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Expansion of the local, organic and zero-packaging food concept in three contexts: zero-packaging grocery stores, conventional supermarkets, and ecostores

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Abstract

The past five years there has been an exponential growth of zero-packaging grocery stores along with increasing popularity of the Zero Waste Movement. Zero-packaging grocery stores eliminate packaging and favour organic and local food as these are good ways to improve the sustainability of food supply chains in developed countries. This research investigates how the concept of zero-packaging grocery stores can penetrate the mainstream through an analysis of three zero-packaging stores, two ecostores and two conventional supermarkets. Semi-structured interviews were conducted with Delhaize, OKay, Bio-Planet, BE O, “Lara kookt voor u”, “Ohne”, and “Anders winkelen” where it was investigated to what extent they adopt the concept of packaging-free, local and organic food and which barriers they face for a more progressive adoption. Sustainability issues are inherently complex and thus the adoption of sustainability science through analytical methods was required for this research. The results are broad and touch upon various domains. The segment of consumers that shop consciously sustainable is growing but is still relatively small and consequently, insufficient pressure is exerted to retailers to change their practices. It is recommended that consumers, corporations of brands, retailers and policymakers receive more, correct, and concrete information regarding food supply chains. Furthermore, retailers remain businesses where profit maximization receives priority. Retailers are also to a certain extent dependent on the multinational companies owning the big brands and are faced with high competition on the market. Regulations stimulating a transition towards a more sustainable food system and restricting unsustainable practices can be implemented to tackle the difficulties retailers are facing. Moreover, joint agreements between retailers or between retailers and companies can remove competitive advantages. Convenience is driving consumer behaviour as a result of the modern lifestyle of the Flemish population. Therefore, a standardised zero waste supermarket is recommended that adopts a circular supply chain and enables an easy and fast shopping experience for consumers.

Table of contents

List of figures/tables

List of abbreviations

SNM	Strategic niche management
MLP	Multi-level perspective
FSC	Food supply chain
FAVV	Federaal Agentschap voor de veiligheid van de voedselketen
LFS	Local food systems

1. Introduction

Food supply chains in developed countries are generally unsustainable and create great amounts of waste (Tassou et al., 2014). A third of all food produced is wasted, plastic pollution increases and food safety is endangered (Bonanno & Orlando-Bonaca, 2018; Borchers, Teuber, Keen, & Gershwin, 2010; Gomiero, Pimentel, & Paoletti, 2011). Furthermore, climate change will impact the food sector and global demand for food will strongly increase as by 2050 we are expected to be with 9 billion people on earth (Kearney, 2010). The food industry faces many challenges and governments need to seek solutions for a transition to a more sustainable agro-food system. More specifically, Flanders is facing difficulties such as increasing scarcity of resources, limited availability of space and economic concerns. The need for efforts and changes towards sustainable development in the Flemish agriculture is acknowledged (Mathijs, 2012). However, there is limited research on how the current system can be redesigned and which solutions should be considered and implemented (Beitzen-Heineke, Balta-Ozkan, & Reefke, 2017). This research investigates how the concept of zero-packaging grocery stores can potentially support the transition towards a low-impact and more sustainable food industry. Zero-packaging grocery stores are small, local and independent businesses that are part of the global Zero Waste Movement as they aim to avoid plastic packaging completely. Furthermore, they also provide local and organic food as this goes hand in hand with their concept and ideology of rethinking the food system.

The first zero-packaging store in Belgium opened in 2014 and nowadays it is estimated that there are about 45 of them. Research on these stores is very limited and this can be the result of the very recent exponential growth. This research aims to fill this gap by analysing the emergence and operation of zero-packaging grocery stores and by exploring what the barriers and measures are for expansion of the concept of local, organic and zero-packaging food in three contexts: zero-packaging grocery stores, ecostores and conventional supermarkets. Semi-structured interviews were conducted with managers of three zero-packaging stores, two ecostores and two conventional supermarkets to investigate possibilities for a local economy and more sustainable food supply chains to retrieve more general conclusions for an upscaling in Belgium (specifically Flanders).

The research is structured as follows: Chapter 1 is the literature review in which the analytical framework, including the multi-level perspective, strategic niche management and a framework for corporate supply chain responsibility, and the impacts of the conventional food supply chain are studied. Chapter 2 describes the methodology. Where after the results from the interviews and media and literature analysis are presented in chapter 3. Chapters 4 and 5 provide a discussion with recommendations and conclusions.

1.1 Literature review

1.1.1 Analytical/theoretical framework

Sustainability challenges are inherently complex since various systems, activities, and actors are typically connected and interacting in differing ways. Due to their complexity, systematic tools are needed to develop sustainability solutions. Multi-level perspective, transition management (Loorbrach & Rotmans, 2010) and strategic niche management (Kemp, Schot, & Hoogma, 1998) are widely used in scientific studies on sustainability challenges and are perceived as valuable to discuss for this research. A transition perspective can be taken to look at the emergence of zero-packaging grocery stores. Since the multi-level perspective (MLP) is widely used to discuss transitions, the multi-level perspective is used as an analytical framework for studying the Flemish agro-food system.

Transition theory

Transitions are *"radical, structural changes of a societal (sub)system that are the result of a co-evolution of economic, cultural, technological, ecological, and institutional developments at different scale levels"* (Rotmans & Loorbach, 2009). They are the processes in which society or a subsystem of society changes in a fundamental way over a long period of 25 years or more. For example, the transition pathway of horse-drawn carriages to automobiles (1860-1930). Transitions are thus long term processes and are co-evolutionary and multi-dimensional (Loorbach, 2010; Meadowcroft, 2005). Three different perspectives can be taken to look at transitions: techno-economic, socio-technical and political perspectives (Kemp, Loorbach, & Rotmans, 2007). These three perspectives are useful as a meta-theoretical framework analysing transitions. It is then important to study both the independent development of each system and the interdependencies between these systems and how they affect each other (Cherp, Vinichenko, Jewell, Brutschin, & Sovacool, 2018; Loorbach & Rotmans, 2010).

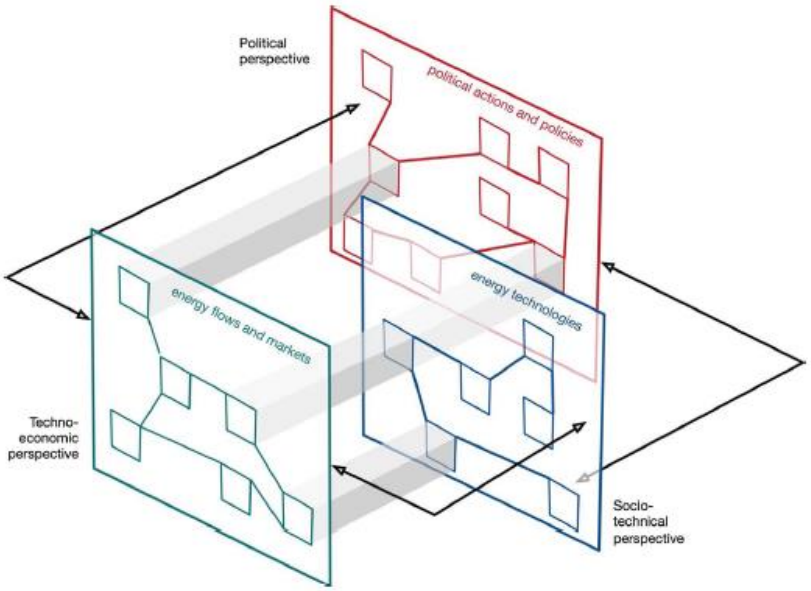


Figure 1: Example of co-evolving systems in national energy transitions (Cherp et al., 2018)

Techno-economic perspective concerns changes associated with production and consumption coordinated through markets. The socio-technical perspective gives focus on the appearance and distribution of new technologies with a sociological frame. One of the most influential frameworks in socio-technical transition analysis is the MLP. Strategic niche management is also a widely used theory that specifically focuses on niches to facilitate technological innovation. The political perspective has a central focus on change in policies and contestations that affect innovation. The state is here the primary focus of analysis.

To describe and analyse transitions, the multi-level perspective is used widely by researchers. For this research, the MLP is seen as useful for describing the agro-food system in Flanders, which is relevant to assess for an understanding of the emergence of the concept of zero-packaging grocery stores.

Multi-level perspective

A report was conducted by the Flanders Environment Agency in which a system analysis of the Flemish agro-food system was conducted (Mathijs, 2012). The multi-level perspective was used to describe the complex socio-technical system the agro-food system is.

The multi-level perspective (MLP) states that transitions are the outcome of interactions between three levels: niche, socio-technical regime, socio-technical landscape. The first level, namely niches, are the places where novel innovations can emerge and develop:

> *"So how do radical innovations emerge? Scholars in sociology of technology and evolutionary economics have highlighted the importance of niches as the locus of radical innovations. Because the performance of radical innovations is initially low, they cannot immediately compete on mainstream markets in the regime. Niches act as 'incubation rooms' for radical innovations, nurturing their early development." (*Geels, 2005, *p. 450)*

These innovations can be technological (from horse carriages to cars), socio-cultural (car ownership to car leasing) or both. Zero-packaging grocery stores can be called niches because they are radical innovations that rely on entrepreneurs who are prepared to take risks. They are occurring in a regime due to an increasing amount of tensions on the landscape level. In niches, the rules are typically diffuse and unclear, and they develop in relative isolation because they are still under development. These stores appeared simultaneously in the last decade in Flanders and social networks were built up recently (Bepakt, n.d.). Niches are important for transitions towards sustainability as they offer opportunities for learning on several dimensions (consumer preferences, regulations, market development,…) (Kemp et al., 1998).

At the landscape level, dominant trends and developments are at play that change very slowly and can hardly or not be influenced. Major social developments concerning e.g. politics, cultures, world views fit into the landscape level. Ten broad landscape developments that affect the Flemish agro-food system and cause tensions in the regime were identified:

- *"Growing world population and welfare*: the world population is expected to rise from 7 billion today to 9 billion by 2050 (Kearney, 2010). The population in developing countries will grow more strongly than in developed countries. Welfare is also expected to grow. These evolutions will heavily impact an increasing demand for food.
- *Globalisation:* Globalisation of markets has strongly influenced the global agro-food system in multiple ways: diets (consumers expect to find a wide variety of food all year round), emergence of leaders in food export, worldwide marketplace for food production & trade and cultural exchange of food (Gharehgozli, Iakovou, Chang, & Swaney, 2017).
- *Greying of the Flemish population*: the proportion of people aged 65+ will be bigger in the future resulting in a less economically active population.
- *Urbanisation*: the population in Flanders is expected to grow and the majority of the Flemish population lives outside the city centres. This places high pressure on the left open spaces in rural areas (Mathijs, 2012).
- *Climate change*: crop production will be affected by the effects of climate change (hot summers, droughts, new illnesses, and plagues).
- *Scarcity of resources*: Belgium, and Europe in general, are relatively poor in resources. Furthermore, energy prices are expected to rise significantly and the production of nitrogen fertilisers are particularly energy-intensive and thus sensitive for higher energy costs. Land available for agriculture is another scarcity in Belgium.
- *Changing values and ethical standpoints of consumers*: These will have a growing impact on policymakers and food systems. Furthermore, people concerned about issues also show entrepreneurial behaviour and search for ways to take action.
- *Other growth paradigms*: occurrence of mental health problems in Belgium is growing.
- *Hunger and inequality*
- *The digital revolution*: the internet allows for worldwide connections and more efficient communication through media*"* (Mathijs, 2012).

Regimes are rules that guide and orient activities of actors. It can be seen as the rule set and grammar embedded in societies' structures, practices, infrastructures, etc. They are described as rigid and stable, which prevents changes in the existing societal structures. However, social, cultural or economic changes at the landscape level lead to tensions in the regime, which in turn leads to complications that cannot be resolved by internal adjustments. This allows the emergence of niches that provide alternative ideas as a response to the tensions and developments at the regime and landscape level (Vlaamse milieumaatschappij, 2009).

Furthermore, the MLP distinguishes four phases in transitions. First, radical innovations emerge in niches and remain still fragile. In the second phase, the innovations develop and begin to stabilize. However, the niche innovations will only diffuse more widely, if the regime becomes unstable. Thirdly, internal drivers like further niche development and external drivers at regime and landscape levels can support niches. When tensions appear, niches can breakthrough and diffuse more. Fourthly, gradually a new socio-technical regime is created and this influences landscape developments. The MLP shows thus that transitions are complex processes and take place through the alignment and interaction of dynamics at three levels (Geels, 2005).

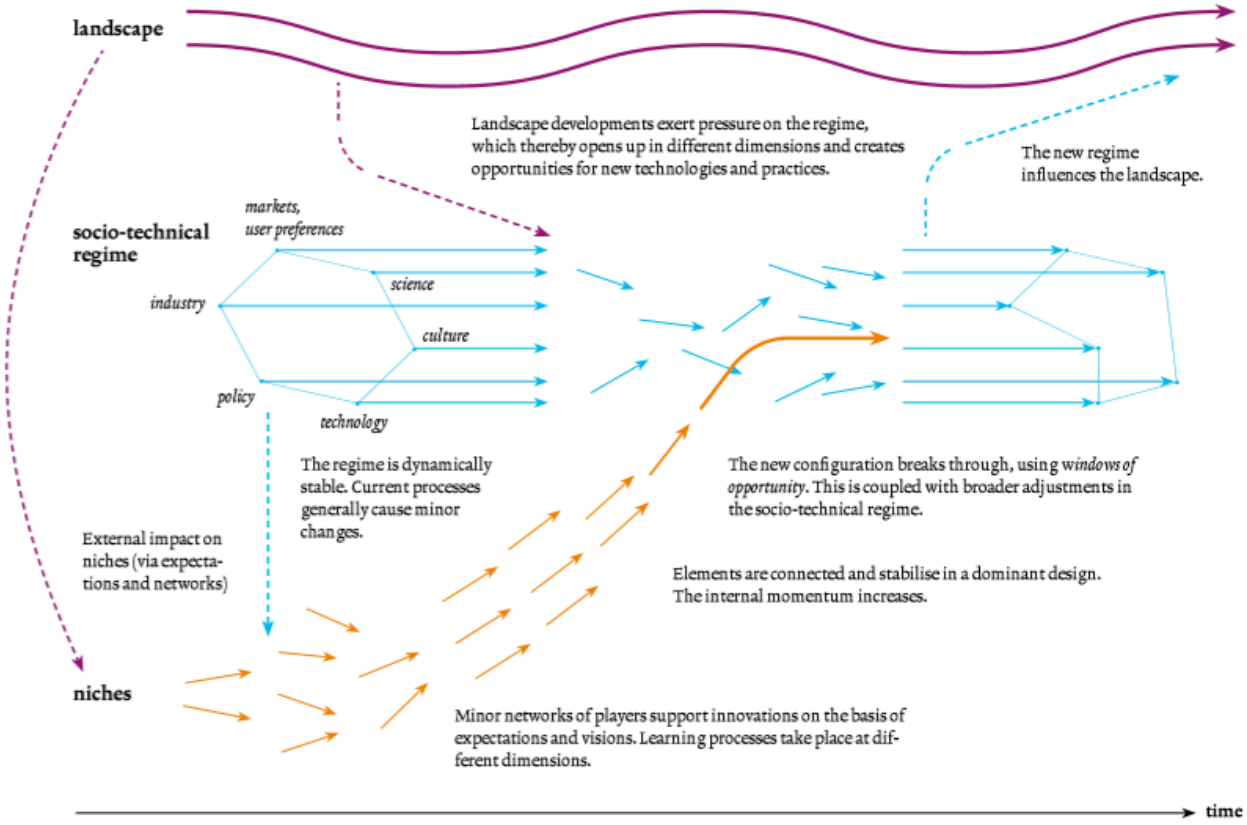


Figure 2: A dynamic version of the multi-level perspective (Paradis et al. (2009), based on Geels (2005))

In this sense, these retailers and their operations can be explored as innovative niches operating in a regime dominated by supermarkets with both the niche and the regime experiencing a changing landscape. In this changing landscape, tensions arise that allow these shops to become more competitive and/or offer greater resilience than conventional large-scale retailers. The latter is true given that zero-packaging stores support and supply local crops, employ local people, and generate little or no packaging waste. For a breakthrough of the concept of zero-packaging grocery stores it would be useful to find more about the experiences of these pioneer retailers: e.g. to explore the potentials and challenges of behavioural change, actual experiences of seeking to induce behavioural change, and what conditions are necessary for larger-scale behavioural change.

The system analysis of the Flemish agro-food system conducted by the Flanders Environment Agency presents four “niche regimes” or clusters of niches that can tackle the different sustainability challenges and states that these may serve as inspiration for a transition to a sustainable Flemish agro-food system. Urban agriculture, organic agriculture, eating differently and new production paradigms were discussed thoroughly in this report (Mathijs, 2012). A summary is given in table 1.

