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FOOD WASTE MANAGEMENT IN MOLDOVAN SUPERMARKETS:
CURRENT PRACTICES AND SUGGESTIONS FOR IMPROVEMENT

Bachelor thesis

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This paper conforms to the requirements for a Bachelor thesis

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I have written this Bachelor thesis independently. Any ideas or data taken from other authors
or other sources have been fully referenced.

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Introduction

*“Cutting food waste is a delicious way of saving money,
helping to feed the world and protect the planet.”
(Tristram Stuart)*

Considering the fast world population growth, forecasting an increase of 2.2 billion people by 2050 and not only (Roser, Ritchie & Ortiz-Ospina, 2019), food loss and waste has become a problem of global concern (FAO., 2011). Searchinger, Waite, Hanson and Ranganathan (2018) and Godfray et al. (2010) identified reducing food loss and waste as the top factor out of the 22 solutions that would help to sustainably feed the expected 10 billion people.

According to the Food and Agriculture Organization of the United Nations (FAO, 2014) report, around 1.3 billion tons of food is wasted each year, which is equivalent to more than a quarter of the overall food production meant for the human consumption and it is expected to rise to 3.40 billion tons by 2050 (Kaza, Yao, Bhada-Tata & Van Woerden, 2018). Kosseva & Webb (2013) mention that all countries, disregard of their economic situation, suffer the consequences coming out of massive food waste. Only in the European Union, 90 million tons of food is wasted every year and it is foreseen to increase by 20% in the next 10 years, whereas it could feed instead 20 million people (Vittuari et al., 2015).

While food waste occurs along the entire food chain, the actors and stakeholders involved in the process are challenged to undertake feasible actions that would reduce the detrimental environmental and economic impacts on society. The retail supply stage is particularly a key factor of food waste generator (British Retail Consortium, 2015) and the retailers are pressured to addressing the issue. Multiple studies have been conducted on Swedish (Eriksson & Spangberg, 2017), Finish (Syroegina, 2016), British (Mena, Adenso-Diaz & Yurt, 2011; Filimonau & Gherbin, 2017), Danish (Kulikovskaja & Aschemann-Witzel, 2017), Spanish (Mena, Adenso-Diaz & Yurt, 2011), New Zealand (Goodman-Smith, Miroso

& Skeaff, 2020) supermarkets and other developed countries, to identify the common supermarket management practices in avoiding, reducing and treating the food waste.

According to the Minister of Agriculture of Republic of Moldova, at this point, there is no compiled statistics about the total amount of wasted food on a national level let alone on the retail level, but as from 2020, new laws and initiatives affecting the food waste generated by the economical agents will enter into force (Economic Council, 2019). Therefore, as Republic of Moldova is toiling towards its integration goal of becoming part of the EU community, the national environmental sustainability situation represents a hot topic that is projected to undergo significant changes. Consequently, all the food industry players are going to be greatly affected and in order to comply with the prospective regulations and to stay relevant on the market, they will have to either adopt new food waste management activities or improve the existent system.

The present paper aims to identify the current practices of food waste management among the Moldovan supermarkets, in order to give suggestions for their improvement.

Research tasks the author set for this paper are:

- To explain the concept of food waste and management options for supermarkets,
- To bring out the main results of previous empirical studies about food waste management in supermarkets,
- To conduct interviews with Moldovan supermarket management representatives in order to identify the in-store food waste management practices,
- To offer suggestions for food waste mitigation practices in Moldovan supermarkets.

The theoretical section of this paper consists of two subchapters. Subchapter 1.1 will familiarize the reader with the relevant definitions to the topic, brief its emergency status across the globe and overlook the supermarket food waste management options. Subchapter 1.2

consists of analysing previous empirical literature related to food waste management practice in supermarkets.

The empirical part of the paper focuses on analysing the outcomes of the interviews. This part consists of two subchapters. Subchapter 2.1 is going to include the methodology used while conducting the interviews and a short background of the interviewees, whilst subchapter 2.2 is conducting an analysis based on the collected data about the current food waste management practices in the Moldovan supermarkets.

Keywords: food waste, management practices, supermarket, Moldova, retail.

1. Theoretical framework of food waste management

1.1 Definition of food waste and supermarket management options

In the past five to ten years, the topic of food waste becomes an issue of global concern and has been gaining importance among all the actors involved in the food supply chain (FAO, 2014; FAO, 2019). Households and businesses started to look up for solutions that would help reduce the amount of wasted food. The problem itself has been around since the beginning of civilization, but the modern approach is different towards it (Nunley, 2013). Therefore, the definition of "food waste" took diverse forms and meanings, being used under different terms by various stakeholders of the food system (see Table 1).

Table 1

Food waste definitions

Author(s)	Year	Definition
FAO	1981	“Wholesome edible material intended for human consumption, arising at any point in the food supply chain that is instead discarded, lost, degraded or consumed by pests.” (p. 44)
Parfitt, Barthel & Macnaughton	2010	“The decrease in edible food mass occurring at the end of the food chain (retail and final consumption), which relates to retailers’ and consumers’ behavior.” (p. 3066)
Ostergren et al.	2014	“Food waste is any food, and inedible parts of food, removed from the food supply chain to be recovered or disposed of (including composted, crops ploughed in/not harvested, anaerobic digestion, bio-energy production, co-generation, incineration, disposal to sewer, landfill or discarded at sea).” (p. 6)
FAO	2014	“An important part of food loss, which refers to the removal from the supply chain of food which is fit for consumption, by choice, or which has been left to spoil or expire as a result of negligence by the actor – predominantly, but not exclusively the final consumer at household level.” (p. 4)
FAO	2019	“Decrease in the quantity or quality of food resulting from decisions and actions by retailers, food service providers and consumers.” (p. 2)

Source: compiled by author

In the definition given by FAO (1981) the concept of food waste is broad and includes everything that is meant for human consumption throughout all the levels of the supply chain but did not reach its final destination – the consumer. The degree of the definition generalization is a proof that by the end of 19th century this everyday life phenomenon is overlooked and neglected by sociology and not classified as a hot issue which is worth extensive research and particular attention (Evans, Campbell & Murcott, 2013).

Thirty years later, Parfitt, Barthel and Macnaughton (2010) narrow down the definition, emphasizing on the retail and final consumption, attributing this environmental problem to retailers' inaction and consumers' behaviour. This shift in the definition is explained by the fast-spreading of supermarkets and grocery retailers at the beginning of 20th century, therefore the amount of wasted food at the end of the food chain outweighing the food waste generated in the production line. During this time, there has been an increased attention towards food waste and Almas and Campbell (2012) reason it with the global food crisis of 2008. The sudden increase of food prices since the price inflation crisis from 1970 served as an awakening signal towards the importance of the matter (Almas & Campbell, 2012).

Another definition is provided by Ostergren et al. (2014), which is a project under the EU Framework Horizon 2020 wing and adds to the aforementioned definitions the concept of “inedible parts” and even the sustainable treated food waste such as the composed food or the one used in the bio-energy production. Therefore, no matter the ways the inedible food is re-used, it is still considered food waste. Ostergren et al. (2014) makes no differentiation between food industry stakeholders, and it refers to the entire chain compared to Parfitt, Barthel and Macnaughton (2010). The difference between Ostergren et al. (2014) and FAO (1981) definitions stands in the more detailed information and inclusion of modern concepts such as “anaerobic digestion” and “bio-energy production”.

