy of the domestic setting since culinary performances and habits of people offering food are open to criticism.

Another important issue concerns participants' willingness to undertake an initiative involving great organizational efforts (Ganglbauer et al. 2014), since the practice of reusing leftovers is, already in itself, extremely challenging at the household level (Cappellini 2009).

Also the assumption that the adoption of food sharing practices automatically leads to food waste reduction is not a foregone conclusion. Although several initiatives and start-ups are being developed in Europe and US, little attention has been paid to test the effectiveness of the possible sharing of consumer-side food surplus. In this context, a first attempt to assess the existence (or not) of a casual relation between food sharing and waste reduction has been provided by Morone et al. (2016). Through a framed field experiment on twenty students sharing private accommodations, the authors assessed the impact of food sharing on waste production, controlling for several other variables influencing subject's behaviors. Specifically, preliminary results showed that sharing practices associated with food purchase and consumption could give rise to a reduction in the amount of the organic food waste for those households showing a certain degree of environmental and economic awareness (e.g. previous engagement in separate waste collection, acquaintance of food shopping expenses, etc.), adequate domestic skills (e.g. appropriate food storage, etc.) and collaborative behaviors.

Finally, Lazell (2016, p. 7) showed that the sharing of food is undermined by the fact that 'food consumption behavior is interlinked with other behaviors in the form of sets of action that determine routines and habits'. There is, indeed, a growing body of the literature which illustrates the importance of acting on collective routines and habits rather than focusing on measures based on behavior change at individual-level (e.g. Shove 2010; Moloney and Strengers 2014).

10.6 Conclusion

With global population nowadays consuming more food than ever before, the food sector has assumed even greater importance (Moomaw et al. 2012) and has been recently recognized as a strategical area for SCP implementation (Tukker et al. 2008).

In particular, there is a growing middle class from emerging countries that will increase demand of most resource intensive food, such as meat (Dobermann and Nelson 2013). This is coupled with an extremely high population growth rate in the least developed countries, which add pressure onto the food supply chain. In this context, the solution lies not only in countries' ability to increase food production. Also the excessive production of food waste needs to be addressed urgently (Garcia-Garcia et al. 2015).

Food waste at the consumer stage has become a plague to developed countries. As described above, greater consistency in its measurement still remains a major challenge since it plays a crucial role in laying down the foundations for more effective preventive and minimization actions (Garrone et al. 2014). Nevertheless, several measures have been put in place in the last years and some positive results have been achieved. More recently, a number of food initiatives related to the sharing economy model have attracted public and media interest.

The sharing economy gives us a new way of thinking based, in principle, on environmental effectiveness and economic efficiency. Our research showed that this new economic model could offer some important opportunities in accelerating the transition towards new and more sustainable consumption and production models. In the more specific context of food waste, food sharing can lead, in theory, to more efficient use of resources reducing at the same time the amount of waste produced. However, the literature points to a number of critical elements such as the rebound effect. For instance, Rutten et al. (2013) present a scenario where savings from reduced food waste are spent for other commodities and/or more expensive food such as meat. 'Therefore, the sharing economy may be presented as a tool for ecological transition only if it meets a number of conditions, such as the durability of the goods or a change in habits in relation to consumption' (Goudin 2016: 17).

Routines and habits indeed play the most critical role in food waste production (Lazell 2016). In general, according to a growing body of the literature based on social practices (e.g. Shove 2010), the prevention and mitigation measures based on behavior change at individual-level cannot effectively change consumption practices as they 'ignore how and why we do what we do, and how practices and routines come to be normal' (Moloney and Strengers 2014, p. 97). Therefore, a more ambitious policy is certainly required.

Moreover, the hypothesis themselves on which food sharing is based need to be further investigated since, as it emerged from the study of Morone et al. (2016), the correlation between food sharing practices and reduced food waste cannot be taken for granted. Since food sharing practices entail great efforts, it is also important that consumers better understand the economic benefits, in terms of savings, the use of this practice can lead to. Likewise, a great deal remains to be done to increase environmental awareness. Just as in studies on the sharing economy, also in studies on food waste it has been found that the environmental concern is still not determinant (Graham Rowe et al. 2014). Lastly, food sharing initiatives should be placed

into the more general framework of food waste minimization which is extremely complex as food waste must always be perceived, and thereby tackled, all along the food supply chain not focusing only on the consumer level (Papargyropoulou et al. 2014).

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