Table 1: Niche regimes as an inspiration for the transition to a sustainable Flemish agro-food system

Niche regime	Description	Niches
Urban agriculture	Food production in and around the city	Extending the functionality of urban space: use of gardens, open space, roofs, balconies,… ➔ What is needed in Flanders? Regulations, innovative architecture, urban planning
		Intensive production units with minimal spatial footprint: (since space is crucial constraint for urban agriculture) ➔ What is needed? Experimentation with new technologies ~ vertical greenhouse
		Short chains (farm product sold off the farm or farmer’s markets) ➔ What is needed? Innovation production concepts: Farmery (living grocery store), agro-park
		Functional broadening of agriculture: to reinforce the sense of community / learn practical skills / experience nature ➔ What is needed? allotment gardens / community gardens
		Urban agriculture as a provider of ecosystem services and closed-loop cycles (Flanders: wetter winters, warmer summers → less pleasant living conditions) ➔ What is needed? Urban food production, green infrastructure (provides cooling capacity, water storage)
Organic agriculture	Avoiding the use of fertilisers & pesticides (EU label)	/ ➔ What is needed? Increase in arable land & reduce inefficiencies (by specialisation, upscaling and grouping of production units) ➔ It will be difficult for organic agriculture to preserve its identity
Eating differently	Consumption driven niche regime	- Reduction of animal proteins: meat substitutes, in-vitro meat, insects, algae and seaweed - Slow food: consciously giving attention to the way we deal with food (slow food movement) - Customisable food: to reduce the consequences of bad nutrition
New production paradigms	Other ways of producing food	- Industrial ecology: industrial system is an ecosystem & has closed loops. (‘Cradle-to-Cradle’ approach) - Bio-based economy: use renewable materials (biomass) ~ biorefinery technology - Factory of the future: a new future to the manufacturing industry (support local) - Peer-to-peer production: growing attention to small-scale producers: due to new possibilities ~ crowdfunding, internet & social media to market products, 3D printing → trend: the spread of green innovation

Strategic niche management

The patterns that played a role in transitions in the past can now be found in the agro-food system as well: landscape pressure, severe problems with the regime and a range of growing niches. As a result, there are many opportunities in the agro-food system to initiate a transition. Large societal transitions happen over time and are the result of the interaction between landscape, regime, and niches. This thesis will zoom in on the niche of zero-packaging grocery stores for a better understanding of their operational processes and zoom out to the agro-food system for analysing how a further expansion of their concept is possible. For zooming in on the topic, strategic niche management (SNM) is found useful as it is a strategy to manage transitions. Niches are of vital importance for the development of a new system. Whether niche formations are successful or not is related to structural problems and changes within the existing regime (Schot & Geels, 2008). The destiny of niches depends on the one hand on successful processes within the niche itself and on the other hand on supporting changes in the regime (Kemp et al., 1998). As discussed above, the regime of the agro-food system in Flanders is facing several changes due to internal and external problems. This can explain the successfulness of the rise of zero-packaging grocery stores in Flanders.

Kemp et al. (1998, p. 186) offer the following definition:

> *"strategic niche management is the creation, development and controlled phase-out of protected spaces for the development and use of promising technologies by means of experimentation, with the aim of (1) learning about the desirability of the new technology and (2) enhancing the further development and the rate of application of the new technology."*

SNM enables thus a free space where technologies can grow to check if further development is desirable and/or feasible and what institutional adaptations are needed to align the technology and its environment (Hoogma, 2002). The primary aims of SNM are to encourage learning about new technology, establish actor networks, alignment of different interests, changing expectations of different actors and finally stimulating institutional adaptation. Guiding steps as a way to achieve the aims of SNM are presented in figure 3.

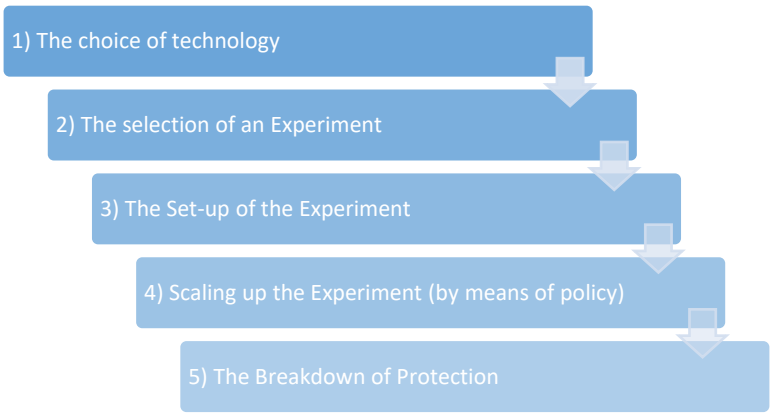


Figure 3: Guiding steps for SNM (Kemp et al., 1998)

The first two steps that are shown in figure 3 are for zero-packaging grocery stores already completed. Step 3 “The Set-up of the Experiment” is the most difficult step: niche policies should be chosen whilst a balance between protection and selection pressure should be met. The policies should be based on the various barriers to the expansion of the niche concept. Furthermore, policies should be integrated looking at all barriers in a coordinated way. It is interesting to see how SNM has a clear focus on policies to support niche development. Policies that facilitate the adoption of a sustainable food retail system for stores will, therefore, be taken into consideration as possible measures. Examples of such policies are the formation of actor-networks, economic incentives (taxes/subsidies), the formulation of long-term goals, standards, etc. Step 4 “Scaling up of the Experiment” is considered to be done through policy. Step 5 “The Breakdown of Protection” means that support may no longer be needed. It is still unclear which niche policies have been chosen for the adoption of the concept of local, organic and zero waste food (step 3). Therefore, steps 4 and 5 are not completed yet.

Governments have thus an important role as facilitators by setting up policies, sponsoring or networking, yet, other actors like industries and NGOs are possible niche managers too.
SNM has identified critical internal mechanisms in sustainable innovation journeys. However, it is also known that these are not the only important factors to bring about regime transformation. External factors, and thus contextualisation of the niche is as critically important for further niche development (Schot & Geels, 2008). This presents another argument for why adopting a multi-level perspective is necessary for this research. Experiments should not be seen as isolated local projects. Furthermore, Kemp et al. (1998) articulate that many of the barriers for upscaling involve uncertainty and perceptions. Consequently, many things about the new technology should be clarified: the technical aspects, government policy, cultural meaning, market, production network, infrastructure & societal and environmental effects.

Classification of drivers and barriers

A study conducted by Chkanikova & Mont (2015), titled *Corporate Supply Chain Responsibility: Drivers and Barriers for Sustainable Food Retailing*, proposes a framework that outlines drivers and barriers for retailers in implementing sustainability initiatives in food supply chains.

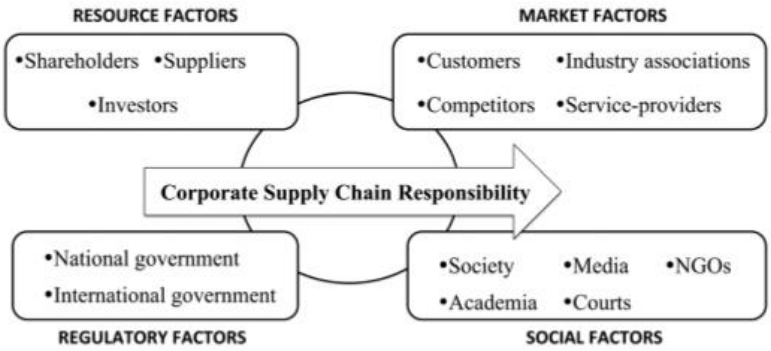


Figure 4: Drivers and barriers for corporate supply chain responsibility (Chkanikova & Mont, 2015)

Sustainability initiatives in the supply chain are defined in this study as *"a broad range of practices undertaken by retailers with the aim of improving sustainability performance of supply chain processes from 'farm to fork', including food production, transportation, consumption, and the store's internal operations"* (Chkanikova & Mont, 2015). In line with this definition, it is considered that the concept adopted by zero-packaging grocery stores concerns several sustainability initiatives in the food supply chain. Therefore, it was chosen to use the proposed framework as an analytical framework that guides this research (Chkanikova & Mont, 2015). It is seen as appropriate, as it outlines four major groups of factors (see figure 5) that touch upon all drivers and barriers retailers face to change their supply chain towards something more sustainable.

Definitions for these factor groups are given in figure 5 and are directly copied from the study of Chkanikova & Mont (2015).

Resource factors	• *"Resource factors derive from shareholder, supplier, and investor pressure. They include both tangible resources (financial, material) and intangible assets (reputation, knowledge) critical to a firm's business activities"*
Market factors	• *"Market factors derive from customer, competitor, industrial association, and service-provider pressure. They include demands, competition, and norms set by these market actors"*
Regulatory factors	• *"Regulatory factors derive from national and international government pressure. They include both coercive and voluntary policy instruments"*
Social factors	• *"Social factors derive from society, NGO, media, academia. They include values and expectations of these community actors."*

Figure 5: Four factor groups and their definitions (Chkanikova & Mont, 2015)

1.1.2 Food supply chains

Over the past fifty years, major changes in food consumption have been occurring with economic development. Figure 6 was taken from scientific research studying the drives and consequences of food consumption trends. It provides a great overview. People in developing countries are faced with more marketing, processed foods (with more sugar and fat) and diversified diets (due to the globalisation of food systems) with various consequences such as environmental degradation and health problems (Kearney, 2010).

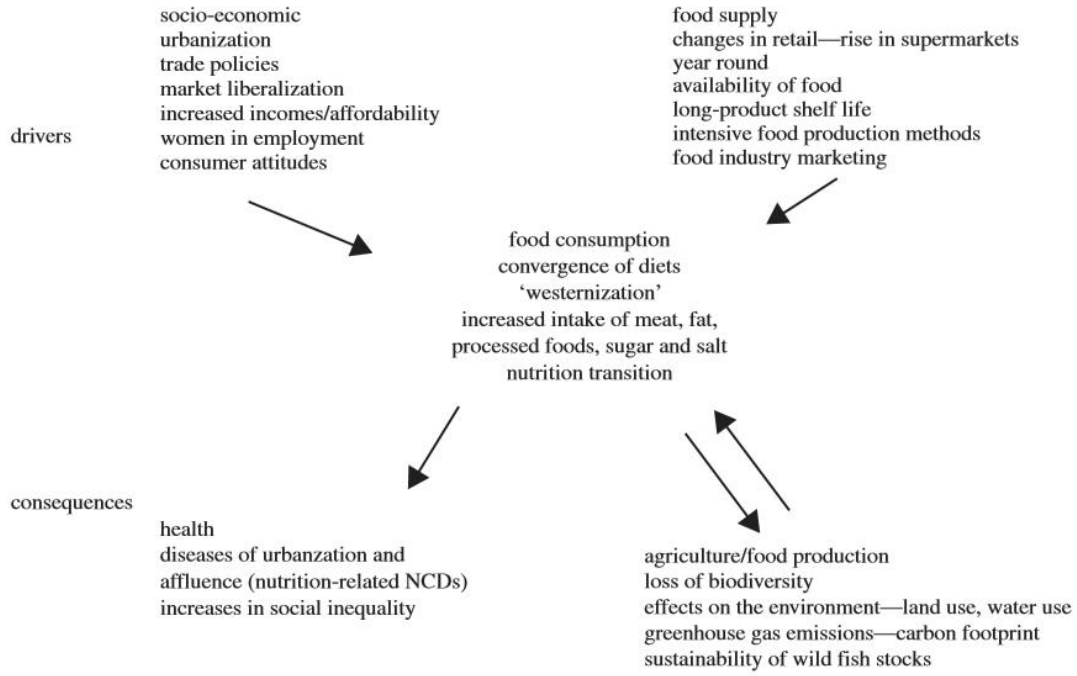


Figure 6: Food consumption trends: drivers and consequences (Kearney, 2010, p. 2801)

Furthermore, supermarkets expanded and are now major players in the agri-food markets, treating consumers with convenience, competitive prices and high standards in food safety and quality. In Belgium the three biggest retailers Delhaize, Carrefour and Colruyt hold more than 70% of the market share (Mathijs, 2012). A typical food chain includes a sequence of steps: agriculture, food processing, distribution, retail, consumption and disposing of food. The food chain consumes a lot of energy, releases tons of emissions and food waste. For example, in the UK the food chain is responsible for 176 Mt carbon dioxide emissions and 15 Mt food waste and consumes about 18% of the total energy use (Gaitán-Cremaschi et al., 2019; Tassou et al., 2014).

The concept of zero-packaging grocery stores shares three characteristics: zero waste, local and organic goods. These three aspects are further discussed in the literature review to understand the problems and consequently the reasoning and drivers behind the concept.

Plastic packaging

Mass production of plastics started in 1940-1950 and since then plastics can be found everywhere in our daily lives. A documentary, called “war on plastic”, counted the amount of single-use plastic in just one street in the UK, the result was 15000 products (BBC one, 2019). This can be explained by its extremely convenient characteristics. Plastics are cheap, strong, lightweight, durable, resistant & insulation material (Thompson, Swan, Moore, & vom Saal, 2009). The durability and extreme usage of plastics today leads to a major waste management problem. Plastics contaminate many natural habitats. Pictures of plastic beaches and dead aquatic animals are common in the media. The “Great Pacific Garbage Patch” or plastic soup has become a known term (Rochman, Cook, & Koelmans, 2016). Of all the plastic we ever produced: 9% is recycled, 12% burned and 79% ended up in dumping areas or nature. We produce 400 million tons of plastic per year worldwide of which half of it is for single use. 10% of plastics globally produced enter the marine environment annually, where they can accumulate and persist for hundreds of years (Bonanno & Orlando-Bonaca, 2018). There is an increase of concern regarding plastic debris if you look at the media attention and increased scientific interest (Rochman et al., 2016). There are still many gaps in the understanding regarding plastic debris, for example, the impact of microplastic on human health (Rochman et al., 2016). Yet, a study by the State University of New York reported that 93% of bottled water showed signs of microplastic contamination with an average of 10 plastic particles per litre. It is said that contamination is twice as much as in tap water and that it comes from the packaging and/or bottling process (Mason, Welch, & Neratko, 2018). Two third of synthetic clothes are plastic and after every wash millions of microplastics go down the drain. Plastic is very intrusive as even in deep-sea microplastics are found. There is even plastic in the air around us, coming from clothing and industries. We don’t know if small concentrations of plastic can do us harm, however, there is already proof that high concentrations of plastic can cause lung disease. Wipes (for make-up remover, baby wipes, wipes for cleaning, etc.) are widely used because of their convenience, however, consumers are unaware that they contain about 84% of plastic. This is not mentioned on the packaging of the wipes (BBC one, 2019). These facts about plastic are alarming signals.

Europeans produce yearly an amount of 25 million tons of plastic waste of which 2/3 comes from packaging. In Europe 30% of plastic waste gets recycled, 39% is burned, 31% is dumped in developing countries (Schweitzer et al., 2018). Belgians are, relative to other Europeans, good in collecting and sorting out garbage (Desmet, 2018; Temmerman & Pichal, 2019). It is however acknowledged that recycling should be improved thoroughly in Flanders. In Flanders, a new PMD bag is being implemented in cities to reach a recycling rate of 50% or higher. However, most of the plastic that gets recycled, actually gets “downcycled” into other materials (Cobbing, 2017).

A recent phenomenon is that more and more developing countries are starting to refuse garbage from other countries. Malaysia is the number one country where waste is being exported to (BBC one, 2019). The Malaysian Minister of Energy & Environment sent 3000 ton of plastic garbage back

to the countries of origin. She said that developed countries should face their garbage problem and shouldn't dump it anymore in developing countries since they don't have the resources to recycle it and thus can't cope with it (BBC one, 2019; De Greef, 2019). Also Indonesia, China, and the Philippines sent dozens of containers back (Geeraert, 2019).

Plastic packaging is often named as a means of avoiding food waste. However, plastic packaging and food waste have seen a growth simultaneously (Schweitzer et al., 2018). It is thus questionable if plastic packaging leads to the avoidance of food waste.

Zero waste

Alongside the discussion of plastics, the Zero Waste Movement has spread globally. It's difficult to point out the founder of this movement but many claim it is Bea Johnson from the USA (Chapman, 2017). She published a bestseller book called Zero Waste Home and is seen as the lifestyle expert with her talks, blog, book and media appearances (Zero Waste Home, n.d.). However, she is not the only one spreading the Zero Waste Movement by reaching a big audience. Various other entrepreneurs have followed: the blogger Kathryn Kellog with her website and book "Going zero waste" (Going zero waste, n.d.) and Lauren Singer with her website "Trash Is For Tossers", TED talks, and her store Package Free in New York (Chapman, 2017).

This lifestyle has attracted the attention of a growing number of citizens worldwide. This is shown with the fact that the *#zerowaste* hashtag has been used in posts 350.000 times on Instagram on the 4th of December 2017, 1.135.000 times on the 4th of June 2018 (Chapman, 2017) and 3.100.000 times on the 2nd of July 2019. This is a clear indication that this Zero Waste Movement is growing rapidly. As a response, many entrepreneurs take action and, for example, start their zero-packaging grocery store (Zero Waste Living Lab, n.d.). These social / business entrepreneurs help the Zero Waste Movement to fulfil its goals. There are more and more zero waste social enterprises (either for-profit or non-profit) that have a goal of solving society's problems (Lombardi & Rogers, 2007). The term "zero waste" has been defined by the Zero Waste International Alliance (ZWIA) as: *"The conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health." (ZWIA, 2018).* Material flow is circular in a zero waste system, which means that no materials are wasted. Various concepts are used to make this possible including reducing, reusing, redesigning, repairing, recycling, remanufacturing or reselling (Song, Li, & Zeng, 2015; Zaman & Lehmann, 2011). "*Mei plastic vrij*" or "May plastic free" is an awareness campaign in Flanders about the impact of plastic consumption on the environment. The purpose is to support people in avoiding single-use plastic for one month by several means (Mei Plastic Vrij, n.d.).

Organic agriculture

The main environmental impacts of agriculture come from the agricultural nutrients that pollute habitats and groundwater, from the conversion of ecosystems to agricultural land and from pesticides that are accumulating and can also harm human health. Modern agriculture created a huge boost in agriculture productivity. However, the environmental impacts are huge and the overall efficiency decreased strongly (Gomiero et al., 2011).