Meanwhile, FAO (2014) publicly stated that in order to facilitate the process of policy and strategy creation meant to cope with this global issue, a common definition of food waste should be agreed upon. Therefore, FAO points out another widely-used synonym of “food waste” which is “food loss”, and tries to create a clear distinction between the two terms, defining food loss as “The decrease in quantity or quality of food” (FAO, 2014, p. 3), therefore, including the food waste as a key component of the food loss. The similarity between “food waste” and “food loss” can create confusion among the food supply chain actors and those people who are addressing the problem, but given the fact that “Food waste is not sharply defined” (FAO, 2014, p. 4) and that the retailers’ activities are related to the food in the post-production stage, the author of this paper will refer to “food waste” and “food loss” as just “food waste”.

The latest definition given by FAO (2019) is more compressed compared to the one from 1981 and stresses out three main players regarding food waste generation: retailers, providers and consumers, therefore we notice a more economical approach towards the concept. Consequently, it sums up the decisions taken by these players that result in food waste generation. This definition is relatable to the one given by Parfitt (2010) because both point out as key factors the retailers’ and the consumers’ behaviour, but the difference is that FAO (2019) embraces all the stages of the food supply chain including the suppliers.

Notwithstanding the actuality of the problem, at the EU level, there is no stratified data about the food waste created throughout the different stages of production, distribution and consumption because of the different interpretation of food waste concept (Garrone, Melacini & Perego, 2014) and varied recording methodologies of the generated food waste (Vittuari, et al., 2015). Nonetheless, it remains a problem of high tension which has a devastating impact on the entire world (Parfitt, Barthel & Macnaughton, 2010; Gustavsson et al., 2011; Eriksson, 2015; Cicatiello & Franco, 2020).

The food waste problem is affecting different life aspects which have consequences for governments and civil society (see Figure 1).

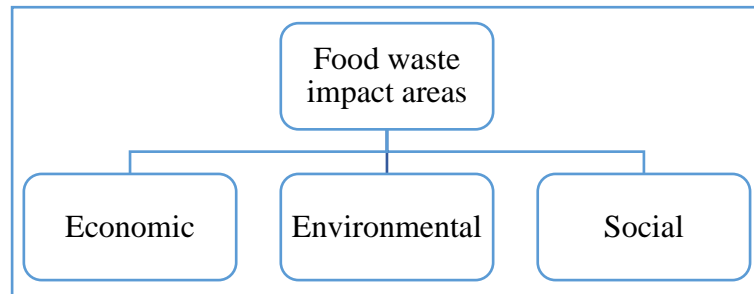


Figure 1. Food waste impact areas

Source: compiled by the author

The major impacted areas are environmental (Nellemann, 2009; Hogg, Barth, Schleiss & Favoino, 2007), economic (Quested, Ingle & Parry, 2013) and social (Henderson, 2003). Food waste aggravates the global warming provoked by the excessive carbon dioxide and methane eliminated from the decomposing food (Hall, Guo, Dore & Chow, 2009; Eriksson & Spangberg, 2017). As the term itself includes the word “waste”, it implies financial waste on a global level as well. According to FAO (2013), the cost of the wasted food in 2007 went up to \$750 billion, converting to today’s money and not taking into consideration the increased amount during the time, it reaches \$930 billion. Moreover, food waste raises social inequalities problems concerning the limited access to food in underdeveloped countries or regions and the tendency of overbuying and recklessly wasting food in the developed countries where the overall economy and purchase power is higher (Wrigley, 2002).

Given the current problem, the actors of the food supply chain should sustain actions and changes for improvement, leading us to the second most important notion of this paper – food waste management.

According to Narvanen, Mesiranta, Mattila & Heikkinen (2019, p.7) food waste management is perceived as “a multilevel, multi-actor effort to prevent and reduce food waste through various solutions. Managing supply and demand for food at all levels and, finally,

managing what happens after food becomes inedible to humans." The National Environment Agency of Singapore (2019, p.1) identifies the main components of "food waste management" as follows:

- Prevent and reduce food wastage,
- Redistribute unsold or excess food,
- Recycle/treat food waste.

Therefore, the term "management" applies to all the levels of the food supply chain and its scope, is to find environmentally friendly solutions that would help prevent, reduce and recycle the food waste.

In this paper, the author is going to explore food waste management practices in Moldovan supermarkets with a focus on preventing the waste of the perishable products at the in-store stage. According to FAO (2011), out of the total amount of food waste generated in the food supply chain, supermarkets and grocery stores contribute with a relatively small share of waste in comparison with other key players (e.g. farmers, food factories, restaurants etc.). Despite that, retailers are the link between food producers and consumers, therefore, they can positively impact the entire food supply chain efficiency. There is a constant battle between supermarkets to stay relevant to the market and prove their corporate social responsibility to their clients and on the other hand, there is a rising concern towards the food waste which can serve as a cost-saving tool and marketing strategy simultaneously.

Several factors such as technical, spatial and economic explain that food waste generated by retailers cannot be diminished in its entirety. Technical factors refer to the perishable nature on some of the foods, spatial factors stand for the actual time which takes to commercialize the products, and economic factors influence the ability of the supermarkets to prevent/avoid the wasted food. Eventually, the products which might put the people's health at

risk are discarded and food waste is generated. (Buzby, Bentley, Padera, Ammon & Campuzano, 2015)

According to Ostergren et al. (2014), there are four major food waste generator stages in the grocery retail chain: pre-store waste; recorded in-store waste; unrecorded in-store waste; and after-store waste. As for this paper, the author refers to recorded and unrecorded in-store waste as in-store waste (see Figure 2).

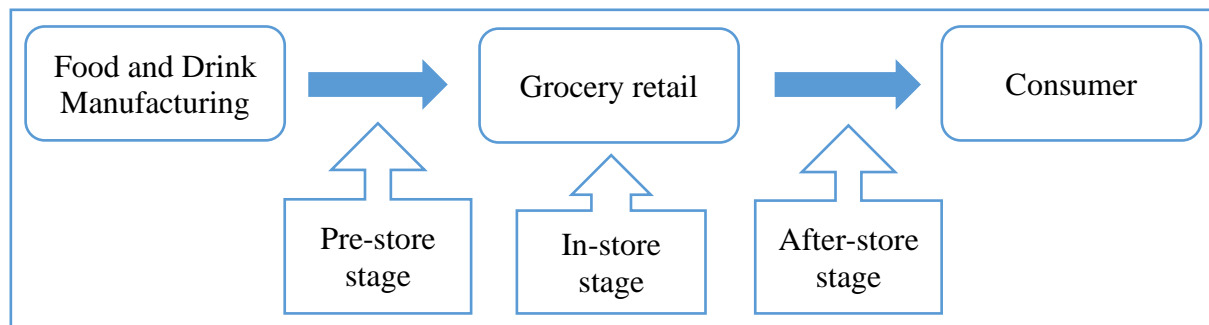


Figure 2. Food waste stages at grocery retail

Source: compiled by the author based on Ostergren et al. (2014)

The pre-store waste happens when the products do not pass the quality test of the retailers or when the food fails to reach the retailers during delivery. This type of waste should be coordinated with the suppliers as it requires a joint effort to reducing the generated amount. Even though it occurs before reaching the grocery retailers, this waste is allocated to supermarkets operations most of the time. (Eriksson, 2015) The in-store waste includes all the discarded food within the walls of the supermarket, some being avoidable and others - unavoidable (Eriksson, Strid & Hansson, 2012). Amongst common in-store food waste management practices, consumer education plays an important role. At this stage, retailers can communicate the importance of reducing the amount of food waste, educate them into embracing responsible food consumption and inform of their role in minimizing the tossed food products (HLPE, 2014). Lastly, the after-store stage consists of food that is no longer good for consumption and goes either to landfill or incineration if it does not reach the consumer first when the food is still good for use (Mena, Adenso-Diaz & Yurt, 2011;

Goodman-Smith, Miroso & Skeaff, 2020; Brancoli, Roustastge & Bolton, 2017). Food waste generation is unavoidable across the entire supply chain as can be seen above, ut the author of this paper denotes that at specific stages, some stakeholders have a bigger food waste mitigation power than others. For the pre-store stage, the suppliers are the main catalysts, at the in-store level – the retailers are the ones who could undertake food waste reduction actions, as for the after-store stage – the consumer is the largest food waste generator according to Parfitt, Barthel and Macnaughton (2010), which means that they have the capacity to tackle the problem at this specific level.

