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A Review on Food Waste Disposal Approach

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ABSTRACT

A review was undertaken to explore the food waste disposal approach from the year 2014 until 2019. Four databases were used to search for articles related to food waste. 324 articles were reviewed prior to selecting 60 papers for final review. The results showed that apart from the economic loss caused by food waste, its environmental and social impacts also cause preventable damage and public debate. Further analyses showed that there were few approaches to food waste disposal. These food waste disposal trends can be categorised into three categories: 1) donation, 2) price reduction 3) food waste recycling programme. These approaches to food waste management have been introduced effectively in the countries studied. Furthermore, the food waste disposal approach could guide the supermarket and other related organisations to follow. However, the limitation of this study utilised four journal databases accessible to the researchers with specific keywords related to this research. Overall, future studies may use other journal databases and keywords for their findings. Future studies also could utilise the quantitative approach with a survey or qualitative method with an interview to gain more insight into this issue.

***Keywords**: food waste, food waste disposal, food safety, retailer, supermarket, literature review*

INTRODUCTION

According to the Food and Agriculture Organisation (FAO) of the United Nations, an estimated 1.3 billion tons of food are wasted each year globally, one-third of all food produced for human consumption. Each year manufacturers, distributors, and customers waste about 45% of all fruits and vegetables, 35% of fish and poultry, 30% of cereals and 20% of meat and dairy products. Due to this, food wastage's carbon footprint is estimated at 3.3 billion tons of CO2 equivalent of GHG released into the atmosphere per year (Food and Agricultural Organisation United Nation (FAO), 2019). Additionally, the direct economic effect of food waste (excluding fish and seafood) is estimated at $750 billion per annum. Growing food requires water, seed, human resources, machinery, electricity, and fertiliser. Therefore, letting food go to waste is a wasteful use of natural resources, pushing up costs, inflating food prices and weakening the food supply chain.

Food waste is one of the biggest problems in the food industry, not only its effects on the customers but the big retailers such as Giant, Tesco and others. Food waste refers to any food and inedible parts of food or the decrease in the quantity or quality of food that were removed from the food supply chain to be recovered or disposed of (Corrado & Sala, 2018). This activity includes composing, crops ploughed in/not harvested, anaerobic digestion, bioenergy production, co-generation, incineration, sewage disposal, landfill or discarded to the sea. In other terms, food waste is defined as the organic waste discharged from various sources, including food processing plants, and domestic/commercial kitchens, cafeterias and restaurants (Chen, Jiang, Yang, Yang, & Man, 2017).

Food waste can occur in the entire supply chain activities: agricultural production, postharvest handling and trade, processing, food service industry, retailers, and households (Blanke, 2015). Previous studies have found different perspectives on food waste. For instance, a portion of agricultural products is discarded because they cannot be used for human consumption. However, it can still be safely used as animal food (Kim, Rundle-Thiele, & Knox, 2019) or to produce marketable foodstuffs (Peira, Bollani, Giachino, & Bonadonna, 2018). Besides manufacturer, there are also studies conducted on consumer behavior towards food waste (e.g., Aschemann-Witzel, Giménez, & Ares, 2018b). Within their household

and in-store decisions, consumers play a key role in food waste and their actual or anticipated food expectations. This also includes their behaviors in food buying, which influence stakeholder decision-making throughout the entire supply chain.

There are growing environmental, social and economic concerns regarding food waste. Thus, it is acknowledged as an urgent issue among governments, businesses, NGOs, academics, and the general public (Schanes, Dobernig, & Gözet, 2018). Given the high amounts of food waste occurring on the household level, many studies and prevention of food waste have been focused on the supply chain's final stages (e.g., Parfitt, Barthel, & Macnaughton, 2010). It should also be noted that there were several studies done to investigate the food waste strategies that were implemented by the supermarkets and retailers. It is found that the store food waste happened due to the customers' demand, and stores declining to put on the shelves other than perfectly edible food.

Given the complex nature of food waste issues, several researchers reviewed the literature of food waste studies. For example, Schanes, Dobernig and Gözet (2018) systematically reviewed the food waste literature focusing on household food waste practices and their policy implications. Aschemann-Witzel, de Hooge, Amani, Bech-Larsen and Oostindjer (2015) concentrated on the cause of food waste and possible action to reduce the food waste. This study has been done comprehensively with a combination of literature and expert interviews, thus provided a clear picture of food waste in the industry. Kim, Rundle-Thiele, and Knox (2019) covered the best practices in a food waste reduction programme. While the current paper only providing three examples of systematic literature review, it is acknowledged that many researchers have done a literature review, critical review and systematic review about food waste. Each of them focused on different issues to highlight. However, a review covering the approaches or methods of food waste disposal, particularly occurring on the retailer or supermarket level, remains lacking.