Organic food production is an important trend in food consumption that places great importance on environmental protection and animal wellbeing, thereby avoiding the use of fertilisers and pesticides. It started in the 1920s in response to the chemical fertilisers in agriculture (Mathijs, 2012). Organic farming has become one of the fastest-growing sections of agriculture due to recently high demand for organic food. In 2017 an increase of organic farmland by 20% was recorded, confirming the rapid growth of organic agriculture. At this time, 30.4 million hectares worldwide are certified according to the organic standards, with Australia, China, Argentina, and the USA having the biggest organic surface area (Kearney, 2010). The part of the agricultural land worldwide that is organic is about 1.4 percent. However, many countries have a much higher organic share. Belgium counts 83510 hectares of organic agricultural land and this is 6.4% of the total agricultural land in Belgium (FIBL & IFOAM, 2009). Most of the organic agricultural land is situated in Wallonia since only 1,2% of the agricultural land in Flanders is organic. This is compared to the European average of 6% low. Consumers choose organic food with the underlying motivations that it is healthier and better for the environment. However, a study shows that organic foods are not necessarily healthier or have nutritional differences (Dangour et al., 2009). It is, furthermore, not proven that someone who eats biological food eats healthier than someone who doesn't (Alles over bio, 2018). It is a complicated matter as good health is not only determined by your diet but also by your environment, genetics and lifestyle. It is, however, proven that residues of artificial additives and chemical pesticides remain in processed food, causing a variety of health risks (Borchers et al., 2010). Biological food, on the other hand, is using only natural additives which prevents exposure to toxic compounds. Furthermore, bio food applies a precautionary principle: no artificial elements are used as it is not confidently clear what effects they have on life and the environment (Alles over bio, 2018).

Nowadays, organic products wear the EU organic label. Organic food is often more expensive and this can be explained by the lower crop yields, higher animal welfare, better labour conditions. The world population is rising and the expectation is that we will be with 9 billion people by 2050 (Kearney, 2010). The question is now whether organic agriculture is capable of producing enough food to meet increases in global food demand. This is a debated issue since various studies have been found with contradicting conclusions. On the one hand, some show that it is unlikely due to lower yields, more land use and lack of organic fertilizers (Kearney, 2010; Tilman, Cassman, Matson, Naylor, & Polasky, 2002). On the other hand, it is shown that organic methods could provide enough calories to feed the whole human population. However, it does not state this for any particular crop or region.

Whether Belgium can feed its population with organic agriculture is thus not directly answered. Yet, nitrogen-fixing vegetables can provide enough nitrogen to replace the entire amount of synthetic nitrogen fertilizer currently in use (Badgley et al., 2007; Badgley & Perfecto, 2007). However, currently, hunger is more a problem of access to food and income distribution than lack of food. In developed countries, obesity is a problem due to the consumption of processed food full of sugar and fat. Furthermore, a healthy diet needs 33% less fossil energy than an average American diet. Food waste is another big problem as about 30-40% of food produced is wasted (Gomiero et al., 2011). Improving diets, reducing food waste, improving access to food, eliminating poverty are thus all relevant pathways to consider and they all should play a role in improving the food system to feed the growing population.

Local food

There is a growing social movement in the USA, namely the local economy movement, that provides an alternative for the globalized capitalism that has been incapable of creating sustainable wealth (Posey, 2011). The local economy movement has the primary goal of localizing the economy to spread wealth and promote sustainable practices. It is in favour of small-scale enterprises that serve small geographic areas. Advocates of a local economy state that it is more just (e.g. farmers get a fair price), it is better for the environment (compared to an economy dominated by multinationals) and it boosts a region's economy (because the money stays in the region). Also, it can help governments in avoiding the race to the bottom coming from the endless competition in an international economy (Posey, 2011).

In the past decade there is an increasing interest in the idea of consuming locally produced goods and especially for food. Local agriculture is the biggest demonstration of the local economy movement. Many cities in Europe are seeing the appearance and rise of "local food systems" (LFS). LFS encompasses diverse practices of upcoming organisations which explore alternatives for the provisioning of food (van Gameren, Ruwet, & Bauler, 2015). In the USA for example, the number of farmers is growing as in five years 14631 small farms opened (Starr, 2010). An overview is given of all kind of initiatives in Belgium that present alternative durable food systems. These initiatives are considered as niches and they are likely to contribute to question and redesign the development and evolution of the regime that holds the most dominant mode of food provisioning in society.

Community-supported agriculture (CSA) are partnerships of mutual commitment between a farm and a community of participants. CSAs allow for local agriculture to be supported by a community. Participants choose for ecological agriculture who takes care of the soil, environment, and health. The farmer receives a fixed salary thanks to the prepayments of the participants for the vegetables, fruit and/or local meat. Participants can also harvest crops themselves on the fields of their farmer. Participants enjoy freshly harvested and seasonal crops (vegetables and fruits). Also eggs, milk, and meat are possible. In this way, there is a direct connection between the farmer and the consumers and a direct link between production and consumption of food (CSA-Netwerk, n.d.). This is an

interesting initiative that promotes local exchange and succeeds in re-localizing the economy. Since the emergence in Japan in 1984 there are today 17000 CSA farmers worldwide. In 2007 the first one started in Belgium (in Flanders) and currently 43 CSA farmers are active in Flanders and connected with the online CSA network.

In Wallonia (Belgium) the CSA network received a different name: GASAP ("*groupe d'achats solidaires de l'agriculture paysanne"*) (GASAP, n.d.). About 40 farmers use this food system with a direct link, without intermediaries, between local farmers and consumers (van Gameren et al., 2015). CSA farmers comprise 7300 members in 2018 (Vankerscchaever, 2018).

"Voedselteams" or Food Teams also exist and these teams are groups of neighbours who organise their acquisition of products from local producers, farmers and/or distributors themselves. In 2019, 169 Food Teams are active in Flanders. This association is acknowledged as a socio-cultural movement and therefore, receives assistance in the form of subsidies from the Flemish Ministry of Culture to pay the coordinators (van Gameren et al., 2015).

Vanier is an online platform developed in 2018 where professionals from the catering sector or traders can buy local food products directly from farmers or other food producers from Ghent and surroundings (Vanier, n.d.). This gives farmers and producers salary security and customers can choose for a sustainable story with fewer kilometres, less packaging and more quality (Vankersschaever, 2018).

"*Boeren & buren*" or "Farmers & Neighbours" is a network and platform where you can directly buy online at the producers in your neighbourhood. On the website, you can order online what you want, when you want it, and where you want it without further subscription and obligations. Flanders has currently 60 neighbourhood farms (where products are delivered by the farmers and taken home by customers), 500 member farmers and 75000 consumer members. In Belgium as a whole, there are 120 neighbourhood farms (Boeren & Buren, 2018). Over 1,5 million people in Europe made use / are making use of the platform. Looking at all these numbers it can be stated that eating consciously has an impact (Boeren & Buren, n.d.).

"Recht van bij de boer" or "straight from the farmer" is an online platform that collects all the different points of sale of local food from neighbourhood farms to food teams. They currently count 1700 points of sale in Flanders. The platform makes it easy for anyone who wants to buy local veggies, fruits, meat, milk and so on since all the initiatives and participating farmers are included in their online database and can be searched for by neighbourhood (De Preter, n.d.).

Initiatives in Flanders are happening that encourage people to try out short supply chains or using less plastic. "*Week van de korte keten*" or "week of the short chain" is one week in May in which approximately 400 events are organised yearly with activities and tastings of farmers and organisations (Week van de Korte Keten, n.d.).

The use of short chains are still a niche but the number of interested people is growing. The conclusion is that these initiatives are all part of the same movement: they are against the globalised

and polluting food supply chain and entrepreneurs take action as a response. Various studies examined the motivations of members of local food systems and they appear to be largely similar: benefits for the environment, supporting local farmers and appreciating the quality of foods are the main motivations. Also eating seasonal food, and reducing packaging were mentioned (Cox et al., 2008).

The amount of Belgian agricultural enterprises has been decreasing in Belgium: between 1980 and 2017 68% of them disappeared. The evolution happened at the same rate in Flanders and Wallonia. In 2017 Belgium counted 35.910 agricultural enterprises and in 1980 there were more than 113.000 farms in Belgium. The amount of agricultural land also decreases but at a lower pace because the average surface per enterprise has almost tripled. Farm sizes thus grew strongly (Belga, 2018). Furthermore, in Flanders, there is little open space left and whether that goes to agriculture is a debated issue (De Walsche, 2011). Every day the size of ten football fields of open space is disappearing under cement. This is twice as much as the European average. There was the so-called "*betonstop*" or "stop cement" announced as an aim for 2040 but this led to adverse effects: space is disappearing at an even higher rate (Rogiers, 2019a). In the last fifty years the agri-food industry transformed completely in developing countries and the question is now whether this had negative effects on small local farms. It a complex issue that requires further research. In general, companies tend to choose large farms above smaller farms, however, there are exceptions to this. Companies source from small farms when they are dominant in the region, providing them occasionally with "resource-provision contracts" (Reardon, Barrett, Berdegué, & Swinnen, 2009).

1.2 Problem statement and relevance in the light of sustainable development

Food supply chains put in numerous ways pressure on the environment and are one of the main contributors to problems such as climate change, eutrophication, and loss of biodiversity. The negative sides of our food supply chain are for example packaging, intense transportation, deforestation, food waste, use of pesticides, pressure on small-scale farmers and concerns about food safety (Molina-Besch, Wikström, & Williams, 2019).

Packaging is used thoroughly by conventional supermarkets and this contributes to the amounts of waste generated per person. According to Eurostat (2019), 170 kg of packaging waste was generated per inhabitant in the European Union in 2016. Paper and cardboard were the main packaging waste material, followed by plastic and glass (Eurostat, 2019). Packagers have explored eco-friendly alternatives for packaging but plastic and paper remain the most used options in conventional supermarkets (Monnot, Reniou, Parguel, & Elgaaied-Gambier, 2019).

Food supply chains (FSCs) are distributed across global markets since all or some parts of the production, storage, process or distribution processes are done in numerous places worldwide (Gharehgozli et al., 2017). For this reason, it can be stated that the FSC is transforming into a global FSC. However, providing local food translates (most of the time) in lower emissions and fresher crops (Coelho, Coelho, & Egerer, 2018). Furthermore, it was found that organic agriculture could feed the current human population and possibly an even larger population (Badgley et al., 2007). Organic agriculture and local food initiatives have been growing in Belgium.

Numerous chemical compounds are present in the entire food chain and threaten food safety. These compounds appear during processing and cooking of foods or leach from the packaging or storage containers. Industrial food processes have released chemicals that pollute the environment and contaminate our food causing a variety of health risks (Borchers et al., 2010).

These issues relate to several Sustainability Development Goals (SDGs): SDG 2, 3, 11, 12, 13, 14 & 15 (U.N., 2015) and are thus relevant for achieving a transition towards sustainability. In the last fifty years, the world population has grown at a faster rate than ever before and it is projected that we will be with 9 billion people by 2050. However, nowadays still 800 million people are chronically hungry and 2 billion of the 7 billion today have nutrient shortages (Gharehgozli et al., 2017). Therefore, it can be stated that studies for improving food supply chains are critically important and new methods and technologies are needed or should be adopted.

A new phenomenon was discovered that provides solutions to the threats of our global food supply chain. “Unpackaged” is one of the pioneer zero-packaging grocery stores that opened its doors in

2006 in London. Currently, there are stores all over the world that use the same concept. The rapid emergence of zero-packaging grocery stores occurred all over Europe starting in 2014. These are all similar shops in the sense that they sell local, organic and package-free goods. These three characteristics define their concept and offer solutions to issues of global FSCs. First of all, it eliminates the threat of packaging since products are sold in bulk. Secondly, by only selling local products these shops are limiting emissions due to transportation completely or significantly and are supporting local farmers. Thirdly, food safety is enhanced because food is grown organically by respecting the seasons and without the use of pesticides (Beitzen-Heineke et al., 2017). In the past, all the processes of the food supply chain occurred locally in a small area so we can state that in a certain way they go back to the roots of our food supply.

It can be stated that zero-packaging grocery stores are a 'niche' concept, as mentioned in a scientific study that explored their prospects (Beitzen-Heineke et al., 2017). Even though these zero-packaging grocery stores face several barriers for the expansion of their concept, the number of stores in Belgium is still increasing. It is unclear with a preliminary literature review what measures can be taken to facilitate the expansion of zero-packaging grocery stores so further research on this matter is needed. Furthermore, given the large market share of conventional supermarkets, it would be more impactful if they adopt the zero-packaging concept. However, a thorough analysis of how conventional supermarkets can adopt a more sustainable food retail system is missing. It can be stated that this research has academic and societal relevance looking at the negative sides of our food supply chain and possibilities for improvement.

1.3 Aims and objectives of the research

Research aims:

- To analyse the emergence and operation of zero-packaging grocery stores (map the diffusion and discuss the motivations and experiences of retailers and clients).
- To explore what the barriers are for expansion of the concept of local, organic and zero-packaging food in three contexts: special zero-packaging grocery stores, ecostores and conventional supermarkets.
- To investigate which measures can be taken to address the barriers for expansion of the concept of zero-packaging for (local) food products in zero-packaging grocery stores, ecostores and conventional supermarkets.

Research objective:

- To investigate possibilities for a local economy and more sustainable food supply chains through an analysis of three zero-packaging stores, two ecostores and two conventional supermarkets to retrieve more general conclusions for an upscaling in Belgium (specifically Flanders).

1.4 Research question & sub-questions

Research question: How can the concept of zero-packaging, local and organic food, as implemented by zero-packaging grocery stores, become mainstream?

Sub-questions:

1. What are the zero-packaging grocery stores operation processes and drivers to improve the social and environmental impacts of the food supply chain?
    a. Why are they emerging?
    b. Do they make certain concessions?
    c. How are the zero-packaging grocery stores dealing with the packaging of products that are delivered? Are ecostores and supermarkets dealing with it differently?
2. How can the number of zero-packaging stores be expanded?
    a. What are the barriers for zero-packaging stores?
    b. What measures can be taken to overcome the barriers?
3. How can the concept of zero-packaging grocery stores be implemented by conventional supermarkets?
    a. Are conventional supermarkets giving attention to moving to the zero-packaging, organic and local concept?
    b. Are there barriers for conventional supermarkets and if so, what are those?
    c. What measures can be taken to overcome the barriers for conventional supermarkets?
4. To what extent are ecostores adopting the concept of zero-packaging, local and organic food?
    a. Are there barriers for ecostores and if so, what are those?
    b. What measures can be taken to overcome the barriers for ecostores?

Three possible pathways are considered for upscaling the concept of zero-packaging, local and organic food. Hence, sub-question 2, 3 and 4.

2 Methods

Different methods of data collection were used. A big part of the research is based on a literature study, in which much scientific literature has been processed. According to Hart (1998), there are three major advantages to a literature study compared to other methods of data collection (Hart, 1998). The biggest advantage of this qualitative way of data collection is that it allows gathering a big amount of information that provides insight for my subject in a quick way. In the first months of the research newspaper articles, scientific articles and reports were systematically searched for to familiarize with the published literature, the terminology and to situate the subject correctly in the literature. The online library of Maastricht University, Google Scholar and JSTOR were the main sources consulted at the beginning. A thorough literature review was conducted. Concepts such as the local economy, zero waste, food supply chains, context specificity (climate change, rising awareness) were found relevant to discuss. The multi-level perspective, strategic niche management and classification of drivers and barriers for sustainable food retail formed the analytical/theoretical framework for this research. Plastics and packaging were mentioned quite a lot in the news lately so journalistic material was used as secondary data.

However, there are also disadvantages associated with the use of literature studies. Van Thiel (2015) identifies the problem of selectivity and subjectivity, in addition to the inevitable to decide which data is used for a master's thesis and which data is retained (Thiel, 2015). This selection can have a negative impact on the objectivity of my results. To quantify preferences and assumptions is not an exact science. So, the conclusions will be in some way subjective. I tried to counteract this selectivity as much as possible by using triangulation. This is gathering numerous relevant sources on the subject and then comparing them to find similarities and verify irregularities (Maso & Smaling, 1998). The topic is very current. This means that it was not always easy to search for scientifically substantiated material. However, the topic was widely discussed in the news all over the world.
It was chosen to conduct a qualitative research, as the scientific research is limited. This allowed me to better understand my subject and describe it afterward. To strengthen this qualitative research, primary data collection was made and in-depth interviews with various actors were conducted. The overall research question was addressed by answering each sub-question thoroughly. This is an explorative study to which the research questions are guiding. This research will use a case study approach where a number of zero-packaging stores, ecostores and conventional supermarkets in Belgium (Flanders) will be compared, analysed and evaluated. The focus lies on zero-packaging stores, ecostores and conventional supermarkets. One possible pathway of upscaling the concept of zero-packaging grocery stores would be the adoption of this concept by conventional supermarkets. Furthermore, studying conventional supermarkets allows researching from a market perspective. Therefore, it was found to be useful to see to what extent companies are working on being more sustainable, for what reasons, and if they have plans to take it on a large-scale.

This is perceived as most suitable for this research because this method allows the exploration of new movements or topics and it allows for comparison. Zero-packaging stores appeared in the past decade, so they are relatively new and the amount of scientific research on this topic is limited. Taking an exploratory approach for describing their concept is thus required. Interviews are suitable for this because the questions asked can be changed according to the interviewee and they allow to identify the underlying mindsets, motivations, and narratives by conducting semi-structured interviews. The importance of enough diversity in the selected interviewees is acknowledged to retrieve valid outcomes. To explore the barriers for zero-packaging grocery stores it is necessary to look at other companies involved in the food supply.