1.2 Empirical literature overview of food waste management in supermarkets

By using three well-known scientific databases (ScienceDirect, EBSCO Discovery and ResearchGate), the author of this paper found studies focused on identifying food waste management practices in supermarkets conducted in several countries across the world. The used keywords were: “food waste”, “supermarket”, “food waste management”, “retail” and “food waste practices”. An adequate number of available relatable studies were found (7,007 results) just by searching the keywords “supermarket food waste” on EBSCO Discovery. The results were narrowed down to research articles and the year starting from 2008 because it is the first year when the topic of this specific research reaches 200 written papers, while only in 2019 there were written over 760 research articles about food waste in supermarkets. This is an indicator that in the last ten years there was an increasing interest in the food waste studies and food waste management at the retail level, both, from environmental and financial cost-saving reasons. Besides, out of the pool of supermarket food waste empirical studies, the ones focusing on identifying management practices were selected for further investigations. As expected, such studies were not conducted in the Republic of Moldova but rather in developed countries with easier access to data and information. The author of this paper is going to point out the most relevant findings of the chosen empirical studies (see Table 2). These studies are

closely related to the current paper's aim and stand as a ground floor for identifying the practices in different countries for further comparison to the ones in the Republic of Moldova.

Table 2

Overview of previous empirical literature

Author, year	Country	Aim of the research	Methods used
Mena, Adenso-Diaz & Yurt, 2011	UK & ES	"To identify the root causes of food waste arising in the supplier/retailer interface and highlight some potential good practices in terms of waste prevention and management." (p. 650)	43 semi-structured interviews for data collection. Desktop research and observations for companies' data.
Syroegina, 2016	FI	"To identify concrete practices that retailers could adopt in order to reduce waste and explore how many of the identified practices Finnish retailers have implemented." (p. i)	Qualitative research. Two structured interviews.
Eriksson & Spangberg, 2017	SE	"to compare the outcome, with regard to greenhouse gas emissions and primary energy use, of different food waste management scenarios available to supermarkets in Växjö in Sweden." (p.787)	Life cycle assessment to calculate the environmental impact of four food waste management scenarios. Food waste simulation of the different food waste management.
Filimonau & Gherbin, 2017	UK	"Exploring the managerial attitudes and approaches to food waste minimization in the UK sector of grocery retail." (p.7)	Qualitative research paradigm, 12 in-depth semi-structured interviews with grocery retail managers.
Kulikovskaja & Aschmann-Witzel, 2017	DK	"to identify which food waste avoidance actions are conducted by retailers in Denmark, to which extent, and how they vary across food categories and supermarket chain" (p.328)	Observations at retail stores and short unobtrusive interviews, focusing on a predefined set of potential actions.
Colombo de Maraes et al., 2020	-	"to identify and relate the causes of waste and practices to reduce and/or prevent it in the retail sector" (p.3)	A systematic literature review with a content analysis.
Goodman-Smith, Miroso & Skeaff, 2020	NZ	"to obtain both quantitative and qualitative data for retail food waste in New Zealand" (p.2)	A qualitative interview outline with key retail staff in stores, consisting of 12 semi-structured interview questions; onsite food waste audits undertaken in stores.

Source: compiled by author

Mena, Adenso-Diaz and Yurt (2011) compare the food waste management practices in the British and Spanish food retail industry. The authors conducted 24 interviews in the UK and 19 in Spain. The target group is formed out the middle to senior managers with knowledge or expertise in food waste management. This paper is particularly useful because it covers two different managerial approaches towards food waste at the retail level and also brings out the similarities and differences between the British and Spanish practices. When it comes to food donations, the practice is more common in Spain than in the UK because British companies are more reluctant towards food charity as the risk to bear legal accusations for unintended food poisoning is much higher than in Spain (Mena, Adenso-Diaz & Yurt, 2011). British managers tend to be more innovative and open towards technology use in order to prevent or minimize food waste (product forecasting software, automatic orders using adjusted re-order point systems, central ordering system etc.), while Spanish managers are more conservative regarding this matter (Mena, Adenso-Diaz & Yurt, 2011). The economic status of the countries could also explain why the UK is better equipped in dealing with supermarket food waste.

Syroegina (2016) paper is an extensive case study of Finish retailers and it assesses the managers' efforts and commitment towards adopting food waste reduction practices. The author compares two different groups of Finish retailers with the help of structured interviews as a basis for data collection with a pre-set hypothesis based on previous empirical studies. The analysed retail groups emphasized the importance of a good communication channel of the supermarket with the suppliers, this representing a great trigger for food waste generation. Some in-store management practices which were adopted by both groups were (Syroegina, 2016):

- Development of shorter supply chains,
- Improvements of demand forecasting,
- Improvements of packaging,

- Discounts for products nearing expiration dates, etc.

The improvement of packaging refers to offering the customers the amount of food based on their demand, as a tool to reduce the in-store food waste (Syroegina, 2016).

Eriksson and Spangberg (2017) have a different approach to the topic compared to the others given that the objective of their work was to determine which of the identified food waste practices emit the highest amount of carbon dioxide and harm the most the environment and society. The identified four food waste management actions practised by Swedish retailers are incineration, digestion, conversion, and donation. Eriksson and Spangberg (2017) stressed out the importance of using the right waste management options in the waste hierarchy, giving noteworthy benefits to environment and society. Conversion and donation of the food were identified as in-store stage practices by the author of the present paper and integrated for further analysis. (Eriksson & Spangberg, 2017) Food conversion refers to products processing before the expiration date and it is common for rather big supermarkets that cook food on the spot. This tactic is a good way to generate income by using resources that risk creating a loss.

Filimonau and Gherbin (2017) research are similar to the one conducted by Mena, Adenso-Diaz and Yurt (2011) in the sense of exploring the management practices in the UK grocery retail sector. The value-added of this paper consists in identifying the managerial attitudes and challenges to food waste mitigation along with their approaches. A new practice identified by this study is the food donation to the supermarket staff. According to the authors, the managers are reluctant to practising it because it can demotivate the staff in putting efforts to sell those products. The research points out that the customers' lack of awareness regarding the importance of food waste reduction, the stringent corporate policies and weak control over suppliers present a barrier in minimizing food waste. The food treatment practices such as recycling or food waste dumping are largely used and given preference over food donation. This situation happens because there are no national policies or services that would facilitate

the food donations. (Filimonau & Gherbin, 2017) Despite that, British Retail Consortium (2015) states that even though the UK government does not impose the economic actors to undertake specific measures to reduce the food waste, the social awareness of the British supermarkets is very high, and they do it voluntarily.

The research conducted on Danish supermarkets by Kulikovskaja and Aschemann-Witzel (2017) resulted in 22 retail-related practices meant to reduce and prevent food waste. These practices occurred from analysis of primary and secondary data obtained from supermarket leaders such as Lidl, Aldi, and Coop. Besides the common actions initiated by the British, Spanish, Finish and Swedish retailers identified in the previous studies, this one brings two new food waste management practices: multi-item package and a designated area for suboptimal food items of mixed product categories. The multi-item package is either sold at a very low fixed-price, or on weight-based and it is used by most Danish retailers. (Kulikovskaja & Aschemann-Witzel, 2017) The product placement plays an important role when making efforts to reduce the food waste, therefore, the Danish managers emphasize it by designating an area of suboptimal products that have a promotional price and are visible and easily accessible by the customers.