This paper explores the food waste disposal trends in the last five years (2014-2019). It presents a literature review of the existing scholarly discussion on the supermarket's food waste disposal approaches. The authors review and analyse evidence on how supermarket disposes of food waste

and, based on this analysis, discuss the practical aspects of implementing the strategies and the insights into policy approaches and business opportunities to address the issues raised by such evidence and recommendations for future research.

The contributions provided by this systematic review are twofold. Foremost, it serves to identify gaps in scholarly evidence that still require to be filled, thus growing the knowledge-base on food waste disposal schemes. Secondly, it offers guidelines for evidence-based management and policy-making, which can potentially enhance the quality and effectiveness of policy measures and technological innovations aimed at minimising food waste.

METHOD

A review was carried out, employing systematic analysis to achieve the objectives stated in the research. This approach has been chosen to minimise the potential for errors and allow generalisability. Following the instructions of Tranfield, Denyer, and Smart (2003), the review process includes five steps: (i) research objectives ; (ii) databases selection; (iii) identification of keywords; (iv) selection of relevant articles and (v) collection of data.

Based on the (i) objectives, the research was designed to explore the food waste trends in the last five years. As to (ii) database selection, the authors have chosen to look at the Scopus, Emerald Insight, Taylor and Francis and Science Direct databases. The (iii) keywords were identified in two stages: At first, the words which are ‘food waste disposal trends’ was searched for the titles, keywords or abstracts that should be present; eventually, intending to justify the reliability of the search; the researchers created a new search on the Science Direct database through the Boolean operation (a: ‘supermarket’ OR ‘reduction’ OR ‘trends’; AND b: ‘zero waste’), searching in ‘all fields’. The document type used for the search was ‘article’, and 2014 until 2019 is the time limit for this research.

Once all the articles covering the most selected papers in the first search were included in this database, the choice for an exclusive search on the Science Direct' database is justified. The very first search resulted

in 309 articles (70 from the Science Direc database, 124 from the Scopus database, 30 from the 30 Emerald Insight database, and 100 from the Taylor and Francis database).

Upon excluding the multiple copies in both searches, (iv) selection of article process continued with analysing the abstracts of the remaining articles. More than one researcher carried out this selection process separately, concentrating on selected articles that had research questions and findings directly linked to only the objectives of this research. The collection of publications was narrowed down to 60 papers at the end of this stage, which addressed the objective.

Eventually, (v) the data extraction was obtained. To achieve the research objective, the researcher carried out a critical review of the collection of publications. Throughout the past five years, the analysis concentrated on the trends in food waste disposal. Finally, the findings of the articles under review were summarised by a systematic method. This systematic approach relies in major part on the researchers' subjective opinion of the articles examined. As mentioned by Tranfield *et al*. (2003), the researchers should be granted this certain level of subjective flexibility to evaluate and interpret different research to derive similar definitions and abstracts.

FINDINGS

The findings were divided into three categories of food waste disposal trends in the five years (2014-2019). These include donations, price reduction and the food waste recycling programme.

Donation

Food donation occurs in several stages of the supply chain. The first stage applies at the production level with crops that are no longer suitable to be harvested, the second stage is on the manufacturing part to the overprice product and the last stage: the distribution and market stage where food has been left out unsold at the store. Some foods are approaching the expiration date, but retailers cannot sell them because of the regulation (Calvo-Porral, Medín, & Losada-López, 2017). On the retailer level, the most common food

waste trend is the redistribution of non-marketable food items. The retailer will donate the non-marketable food items to the farmer, retailer employees and charity organisations such as food banks and social supermarkets. It can be seen most of the retailers are ready to collaborate with farmers regularly for donation, such as animal feed or composition (recycling). However, somehow, or rather, most retailers still preferred to donate food for those who could not afford to buy it.