The main purpose of these interviews was to obtain the necessary information that was lacking in the scientific literature. I chose semi-structured interviews. The questions for the interviews were structured using the analytical framework of barriers and incentives for taking sustainability initiatives in the food supply chain (see the three first appendices for the interview questions). All interviews were fully transcribed. To minimise a subjective interpretation of natural conversations, Atlas.ti was used, a programme for coding qualitative sources and that also ensures that every piece of research information can be easily retrieved. Through this programme, all information was analysed, classified and ordered by codes, which enabled a systematic analysis (Flick, 2009).

From a scientific perspective, the relevance of the research is its contribution to the limited academic literature on the zero-packaging grocery stores. Furthermore, this research contributes to scientific knowledge by the fact that the central research question uses a unique approach. The research focuses namely on a comparison between zero-packaging grocery stores, ecostores and conventional supermarkets to retrieve more general conclusions for transitioning to a more sustainable food supply chain in Flanders. From a societal perspective, this research will directly contribute to the Bepakt website by creating a clearer understanding of possibilities for sustainable food supply chains in Flanders. This research will be published on the website of Bepakt, as confirmed by its founder (Bepakt owner, personal communication, June 11, 2019), to further contribute to the diffusion and understanding of the zero-packaging grocery stores phenomenon.

Also, media analysis was considered as a useful data source for this thesis topic. Relevant websites and journalistic material were taken into consideration. All zero-packaging grocery stores have their own website referencing to their beliefs, motivations, operation processes, and so on. What can be found on their website was not asked during interviews unless something was not clear or required elaboration.

Appendix 4 gives an overview of the research including the aims and objectives, research questions, methods, and sources. Appendix 5 contains a table of all the stores who were contacted and a table of all the interviewees. In total 22 stores were contacted by email, phone call and/or personal visit in the store. Supermarkets were especially hard to communicate with. I had three positive responses

(Bio-Planet, Delhaize and OKay) after several attempts for each of the eleven supermarkets contacted. Usually, I received no reply, or in other cases a negative reply saying they don't do interviews or don't have time for it. In total eight interviews were conducted (see appendix 5, table 6). The number of interviews as proposed in the thesis research proposal was thus reached.

I interviewed three zero-packaging grocery stores in Flanders: *Lara kookt voor u* (Antwerp), Ohne (Ghent) and *Anders winkelen* (Vilvoorde). These interviews were very informative and different from one another. Each of them is considered as an added value to this research. Furthermore, two conventional supermarkets were interviewed, namely OKay and Delhaize. These interviewees were very knowledgeable and also talked about the practices of other supermarkets. Therefore, these interviews were seen as very instructive for a deeper understanding of the food systems of mainstream supermarkets. Moreover, a supermarket that only sells biological goods was interviewed, namely Bio-Planet. It can thus also be regarded as an ecostore. This interview was very valuable. The ecostore "BE O" was interviewed and was very instructive as their concept and operation processes are different from the ones from Bio-Planet. The interview with Delhaize happened over the phone and all the other interviews happened face-to-face. All the interviews lasted 50 minutes or longer. The questions asked during the interviews differ sometimes from the prepared questions (appendix 1 and 2). I usually reacted to what they were saying to go deeper into the topic or I let the talk happen naturally. Appendix 7 includes pictures of different stores to comprehend the differences between Bio-Planet and BE O (two ecostores) better and to visualize zero-packaging grocery stores.

3 Results

3.1 Zero-packaging stores

RQ 1: What are the zero-packaging grocery stores operation processes and drivers to improve the social and environmental impacts of the food supply chain?

"The phenomenon of packaging-free (zero waste) grocery stores has evolved as a 'glocal grassroots' movement: the shops are small, local, independent businesses, offering mostly local products – yet they are connected via a global Zero Waste Movement, with most of its influence spreading via the internet. Bepakt stimulates research into the economic and societal potential of this unique business model." (Bepakt, n.d.)

Over the past decade, a large number of zero-packaging grocery stores has opened their doors across the world. "Unpackaged" is one of the pioneer zero-packaging grocery stores that opened in 2006 in London. The rapid emergence of zero-packaging grocery stores occurred all over Europe starting in 2014. As demonstrated by Bepakt's Zero Waste Supermarket Index[1] these stores are growing strongly and spreading worldwide. The first zero-packaging grocery store in Belgium was "Robuust" and opened in 2014 in Antwerp. The Zero Waste Supermarket Index counts currently 36 stores in Belgium (Bepakt, n.d.). However, there are certainly more in Belgium since some stores were missing on the list (e.g. "Lara kookt voor u" (Antwerp), Karmamarkt (Brugge), Bulk (Brussels), Bio Délice & Épices et tout (Wallonia)). In France currently, 160 zero-packaging stores are present (in 2015 only 18 were present) (Leymergie, 2019). The exponential growth happened in line with a global expansion of the Zero Waste Movement, as discussed in the literature review of this thesis.

Zero-packaging grocery stores are all similar stores in the sense that they to a large extent sell local, organic and package-free goods. The primary goal of these stores is to reduce or eliminate packaging.

A clear definition of these stores is missing. This is possibly because these stores define themselves in different ways and to the fact that the emergence of these stores is very recent (or very old) (Saladino, 2018). Furthermore, there is still a very limited amount of peer-reviewed scientific literature on the topic of zero-packaging grocery stores. Bepakt, a website collecting data on zero-packaging grocery stores, published guideline criteria for defining them (see table 2) (Bepakt, n.d.).

Figure 7: Visualisation of zero-packaging stores in Europe (Bepakt, n.d.)

[1] The Zero Waste Supermarket Index on the website of Bepakt is the biggest database of zero-packaging grocery stores around the world and is constantly being updated.

Table 2: Bepakt's guideline criteria for defining zero-packaging grocery stores

"Primary value	*Zero waste, packaging reduction/abolition*
Product assortment	*A wide product range, competitive with regular supermarkets*
Product sourcing	*A strong focus on local and/or organic products*
Branding design	*Modern graphic design, web design, etc.*
Marketing	*Mainly through social media*
Shop financing	*Often through crowdfunding*
Knowledge sharing	*in the shop (shop assistant substitutes the informative role conventionally performed by the packaging); online (web communities, courses); and offline (courses, workshops, lectures)*
Consumers shopping experience	*Serviced (by shop assistant) or self-service (but still while interacting with the shop assistant)*
Additional characteristics	*sociability dimension/human relations between shop owner and (local/small) suppliers as well as between shop owner and clients; limited financial resources (often a single employee in the shop); little prior business knowledge; little contact with governments, etc"* (Bepakt, n.d.)

The drivers of zero-packaging grocery stores to improve the social and environmental impacts of the food supply chain are discussed in the literature review and are elaborated further below for the next research question. The primary intention is to use as less packaging as possible and to avoid plastic. Therefore, customers should preferably be prepared when shopping there by bringing their reusable packaging (jars, boxes, cotton bags,…) to fill them in the store (De Cock & Fluyt, 2019). Also, these stores aim to reduce food waste as much as possible. Yearly almost one-third of food produced for humans is wasted (Beitzen-Heineke et al., 2017). This is a total of 1.3 billion tonnes of food per year. The biggest part of food waste occurs on the household level (Schanes, Dobernig, & Gözet, 2018). Zero-packaging grocery stores state that they help reducing food waste as buying products in bulk allows the customer to buy exactly the quantity he/she needs (Leymergie, 2019). Furthermore, most of the stores are creative with leftovers: they make soup or smoothies out of it and sell it in their store or at their bar if there is one, or give it away to the community (Vasil, 2017). Moreover, they are not committed to big producers and order in small amounts. The small supply chain allows them to respond faster to sales. FAVV ("*Federaal Agentschap voor de veiligheid van de voedselketen"*) are regularly conducting inspections in the stores and the three interviewed stores state that they are friendly and the regulations are normal and easy to comply with. Food safety regulations thus allow the stores to sell in bulk and avoid plastic.

Many networks exist nowadays through which these stores are connected. As confirmed by store owners of Ohne and "Anders winkelen", there is a Facebook group for zero-packaging store owners in Flanders in which they share ideas or help each other (store owner Ohne, personal communication, June 20, 2019). Moreover, "*Réseau Vrac*" or "Network Bulk" has been launched this year in Belgium (it was already established in France, Luxembourg, China, and Portugal). This

network wants to speed up the development of the market towards sustainable consumption by supporting zero-packaging / ecostores through training, workshops, and provision of regulatory information (Vanderstichele, 2019).

a) *Why are they emerging?*

Avoidance of plastic packaging is the number one goal of zero-packaging grocery stores. Food supply chains were discussed in the literature review of this thesis. Modern agriculture, globalised food chains, and plastic packaging are the main topics discussed to understand the problems and consequently the reasoning and drivers behind the concept of these stores. Zero-packaging grocery stores eliminate packaging and favour organic and local food as these are great ways to solve the issues behind global FSC (Chakori & Abdul Aziz, 2019). As the store owner of the zero-packaging grocery store "Lara kook voor u" stated: *"Actually, they existed already before but they weren't called zero-packaging shops, they were just grocery stores in 1920 or so. Shops like ours were the normal shop back then. All grocery stores were like this and there were no brands. Supermarkets, as we know them now, are an invention of marketeers and economists. It's for brands to sell their products."* She explained that she sees her shop a little bit as a way to go back to the past. There is again a personal connection with the clients and a community feeling within the neighbourhood. Moreover, she added that there have always been people thinking in the same way and that it is still growing very slowly. Her parents took over the first organic shop in Antwerp in 1960 and opened the second organic shop in Antwerp around 1970.

"Yes, I think this shop is going back to the past a bit. I think everything got bigger and bigger until a certain point where people don't have the human connection anymore. Even the cashiers now are replaced by computers and some people like this anonymity and like to not have to communicate with other people. But I think a lot of people love it that they come in here and we know their name and we remember that he always takes this bread and we don't have to ask it anymore. It's nice to feel a bit in a community. People tell us if something happened to them. They come here and they tell us, and we feel sympathy for them. For example, with the birth of our son, everybody was very happy for us. We got a lot of presents from our clientele and we got cards from everybody. So you make friends and it's nice."

Furthermore, clients can enjoy a relaxed shopping experience as they are not faced with so many choices and temptations as in supermarkets. Shopping at zero-packaging stores is simple and clients don't get overstimulated as they do in supermarkets (store owner "Lara kookt voor u", personal communication, June 17, 2019). Regular customers of zero-packaging stores enjoy these aspects and this can be seen as a reason why these stores are emerging in our society.

The owner of the zero-packaging grocery store Ohne acknowledged that there is a trend of growing awareness in society and that more and more people are becoming open to this alternative way of buying food. It is still only one part of consumers, however, but it is big enough for an increasing

appearance of zero-packaging grocery stores (store owner Ohne, personal communication, June 20, 2019). The owner of the store “Anders winkelen” attributed the rising emergence of zero-packaging stores to more and more people realising that too much waste is being produced and that we can avoid that. She also stated that eventually, it is not something new, it is just about going back to the practices of the past (store owner “Anders winkelen”, personal communication, July 9, 2019).

The owners of zero-packaging grocery stores are intrinsically motivated and are convinced of their concept and the benefits it has. The store owner of “Anders winkelen” explained she started paying attention to eating healthier and she quickly realised that so many products of conventional supermarkets contain sugar. A changing diet resulted in thinking differently about the environment, agriculture, plastic pollution, and so on. The owner from “Lara kookt voor u” finds it criminal that products in supermarkets can be so cheap and that it proves that their chains are unethical and unsustainable. *“It's our ideology. I wouldn't be able to sell food coming from Mexico, or like Coca Cola or big companies. I wouldn't feel good about myself selling these kinds of things. Because we think about the environment, think about our health and the health of the people around us. It's not one reason, it's everything. We also love local initiatives and supporting that instead of only the multinationals. We want to be able to sell products that we really believe in and have a store that we would love to go ourselves to.”* (store owner “Lara kookt voor u”, personal communication, June 17, 2019). For her, food is the most important thing as it goes inside your body. She commented that her mindset origins from her education as for her parents, food had always been something very important. It had to be high quality, organic, sustainable and seasonal. The store owner of Ohne worked in the USA in 2013 and noticed how (unpackaged) bulk foods were already so mainstream there. It inspired her to introduce a store with bulk in Belgium and go even further by going zero waste.

b) <u>Do they make certain concessions?</u>

The concepts of the interviewed stores need to be clarified first to investigate whether these stores are going beyond their own concept. Ohne described their concept as first zero waste, then organic and if possible local. Single-use packaging is nowhere to be found in this store, except for packaging in cardboard of non-food items but it can be given back to the suppliers. Ohne, therefore, stated that they don’t make certain concessions as their concept is first unpackaged. They do sell products from abroad, like cashew nuts, kiwis and coffee. They come in big bags that they can bring back to the suppliers. These products are therefore unpackaged and organic but not local since they are not available in Belgium. Furthermore, Ohne wants to sell everything that customers need in their daily life, this leads thus to a wide product range including products from other continents (like coffee, nuts, kiwis, etc.) (store owner Ohne, personal communication, June 20, 2019).

“Anders winkelen” described their concept as “low amounts of packaging” (*verpakkingsarm*) and not as packaging-free. Being 100% packaging-free is impossible she said. Breakfast cereals, for

example, are being delivered to her store in plastic. She added that she does go beyond her concept in the sense that she wanted to avoid sugary sweets but customers asked for them so she provides them now (store owner “Anders winkelen”, personal communication, July 9, 2019).

“Lara kookt voor u” explained their concept as “less waste”, not zero waste and organic. They try to have as many local suppliers as possible. However, they see their concept as flexible: *“We are quite free in all of this. We don't want to be very rigid because it's difficult to do it very strictly. Being completely zero waste or everything local or organic is very difficult. We want to have possibilities so that we can supply also everything to our customers and that we don't have a too small product range. To have different products and enough choice.”* (store owner “Lara kookt voor u”, personal communication, June 17, 2019). Moreover, she stated that they are making certain adaptations to their concept to have a bigger product range. They sell bananas, for example, coming from another continent as a result of consumer demand.

The conclusion is that these stores tend to go beyond their concept to provide a wide range of products to their consumers. Providing 100% local food is not possible as Belgium has limited resources and customers consume products that grow abroad.

c) *How are the zero-packaging grocery stores dealing with the packaging of products that are delivered? Are ecostores and supermarkets dealing with it differently?*

Every zero-packaging grocery store has different and usually a number of suppliers, with some big distributors for vegetables, fruits and dry products and smaller suppliers from the region for marmalade, cookies, bread, juices, soaps, etc. Most of the packaging that is being delivered with the products are taking back by the suppliers. The store owner of “Anders winkelen” declared that she gives preference to suppliers who take back their packaging, even if it is more expensive. This didn’t work out for all her products. However, she tries to do something with the bags that are not taken back. For example, she gives away paper bags of the nuts to her farmers as they can re-use it (store owner “Anders winkelen”, personal communication, July 9, 2019). The store owner of Ohne stated that they are completely packaging-free and that their suppliers take back the packaging: “*Our shop is a zero waste shop, so you can’t find anything in throw away packaging, except for a couple of non-food items where it’s packaged in cardboard. But even then, we say that people can give it back because we try to give it back to the supplier. Other things that are prepackaged, you can always bring back and we give it back to resell it. That’s the idea of the shop. First, zero waste, then biological and/or local.”* (store owner Ohne, personal communication, June 20, 2019). The store owner of “Lara kookt voor u” mentioned she has some waste every week. For example, mayonnaise comes in a large plastic box and chocolate comes in a cardboard box. However, she tries to find other purposes to the packaging, for example, she gave away bidons of liquid soaps to youth movements (store owner “Lara kookt voor u”, personal communication, June 17, 2019).

The conclusion is that these stores first discuss with their suppliers how packaging can be reduced and/or re-used as much as possible. Usually, this process is going smoothly. Secondly, they try to repurpose unavoidable packaging. Thirdly, they throw it away.

RQ 2: How can the number of zero-packaging stores be expanded?

a) What are the barriers for zero-packaging stores?

One scientific study researched the barriers for zero-packaging grocery stores and their table of results was copied in table 3 (Beitzen-Heineke et al., 2017). Only three of the five barriers were confirmed by the three interviewed stores, namely lifestyle change, change in the consumer-brand relationship and pressure of main market player.

Table 3: Barriers and drivers for the expansion of zero-packaging concept (Beitzen-Heineke et al., 2017, p. 1539)

Barriers	Drivers
- Lifestyle change and cooking skills required of consumers	- Consumer demand more transparency and sustainability
- Suppliers have to change their practices	- Price advantage due to avoided cost in production and disposal
- Fundamental change of marketing and consumer-brand relationship	- Facilitating low-impact and healthy consumer behaviour
- Establishing trust in food safety	- Competitive advantage regarding environmental behaviour
- Pressure of main market player	

- **Resource barriers**

These stores aim to have as many fruits and vegetables from Belgium, but in the winter there is not enough which forces them to supply from other countries.

The store owner of Ohne stated that the problem with farmers is that they all have the same vegetables. The store owner of “Lara kookt voor u” stated the same thing: that not all organic farmers are diverse enough as they usually grow only one crop, which makes them less resilient for bad weather and it leads to poor soil. Furthermore, she argued the importance of diversity: *“You can only get a healthy soil if you plant different things”*. She also stated that she gives preference to organic farmers growing different crops. Nevertheless, all three store owners declared that organic farmers are booming in Belgium.