Colombo de Maraes, Henrique de Oliveira Costa, Pereira, Lago da Silva and Delai (2020) paper is a synthesis of food waste generation causes and current practices of reduction from the existing literature. Unlike other studies, their work is not country-based but rather a melting pot of food waste management practices that were identified in various articles from 2008 to 2017 (Colombo de Maraes, Henrique de Oliveira Costa, Pereira, Lago da Silva & Delai, 2020). The advantage of including this type of theoretical study only in the current paper is validating some of the management practices and identifying new ones that were not spotted in other works.

Goodman-Smith, Miroso and Skeaff (2020) conducted the first study of its kind in New Zealand at a retail level. Unlike the previously mentioned studies, this one focused on quantifying the generated food waste and identifying the motivators and barriers to food waste reduction. The study concluded that maximising the profits stay as a top motivator for much retail staff and that the most common barrier was the lack of staff training concerning the matter. Additionally, four food waste practices investigated aim to quantify the food waste, but out of them, only two could be classified as in-store stage practices: in-store logistics and food donation to third parties, and used for further discussion in this paper. (Goodman-Smith, Miroso and Skeaff, 2020) Although the two practices mean to quantify wasted food, they also have good applicability for food waste mitigation.

Concluding the previously stated efforts (empirical studies) as a base for a pre-defined hypothesis concerning the food waste management practices, one study represents a synthesis of related literature, and the rest six provide complementary data for this paper's aim. The main difference between those six empirical studies lay in the country of research.

A study carried on six Swedish retail stores found out that the largest quantity of food waste is generated at the pre-store and in-store stage (Eriksson, Strid & Hansson, 2012). The current paper is focusing on in-store food waste stage because the pre-store stage is heartily affected by suppliers (Mena, Adenso-Diaz & Yurt, 2011; Kulikovskaja & Aschemann-Witzel, 2017) while the supermarket managers and staff have a more prominent decision-making power to reduce the in-store food waste (Colombo de Maraes, Henrique de Oliveira Costa, Pereira, Lago da Silva & Delai, 2020).

Based on the literature overview and previous empirical studies, the author of this paper identifies 16 in-store food waste practices undertaken by supermarket management (see Table 3).

Table 3

In-store food waste practices identified in empirical studies

Nr.	In-store food waste practices	Author
1.	Demand forecasting	Syroegina, 2016; Colombo de Maraes et al., 2020
2.	Optimal storage conditions	Mena, Adenso-Diaz & Yurt, 2011; Colombo de Maraes et al., 2020
3.	Inventory policy	Mena, Adenso-Diaz & Yurt, 2011; Colombo de Maraes et al., 2020
4.	Employee training for waste reduction/prevention	Mena, Adenso-Diaz & Yurt, 2011; Syroegina, 2016; Colombo de Maraes et al., 2020
5.	Pricing strategy	Kulikovskaja & Aschemann-Witzel, 2017; Filimonau & Gherbin, 2017; Eriksson & Spangberg, 2017; Mena, Adenso-Diaz & Yurt, 2011; Syroegina, 2016; Colombo de Maraes et al., 2020
6.	Food waste tracking	Kulikovskaja & Aschemann-Witzel, 2017; Filimonau & Gherbin, 2017; Mena, Adenso-Diaz & Yurt, 2011; Syroegina, 2016; Colombo de Maraes et al., 2020
7.	Product placement	Kulikovskaja & Aschemann-Witzel, 2017; Mena, Adenso-Diaz & Yurt, 2011; Filimonau & Gherbin, 2017
8.	Food processing	Eriksson & Spangberg, 2017; Filimonau & Gherbin, 2017; Kulikovskaja & Aschemann-Witzel, 2017
9.	Collaboration with suppliers	Kulikovskaja & Aschemann-Witzel, 2017; Mena, Adenso-Diaz & Yurt, 2011; Colombo de Maraes et al., 2020
10.	Customer awareness	Kulikovskaja & Aschemann-Witzel, 2017; Syroegina, 2016
11.	Designated area for suboptimal food items	Kulikovskaja & Aschemann-Witzel, 2017
12.	Technology usage	Mena, Adenso-Diaz & Yurt, 2011; Kulikovskaja & Aschemann-Witzel, 2017; Colombo de Maraes et al., 2020
13.	Packaging	Mena, Adenso-Diaz & Yurt, 2011; Kulikovskaja & Aschemann-Witzel, 2017; Colombo de Maraes et al., 2020
14.	Multi-item package	Kulikovskaja & Aschemann-Witzel, 2017
15.	Food donation/Charity to third parties	Mena, Adenso-Diaz & Yurt, 2011; Filimonau & Gherbin, 2017; Eriksson & Spangberg, 2017; Kulikovskaja & Aschemann-Witzel, 2017; Colombo de Maraes et al., 2020; Goodman-Smith, Miroso & Skeaff, 2020
16.	Food donation to staff	Filimonau & Gherbin, 2017

Source: compiled by the author

Some of the listed practices share common characteristics and they are grouped for further analysis under four main categories: Logistics, Promotion, Processing and Communication (see Figure 3).