A food donation programme allows the retailer to collaborate with charitable organisations to donate and redistribute food that cannot be sold anymore. Food donation can also be defined as giving away food voluntarily to the society that needed it, which otherwise will throw away or waste it (Calvo-Porral *et al*., 2017). Donations are economical compared to the disposal, so the economic benefits add another inspiration for the retailer to contribute. This donation depends on the regulatory framework in the country where food redistribution may be duty deductible. This results in reasons for food donations, including reputation advantages, tax savings, and avoidance of disposal costs (Mirosa, Mainvil, Horne, & Mangan-Walker, 2016). For example, in France, retail stores measuring 400 square meters and above are mandatory to offer extra food to educational or charitable institutions. However, regulations in the UK hamper redistribution because retailers are afraid of lawsuits (Hermsdorf, Rombach, & Bitsch, 2017).

Another similar programme is called a food bank. Redistribution of food via food banks and charities was described as a morally and environmentally friendly solution for food waste matter and food deprivation. A food bank is described as a nonprofit organisation that coordinates the pickup and distribution to charities of food products from commercial stakeholders. The food bank's goal is to provide excess food from agriculture, industry, and restaurants to redistribute it to social welfare organisations. Over-order or manufacturers that overproduce food products will be taken care of by the food banks, which will collect that extra food on a large scale from the retailer (Facchini, Iacovidou, Gronow, & Voulvoulis, 2018). The food bank will then handle fresh surplus produce with a remarkably rapid reception and redistribution system. The Global Food Banking Network has established the standard where several organisations for food bank such as The Food Central (Norway), The Food Bank (Denmark) and Last Minute Market (LMM) (Italy) are operating in compliance with these principles (Bech-

larsen & Ascheman-witzel, 2018). Other than Norway, Denmark and Italy, the practice of food bank can be seen from the Feeding America where it has a national food brand of more than 200 food bank that coordinates the distribution of edible food and grocery products in the United States (Calvo-Porral *et al*., 2017).

The food bank has an obvious purpose where they are targeting to eliminate food waste and the campaign against food insecurity. Relatively, though, they are all related to both the goals of development before hunger. Also, food banks have been recorded to have moved from an appearance that was once solely hunger and deprivation to one that involves conservation but is often dominated by it. However, another reason found behind this was the promotional techniques which were an essential part of this growth (Bech-larsen & Ascheman-witzel, 2018).

Generally, obstacles identified by donations are an administrative burden, economic burden (donation costs must not surpass disposal costs), shortage of donor storage space to reduce food losses if food banks/food charities do not instantly receive it, lack of (cooled) acceptor-side transport (capacity) and poor coordination attributed to food banks/food charity mostly collaborating with volunteer groups (Garrone, Melacini, & Perego, 2014). Commonly for the food manufacturing sector, most donated goods surpass domestic/commercial sales by date. For example, the food manufacturing firm will deliver a perishable product to a manufacturer so that the retailer can sell it to the customer. This has been the key reason for the production of excess food in places such as Italy as well. A significant obstacle stated by the expert of the Belgian Association of the Food Industry is the fact that relatively non-finished products could not be donated because they were not wrapped or labelled and very often risk ending up in feed processing or waste disposal agencies (De Boeck, Jacxsens, Goubert, & Uyttendaele, 2017). The donation can be financially burdened for the food manufacturing firm before packaging and branding these semi-finished products. When packaging and labelling were to be carried out by food banks or charities, this may also cause concern because the product labels required extra legal obligations to be followed. Insufficient voluntary awareness of the legal side of label details may cause food safety issues. The latter could be resolved by a standardized food bank tag licensed to be used by the qualified national food safety regulator (De Boeck *et al*., 2017).

For the retailer charity process, it could be assumed that each retailer has its own approach. The common practice to donate goods ranges from pre-packed food donations that is already four days prior use-by date to late afternoon donation after 16 hours of the use-by date. This practice will have significant consequences for the acceptors such as food banks or local charities as it indicates when they need to distribute the goods to the most disadvantaged. The latter, which is a best before date donation, requiring immediate redistribution that is not always possible. This is because volunteers operate in charities that are less flexible in affordability and mode of transportation to collect the almost spoiled food products from the given retailer. National food banks primarily received food goods from the retailer's central warehouse, while local food charities typically received donations from local stores.

Nevertheless, the latter must meet other standards to obtain the goods, although they differ depending on the manufacturer or local shop involved. For instance, goods purchased have to be delivered free of charge, and perhaps most large retailers contribute only to food banks-related charities. The local shop's distance to the charity must also be minimal for some suppliers that can be under a certain number of kilometers. Stores do not always donate stable shelf items, as there are no losses due to efficient inventory control. The same refers to goods that are frozen. Deli-based salads are the majority of donated products, fresh fruits and vegetables and composite ready-to-eat goods such as cooked meat products. Fresh meat and fish donations are very minimal because they are highly vulnerable to microbiological degradation and require strict monitoring of the cold chain to avoid possible outgrowth of foodborne pathogens (De Boeck *et al*., 2017).