- **Market barriers**

As said, zero-packaging stores sell biological, fair, local and seasonal products which are favourable for the environment. The downside is that it can be more expensive than shopping at a conventional supermarket. A study that did research on 11 zero-packaging grocery stores in Belgium discovered that for 23 products you pay 34% more than you would at Delhaize and 47% more than you would at Colruyt (De Cock & Fluyt, 2019). For some products, like rice, lentils, hazelnuts, potatoes, etc. it is the other way around and you pay less in a zero-packaging store (Leymergie, 2019). Also, there you only buy exactly what you need and that can already potentially lower the bill.

Furthermore, the offer is less broad than in biological stores or conventional supermarkets: you often find only one or a few goods per category. Additionally, ready-to-eat products or meals are often not offered by these stores so the customer needs to be willing to prepare his meal himself (De Cock & Fluyt, 2019).

Online shopping on the internet is perceived as a barrier by Ohne and "Anders winkelen". People order more and more online and this is not helping local retailers to survive. Furthermore, marketing advertisements displayed everywhere attract consumers to supermarkets and make them unaware of the hidden impact of most products.

- **Regulatory barriers**

The three store owners declared that it is a lot of work to open and maintain this kind of store and that a clear vision and intrinsic motivation is necessary as it also doesn't enable you to gain a lot of money. "*Being self-employed is hard. It's sad that our government doesn't reward people who take high risks. We have a lot of added value and bring a lot of benefits to the society because if your city would just exist with multinationals, every city in the world, would be the same. So what makes your city unique & your country unique is the small, independent shops & the small independent entrepreneurs who make the local economy work."* (store owner "Lara kookt voor u", personal communication, June 17, 2019) There are no specific subsidies or facilitations from the government for zero-packaging grocery stores. Being self-employed is perceived as something difficult and more support for self-employed people would be appreciated by all three store owners.

- **Social barriers**

The store owner of Ohne mentioned that it takes more time to shop at her store because you must plan your visit and fill your jars yourself. A Belgian study about zero-packaging stores stated as well that it requires more effort and time to shop there (De Cock & Fluyt, 2019). In contrast, the store owner of "Lara kookt voor u" argued that it allows you to save time and to shop in a more relaxed way. The product range is limited and simple and you never have to wait long at the cashier. You are not faced with a big variety of choices or a long queue as you are in supermarkets. Besides, the store owner of Ohne stated that regular customers find it nicer to shop at their store because it is more personal and different and when they go back to the supermarkets they are shocked by the packaging and miss the relaxing shopping experience at her store (store owner Ohne, personal communication, June 20, 2019). The conclusion is that consumers have possibly a wrong perception of shopping at these stores. People perceive it as more demanding and think it would take them longer. However, overall it is more pleasant, less stimulating and it allows you to save time as you only buy the essentials and are not distracted by tons of advertisements. Although, more research is needed on this since not all research states this.

"Lifestyle change and cooking skills required of consumers" was discussed as a barrier for the expansion of the zero-packaging concept by a scientific study (Beitzen-Heineke et al., 2017). This

barrier has also been emphasized by the store owner of “Lara kookt voor u”. The stores have normal hours and are not like supermarkets open till after 18h. She stated that people should work less so that they have time to shop during normal hours and prepare a decent meal for themselves (store owner “Lara kookt voor u”, personal communication, June 17, 2019). The store owner of “Anders winkelen” explained that behavioural change is something that requires a lot of time. People are used to living a certain way and changing requires time which most of the people don’t have. People work way more than in the past. Lara also had an interesting view on how the consumption society reinforces itself: “*I think it’s all connected: people want to access stores at these crazy hours because they have to work so much and they don't have time to cook themselves because they don't have enough free time / spare time and they are expected to travel and to do all these hobbies. So I think it's all connected. There's a lot of pressure and that's why this consumption society, is feeding itself and a solution for everything is just to buy something. I’m always saying: you have to buy less.”*
Moreover, in general, people expect their food to be very cheap and have other prioritizations to spend their money on.
Furthermore, the three zero-packaging store owners mentioned that it is not so convenient for customers to bring their jars. This is perceived as the main barrier for customers.
People don’t understand what organic is or means, stated the store owner of “Lara kookt voor u”. She sees this lack of education as a problem to make organic agriculture more mainstream.
“*Fundamental change of marketing and consumer-brand relationship*” is mentioned as a barrier in the scientific study (Beitzen-Heineke et al., 2017). The store owner of “Lara kookt voor u” confirmed that brands are one of the main reasons why people go to supermarkets: “*People want their Coca-Cola, and this cereal from this brand and these brands will never want to sell wholesale because then they don’t have their brands on the packaging.”* (store owner “Lara kookt voor u”, personal communication, June 17, 2019).

b) <u>What measures can be taken to overcome the barriers?</u>

- **Resource measures**

A possible measure that could solve the problem of shortage of fruits and vegetables during the winter months in Belgium is innovative technology. The store owner of Ohne declared that she is interested in technology such as vertical farming but they lack the money for it.
As confirmed by the store owners, farmers tend to have low diversity in their crops. “*If you don't use artificial fertilizers and pesticides then you need a very healthy soil and you can only get a very healthy soil if you plant different things. Because if you plant every year the same crop, this crop always takes the same nutrition and then the soil gets very poor.”* (store owner “Lara kookt voor u”, personal communication, June 17, 2019) Farmers and organic farmers especially should get more information and sensibilisation about this issue. It will also help them as harvesting different crops lead to higher yields and more resiliency for changing weather conditions.

- **Market measures**

To gain a bigger market share, zero-packaging stores could try out other options, e.g. an online delivery system.

- **Regulatory measures**

The government could invest in sensibilisation and education (see further).

The government could invest in community gardens and research regarding urban agriculture, including innovative technologies.

- **Social measures**

Bringing your packaging to the store is not always perceived as convenient by the consumer. Therefore, the stores are providing alternatives that offer solutions. All three offer paper bags, or glass jars with a deposit system. Furthermore, "Anders winkelen" advises her clients to bring cotton bags, which are lightweight and thus more convenient, and to fill their jars afterward at home (store owner "Anders winkelen", personal communication, July 9, 2019). The designer of the website Bepakt mentioned the importance of innovation as according to him convenience is the most important factor for people to shop. He suggested that zero-packaging stores should focus on investing in convenience. He acknowledged that bringing glass jars to the shop and carrying it, is not so practicable and suggested to innovate in a lighter material and/or machinery doing the work for the customer. He stated the following: "*Zero-packaging shops shouldn't be like the shops in the past, they should adapt to the now. I imagine a zero waste supermarket where everything is standardized, where there is only one packaging kind and where machinery fills your jars/bottles etc. automatically, and where waste gets a new purpose."* (Bepakt owner, personal communication, June 11, 2019). MIWA, an organisation that aims to minimize waste, develops a similar standardised system that can improve the sales of packaging-free goods (MIWA, n.d.). With the use of a scanner on your phone, people can order the exact amount of food they want and in which packaging, where after it is being prepared automatically and thus quickly and conveniently.

Education and sensibilisation about the importance of a healthy diet, the benefits of organic agriculture & eating according to the seasons, and the importance of preventing waste, is needed. Media can play a role here but also the government (through e.g. campaigns, education in schools: vegetable gardens with kids maintaining it and eating the veggies for lunch). We have lost a food culture as the store owner of "Lara kookt voor u" explained: **"***The amount of food wasted is enormous because there's no personal connection with food anymore. If I get vegetables from a farmer and I see they're grown with love and I know the people who have grown this food with so much care, I don't want to throw this away. And if there's something that doesn't look that fresh any more than we use it in the soup or make bread pudding out of it or we eat it ourselves. That's why we have so little waste. So we don't only have little waste of packaging, but we also have little food waste. And I just think there is a mind shift needed and we need to stop wanting to eat strawberries in winter and have*

asparagus in the fall, and just eat what our farmers give us." (store owner "Lara kookt voor u", personal communication, June 17, 2019). As discussed in the literature review, the system analysis of a transition to a sustainable agro-food system in Flanders, suggests "eating differently" as an important niche regime. Changes in dietary patterns will significantly impact the agro-food system. The niche 'slow food movement' kind of represents what the zero-packaging store owner is stating. The movement states that we need to alleviate the importance of food and appreciate it. Developing a community feeling in vegetable gardens and protecting the environment are key ways of doing that according to the slow food movement (Mathijs, 2012).

Concluding remarks

The store owners believe that zero-packaging stores will continue to expand in the future as they notice that stores are still emerging nowadays and the Zero Waste movement is still spreading in Belgium. However, they state that having a zero-packaging grocery store at every corner of the street isn't feasible today because people aren't ready for that. The owner of "Anders winkelen" stated that it would be too early for her to have competition now in the same city. It took about two years now to break even, as confirmed as well by the store owner of Ohne, so having more competition would not make things easier. An interesting fact is that most zero-packaging stores provide extra services to their customers. "Lara kookt voor u" allows customers to have some food or drinks at her store and you can also order meals there in small or large quantities (catering). The new zero-packaging store in Bruges (Karmamarkt) allows you to take yoga classes there. "Anders winkelen" and Kabas in *Mechelen* organize all kinds of workshops related to their concept. They state that it adds personality to their store, and/or attracts possibly new customers and thus aids to the success (store owner "Anders winkelen", personal communication, July 9, 2019; store owner "Lara kookt voor u", personal communication, June 17, 2019). The designer of Bepakt mentioned that some zero-packaging stores had to close. These shops don't have it easy, it requires a lot of work, motivation, and patience to make it a success. It takes time for people to get used to the new concept and make it part of their habits. However, it is important to acknowledge that zero-packaging stores are part of a transition towards a more sustainable agro-food system in Flanders. Niche experimentation is part of a transition and in experimentation, you just have ups and downs. Supermarkets can learn from the practices from zero-packaging stores and that is what is happening now (see further).

3.2 Conventional supermarkets

RQ 3: How can the concept of zero-packaging grocery stores be implemented by conventional supermarkets?

a) *Are conventional supermarkets giving attention to moving to the zero-packaging, organic and local concept?*

Packaging

Zero-packaging grocery stores are exponentially growing and some supermarket chains are following the Zero Waste Movement by changing certain behaviour (Zero Waste Living Lab, n.d.).
In Belgium, changes are happening regarding plastic bags. Since the 1st of January 2019 plastic bags are forbidden in Wallonia, the transition period is over and retailers risk a fine of 50€ up to 100000€ if they provide it (Dehaye & Elsen, 2019). In Brussels, a ban for plastic bags is coming in September 2019. In Flanders, however, no official ban is coming for now. Nevertheless, this doesn't hold supermarkets in Flanders back as Aldi, Lidl, Delhaize, and stores from Colruyt Group (OKay, Spar, Colruyt & Bio-Planet) state they are going to remove plastic bags for fruits and vegetables before the end of 2019 (HLN, 2019; RTL Nieuws, 2019). Cotton reusable bags and paper bags will be the alternatives present (Hofman, 2019; Thijs, 2018). However, no drastic changes to reduce the amount of plastic packaging for a wider variety of goods have been implemented yet by these supermarkets. Plastic packaging is still used thoroughly in these conventional supermarkets in Belgium. Yet, Carrefour is as a mainstream supermarket the frontrunner regarding the limitation of plastic packaging in Belgium. On Friday 12/07/2019 Carrefour opened its first Carrefour Bio-store in Belgium (Brussels). The focus lies on Belgian, local and seasonal products. Besides fruits and vegetables, a wide variety of dry products are sold in bulk. Clients are encouraged to bring their reusable containers or cotton bags or can buy them there. The fruits and vegetables don't even have plastic/paper labels anymore as the label has been lasered on the peel. There are also two refill stations for washing liquids of Ecover (Goethuysen, 2019). It is said that Carrefour plans to open thirty Bio-stores in Belgium in the future, and about two more this year. In the past Carrefour already opened three stores in France and four stores in Spain with the same concept and they are a big success. By 2022, Carrefour would open a total of 120 Carrefour Bio stores (Belga & WHW, 2019). Moreover, Bio-Planet, OKay, and Delhaize are adopting tests in some of their stores with dry food in bulk (manager Delhaize, personal communication, July 7, 2019). See timelines 8 – 12 below for a clearer representation.

Carrefour is testing a model called LOOP in France, which is an online shopping service, where single-use packaging is excluded. Products are delivered in reusable containers with a deposit system and can be picked up and refilled after request. Carrefour is the first retailer testing this circular model that allows shopping in a zero waste way (Carrefour, 2019). On the reusable packaging, the brand and product information are present (Carrefour, n.d.), which makes marketing

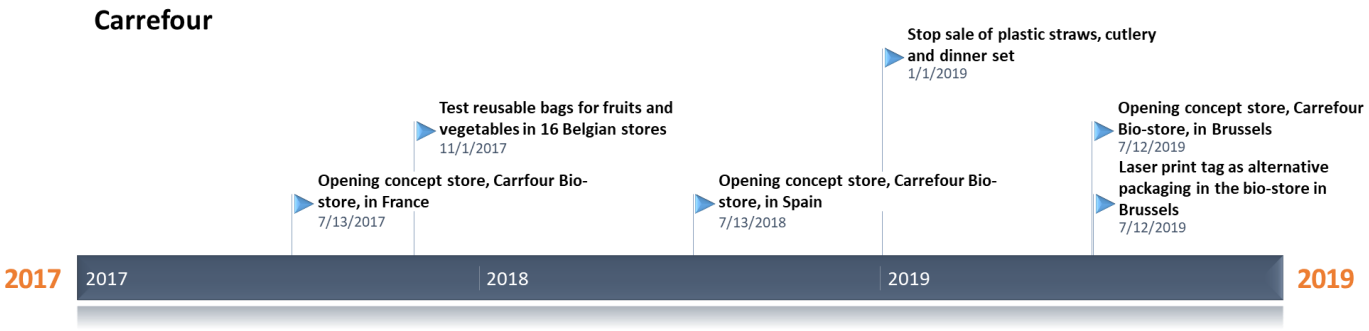
still possible. Also, Tesco is going to test this online shopping service with refillable containers after the trial in Paris by Carrefour (Hope, 2019). Large consumer goods firms (Unilever, Nestle, PepsiCo, The Body Shop, Mondelez, Procter & Gamble) are participating in the trial to see if this reuse and refill model can be successful in reality (Hope, 2019).

The British supermarket chain Marc & Spencer, with one shop situated in Brussels, published their ambition of becoming a zero waste business by 2025. They state that 1000 tonnes of plastic packaging will be eliminated with the adoption of different projects (Mark & Spencer, 2019).

Nevertheless, in America foods in bulk are going mainstream in conventional supermarkets. Kroger, Wegmans, and Hy-Vee are mainstream retailers selling all kinds of dry food in bulk. Bulk food is there thus not only for natural grocery stores anymore. Mainstream supermarkets in the USA are turning to bulk to gain a competitive advantage as a result of increasing consumer interests in natural unprocessed products. It is stated that bulk foods are simple to execute for retailers and that it leads to price savings of 15-20% compared to packaged alternatives for consumers. Consumers there are happy with the bulk foods as it allows them to experiment. Trying different products by buying as much or as little as they want is now possible. However, it is mentioned that educating consumers on how it works and/or helping when desired is very necessary, otherwise, they tend to turn to packaged goods (Wells, 2017).

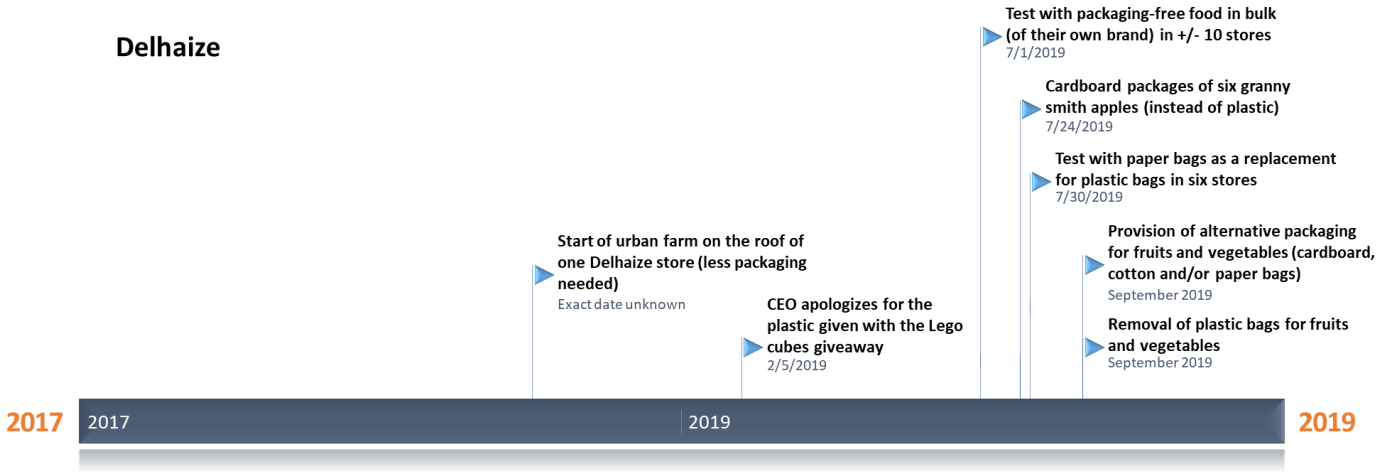
Waitrose, a supermarket active in England, started a trial at their store in Oxford (in June 2019) to investigate whether customers are ready to ditch plastic packaging and weigh and pack their food. Waitrose is the first national supermarket to experiment with zero waste practices for such a large variety of products (even wine and frozen food). Customers can borrow reusable containers there with a deposit system or can bring their own (BBC News, 2019). It is, in fact, cheaper for customers to shop there. The findings of the 11-week trial will determine which practices will be implemented in other stores of Waitrose (Smithers, 2019).