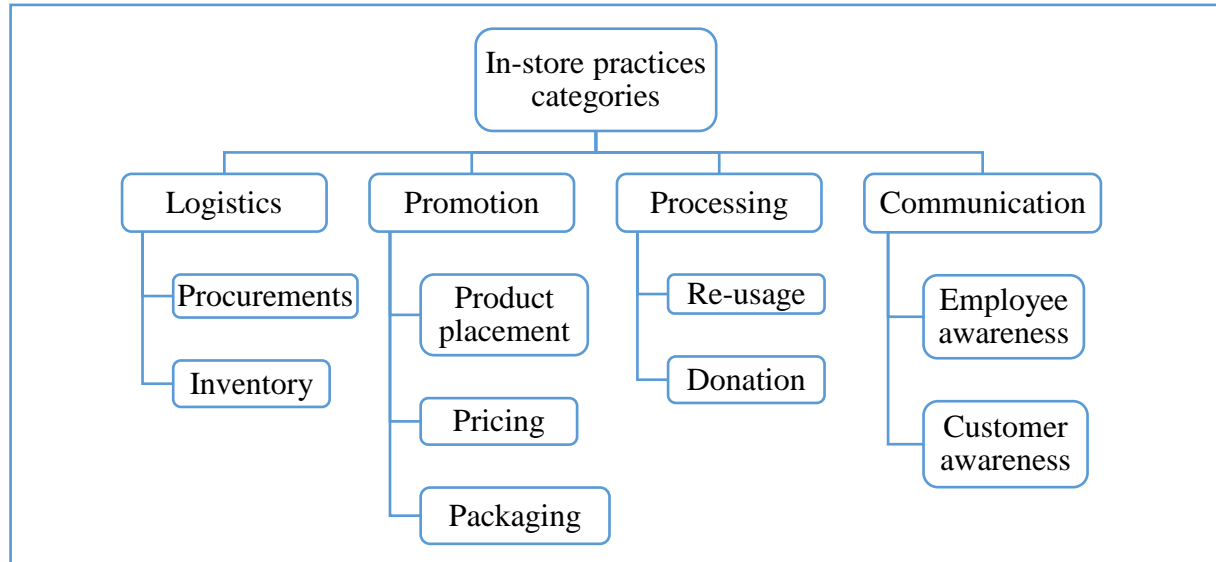


Figure 3. In-store food waste management practices categories illustration

Source: compiled by the author

Practices that are related to initial product selection and working with suppliers (Practice nr. 1 and 9) fall under Logistics' first sub-category Procurements. Demand forecasting and collaboration with suppliers are core activities on minimizing the in-store food waste (Syroegina, 2016). The second sub-category is Inventory, and it compiles all the practices linked with food waste tracking and storing (Practice nr. 2, 3, 6 and 12). Optimal storage conditions, as explained by Colombo de Maraes et al. (2020), refers to respecting the indicated storage conditions in such a way, so the consumption period shortened by external climatic factors. The next category is Promotion, which plays a crucial role in the in-store food waste minimization and commercialization of the excess products (Mena, Adenso-Diaz & Yurt, 2011; Kulikovskaja & Aschemann-Witzel, 2017). This category is split into three sub-categories: Product placement (Practice nr. 7 and 11), Pricing (Practice nr. 5) and Packaging (Practice nr. 13 and 14). By scaling these three sub-categories based on their popularity of use, the first one is Pricing, followed by Placement and ending with Packaging (Mena, Adenso-

Diaz & Yurt, 2011; Kulikovskaja & Aschemann-Witzel, 2017; Colombo de Maraes et al., 2020). The next category is placing itself in a grey area as Processing is at the border between in-store practices and after-store practices. Processing activities were split between food Re-usage (Practice 8) and Donation (Practice 15 and 16). Food re-usage is mainly common for supermarkets that have on-spot food production and offer catering to its customers. Therefore, those products with short lifespan are the first to be used to produce new food. This approach not only reduces the expenses created by food waste, moreover, creates additional profit. The last category is Communication and consists of two sub-categories: Employee awareness (Practice 4) and Customer awareness (Practice 10). Employees and customers represent the human factor that can be influenced by supermarket management through employee training and in-store food-management campaigns concerning the scale, as well as the environmental and practical implications of the problem (Syroegina, 2016; FAO, 2013; Parfitt, Barthel & Macnaughton, 2010). This category targets the morality and conscience of the people directly involved in the retail food waste problem.

Hence, there are different domains of practices that a supermarket can improve in order to decrease in-store food waste. In the next chapter, the author identifies the practices undertaken by Moldovan supermarket managers, which are meant to tackle the food waste generation issue.

2. Food waste management practices in Moldovan supermarkets

2.1 Research process and sample

The most current data concerning the food waste management in the Republic of Moldova is from 2008 under the Food Waste Management Strategy 2013-2027, which states that the biggest share of enterprise food waste generation is attributed to food industry companies – 1570 thousand tonnes out of 2841,7. The strategy aims to create an integrated and durable food waste management system from an economic, environmental and social point of view. (The Republic of Moldova Government, 2013) Given the strategy, there is a clear need for studies and researches to tackle this topic, but the actuality of quantified food waste data, lack of information regarding classified food waste generation sources and food waste mitigation practices, show that this need is not fulfilled.

The current research is going to identify the food waste management practices in Moldovan supermarkets. Five out of seven similar empirical studies conducted in other countries used the qualitative research paradigm to achieve their aims. Kalra, Pathak and Jena (2013) advocate that qualitative methods offer more objective interpretation of results by using a small sample size. The primary data collected via interviews gives you more insights into the matter and helps the author on finding a certain pattern in practices (Filimonau & Gherbin, 2017). Moreover, interviews are a relatively cheap and convenient data-gathering method, being more practical to organize than focus groups (Filimonau & Gherbin, 2017; Silverman, 2013). Furthermore, the author of this paper is going to apply the same data gathering method by conducting semi-structured and unobtrusive interviews with Moldovan decision-making personnel or food waste knowledgeable staff of supermarkets with the help of preidentified in-store practices. The downfall of this qualitative research tool consists of limited representativeness of its outcome and by being very particular and specific, which means that the information received cannot be used for generalization. However, when the key study

informants are difficult to reach, such as supermarket managers, the interview is an appropriate research tool (Silverman, 2013).

To gather the necessary data for identifying the present research, the author conducted semi-structured interviews with questions developed on findings from the previous empirical studies (Appendix) designed to cover five major areas: general knowledge about food waste, logistics, promotion, processing and communication food waste practices. The target group of this research is Moldovan supermarket staff with knowledge and experience in food waste mitigation and handling. Recruitment of interviewees took place online and offline, and it was purposively based. The selection criteria were the following: managerial position within a grocery retail outlet (supermarket, grocery store), at least two years of experience in the grocery retail industry, located in Straseni county. The latter criterion is due to financial restrictions of the research and difficulty to reach the target group. There were conducted five interviews in total with the staff of four different supermarkets, more detailed information about the sample can be found in Table 4. Supermarket A is a regional retail chain with eight supermarkets in the neighbouring villages while Supermarket B is a medium-sized state supermarket in Straseni city. Supermarket C and D are sole proprietorship owned supermarkets and they are dispersed in Straseni city.

Table 4

Description of the sample

Interview	Gender	Position	Experience (years)
1	Female	Supermarket A manager	7
2	Female	Supermarket B compliance manager	14
3	Male	Supermarket A owner	24
4	Female	Supermarket C manager	23
5	Female	Supermarket D owner	5

Source: compiled by the author

The author reached to six people for the interview but the latest person, which was the manager of a national supermarket chain, did not want to collaborate. The five retail personnel

(store manager, owner, compliance manager) agreed to take part in the research and the interview questions were answered in their entirety. Recruitment of willing participants was challenging, given the sudden economic crisis provoked by COVID-19 and intensive grocery retail work during the period of the study research. Initially, the author opted to have a gender-balanced pool of interviews, but given the circumstances, he dropped the idea. Financial incentives were not offered for participation.

The questions based on specific food waste category practices used for the interviews are deducted from the analysed studies described in the previous chapter, by Mena, Adenso-Diaz and Yurt (2011), Kulikovskaja and Aschemann-Witzel (2017), Colombo de Maraes et al. (2020) and other aforementioned empirical studies.

Each interview started with a short introduction to the food waste topic. The first part of the interview included questions about the overall management opinion regarding the food waste generation and if it represents a problem to the supermarket. This part is further analysed as *Theme 1*. The main part of the interview was split between the four categories for research: Logistics, Procurements, Promotion and Communication. For each part, the author identified patents and repetitive keywords for a content analysis that would lead to identifying food waste management practices. These would be further compared to the current paper's secondary data, subsequently completed with any additional information emerged during interviews. This part will be referred to as *Theme 2*. Besides checking for implementation of the practices found in the literature review, it will also identify novel supermarket management activities which are undertaken by the Moldovan supermarket management. The closing part of the interview was a checking point of any missing or novel food waste management that were addressed in the interview. During the interview, the interviewer could ask additional questions or miss some on purpose, because the respondent either answered to them in a different context or the question was not relevant anymore.

All five interviews (see Table 5) were conducted in person, audio-recorded and transcribed verbatim into Microsoft Word. During transcription, personal identity and store identity were removed for personal data safety reasons.

Table 5

Research process description

Interview	Interview date	Interview format and place	Interview length
1	09.04.2020	In person, in office	23 minutes
2	14.05.2020	In person, in office	26 minutes
3	16.05.2020	In person, outside office	28 minutes
4	16.05.2020	In person, in office	25 minutes
5	22.04.2020	In person, outside office	18 minutes

Source: compiled by the author

The interviews lasted between 18-28 minutes. The total fieldwork concluded with 2 hours of audio data and 36 pages of transcripts.