Furthermore, the charity organisations' lack of cooled or frozen storage capacity and logistics is identified as obstacles (Bech-larsen & Ascheman-witzel, 2018). The volunteers concerned have re-emerged a lack of stability, coordination and lack of information on food safety. If the products are not well stored (refrigerated) and delivered, several retailers listed the potential damage to their brand name. The concern for the growth of parallel loops where products are sold at a reduced price and the challenge of identifying a charity organisation with adequate resources and a reliable team of people to establish a long-lasting relationship has also been considered inefficiencies. Depending on the region, the latter challenge differs as some areas, houses

are more charities than others. Donating items involve the retailer's extra effort as they are constantly in contact with any charity and keep track of which charity organisation comes to receive which one of the donated goods (De Boeck *et al*., 2017).

Price Reduction

One of the food waste trends in the last five years is where the retailer prefers to reduce the price for substandard or low-quality food products which is why they can offer a wide range of food product. This strategy is usually for a product which its characteristic might be impaired, but it does not imply a lack of nutritional quality. Therefore, the retailer could offer the consumer with a considerably lower price of the product, which is suitable for its lower quality than the standard offer. A food product that is almost expired usually will be introduced with a discount since a consumer will prefer to buy the low food price, and this is seen as a good move by the retailer. The excess food will be sold immediately compared to the food that are thrown out (Halloran, Clement, Kornum, Bucatariu, & Magid, 2014). Similarly, minor visual flaws also can be offered at a reduced price even though it does not affect the product quality (Lebersorger & Schneider, 2014).

In order from retailers to tackle food waste problem, they need to consider a serious outlook on the price strategy since it plays a large and potentially beneficial role in reducing food waste in the store itself. Most of the retailer use price strategy, which is a widespread application for food waste avoidance. This practice is suitable for the products that are almost expired, which is called expiration date-based pricing or also for products that have slight damage or, in terms of appearance, in which they start to look unappealing. Food is one of the best examples for this practice as food are easy to be expired, abnormal, imperfect, which can be called 'suboptimal food'. Suboptimal food can be defined as food which is still edible to eat but had been differentiated from the usual food in term of their appearance or that which almost reach the expiration date. There are several advantages of price reduction in suboptimal food. The food waste in the store will automatically be reduced and therefore will improve employee satisfaction as they no longer need to handle the food waste and no additional sources needed to transport food waste to another location. Food waste can be avoided from

the start of the process. The price reduction strategy has also been viewed as beneficial in term of the food waste hierarchy (Aschemann-Witzel *et al*., 2019; Filimonau & Gherbin, 2017).

However, there is a particular risk of implementing the retailer's price reduction strategy as it requires additional resources. Therefore, the store image might be impacted by implementing a pricing strategy and the characteristic of the product sold. Retailers need to be concerned about the value of this kind of food on display to be sold, and the pricing strategy used as customers might have a negative perception of the quality and brand image. Thus, to address such issues and also to investigate on which practice to be implemented that provide price-reduced suboptimal food for tackling wastage quite effectively, more in-depth information is required. It is a fact that most of the food thrown away at the retail stage or process are still in good condition in terms of appearance, but because the food has passed the expiration date, the food is no longer to be sold. For instance, it can be seen in Austria, where it has higher than one-quarter of the food wasted (Lebersorger & Schneider, 2014). The food that is still in a good condition is why the retailer has taken initiatives to sell the food that almost reaches best before date or suboptimal food in appearance, but at a lower price (Aschemann-Witzel *et al*., 2015). This practice has also been widely used in Denmark (Aschemann-Witzel, de Hooge, & Normann, 2016; De Hooge, Oostindjer, Aschemann-Witzel, Normann, Loose, & Almli, 2017).

The price reduction strategy has been proved to be successful as it generates excellent sales, which contributes to minor wastage amounts (Lebersorger & Schneider, 2014). This action seems to not break any rules in terms of morally 'right' to consumers at first sight and is economically stable. Furthermore, the retailer also gets profit from selling suboptimal food or food which almost reach the expiration date that otherwise is being thrown away, which generates loss to the store. Nonetheless, it is not as simple from the supermarket's perspective, and accurate data on either the actual value of recycling wastage is still lacking (Brancoli, Rousta, & Bolton, 2017).