The conclusion is that a lot is happening regarding plastic packaging in conventional supermarkets. Worldwide supermarkets are trying out new ways to minimize or avoid the use of plastic. It can be stated that Flanders is a bit behind in the transitioning process compared to other countries (like the USA, England or France). However, initiatives in Flanders are appearing right now. Plastic pollution is discussed intensively in the news lately and this makes consumers critical.



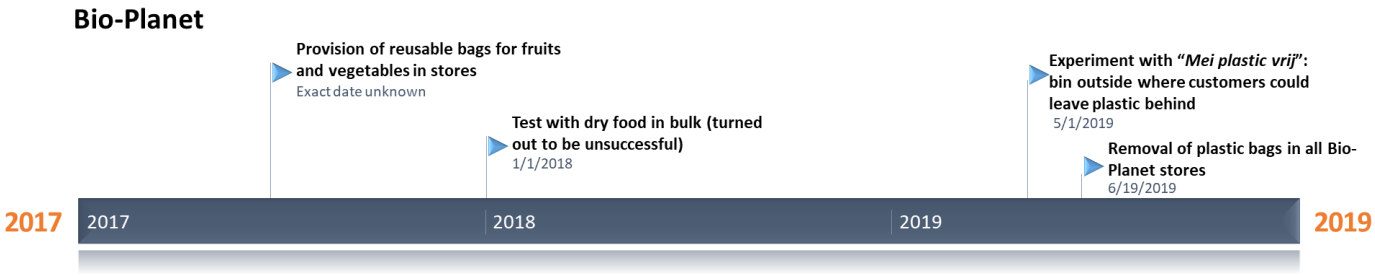
Sources: (Carrefour, 2019), (Gondola, 2017) & (cf. supra)

Figure 8: Timeline of activities regarding plastic packaging at Carrefour



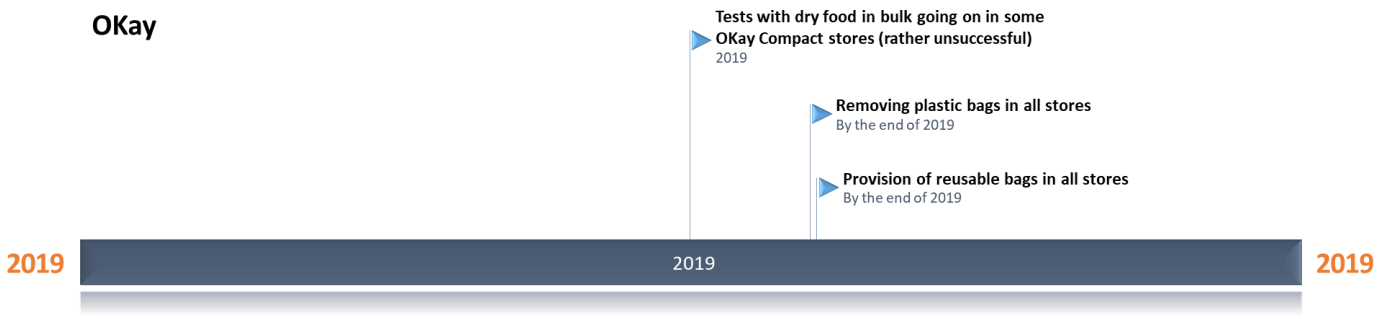
Sources: (Delhaize, personal communication, July 24, 2019), (Thijs, 2018) & (cf. supra)

Figure 9: Timeline of activities regarding plastic packaging at Delhaize



Source: (Bio-Planet, personal communication, June 21, 2019) & (Colle, 2018)

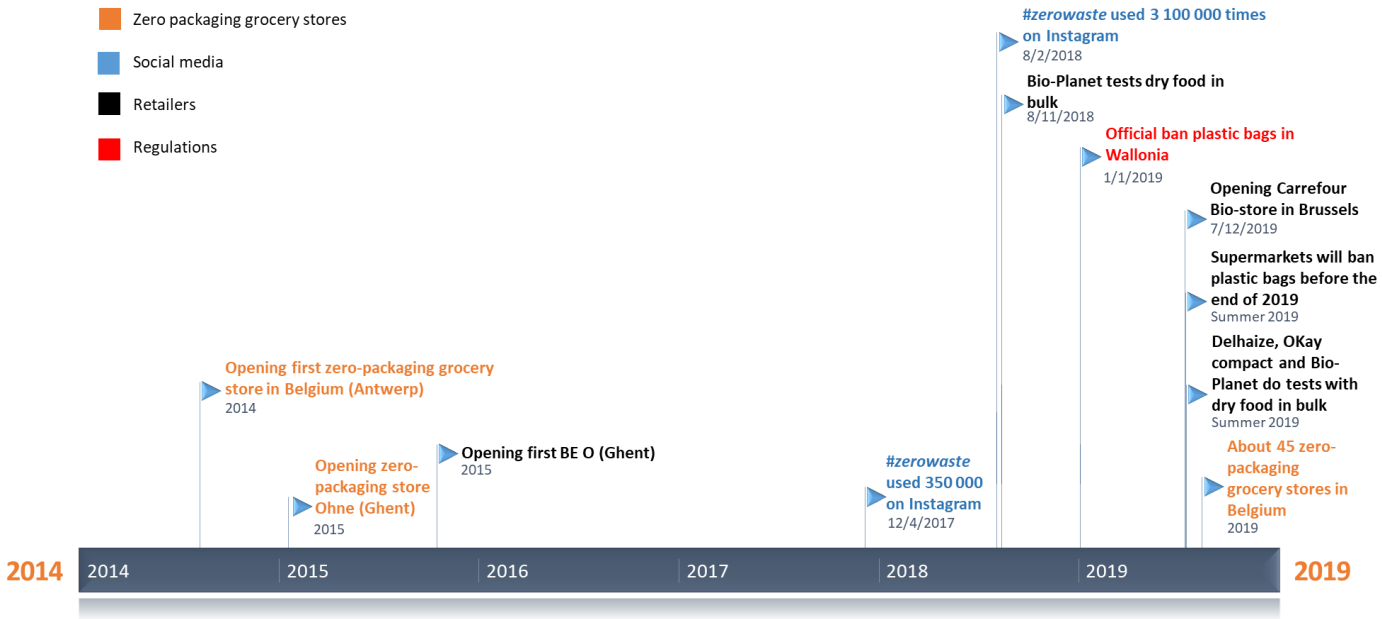
Figure 10: Timeline of activities regarding plastic packaging at Bio-Planet



Source: (OKay, personal communication, July 4, 2019)

Figure 11: Timeline of activities regarding plastic packaging at OKay

Figure 12 below is a summarizing timeline to provide a bigger picture of all the activities regarding the limitation of plastic packaging. The growth in #*zerowaste* on Instagram indicates an expansion of the Zero Waste Movement. This happened in line with an exponential growth in zero-packaging grocery stores in Belgium. Furthermore, summer 2019 seems to be a breaking point for several supermarkets in Belgium.



Source: (cf. supra) & (cf. infra)

Figure 12: Timeline of happenings regarding plastic packaging in Belgium

Organic

Organic food production started in the 1920s in response to the intense usage of chemical fertilisers in agriculture (Mathijs, 2012). Organic agriculture became very quickly conventional due to recent high demand for organic food. It has become one of the fastest-growing sections of agriculture.

Biological food is not only available in ecological stores or straight from the farmer. Supermarkets are increasingly selling bioproducts. Bio-Planet, founded in 2001 as part of Colruyt Group, is opening more and more stores and counts currently 31 stores in Belgium. Also Carrefour, Delhaize, Lidl, Colruyt, and Aldi confirm that their range of bioproducts is expanding due to increasing consumer demand (manager Delhaize, personal communication, July 7, 2019). Almost half of the sale of biological products in Belgium happens in supermarkets. The majority of bio food comes from Belgium. For example, 60% of the bio vegetables from Colruyt is produced in Belgium. Bio food coming from abroad is as biological as Belgian bio food as they are all as strictly verified to receive the bio label. Currently, the supply for bio food in Belgium is enough to answer the demand. However, the demand is growing and will soon exceed the supply. Biological farm enterprises in Flanders (468 in 2017) are growing: last year an increase of 9% was measured. Belgian farmers are open for transitioning to biological agriculture as it is regarded as a promising niche due to increasing consumer demand. Furthermore, it is more likely that they receive an honest price for biological crops. However, compared to the European average of 6% (quantity organic agricultural land on total agricultural land) Flanders is with a 1,2% very slow in transitioning to organic agriculture. However, Belgium as a whole has 6,4% organic agriculture land. In the last years there is an acceleration and this should be maintained, otherwise, more import of bio food from neighbour lands will be necessary (Dambre & Grommen, 2018). The latter wouldn't be cherished by Belgian farmers. Colruyt and Carrefour are helping traditional farmers in transitioning to organic agriculture. Carrefour opened very recently its first Carrefour Bio-store in Belgium (cf. supra), offering about 3000 biological products (Belga & WHW, 2019).

Local

In general, it can be stated that supermarkets are given attention to provide more local products and/or food coming from Belgium. Having the right vegetables according to the right seasons is something they follow precisely at the OKay supermarket from the Colruyt group (manager OKay, personal communication, July 7, 2019). A manager of Delhaize mentioned that 70% of their brand assortment is sourced in Belgium. The provision of local food is part of Delhaize's strategy (manager Delhaize, personal communication, July 7, 2019). However, all conventional supermarkets sell tropical products that cannot be found in Belgium nowadays to satisfy consumer demand.

b) <u>Are there barriers for conventional supermarkets and if so, what are those?</u>

- **Resource barriers**

Practical side of plastic

Both managers from Delhaize and OKay commented that packaging helps to combat food waste since some products preserve longer when packaged (manager Delhaize, personal communication, July 7, 2019).

A manager of Delhaize explained that supermarkets, including Delhaize, use plastic around biological fruits and vegetables to be able to distinguish them from non-bio food for the customer and for the cashier (as bio-food is usually more expensive). No alternatives have been found yet. A laser print, for example, can only be used on crops with a strong peel (manager Delhaize, personal communication, July 7, 2019).

Suppliers (big brands)

"Suppliers have to change their practices" is named as a barrier for expansion of the zero-packaging concept in the scientific study (Beitzen-Heineke et al., 2017) and is confirmed by managers of OKay and Bio-Planet. The goods they are selling come from their suppliers who are responsible for the packaging they use to deliver the products. The marketing manager of OKay stated that they don't have enough impact on the packaging of their suppliers. It is, in the end, the customer who has the biggest influence: *"Of course as a mainstream retailer we want to encourage this* (reducing packaging) *but we won't refuse it. The client does not ask us to do so."* (manager OKay, personal communication, July 7, 2019).

As reported by Greenpeace, multinational corporations are the major contributors to plastic pollution. Coca-Cola, PepsiCo, Nestlé, Danone, Unilever are only a few examples of brands identified when plastic waste was collected around the world (Cobbing, 2017). A manager of Delhaize, who is part of Delhaize's sustainability team, commented that their bulk tests are only for their products (from their brand Delhaize) and aren't aiming for any changes from multinational corporations (manager Delhaize, personal communication, July 7, 2019).

The marketing manager of OKay mentioned that OKay hasn't done tests with alternative eco-friendly packaging and that tests usually come from the suppliers instead. She gave the example of 'Sanex' for shower gels, who offers now refill packs of shower gels and is promoting them with the fact that consumers save 70% plastic by buying the refill instead of a new original bottle. She added that in a lot of cases these types of initiatives come from the supplier and that Colruyt group is open for more. *"You are thus very dependent on your suppliers? We can play a role ourselves. We can also, of course, be more demanding and say to our suppliers we don't want any plastics anymore. We know that a lot of multinationals are moving to reduce plastics, so that is a good thing. Are we in a position today to say we only want 100% recyclable plastic bottles? I think we are not able to go there today. I think that would limit the offer to our customers who still want Coca-Cola bottles."* It is questioned with this quote whether suppliers are truly limiting retailers in becoming packaging-free, or whether the true reason is more the lack of willingness of retailers and reinforcing consumer behaviour. Nevertheless, changes are happening since some suppliers are adapting. The Naked Shop, a zero-packaging store in Paris (open since 2018), offers liquid products from big brands like L'Oréal and The Body Shop in bulk (Garnier, 2019).

Financial issue

It is clear from the interviews that consumers have a great influence on the practices of supermarkets. Although, OKay remains a business where profit maximization receives priority: "*Going into bulk tomorrow, from an economic point of view, if customers always buy a six pack of apples but now you can take them loose, there is a chance that you would buy only four apples, instead of six. From a food waste point of view, it is completely good. Because maybe you don't need six apples, you need four and there is a risk you will throw away the two others. From an economic point of view: I'm losing two apples when I'm selling it. I would lie to you if I would say that this is not an aspect we have to take into account."* (manager OKay, personal communication, July 7, 2019).

From an economic point of view going to bulk is a huge investment as their supply chains need to be changed, people need to be employed for cleaning the bulk, etc: "*All our warehouses now and all our processes in the supply chain are fit with these card boxes and certain products. You should redesign the whole warehouse if you do it in another way. Imagine your shower gel from Dove coming in large boxes: it is completely different in your supply chain strategy. It has a big impact. Although the big retailers can have maybe the money to go there, this investment is huge if you see the impact on the whole supply chain."* (manager OKay, July 7, personal communication, 2019).

- **Market barriers**

Competition between conventional supermarkets is big and so predicting market evolution is crucial for the competitiveness of retailers, as confirmed by Okay: "*If tomorrow on the market bulk will become mainstream, I think OKay will also follow. We are a classical type of supermarket, I think we will move with the speed of the market. We will try innovative things to see what will happen, but today we also see that if we go too far our customers today are not interested in it."* (manager OKay, personal communication, July 7, 2019). In the OKay Compact store, they have tried selling dry products in bulk to see how the market is evolving and to see if their customers are happy with it. Unfortunately, it wasn't successful.

A marketing manager of OKay argued that the adoption of a local, organic and zero waste food supply could attract new **customers** but could lose others: "*Today I think that, if we go too far in that, the risk of losing more customers than we will gain, is realistic. OKay is really about evolving with the customer expectations for OKay. We will go there if our customer is ready to go there. On the one side, recruiting new customers is important. But on the other side, it's only relevant if you don't lose others."* (manager OKay, personal communication, July 7, 2019).

- **Regulatory barriers**

Regulations or incentives that support the sale of local food (e.g. import taxes) or zero waste practices are missing and this can be seen as a barrier (manager Delhaize, personal communication,

July 7, 2019). The lack of these types of regulations doesn't stimulate retailers to change their operation processes since they are also faced with high competition on the market (see further under regulatory measures), consumer behaviour and multinational corporations.

When asked about possible regulations hindering a transition to bulk food, a manager of Delhaize responded that food safety regulations for meat and fish make it hard (manager Delhaize, personal communication, July 7, 2019). A butcher servicing unit like in the past can be a potential solution.

- **Social barriers**

Consumer behaviour regarding plastic packaging

Social perceptions are changing nowadays*: "We are aware that things are evolving and changing very rapidly. Also, the customer expectations are changing very rapidly from that point of view. I think the media plays a key role there."* (manager OKay, personal communication, July 7, 2019). The supermarket notices that there is consumer demand for less packaging, nevertheless it is currently still a relatively small niche but it is growing. For example, Delhaize launched a campaign with Lego blocks toys with each toy packaged twice in plastic. Delhaize received tons of negative consumer reactions up to the point where the CEO apologized for it with the press (Radio 1, 2019). A marketing manager of Okay commented that this would have never happened five years ago (manager OKay, personal communication, July 7, 2019). A manager of Delhaize confirmed that they notice an increasing consumer demand for less packaging as a result of media attention to plastic pollution. She explained further that Delhaize focuses on four consumer groups and one of them is the expanding group of "game changers": consumers who prefer natural, healthy, clean and organic products (manager Delhaize, personal communication, July 7, 2019).

"What is important today in dry food is that you have a lot of A-brand manufacturers, like Knorr or Barilla for pasta. Our suppliers are really an important stakeholder for us. I think that today our customers for OKay are expecting to see these brands and these goods. So if we would decide on our own to only have products in bulk I think it won't strike with the customer's expectations today." OKay stated that customers of OKay are not ready today for food in bulk. However, it is acknowledged that this can change in the future: "*Will this evolve in the future? Maybe yes, I could imagine that if you have a bulk supply of pasta from Barilla and still can see as customer 'this is the Barilla pasta' then maybe we would go there."* Moreover, she added that it will take the time it will take. The trend for bio food, for example, happened also slowly and is still growing. Biological food was still a niche ten years ago, and today you see it is mainstream in some product categories in supermarkets. She stated that the same thing will happen with packaging (manager OKay, personal communication, July 7, 2019). Consumers are currently not ready for bulk. If OKay notices an increasing consumer demand and the market is evolving towards zero waste practices, then OKay will certainly follow: *"From a sustainability point of view for the Colruyt Group, we do a lot of things*

behind the scenes. Think about our wind turbines, we are generating our electricity. From a customer's point of view, it doesn't make any difference. Zero waste shopping on the other hand impacts the customer behaviour, so it should be the rhythm of the customer and of course the media, and societal discussions will influence this evolution and will, of course, force us to follow this rhythm." (manager OKay, personal communication, July 7, 2019).