2.2 Current practices of food waste management in Moldovan supermarkets and suggestions for improvement

The interview kick-starter questions address the general food waste awareness to assess how important this topic is in the eyes of the Moldovan supermarket managers. In order to undertake measures for food waste reduction, first, the managers should identify it as a need that requires actions from their sides. Table 6 compiles the answers of all respondents regarding their viewpoints towards food waste problem.

Table 6

Theme 1, Keywords about respondents' attitudes towards food waste problem

Interview	Food waste problem attitudes
1	Economic burden; Social issue; Food waste should be avoided; The supermarket is a small food waste generator in the industry; Sufficient measures are undertaken.
2	Economic burden; Environmental issue; Social issue; Food waste should be avoided; The supermarket is a significant food waste generator in the industry; Sufficient measures are undertaken.
3	Economic burden; Environmental issue; Social issues; Food waste should be avoided; The supermarket is a small food waste generator in the industry, Untapped food waste solutions.

- | | |
|---|---|
| 4 | Economic burden; Environmental issue; Social issue; Food waste should be avoided; The supermarket is a big food waste generator in the industry; Untapped food waste solutions. |
| 5 | Economic burden; Environmental issue; Food waste should be avoided; The supermarket is a big food waste generator in the industry; Untapped food waste solutions. |

Source: compiled by the author based on interview results

The respondents' answers structure followed the food waste impact areas presented in the theoretical part of the thesis (Figure 1), the relevance of the supermarket regarding this problem and wherever they are taking all the possible measures. The author deduces that all of them see food waste as a problem worth talking about, especially from a financial point of view. Four out of five respondents asserted the environmental damages developed by food waste and three out of five mentioned the social aspect of this global issue. Wherever supermarkets play a significant role in food waste generation within its industry was viewed differently by the respondents.

"It is (supermarket) a key food waste generator in the local community, in the entire country ... but they can tackle most of them, this is the advantage." (Interview 4)

"Our supermarket is not that big compared to the ones from the capital or hypermarkets, those are a very big food waste generator." (Interview 5)

One interviewee stated his opinion resonating the information provided by FAO (2011) about supermarkets having a small share of the food waste in food industry.

"Supermarkets are not the main food waste generator, there are factories and restaurants that waste way more food than we do." (Interview 3)

Both managers and owners agree that this problem needs to be addressed accordingly, and three out of them mentioned that there are untapped opportunities for food waste mitigation that are not familiar to the Moldovan market (Interview 1, 4, 5). Regarding the reasons behind food waste generation, all respondents mentioned the employee's negligence and lack of

awareness regarding the damages stimulated by food waste, and challenging consumer demand forecast.

Next, each practice category that was identified and discussed in the empirical studies chapter is explored in correlation to the Moldovan supermarket food waste management practices, and relevant suggestions are offered.

Logistics

This category is the closest one to suppliers and requires continuous communication and collaboration with them. Previous studies emphasized the importance of fostering the retailer-supplier relationship (Kulikovkaja & Aschemann-Witcel, 2017; Mena, Adenso-Diaz & Yurt, 2011; Colombo de Maraes et al., 2020), while Moldovan managers expressed a slightly hostile attitude towards suppliers. This setting directly impacts the food waste reduction practices adopted at this stage. Therefore, when it comes to Procurements activities, besides Collaboration with suppliers, all respondents except Interviewee 5 undertake a Thorough control of the products. This activity is justified by the existing risk of suppliers providing products with a short lifespan that end up creating more wasted food for the retailer.

“When you receive the products from a supplier, you would expect them to be fresh, but it is not the case (laughing). This kind of situation can happen anytime, and it pushes us to thoroughly check the expiration date of the products.” (Interview 1)

Furthermore, a new practice under Procurements sub-category mentioned by respondent #1, #3 and #5 is Supplier agreement for product return. Therefore, according to the owner of Supermarket D, retailers with a bigger purchasing power and longer history in the industry have the possibility to return the products if the staff notice irregularities after receiving and paying for it.

“We presume that if the products are brought to the supermarket today, then they are fresh, especially the easily perishable ones. If it does not have an expiration date or it is close to be expired, we return it back to the suppliers.” (Interview 5)

The owner of Supermarket A levels up this agreement by having contracts with some suppliers allowing them to pay only for the products which have been sold. This approach alleviates the financial burden created by food waste for supermarkets, but it does not solve the problem itself of food waste generation. Contrary, the retailers are less interested in adopting food waste minimisation activities for those products once there are no direct consequences.

Demand forecasting activities that are applied by Finish supermarkets based on data analysis (Syroegina, 2016) are missing in Moldovan supermarkets, and the demand planning relies on the manager’s intuition and experience. The need for such an activity outline to avoid food excess exists, but the know-how is missing.

“Customer flow is unpredictable. It is a challenge to order products in such a way so you would not have leftovers. Therefore, we are looking for alternatives to sell them, we are getting creative (smiles).” (Interview 2)

Inventory is a sub-category of Procurements and a well-approached topic by the Moldovan management. Therefore, the Optimal storage conditions are secured by different activities such as journals for storage conditions and temperatures tracking (Interview 1, 3), daily storage check-up (Interview 1, 2, 3, 4, 5) and an employee that must provide and maintain optimal storage conditions for all products (Interview 5). Furthermore, all the respondents, except Interviewee 5, stated that there is a set food tracking process and that the management is aware of how much food is wasted daily. In this way, there is good countability regarding the created loss, and food waste patterns can be spotted and ameliorated. When asked how much food is generated by their supermarket, the answers oscillated between 3 and 15 per cent out of the total amount of food, depending on the size and variety of the products.

Technology use is the domain where all the respondents lack expertise. This set-up is similar to the one researched in Spain by Mena, Adenso-Diaz and Yurt (2011), where the managers would rather rely on traditional practices. Despite lacking the know-how, the interviewed managers showed interest in the matter and believe that digitalisation could reduce the food waste significantly.

“A dream of mine is to have such a computer system or application that once the products are introduced in the supermarket’s database, the expiration dates are also displayed. Therefore, the computer would inform the staff about soon expiring products, so we could reduce their price in prior time.” (Interview 3)

Suggestions for logistics improvement. The data collected out of the systematic food waste tracking can be used in analysing it further and creating a model that would help the managers improve their product demand forecast. Process digitalisation is a thing of the future and early adoption of technology in identifying the soon-to-be expired products would automatically reduce the human factor glitches, the total amount of food waste by noticing the staff in advance about the prospective issues and would offer a competitive advantage as the chances of customers finding expired food on the shelves would be minimal.

Once the Moldovan managers do not have an elaborated demand forecasting plan, nor technology application for food waste reduction, the author expects new activities in the categories that follow.

Promotion

The practices under this category are the most popular among supermarkets management of the previous empirical studies (Kulikovskaja & Aschemann-Witzel, 2017; Filimonau & Gherbin, 2017; Eriksson & Spangberg, 2017; Mena, Adenso-Diaz & Yurt, 2011; Syroegina, 2016; Colombo de Maraes et al., 2020). Moldovan managers also put a strong emphasis on promotion activities in order to prevent food waste generation, but they have a

slightly different approach. All respondents stated that they undertake Product placement and Pricing activities regularly and that they consider the second one being the best incentive for customers to buying food products and reducing the prospective food waste.

“Promotion practices ... price reduction, practically this is the one. Sometimes we might set-up a promotional stand for specific products, but at the end of the day, price is king.”

(Interview 3)

Three out of five respondents talked about a food waste mitigation practice that is closely related to Product placement which is Stock rotation. The Stock rotation described by Moldovan managers follows the FIFO (First-In, First-Out) accounting method as a basic rule and is practised each time there is a new product's stock in the supermarket.