For the first one, it is not always the seller that pays the price of unpurchased goods based on the legal agreements for the particular item in question. Next, there is a risk when suboptimal food that were displayed on the shelf with a price reduction as the consumer might have a negative view

toward the standard price of the product and the remaining product range offer at the store. This is because a particular product which has a lower price and suboptimal product in term of appearance have been regarded as an indicator of the store quality (Bech-larsen & Ascheman-witzel, 2018). Additionally, consumer during their shopping will learn more about the price. Therefore, the image of the store and price knowledge have been impacted as the consumers may know about the price. The business of the store then might have a negative view by the consumer, especially on the price of reduced items. Third, there is additional work for the employees. The employees need to identify the products, add an expected price label and ensure the suboptimal is separated from the shelf when the food is no longer suitable to be sold or has reach the expiration date. This process is to ensure other products sold at the store is of high quality. Finally, the selling of valuation-reduced goods could end up in reducing the more beneficial revenues of goods with a standard price (Aschemann-Witzel, Jensen, Jensen, & Kulikovskaja, 2017a).

Food Waste Recycling Programme

Based on previous studies by Aschemann-Witzel *et al*. (2015), the food waste can be decreased with strategic collaboration among institutions; synergistic activities between governments, societal stakeholders, and retailers; appropriate communication to consumers; and consumer education (best-before-date, expectations and perceptions, and consumer household food management behaviour). Additionally, educating the curriculum on food waste in school can help the reduction of food waste by giving awareness about food waste from an early age and implementing in educational programmes in EU school (i.e., UK, France, and the Netherlands) (Hermsdorf *et al*., 2017; Russell, Young, Unsworth, & Robinson, 2017).

Furthermore, the programme made by nonprofit organisation to collaborate with various companies in providing information about food waste and other incentives that are relative on low cost and quick implementation (Priefer, Jörissen, & Bräutigam, 2016). There are also a lot of campaign that are driven by Non-Organisation Profit such as 'Love Food Hate Waste' in Great Britain launched in 2007, that led to a 21% reduction of household FW (2007-2012), 'Stop Wasting Food' in Denmark,

'Too Good for the Bin' in Germany, 'Quijette un oeuf, jette un boeuf' in France, 'Of a meal do not even waste a tiny bit' in Catalonia, and 'Zero Waste Movement' in Portugal (Priefer *et al*., 2016). The aim of all these programmes and campaign is to give information about food waste that is currently a problem and to give the awareness of how this food waste have impacted the environment (Calvo-Porral *et al*., 2017).

The two ways to minimise food waste are monetary and non-monetary strategies. In non-monetary strategies, businesses collaborate with non-profit organisations on a donation basis, without exchanging money for surplus food. In the case of food-sharing or food bank operations, the participating non-profit organisations, e.g. food banks or food-sharing operations, distribute donated items to either individuals in need or group leaders as well those that are interested (Hermsdorf *et al*., 2017; Johnson *et al*., 2019). Meanwhile, in monetary strategies, the redistribution of the surplus takes place by identifying and developing (secondary) markets, usually in business models. Another monetary strategy is selling of defective items (e.g., damaged packaging, a few days to best-by date) through standard retail at a reduced price (Teller, Holweg, Reiner, & Kotzab, 2018). For example, like Food Rescue where food items that are discarded as food waste at one stage of the supply chain are then used in a product or as part of a service and sold for profit. The aims of the Food Rescue include giving awareness on food waste and the side effects it have on the environment and social behaviours in society.

According to Hahn, Spieth, and Ince (2018), it is possible to assess whether an organisation should be deemed sustainability-oriented based on the motivation of the entrepreneur. Sustainability-oriented businesses aim to contribute to the enhancement of human well-being and the overall condition of the social and environmental factors (Jolink & Niesten, 2015). Yet the company's survival cannot be achieved without economic prosperity (Breuer, Fichter, Lüdeke-Freund, & Tiemann, 2018). The goal of making the food supply chain more sustainable is pursued through a business model (Shashi, Singh, Centobelli, & Cerchione, 2018). The core idea is to develop a business model specifically for food rescue, combining efforts to reduce waste and save food while generating profit (Aschemann-Witzel *et al*., 2017b).