Consumer behaviour regarding local food

A barrier for the provision of local food is that customers are not willing to pay more for local products. OKay launched an initiative where soup was made by unemployed people with vegetables that otherwise would have been thrown away. The product is more expensive than the soups of Knorr for example because Belgian employees need to be paid and it doesn't have the efficiency of the mass market of Knorr. OKay observed that customers today don't want to spend money on that. This holds them back in trying out similar sustainable projects. *"You can have a lot of good intentions and you should have good intentions and then you have the economic reality that kicks in."* (manager OKay, personal communication, July 7, 2019). Moreover, the same problem also appears with fruits and vegetables. For example, at a certain time of the year, green beans grow in Belgium. However, even during this period, OKay still offers both: the green beans from Kenia and Belgium. The green beans from Kenia are cheaper and customer preference tends to go for the cheaper ones.

Another social barrier for the provision of local food is the desire of consumers of having certain products all year round. The marketing manager of OKay mentioned that they get complains if they don't sell blueberries in winter. OKay will continue to source them from South Africa or Peru if there is consumer demand. She stated that currently there are different segments in customer behaviour: some effectively avoid goods coming from so far, others don't as they find the price more important than the local aspect (manager OKay, personal communication, July 7, 2019). A manager of Delhaize, who is part of Delhaize's sustainability team, said as well that as long as there is demand for foreign products, they will supply it (manager Delhaize, personal communication, July 7, 2019). The consumer plays thus a big role here.

Retailers/consumers are too little informed correctly

The marketing manager of OKay stated that consumers' perception is not always accurate or based on in-depth evaluation: "*I think perception today influences the discussion on plastics a lot and not always from a realistic point of view. For example, the plastic wrap around a cucumber: the plastic is helping you to conserve the cucumber longer (prevention of food waste). So, what is the cost of food waste against the cost of plastic? And where is the impact from an environmental point of view bigger?"* The desire for less plastic leads to more "window dressing" in the retail world, as confirmed by a marketing manager of OKay. She is questioning the environmental impacts of limiting plastic packaging (manager OKay, personal communication, July 7, 2019). A manager of Delhaize

responded similarly saying that plastic isn't necessarily bad and that for some products it is unavoidable. She added that plastic will definitely and continuously be used in the future (manager Delhaize, personal communication, July 7, 2019). However, scientific research confirms that plastic intrudes nature and is contaminating our food. Besides, the recycling rates are very low (European recycling rate is 30%) which means that virgin plastic is still widely necessary. The latter is produced by drilling oil or fracking cheap shale gas. Plastic packaging thus adds up hugely to the environmental impacts of the food industry (Cobbing, 2017). The interviewed managers from Delhaize, OKay and Bio-Planet are potentially unaware of these findings.

A manager of Delhaize explained that the main focus of Delhaize concerning limiting packaging is on fruits, vegetables, meat and fish since in these categories plastic is used the most. It was asked then if she forgot the other product categories where plastic is probably even more used. After precision of which products were meant, namely other packaged products in supermarkets like dry food, cleaning products, soft drinks, etc., she reflected and recognised that Delhaize should also look at those. Furthermore, the manager stated that alternatives for single-use plastics will be provided by 2020, as mentioned on the website of Delhaize. This seems like a progressive goal. However, according to Delhaize single-use plastic only refers to plastic cutlery, cups, and plates. Even though practically all plastic packaging is for single-use (there are no refill options) (BBC one, 2019).

c) What measures can be taken to overcome the barriers for conventional supermarkets?

- **Resource measures**

More in-depth research is needed on the impacts of limiting packaging on food waste prevention, etc. Some supermarkets state that plastic is necessary for food safety regulations and to prevent food waste. However, zero-packaging stores are doing it: they are providing bulk foods and thus avoiding plastic while limiting food waste at the same time. There needs to be more scientific research studying these trade-offs by looking at all the processes and possible consequences. The marketing manager of OKay mentioned that the Colruyt Group would also like to see this happen (manager OKay, personal communication, July 7, 2019).

Furthermore, the results of research should be published through the media for sensibilisation and education of consumers, retailers, and policymakers. Also, the influences of possible regulations supporting the sales of local food (e.g. import taxes) should be investigated. As stated by managers from OKay and Delhaize, the provision of more local products can positively influence the amount of packaging. Delhaize has adopted an urban farm on the roof of one of its stores. The crops go straight from the roof to the store whereby all packaging is avoided. More of these urban farms could be a potential solution. Moreover, Delhaize and Colruyt Group are considering vertical farming by

investigating its practicability and efficiency (manager Delhaize, personal communication, July 7, 2019).

- **Market measures**

Social measures (in the form of education and sensibilization) and regulatory measures (new laws) will influence the market in the sense that it will influence customer behaviour and the competition between retailers.

- **Regulatory measures**

Today, there are about 400 extended producer responsibility (EPR) schemes in operation for various products including batteries, electronic equipment, vehicles, and packaging. The European Commission stated that by 2025 a mandatory EPR scheme has to be put in place for all packaging to achieve the set of new recycling targets for waste (European Commission - DG Environment, 2018). The most common instruments for EPR are firstly take-back requirements and secondly fees (OECD, 2016). For example, in Belgium, the average fee charged to producers per tonne of domestic packaging put on the market is about €78 (European Commission - DG Environment, 2014). The problem is that manufacturers don't get enough incentive to make their products recyclable. Consequently, recycling is abundant. If they would be fully responsible for the waste, they would do everything they can to design something recyclable since most plastic packaging nowadays consists of a mix of different types of plastics and colours (for marketing purposes), making it impossible to recycle (Bepakt owner, personal communication, June 11, 2019). They should pay 100% of the recycling cost and not 10% as it currently is (BBC one, 2019). As expressed by OKay and Bio-Planet, suppliers have a big influence on the packaging of their products.

In Wallonia, there will come a ban of unnecessary plastic around publicity folders. The marketing manager of OKay is in favour of these kinds of regulations as they will help retailers in the future with limiting packaging. She explained that in the market there is high competition and if they would be the only retailer quitting plastic packaging around folders, they would lose a competitive advantage on the market (manager OKay, personal communication, July 7, 2019). When it is a regulation, everyone is obliged to cut it off which means no one will have a competitive advantage. The same thing would happen if bulk food becomes mandatory, for example.

Furthermore, the marketing manager of OKay commented that the government could play a role and intervene with the issue of a price difference between Belgian products and products from abroad. The principal reason that retailers are still offering veggies/fruits from far away even if Belgian ones are available is that, besides consumer demand for a cheaper price, other retailers are offering them (manager OKay, personal communication, July 7, 2019). If the government introduces a regulation,

like an ecotax that would multiply the price of imported goods, it will affect all retailers in the same way.

- **Social measures**

Sensibilization is necessary, in combination with legislation. Anyone who believes that bottled water is better than tap water is mistaken since is it not healthier, unnecessary and more expensive. Consumers keep on buying it because it is so convenient (BBC one, 2019). So besides education around plastic packaging, we need legislation too since convenience is driving consumer behaviour (Kelley, 1958). Moreover, managers from retailers need correct information on their food supply chains and on all aspects of sustainability.

A marketing manager of OKay suggested that education should come from all key players (government, schools, media, businesses) together since that would be most effective. More consumer demand for less packaging will stimulate retailers to implement zero waste practices, as mentioned by a manager of Delhaize (manager Delhaize, personal communication, July 7, 2019).

3.3 Ecostores

RQ 4: To what extent are ecostores adopting the concept of zero-packaging, local and organic food?

Ecostores are stores selling exclusively organic food. About 33% of the sale of organic/biological food in Belgium happens in ecostores so they are consequently interesting to discuss. In Belgium, there are various kinds of ecostores with different operation processes and sizes. Bio-Planet is a biological supermarket from Colruyt Group selling over 6000 bioproducts per store. Plastic packaging is widely used at Bio-Planet and there are no bulk options (manager Bio-Planet, personal communication, June 21, 2019). Origin'O, Biovita, "het Natuurhuis", Bioshop, BE O, the Barn Bio Market, and Färm are other examples of ecostores. The majority of goods in ecostores are from Belgium and exotic products that don't grow in Belgium (kiwi, bananas, coffee, rice,…) come from abroad (manager BE O, personal communication, July 13, 2019). Some ecostores, namely BE O and Färm, limit the amount of packaging by selling a large majority of their products in bulk in the same way as zero-packaging grocery stores do. The conclusion is that shopping at ecostores is enabling a more sustainable food consumption as their focus goes to organic food protecting the environment and some even go further by avoiding plastic packaging and/or prioritising local food.

Managers from BE O and Bio-Planet were interviewed for this research. Pictures of how these stores look like are presented in appendix 7 to have a visualisation of the differences.

BE O's concept is based on the concept of a market. A manager of BE O sees BE O thus more like a market than as a store, selling every day fresh products. Three years ago, the first BE O fresh market opened its doors in Ghent, after that another one opened in Nevele and the third one opened

in Antwerp in January 2019. Their concept is furthermore “biological and affordable”: it is their mission to reconcile the two words. They make their 300 biological products payable by bringing the products straight from the farmer’s field to BE O’s market. Although BE O prefers a local / Belgian product assortment, it also works with Italian, Greek, French and Spanish producers (BE O Antwerpen, 2019). Moreover, they don’t market themselves as packaging-free, even if they generally are as dry products are sold in bulk and regular plastic packaging is nowhere to be found. Also, organic wine can be bought in bulk with reusable bottles. Products arrive in big cloth bags, big plastic bags or cardboard boxes. During transportation, goods need to be packed in something to protect it and to comply with food safety (manager BE O, personal communication, July 13, 2019). They do offer plastic containers for salads in the store, but they are compostable. However, whether these are really more environmentally friendly is questioned a lot (Cobbing, 2017) and a manager from BE O recognized this. Moreover, BE O intends that customers can shop in a nice atmosphere and feel at ease. There is plenty of room, it is quiet, and they can enjoy a free cup of coffee. Moreover, the manager states that a good atmosphere between employees is upheld and everyone shares equal values and attributes great importance to a healthy diet and lifestyle. BE O has an open culture, inspired by the book “reinventing organisations” by Frederic Laloux, where everybody can share their ideas and have responsibilities (manager BE O, personal communication, July 13, 2019).
BE O also succeeds, like the zero-packaging grocery stores, in limiting food waste thoroughly. They work with the “too good, to go” app enabling pickups of crops at the end of each day. Also, before their two closing days, they give away leftovers to *veganation*, an organization offering fresh meals for low prices to support underprivileged.

Bio-Planet is part of Colruyt Group (like Spar, OKay, Colruyt and Dreamland) and it is a supermarket entirely organized through operation processes any supermarket would use. Each of the supermarkets of Colruyt Group has its brand strategy and Bio-Planet is a supermarket that wants to take leadership in conscious consumption, as confirmed by the regional manager of Bio-Planet (manager Bio-Planet, personal communication, June 21, 2019). During the nineties, a sequence of crises in the food chains led to consumer demands for more transparency. This triggered the introduction of Bio-Planet with the first opening in 2001 and gradually leading to 30 stores in Belgium today. The regional manager mentioned that Bio-Planet certainly gives attention to provide local products since about 70% of their products are from Belgium. They do sell products from other continents, like pineapples, mango, and kiwi (manager Bio-Planet, personal communication, June 21, 2019).

a) *Are there barriers for ecostores and if so, what are those?*

Only a few barriers (and measures) were found for BE O as BE O is already very successful in the adoption of a zero-packaging, local and organic food supply.

- **Resource barriers**

BE O tries to offer Belgian products as much as possible. Some goods don't grow in Belgium, thus for those import is necessary. However, they want to keep their assortment affordable to their customer so in some cases, they choose foreign products over Belgian (more expensive) ones. These are the trade-offs they have to make to comply with the concept of their store (manager BE O, personal communication, July 13, 2019). According to a manager of BE O, more and more Belgian farmers are switching to biological food because there is more and more demand. You can observe an increase in ecostores or markets, similarly as BE O.

BE O works with seasonal products and stated that this could potentially be seen as a barrier but so far customers are supportive of that. BE O mentions on their website that they work with seasonal products and explain it to their customers when being asked about missing crops (manager BE O, personal communication, July 13, 2019).

Biological goods are faced with strict controls to get certified. All biological food has the same certification. BE O mentioned that they had farmers showing up saying that they don't use any artificial additives and want to supply to BE O their organic crops. But BE O, like all stores, can't accept that. Getting certified is a big financial investment for farmers and this is usually the problem (manager BE O, personal communication, July 13, 2019).

Another barrier regarding organic food is that organic food doesn't get sprayed on with chemical additives, as a manager from BE O explained, and consequently, they maintain fresh a shorter amount of time than conventional crops.

The regional manager of Bio-Planet stated that some basic products can never be local, e.g. chocolate, coffee, and tea.

- **Market barriers**

For dry products, Bio-Planet could change to bulk but the regional manager commented that they are evolving at the pace of the competition. If the competition regarding limiting packaging would grow, then it would mean that the customer is evolving in that way and then Bio-Planet can adjust, as said by a manager of Bio-Planet. She explained further that there is a difficult balance to strike between motivating people to behave a certain way and not being too moralizing (manager Bio-Planet, personal communication, June 21, 2019).

- **Regulatory barriers**

The regional manager of Bio-Planet argued that food safety regulations make it impossible to work without plastic for ultra-fresh products that could get contaminated: namely meat and fish. For dry products, on the other hand, it would work out (manager Bio-Planet, personal communication, June 21, 2019).

Furthermore, the manager of Bio-Planet explained that there is a regulatory barrier for the provision of local food. For some small local suppliers, it is impossible to comply with legal requirements that

apply in a retail context. Retailers are obliged to track the food chain (barcodes are for example needed). Consequently, there is some form of initial investment necessary to be able to sell to supermarkets.

- **Social barriers**

A regional manager of Bio-Planet stated that she believes that Colruyt Group is already close to being zero waste in the sense that they almost achieve a closed recycling system with a recycling rate of 85%-90% (manager Bio-Planet, personal communication, June 21, 2019). However, the recycling rate in Belgium is below 45% so a rate of 85% is an unrealistic thought nowadays.

Bio-Planet has conducted tests in some of their stores with dry food in bulk (while still offering pre-packaged food) but the tests failed since the vast majority of their customers preferred the pre-packaged food (manager Bio-Planet, personal communication, June 21, 2019). These bulk tests failed because of several reasons, e.g. lack of information and plastic single-use containers were provided for customers who forgot their reusable packaging. The latter potentially led to confusion of the purpose of the bulk concept (Colle, 2018). However, they are going to do another test with bulk again. A manager of Bio-Planet explained that media has a huge influence on this: *"plastic becomes, has become a very bad thing, even to such an extent that necessary topics, such as food safety considerations and food waste prevention have lost the attention they deserve*". Next, she continued saying that for the meat department food safety without plastic becomes very difficult. They currently have a combination of a classical servicing unit and prepacked meat which allows clients to shop faster and allows them to work more steadily.

Interestingly, the manager of Bio-Planet added that the demand for local products in Wallonia is bigger than in Flanders. They got reactions when they were selling Flemish bread in Wallonia. She hypothesized that this can be because the economic importance of farming is (still) more important in Wallonia than in Flanders (manager Bio-Planet, personal communication, June 21, 2019).

b) <u>What measures can be taken to overcome the barriers for ecostores?</u>

- **Resource measures**

Buying straight from the farmer, without an intermediary, is enabling BE O to make organic food affordable and thus having a competitive advantage on the market. Furthermore, it improves the freshness of products as the supply chain is shorter and thus saving time. A manager from BE O stated that this is another main reason why they chose to avoid distributors.

The managers from Bio-Planet and OKay mentioned both that the Colruyt Group is considering investing in innovative technologies like vertical farming since it can be an efficient way of cultivating food. However, food grown by vertical farming can by definition never get the organic certification. This is another legal barrier.

- **Market measures**

/

- **Regulatory measures**

The government hasn't offered any assistance or incentives for limiting packaging, as mentioned by the regional manager of Bio-Planet. There are evolutions towards the prohibition of certain behaviour (like repack for magazines) and she thinks that's positive. However, prohibiting behaviour is not the same as stimulating others. Subsidies for selling dry products in bulk would make it easier to implement it in the stores, suggested the regional manager of Bio-Planet (manager Bio-Planet, personal communication, June 21, 2019).

- **Social measures**

A manager from BE O mentioned that her customers are doing efforts for limiting packaging since more and more customers bring their jars and their bags. She stated that this is because plastic pollution was discussed a lot in the news and social media lately and you also see retailers banning plastic bags. BE O even got requests for selling zero waste articles (like soaps, bottles, cups, toothpaste, etc.) but they refused as their focus goes to food. However, a manager from BE O commented that people should be guided more since some people want to change but don't know how. Therefore, BE O decided to organize events (readings) to promote a healthier and more sustainable lifestyle, including zero waste practices (manager BE O, personal communication, July 13, 2019).

The regional manager of Bio-Planet mentioned that media attention about the importance of buying local products and eating seasonal could influence consumer behaviour. She added that footprint information should be included in the local food discussion since certain products from Spain potentially have a lower footprint than certain products from Belgium (Spain has more solar energy) (manager Bio-Planet, personal communication, June 21, 2019).

The regional manager of Bio-Planet stated that more investments should be made in the research of finding solutions to limit food waste without packaging. She is sure that every retailer could use help as eliminating plastic would lead to abandoning a big part of their assortments (manager Bio-Planet, personal communication, June 21, 2019).

4 Discussion and recommendations

The overarching research question of this research is: *How can the concept of zero-packaging, local and organic food, as implemented by zero-packaging grocery stores, become mainstream?*
Zero-packaging grocery stores are still emerging nowadays. A strong expansion of them would in terms of supply be feasible but in terms of demand not. Currently, there are one to maximum two stores in a city in Flanders and this is according to the three store owners enough at this moment. It is still a relatively small segment of consumers who shop at zero-packaging grocery stores. It already took time for them to gain loyal customers so more competition wouldn't be doable. Therefore, it is concluded that the best way to make the zero-packaging concept mainstream is the implementation of it by supermarkets.