“If the Stock rotation is not made in time, you can already consider those products already wasted food. As a manager, I continuously repeat the staff about it as the Golden Rule, an easy move that saves money.” (Interview 1)

“When you are receiving new products, the Stock rotation should happen automatically, this is how we trained our employees.” (Interview 4)

Stock rotation seems to be a logical, and reasonable practice for most stakeholders in the food industry, however, the previous studies did not highlight it in any way, while the interview respondents referred to it several times. Another Product placement activity that was under discussion is a Designated area for suboptimal food products. Respondent 4 mentions an unsuccessful trial putting together this area due to lack of proper promotion and consumers' attitude towards these types of products.

“People would pay a bit more, but at least they know that the food they are buying is fresh.” (Interview 4)

Moldovan managers do not undertake any Packaging activities, compared to the managers in previous empirical studies. Interviewee 2 and 5 admitted that they are not aware

of Packaging practices that could help to minimize food waste, the rest, find them unnecessary and again made reference to pricing activities as being the most effective for food waste reduction.

The novelty related to Promotion activities stands in Customer persuasion. This activity is due to the fact of Moldovan supermarkets having a more interpersonal approach between the salespeople within the supermarket and customers. It consists of suggesting customer buying products that have a higher chance to turn into food waste. Customer persuasion represents a two-sided activity. On one hand, it is an effective solution for preventing food waste, on another, it encourages over-buying and stimulates household food waste. Except respondent 5, all the managers undertake this activity and explain it as a responsible and conscious attitude of the salesperson.

Suggestions for promotion improvement. The designated area for suboptimal products proved to be a successful food waste prevention solution for supermarkets in different developed countries (Kulikovskaja & Aschemann-Witzel, 2017). The Moldovan supermarket managers are encouraged to slowly adopt this practice that targets low-income or environmentally conscious customers. This activity can be kick-started by having a shopping cart filled with these types of products, and if it proves a success, the idea can be expanded to several shelves in the supermarket. Concerning Customer persuasion practice, it is highly recommended to managers help their employees creating an enabling environment for its customers by not crossing the line between offering products with a short lifespan as alternatives and convincing the consumer buying products that are going to pass from in-store food waste to after-store food waste.

Processing

Processing practices in Moldovan supermarkets have a different character compared to the ones in developed countries. The interviewed managers admitted that there is not an

elaborated and standardized food Re-usage process and that such practice is undertaken by employees being conscious about this problem. According to respondent 2 and 4, one Re-usage activity approach comes from employees' initiative, that of using the suboptimal products expected to turn into food waste as meals.

"In our supermarket, there is a small food waste quantity. I am promoting the idea of not easily giving up on products that still have opportunities for usage. We do not throw ugly veggies; I see it as a sin to throw food that can be eaten." (Interview 2)

Supermarket A has a catering section which facilitates the re-usage of products, therefore, Interviewee 1 and 3 stated that when producing meals on-spot for customers it is more sustainable for the supermarket to maximise the use of its products and reducing the prospective food waste.

Concerning the Food donation practices, the Moldovan supermarket managers have the same attitude as the British ones, identified by Mena, Adenso-Diaz and Yurt (2011). Therefore, none of the supermarkets practice Food donation to third parties, nor they have facilities or organisations that they are aware of that could provide such an option. Moreover, the managers are hesitant to adopt such a practice because, according to the governmental laws, they bear legal responsibility for any kind of accidents such as food poisoning.

"Donating suboptimal products to third parties such as orphanages or retirement homes is like searching for unwanted problems. If any of them gets sick from whatever reason, we would be the first ones suspected." (Interview 2)

Nevertheless, the Moldovan managers are not against Food donation to the supermarket staff. Therefore, the managers of supermarkets A and D practice this activity in a small amount, while the rest are avoiding it from the same reasons as stated in the study conducted by Filimonau and Gherbin (2017), staff demotivation to sell the products over receiving them as a donation.

An unprecedented practice under Processing category that is under a trial period was disclosed by Interviewee 3. It consists of offering certain types of excess products to customers that spend a certain amount of money in the supermarket (Customer gift practice).

“There were a couple of cases when we donated products to customers that looked in higher need for them, but we decided to focus on revenues and experiment this new approach.”

(Interview 3)

He identifies this practice as a food waste reduction opportunity that could strengthen the loyal customer base.

Suggestions for processing improvement. The author of this paper suggests the Moldovan supermarket managers look into NGOs that offer free pick-up services for suboptimal products. Besides doing an act of civic spirit nature and contributes to the in-store food waste reduction, it enhances the company’s Corporate Social Responsibility and can be used for promotional purposes. The Customer gift practice is an initiative worth investigating, but it should be tailored in such a way so that the offered products will not be wasted at the household level. As in the UK, the legal issues seem to be a hindrance for more elaborated improvements to be applied in this food waste management category.

Communication

All the managers expressed strong opinions regarding the activities under this category. They agree that rising Employee awareness about the importance of food waste mitigation practices is a must as it directly influences the total amount of wasted food. This practice is not done in the frame of targeted training, but the managers undertake a face-to-face approach and regularly remind the employees about the matter through direct communication.

“I continuously remind the staff to put effort into not wasting food. It is not a daily activity because you don’t want to be naggy, but I enforce it when I find it necessary.”

(Interview 4)

“I am closely collaborating with the person who makes the orders to the supplier. I need to make sure that he or she is aware that a mistake can end up with tens of kilos of wasted food. This matter is usually discussed during the hiring process and reminded along the way.”

(Interview 5)

Although the interviewed managers identify the food waste Employee awareness as an important practice that is part of the management’s responsibilities, they have a reversed attitude concerning Customer awareness. Three out of five managers state that they do not enterprise any practices that grow the customer’s awareness about the food waste issue and the rest of them identify it as being unnecessary and not of the supermarket’s concern.

“Most of the customers are indifferent towards this problem, and they do not care about it. Our job is to sell, and promote our products, not to educate people, there is no time for this.”

(Interview 2)

“We haven’t reached this level (laughs). Our society has bigger problems than food waste. We are part of this industry, true, but the supermarket is not an auditorium for holding lectures about food waste, the customer is not coming to us for story-telling.” (Interview 3)

The managers of the sole proprietorship supermarkets (Supermarket C and D) believe that this matter should be tackled by the government (top-down approach) and that they should be the initiators and the main supporters of informing its citizens.

Once the Moldovan supermarket managers do not put any efforts in making their customers more consciousness about food waste problem, nor they find it an effective measure to tackle it, another practice was implemented by the Interviewee 2 and 3. Employee financial motivation is a new practice that managers describe it as being the main food waste reduction incentive, meant to reward the supermarket staff if they fit within the food waste limit set by the management. Therefore, the entire staff is aware of the food waste quantity limit for the

upcoming month, and if they manage to generate a lower amount of food waste, then they receive a salary bonus for that month.

“We created such a system that motivates the employees reduce the food waste not only for us (the managers) or for the environment, but also for themselves, and I find it a fair procedure, which is actually the most effective one.” (Interview 3)

This is a new practice compared to the ones identified in the previous empirical studies, but was well reasoned by the owner of the Supermarket A.

Suggestions for communication initiatives. Regarding employee awareness, the current situation shows that the Moldovan supermarket managers undertake the necessary practices to incentivize their staff in having a responsible attitude towards food waste and put efforts in minimizing it. Compared to the previous study, there are no suggestions for improvement concerning this type of activities. When it comes to Customer awareness, the main suggestion is to reconsider the importance of informing their consumers about responsible food consumption and food waste problem and implement relevant targeted practices. In order to have your customers care about helping the supermarkets mitigate food waste, first, the managers should believe in their power and influence in doing that.