CONCLUSION

The increasing amount of food lost or wasted globally impacts food security and has attracted the attention of researchers, governments, and international organisations. While extensive research has been carried out regarding food waste management, this paper explored the small segment of it, particularly the food waste disposal approach from 2014 to 2019. Thus, only one important topic was discussed in this paper: the approach that has been implemented by supermarket management in reducing their food waste. If consumers and retailers could avoid food waste from occurring along with every phase of the food chain, including at the supermarket and household levels, reducing food waste is achievable (Schanes, Dobernig, & Gözet, 2018). This paper explained three approaches in dealing with food waste that supermarkets have implemented.

First, food donation through charity or food bank organisation should be considered. Many researchers have proved that this approach could reduce food waste from retailers and supermarkets (Rombach *et al*., 2018). Not only does it reduce waste in the supermarket, but this approach also boosts the company image. When the supermarket or retailer donates surplus food to the people in need, the society will look up to the retailer as an example of a good organisation (Devin & Richards, 2018). Price reduction strategies could also be advantageous, although it has some risks for the organisation before implementing them. This is because the retailer will reduce the price of inferior or low-quality food products, particularly suboptimal food. This practice has been proved to be successful as it generates great sales and is connected to minor wastage amounts (Lebersorger & Schneider, 2014). The third approach is the food waste recycling programme. This programme usually synergies several organisations together in implementing the project and is another excellent choice, especially to build up an organisation image in a country. The programme is made with the collaboration of non-government organisation (NGO) and various companies that give information about food waste and other incentives relative to low cost and quick implementation (Priefer *et al*., 2016). This programme supports the country's food waste policy (Vilariño *et al*., 2017).

Although this is only a conceptual paper, some practical implications could be suggested to be implemented. Firstly, the food waste campaign may

increase awareness among consumers and supermarket managers about the methods that could be used to reduce food waste. The supermarket can boost profitability and create goodwill in the process (Vilariño *et al*., 2017). It is also possible to achieve increased profitability through incurring additional tax write-offs (reducing taxable income) or by the revenues by additional tax write-offs (reducing taxable income). The tax deduction is only possible if the country's food waste policy includes it as an incentive for the company or organisation (DeLorenzo, Parizeau, & von Massow, 2019).

Supermarket food waste is a very narrow area of study, but the extension would be beneficial because it could minimise both costs and effects on the environment. However, the limitation of this study should be noted. First, this study only utilised four journal databases accessible to the researchers with specific keywords related to this research. Therefore, it is suggested that future studies may use other journal databases and keywords related to food waste. It is important to examine other approaches or methods aimed at reducing food waste. This includes a more experimental studies to identify food waste intervention and to assess the actions in real situations. Future studies could also utilise the quantitative approach with a survey or qualitative approach with the interview or to gain more insight into this issue. The mixed-method approach could support and justify the food waste disposal issues greatly.

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REFERENCES

Aschemann-Witzel, J., Jensen, J. H., Jensen, M. H., & Kulikovskaja, V. (2017a). Consumer behaviour towards price-reduced suboptimal foods in the supermarket and the relation to food waste in households. *Appetite, 116*, 246–258. https://doi.org/10.1016/j.appet.2017.05.013

Aschemann-Witzel, J., Otterbring, T., de Hooge, I. E., Normann, A., Rohm, H., Almli, V. L., & Oostindjer, M. (2019). The who, where and why of choosing suboptimal foods: Consequences for tackling food waste in store. *Journal of Cleaner Production, 236*, 117596. https://doi.org/10.1016/j.jclepro.2019.07.071

Aschemann-Witzel, J., De Hooge, I. E., Rohm, H., Normann, A., Bossle, M. B., Grønhøj, A., & Oostindjer, M. (2017b). Key characteristics and success factors of supply chain initiatives tackling consumer-related food waste–A multiple case study. *Journal of Cleaner Production, 155*, 33-45.

Aschemann-Witzel, J., De Hooge, I., & Normann, A. (2016). Consumer-related food waste: Role of food marketing and retailers and potential for action. *Journal of International Food & Agribusiness Marketing, 28*(3), 271-285.

Aschemann-Witzel, J., de Hooge, I., Amani, P., Bech-Larsen, T., & Oostindjer, M. (2015). Consumer-related food waste: Causes and potential for action. *Sustainability (Switzerland), 7*(6), 6457–6477. https://doi.org/10.3390/su7066457

Aschemann-Witzel, J., Giménez, A., & Ares, G. (2018a). Consumer in-store choice of suboptimal food to avoid food waste: The role of food category, communication and perception of quality dimensions. *Food Quality and Preference, 68*, 29-39.