Concluding this study’s findings, Table 7 is a structured representation of the identified food waste management activities discussed above compared to the preliminary food waste practices. The sub-categories written in bold indicate the practices that are undertaken by the Moldovan supermarket managers and have not been identified in the previous studies.

Table 7

Theme 2, Moldovan supermarket management practices in reducing food waste assessment

Category	Sub-category	Interviews				
		1.	2.	3.	4.	5.
Logistics	Procurements	X	X	X	X	X
	Inventory	X	X	X	X	X

Promotion	Product placement	X	X	X	X	X
	Stock rotation	X		X	X	
	Pricing	X	X	X	X	X
	Packaging					
Processing	Customer persuasion	X	X	X	X	
	Re-usage	X	X	X	X	
	Donation	X		X		X
	Customer gift			X		
Communication	Employee awareness	X	X	X	X	X
	Employee financial motivation		X	X		
	Customer awareness					

Source: compiled by the author

Based on the findings of seven empirical studies, the author pulled out 16 in-store food waste management practices for further analysis. After conducting five interviews with Moldovan supermarket managers, the author of this paper identified 15 in-store food waste mitigation practices, from which five of them were new to the author of this paper.

Conclusions

Food waste is a pressing problem for our growing society, and it comes with a financial, environmental, and social burden. In order to tackle this issue, the food industry players undertake measures and practices to ameliorate the severity of it and supermarkets are not an exception. The thesis aimed at explaining the concept of food waste management options for supermarkets, bringing out the main results of previous empirical studies. Seven studies were analysed, targeting supermarkets from Finland, the UK, Spain, Denmark, New Zealand and Sweden, from which 16 in-store food waste practices were retrieved. These practices were used for creating a deductive interview for Moldovan supermarket managers and identify the existing supermarket practices in this country. Despite the fact that supermarkets hold the biggest of food waste generate by the enterprises of the food industry of this country, a study that identifies the managerial practices to cope with this problem has not been conducted before.

Chapter 2 of this paper provides the method used to conduct the study (content analysis) and the gathered data. Based on five interviews conducted with managers and owners of Moldovan supermarkets, the author of this paper concluded that food waste issue is one of their priorities and despite the lack of public information targeting the Moldovan market, the managers are undertaking the necessary practices to mitigate food waste problem.

Following the pre-set food waste practices categories, the author found out that when it comes to Logistics activities, the management is missing on digitalisation know-how and implementation for a more accurate demand forecast. Further on, the managers are on top with Promotional practices and the personal approach with the customer offer them the possibility to lead them towards purchasing the products with a short lifespan. Processing activities are under development and Communication activities lack the customer approach of bringing awareness regarding the food waste problem.

When it comes to Moldovan supermarket management, the awareness about the environmental and social damage that comes with the food waste is rather overlooked and a high importance is given to the financial driver and practices that have an immediate financial result (employees financial motivation).

Further on, each food waste practice category was followed up by a section with customized suggestions meant to improve the current efforts.

The future recommendations for further exploration of the topic would be to expand the geographical region of research and the number of interviewees and conduct a quantitative research of this study. The aim of this study was to identify the current practices but a good continuation would be analyse how they actually succeed at decreasing food waste in numerical terms.

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Appendices

Interview questions

Moldovan supermarkets – food waste management practices and barriers

This interview is part of research conducted by Bachelor student of Business Administration at the University of Tartu, Estonia. The aim of this research is to identify the food waste practices used by the Moldovan supermarkets management at the in-store stage.

Questions	Theoretical background of the questions
1. Introduction	
What is your opinion about food waste as a whole?	Compiled by the author
Do you consider food waste a global / national / local problem?	Compiled by the author
Do you see the grocery retail industry as a significant food waste generator?	Compiled by the author
Do you consider food waste being a problem for your store?	Goodman-Smith, F., Miroso, M. & Skeaff, S. (2020)
Which are the reasons behind in-store food waste generation?	Compiled by the author
Could you estimate the % of food loss in your store?	Compiled by the author
2. Logistics	
Do you collaborate with the suppliers to keep the food waste low?	Kulikovskaja & Aschemann-Witzel, 2017 Filimonau & Gherbin, 2017 Mena, Adenso-Diaz & Yurt, 2011 Syroegina, 2016 Colombo de Maraes et al., 2020
What kind of procurement rules do you follow in order to avoid food waste?	Compiled by the author
What kind of in-store products control do you undertake to avoid food waste?	Eriksson & Spangberg, 2017 Filimonau & Gherbin, 2017 Kulikovskaja & Aschemann-Witzel, 2017
Do you keep track of the generated in-store food waste?	Kulikovskaja & Aschemann-Witzel, 2017 Filimonau & Gherbin, 2017 Mena, Adenso-Diaz & Yurt, 2011 Syroegina, 2016 Colombo de Maraes et al., 2020
What kind of storage practices do you have in order to avoid food waste?	Kulikovskaja & Aschemann-Witzel, 2017 Syroegina, 2016
How do you use technology to mitigate food waste?	Mena, Adenso-Diaz & Yurt, 2011 Colombo de Maraes et al., 2020
3. Promotion	

Are you using any promotions tactics to boost the sales of the perishable products?	Mena, Adenso-Diaz & Yurt, 2011 Kulikovskaja & Aschemann-Witzel, 2017 Colombo de Maraes et al., 2020
Do you use any price reduction strategies to avoid/minimise the food waste?	Syroegina, 2016 Mena, Adenso-Diaz & Yurt, 2011 Kulikovskaja & Aschemann-Witzel, 2017 Colombo de Maraes et al., 2020 Filimonau & Gherbin, 2017
What kind of product placement strategies do you use to minimise the food waste?	Kulikovskaja & Aschemann-Witzel, 2017 Mena, Adenso-Diaz & Yurt, 2011
Do you use labelling strategies to minimise the food waste?	Syroegina, 2016 Kulikovskaja & Aschemann-Witzel, 2017
Do you use packaging strategies to minimize the food waste?	Syroegina, 2016 Kulikovskaja & Aschemann-Witzel, 2017
What kind of marketing strategies do you use for food waste mitigation?	Compiled by the author
4. Processing	
Do you have any in-store food re-usage practices?	Mena, Adenso-Diaz & Yurt, 2011 Kulikovskaja & Aschemann-Witzel, 2017 Colombo de Maraes et al., 2020
Do you donate the food that is yet to expire to third parties?	Gusinja, 2018 Kulikovskaja & Aschemann-Witzel, 2017 Filimonau & Gherbin, 2017 Mena, Adenso-Diaz & Yurt, 2011 Syroegina, 2016 Colombo de Maraes et al., 2020
Do you donate the food that is yet to expire to the staff?	Filimonau & Gherbin, 2017
How do you process the food that is yet to expire?	Compiled by the author
5. Communication	
Do you raise awareness about food waste topic among your customers?	Syroegina, A. (2016)
Do you raise awareness about food waste topic among your employees?	Mena, Adenso-Diaz & Yurt, 2011 Syroegina, 2016 Colombo de Maraes et al., 2020
Do you instruct your employees about practices meant to reduce the food waste?	Mena, Adenso-Diaz & Yurt, 2011 Syroegina, 2016 Colombo de Maraes et al., 2020
6. Closing	
Are there any other practices that you undertake to cope with the food waste problems?	Compiled by the author

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FOOD WASTE MANAGEMENT IN MOLDOVAN SUPERMARKETS:
CURRENT PRACTICES AND SUGGESTIONS FOR IMPROVEMENT

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