Aschemann-Witzel, J., Giménez, A., & Ares, G. (2018b). Convenience or price orientation? Consumer characteristics influencing food waste behaviour in the context of an emerging country and the impact on future sustainability of the global food sector. *Global Environmental Change, 49*(September 2017), 85–94. https://doi.org/10.1016/j.gloenvcha.2018.02.002

Bech-Larsen, T., Ascheman-Witzel, J., & Kulikovskaja, V. (2019). Re-distribution and promotion practices for suboptimal foods–commercial and social initiatives for the reduction of food waste. *Society and Business Review, 14*(2), 186-199. https://doi.org/10.1108/SBR-11-2017-0094

Blanke, M. (2015). Challenges of reducing fresh produce waste in Europe—From farm to fork. *Agriculture, 5*(3), 389–399. https://doi.org/10.3390/agriculture5030389

Brancoli, P., Rousta, K., & Bolton, K. (2017). Life cycle assessment of supermarket food waste. *Resources, Conservation and Recycling, 118*, 39–46. https://doi.org/10.1016/j.resconrec.2016.11.024

Breuer, H., Fichter, K., Lüdeke-Freund, F., & Tiemann, I. (2018). Sustainability-oriented business model development: Principles, criteria and tools. *International Journal of Entrepreneurial Venturing, 10*(2), 256–286. https://doi.org/10.1504/IJEV.2018.092715

Calvo-Porral, C., Medín, A. F., & Losada-López, C. (2017). Can marketing help in tackling food waste?: Proposals in developed countries. *Journal of Food Products Marketing, 23*(1), 42–60. https://doi.org/10.1080/10454446.2017.1244792

Chen, H., Jiang, W., Yang, Y., Yang, Y., & Man, X. (2017). State of the art on food waste research: a bibliometrics study from 1997 to 2014. *Journal of Cleaner Production, 140*, 840–846.

Corrado, S., & Sala, S. (2018). Food waste accounting along global and European food supply chains: State of the art and outlook. *Waste Management, 79*, 120–131. https://doi.org/10.1016/j.wasman.2018.07.032

De Boeck, E., Jacxsens, L., Goubert, H., & Uyttendaele, M. (2017). Ensuring food safety in food donations: Case study of the Belgian donation/acceptation chain. *Food Research International, 100*, 137–149. https://doi.org/10.1016/j.foodres.2017.08.046

De Hooge, I. E., Oostindjer, M., Aschemann-Witzel, J., Normann, A., Loose, S. M., & Almli, V. L. (2017). This apple is too ugly for me!: Consumer preferences for suboptimal food products in the supermarket and at home. *Food Quality and Preference, 56*, 80-92.

DeLorenzo, A., Parizeau, K., & von Massow, M. (2019). Regulating

Ontario's circular economy through food waste legislation. *Society and Business Review, 14*(2), 200-216. https://doi.org/10.1108/SBR-12-2017-0115

Devin, B., & Richards, C. (2018). Food waste, power, and corporate social responsibility in the Australian food supply chain. *Journal of Business Ethics, 150*(1), 199-210.

Facchini, E., Iacovidou, E., Gronow, J., & Voulvoulis, N. (2018). Food flows in the United Kingdom: The potential of surplus food redistribution to reduce waste. *Journal of the Air & Waste Management Association, 68*(9), 887-899.

Filimonau, V., & Gherbin, A. (2017). An exploratory study of food waste management practices in the UK grocery retail sector. *Journal of Cleaner Production, 167*, 1184–1194. https://doi.org/10.1016/j.jclepro.2017.07.229

Food and Agricultural Organisation United Nation (FAO). (2019). Food wastage: Key facts and figures. Retrieved on September 8, 2020, from http://www.fao.org/platform-food-loss-waste/en/

Garrone, P., Melacini, M., & Perego, A. (2014). Surplus food recovery and donation in Italy : The upstream process. *British Food Journal, 11*6(9), 1460-1477. https://doi.org/10.1108/BFJ-02-2014-0076

Hahn, R., Spieth, P., & Ince, I. (2018). Business model design in sustainable entrepreneurship: Illuminating the commercial logic of hybrid businesses. *Journal of Cleaner Production, 176*, 439–451.

Halloran, A., Clement, J., Kornum, N., Bucatariu, C., & Magid, J. (2014). Addressing food waste reduction in Denmark. *Food Policy, 49*(P1), 294–301. https://doi.org/10.1016/j.foodpol.2014.09.005

Hermsdorf, D., Rombach, M., & Bitsch, V. (2017). Food waste reduction practices in German food retail. *British Food Journal, 119*(12), 2532–2546. https://doi.org/10.1108/BFJ-06-2017-0338

Johnson, L. K., Bloom, J. D., Dunning, R. D., Gunter, C. C., Boyette, M. D., & Creamer, N. G. (2019). Farmer harvest decisions and vegetable loss in primary production. *Agricultural Systems, 176*(May), 102672. https://doi.org/10.1016/j.agsy.2019.102672

Jolink, A., & Niesten, E. (2015). Sustainable development and business models of entrepreneurs in the organic food industry. *Business Strategy and the Environment, 24*(6), 386–401.

Kim, J., Rundle-Thiele, S., & Knox, K. (2019). Systematic literature review of best practice in food waste reduction programmes. *Journal of Social Marketing, 9*(4), 447–466. https://doi.org/10.1108/JSOCM-05-2019-0074

Kulikovskaja, V., & Aschemann-Witzel, J. (2017). Food waste avoidance actions in food retailing: The case of Denmark. *Journal of International Food & Agribusiness Marketing, 29*(4), 328-345.

Lebersorger, S., & Schneider, F. (2014). Food loss rates at the food retail, influencing factors and reasons as a basis for waste prevention measures. *Waste Management, 34*(11), 1911–1919. https://doi.org/10.1016/j.wasman.2014.06.013

Mirosa, M., Mainvil, L., Horne, H. and Mangan-Walker, E. (2016). The social value of rescuing food, nourishing communities. *British Food Journal, 118*(12), 3044-3058. https://doi.org/10.1108/BFJ-04-2016-0149

Parfitt, J., Barthel, M., & Macnaughton, S. (2010). Food waste within food supply chains: quantification and potential for change to 2050. *Philosophical Transactions of the Royal Society B: Biological Sciences, 365*(1554), 3065-3081. https://doi.org/10.1098/rstb.2010.0126

Peira, G., Bollani, L., Giachino, C., & Bonadonna, A. (2018). The Management of unsold food in outdoor market areas: Food operators' behaviour and attitudes. *Sustainability (Switzerland), 10*(4), 1–16. https://doi.org/10.3390/su10041180

Priefer, C., Jörissen, J., & Bräutigam, K.-R. (2016). Food waste prevention in Europe – A cause-driven approach to identify the most relevant leverage points for action. *Resources, Conservation and Recycling, 109*, 155–165. https://doi.org/10.1016/j.resconrec.2016.03.004

Rombach, M., Bitsch, V., Kang, E. and Ricchieri, F. (2018). Comparing German and Italian food banks: Actors' knowledge on food insecurity and their perception of the interaction with food bank users. *British Food Journal, 120*(10), 2425-2438. https://doi.org/10.1108/BFJ-11-2017-0626

Russell, S. V., Young, C. W., Unsworth, K. L., & Robinson, C. (2017). Bringing habits and emotions into food waste behaviour. *Resources, Conservation and Recycling, 125*(May), 107–114. https://doi.org/10.1016/j.resconrec.2017.06.007

Schanes, K., Dobernig, K., & Gözet, B. (2018). Food waste matters - A systematic review of household food waste practices and their policy implications. *Journal of Cleaner Production, 182*, 978–991. https://doi.org/10.1016/j.jclepro.2018.02.030

Shashi, Singh, R., Centobelli, P., & Cerchione, R. (2018). Evaluating partnerships in sustainability-oriented food supply chain: A five-stage performance measurement model. *Energies, 11*(12), 3473. https://doi.org/10.3390/en11123473

Teller, C., Holweg, C., Reiner, G., & Kotzab, H. (2018). Retail store operations and food waste. *Journal of Cleaner Production, 185,* 981–997. https://doi.org/10.1016/j.jclepro.2018.02.280

Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management, 14*(3), 207–222. https://doi.org/10.1111/1467-8551.00375

Vilariño, M. V., Franco, C., & Quarrington, C. (2017). Food loss and waste reduction as an integral part of a circular economy. *Frontiers in Environmental Science, 5*, 21.