Sustainability science and transition studies were found suitable for this research. Sustainability issues are usually inherently complex through the interwovenness of technological, economic, ecological and institutional processes. Sustainability science allows for an integrated assessment and is thus able to reflect the complexity and the multidimensional character of sustainable development (Martens, 2006). Transition management is a method of sustainability science since it sees society as a complex adaptive system where change results from the interaction between the different societal levels, multiple domains, diverse actors and different moments in time (Kemp et al., 2007).

In first instance, it was very difficult to provide clear recommendations as the topic of this research is very complex. Everything is connected to everything and thus to solve the barriers different measures will have to be implemented. As suggested by Kemp et al. (1998) niche policies need to touch upon the different barriers in combination as they interact with one another. The analytical framework with the classification that outlines drivers and barriers for sustainability initiatives in food chains was very useful to maintain an overview. Furthermore, the multi-level perspective was used to understand the complexity of the system and the trade-offs and tensions between landscape, regime, and niche (see figure 13).

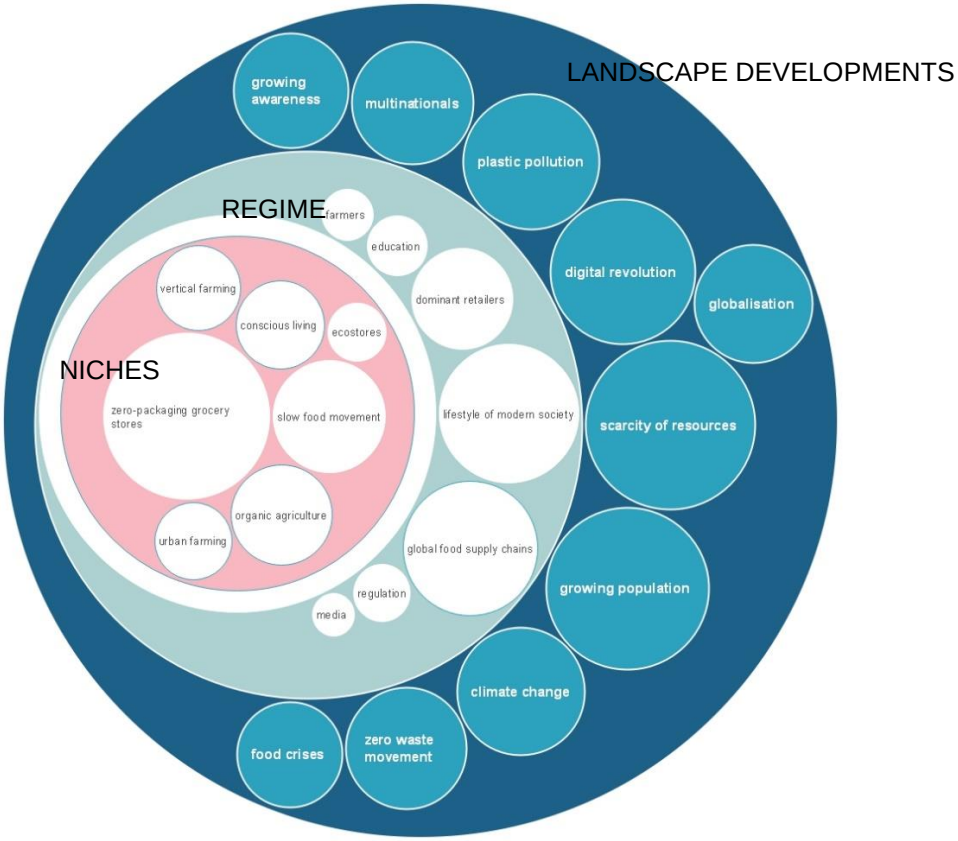


Figure 13: MLP perspective on food system

It can be stated that there is a small regime adaptation happening nowadays in the retailer world. Dominant retailers in the regime are changing some of their practices to be more sustainable. This is partly due to the increasing consumer awareness of climate change and the unsustainability of global food supply chains. New concept stores, new regulations and more zero waste practices (bulk sections) are emerging in conventional supermarkets and ecostores. Sustainability science and transition management were thus useful for this research as a framework for the analysis of the inherently complex agro-food system.

Recommendations for policy and/or society

Main barriers & measures

Concerning packaging

Table 4: Barriers and measures concerning the limitation of plastic packaging

Packaging	Barriers	Measures
Social factors	Not enough pressure from consumers Consumers want their brands Lifestyle of modern society Too little awareness of the negative aspects of plastics Convenience is driving consumer behaviour Economic profit is of critical importance for retailers	Investing in scientific studies (e.g. on the interactions between plastic and food waste) Education and sensibilisation (through correct and concrete information, slow food movement, mindfulness, vegetable gardens in schools) Opening of / promoting a standardized zero waste supermarket Publicity of scientific results in media Clear communication with customers during tests with bulk
Regulatory factors	Not enough regulation regarding plastic packaging (only ban on plastic bags and single-use plastics)	Implementation of regulation banning plastic for dry products and extended producer responsibility (polluter pays principle)
Resource factors	Dependence on big brands that are changing (too) slowly	Joint agreement between big brands and retailers
Market factors	High competition between retailers	Joint agreement between retailers (removes all competitive advantages) Business models based on service (LOOP example)

Concerning local food

Table 5: Barriers and measures concerning the provision of more local food

Local food	Barriers	Measures
Social factors	Consumers unaware of importance of eating seasonal Consumer demand for foreign goods all year round Economic profit is of critical importance for retailers Consumers choose cheaper over local food Retailers don't promote seasonal food actively	Consumer education and sensibilisation (through correct and concrete information, slow food movement, mindfulness, vegetable garden in schools) Active promotion of seasonal food by retailers
Regulatory factors	No regulation supporting local food over foreign food No regulation regarding eating seasonal Small local farmers struggle to comply with the legal requirements for selling to retailers	Import taxes or subsidies allowing an equal price between Belgian and foreign goods Ban of selling tropical fruit and vegetables in winter Subsidies for investments in technologies and urban farming Regulation regarding cement stop More support to local farmers (so that they can supply to large retailers)
Resource factors	Very limited usage of innovative technologies Very limited urban farming Scarce open space in Flanders Some crops don't grow in Belgium (especially in winter)	Investments in technologies and urban farming Cement stop
Market factors	High competition between retailers	Joint agreement between retailers (removes all competitive advantages)

Concerning organic food

Table 6: Barriers and measures concerning the provision of more organic food

Organic food	Barriers	Measures
Social factors	Consumers are unaware of the meaning of organic	Consumer education on organic food and its benefits for health and environment
Regulatory factors	Cost price of getting certified	More support to farmers when transitioning to organic agriculture (e.g. subsidies, assistance)
Resource factors	Not all organic farmers are diverse	Sensibilisation on importance of growing different crops for a healthy soil and resilience for changing weather
Market factors	Organic food is more expensive	Subsidies for supporting organic agriculture

The conclusion is that retailers face numerous barriers for the expansion of the organic, local and zero-packaging concept. However, there are also numerous measures to respond to them. For a successful transition to a more sustainable food system, a package of different measures of each factor group should be adopted.

It can be stated that there is still a long way to go. This is illustrated, for example, by the fact that Bio-Planet represents its mission as “taking leadership in conscious consumption”, but regarding plastic packaging, they are certainly not the frontrunners in transitioning away from plastics. This was also confirmed by the marketing manager of OKay (manager OKay, personal communication, July 7, 2019). Furthermore, Delhaize is one of the biggest retailers in Belgium and their goals for the limitation of packaging are not very progressive. The most influential aspect, as illustrated by all interviewees, are the consumers themselves. Cultural change is thus important in this transitioning process. Consumers are in this case the Flemish population who have a Western lifestyle and where burnout and stress are common problems in society (Agentschap Zorg & Gezondheid, 2018; KU Leuven, 2019; KVDS, 2018). It is said that the average Flemish citizen has a lack of resilience. Their nerves tend to be tensed, which is confirmed as well by the relatively high usage of medicines (Vroom & Vandenabeele, 2018). This can be seen as a problem for changing shopping behaviour or raising awareness on sustainability issues since new information can potentially be neglected by ‘overloaded’ people (Rogiers, 2019b). Given that, mindful people tend to behave in a more sustainable and environmentally friendly way (Barbaro & Pickett, 2016; Ericson, Kjønstad, & Barstad, 2014; Hunecke & Richter, 2019).

The opening of a standardized zero waste supermarket is possibly an important measure that can be adopted in Belgium. The advantage of supermarkets is that it is so convenient: you can find everything there (including pre-packaged meals and consumer brands) and prices are competitive.

The disadvantage of zero-packaging stores is that they are perceived as less convenient: you have to bring your jars, invest time in cooking your meals and the limited product range potentially doesn't satisfy all your cravings. However, BE O and many zero-packaging grocery stores have proved that their concept of local, organic and zero-packaging food works and is successful. It is only a matter of time until consumers are used to the concept, change their shopping behaviour and realize that grocery shopping can work without brands. The owner of Bepakt suggested that these two can to a certain extent be combined into a standardized zero waste supermarket based on a circular supply chain and modern technologies (artificial intelligence), still providing the convenience that consumers wish for.

Recommendations for further research

One recommendation for further research is to conduct more interviews with more actors. Also, other actors could have been interviewed for answering the research questions of this research and they could have been potentially an added value to the results. Namely: farmers, consumers, policymakers in the food sector, and so on. As explained above, the problems in food supply chains are very complex and concern many different domains and developments. It is therefore seen as useful to include more actors.

Furthermore, it is recommended that the same research could be conducted in Wallonia to investigate regional differences between Flanders and Wallonia. During the interviews, several times regional differences (e.g. more consumer preferences for local food in Wallonia (manager Bio-Planet, personal communication, June 21, 2019)) were mentioned and this is thus regarded as a potential interesting research path.

Moreover, it is recommended to conduct the research again in approximately 3-5 years to identify the differences between the results and to see how the evolution towards a more sustainable Flemish agro-food system is taking place.

Finally, the scope of this research is very broad and the results thus touch upon various domains (policy, society, industry). Therefore, it is recommended to research one chosen aspect individually since this will likely lead to new and more detailed insights. For example, on the development/business model of a zero waste supermarket, the influence of modern lifestyle on consumer behaviour, etc.

Reflection

The chosen research methods for this research were found suitable to answer the research questions. A media analysis was appropriate as organic agriculture and plastic packaging were intensely discussed in the news lately. It was also necessary to investigate tendencies worldwide (e.g. the Zero Waste Movement, American supermarkets adopting bulk departments, etc.). The eight semi-structured interviews allowed for a very flexible way of asking questions: issues were discussed

into detail since unclear or vague answers weren't neglected and led to more critical questions. This was especially useful with the interviews of supermarkets Delhaize, Bio-Planet and OKay. If I hadn't dug deep into their answers as I did, I wouldn't have had the (more honest) answers I collected. Furthermore, it allowed the interviewees to touch upon all relevant aspects of the complex system and this would not have been possible with a predefined questionnaire.

A limitation of the research is that the research objectives and questions touch upon a lot of aspects and thus led to very broad and complex results. Consequently, certain topics could have been studied more intensely if the scope of the research would have been smaller.

A second limitation of this research is that the results cannot be simply generalised. A larger number of interviews should have been conducted for that. Furthermore, the problem of subjectivity and selectivity inevitably make the results in a certain way subjective. However, to minimize this limitation a coding programme was used in the analysis of the qualitative data. Also, triangulation was adopted. This is gathering different sources (in this case: interviews, reports, newspaper articles, scientific articles) about a topic to compare and verify statements. Therefore, it can be stated that a repetition of this research would mostly lead to the same results, which makes the results of this research valid.

This research contributes to the limited academic literature on zero-packaging grocery stores and contributes to the scientific knowledge since a unique approach was used: a comparison between zero-packaging stores, ecostores and conventional supermarkets was conducted.

5 Conclusion

This research aimed to shed light on the complex and under-researched topic of how the concept of zero-packaging grocery stores can upscale. Zero-packaging grocery stores eliminate packaging and favour organic and local food since these are clear ways to improve the sustainability of food supply chains in developed countries. The latter is heavily depended on single-use plastics, global food trade and modern agriculture using artificial chemicals. Expansion of the Zero Waste Movement and a growing awareness of the named problems of global FSCs led to an exponential growth of zero-packaging stores. This research explores three potential pathways by which the concept of these stores can become more mainstream: namely through an expansion of zero-packaging stores, through the adoption of the concept by conventional supermarkets and through the adoption of the concept by ecostores. This research contributes to the limited academic literature on zero-packaging grocery stores and to the scientific knowledge regarding the barriers and measures for transitioning to a more sustainable food supply system in Belgium (Flanders). A comparative study was conducted based on eight interviews with three zero-packaging grocery stores, two conventional supermarkets, two ecostores and the designer of the website Bepakt. This led to various valuable insights and recommendations for future research.

It is concluded that the best way to make the zero-packaging concept mainstream is the implementation of it by supermarkets. They hold the biggest market share and an expansion of zero-packaging stores in Flanders wouldn't be feasible today as the demand remains limited. Supermarkets give to a certain extent attention to moving to the zero-packaging, organic and local concept. However, numerous barriers that limit a more progressive adoption were found and measures to overcome these barriers were also discussed in this research.

Firstly, concerning the limitation of plastic packaging, it was found that the lifestyle of modern society is a barrier. People tend to work a lot, leading to high levels of stress and lack of spare time, consequently, convenience is driving consumer behaviour, supporting the usage of plastic packaging. Consumers exert not enough pressure on supermarkets, which in turn will only adopt zero waste practices when consumers demand them. Given that, supermarkets value economic profit over sustainability and are also restricted by high competition between retailers and by big international brands. Therefore, consumer education and sensibilisation are important measures supporting a transition to more packaging-free supermarkets. Furthermore, joint agreements between brands and retailers and retailers amongst themselves can potentially weaken the competition on the market. Also, stricter regulations regarding plastic, e.g. extended producer responsibility and bans, can be useful since they would oblige supermarkets to change, regardless of consumer behaviour and practices of suppliers.

Secondly, concerning the provision of more local (Belgian) food, consumer behaviour was found as an important barrier. In general, consumers demand fruits and vegetables all year round, regardless

of the seasons, and therefore retailers are providing them. Consumer education, sensibilisation and active promotion of seasonal food can possibly resolve this issue. Furthermore, foreign crops are usually cheaper than Belgian ones, which stimulates the continuous import of fruits and vegetables. The latter can potentially be avoided by regulatory measures, such as import taxes, bans, and subsidies supporting Belgian crops over foreign ones. Moreover, various goods don't grow in Belgium and thus need to be imported from abroad (e.g. bananas, chocolate, coffee, nuts, etc.). Innovative technologies such as vertical farming can potentially provide a solution here, although more research is needed on this. Also, urban farming can make the provision of local food easier. A joint agreement between retailers stating to quit the import of fruits and veggies when Belgian ones are available is a possible market measure eliminating the pressure of competition on the market.

Thirdly, concerning the provision of more organic food, various barriers and measures were found. Consumers tend to be uninformed about the true meaning of organic food and, therefore, consumer education about the benefits for health and the environment of organic food is recommended. Furthermore, to facilitate an expansion of organic agriculture in Belgium, the government can for instance support farmers financially and inform them.

It is emphasised that an adoption of different measures, which touches upon different barriers in combination, is needed for a successful transition towards a more sustainable food system. This is also recommended by strategic niche management which is a way to manage transitions. Sustainability science has an eye for complexity and uncertainty and implements integrated approaches that are needed to reflect on the multidimensional character of sustainability issues. Therefore, the adoption of integrated assessment methods (transition management and analytical methods) was seen as a prerequisite for conducting this research. Knowing that the matter is very complex and is confronted with barriers from different domains (social, regulation, resource and market).

It became clear that consumers tend to be of critical importance for a transition towards a more sustainable food supply system in Flanders. However, the Flemish population relatively experiences lots of stress which doesn't facilitate a large-scale change in consumer behaviour. Therefore, it is recommended to open a standardized zero waste supermarket that adopts a circular supply chain and modern technologies, still providing the convenience that consumers wish for.

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Appendices

Appendix 1: Questions for the interviewees of zero-packaging stores

Introduction

This interview will be used for writing my thesis for the master Sustainability Science & Policy at Maastricht University. The research objective is to investigate possibilities for a local economy and more sustainable food supply chains in Belgium through a comparative analysis of zero-packaging stores, ecostores and conventional supermarkets. So I'm looking at how the concept of local, organic and zero-packaging food can become more mainstream by investigating the barriers and incentives retailers are facing. Feel free to ask me questions if something is not clear.

Can I record this conversation?

The interview is structured as follows: First I will ask you questions about your background and function in the store and then more specifically about the barriers and incentives you have faced or are facing. The questions are organised in four groups, questions related to market aspects, regulation, society and suppliers.

Questions

Background questions

1. Can you shortly introduce yourself and your zero waste shop?
2. Can you shortly explain the concept of the store and his operation processes?
3. What were the main motivations for you to open the store?
4. Was it difficult to open such a store? Which difficulties did you encounter?
5. Did you use crowdfunding for financial help?

Market related questions

6. What are your customers like?
7. Do you think people are open for this alternative way of buying food? Do you see any trend of growing awareness?
8. What are the main barriers customers face at your store?
9. Did you go beyond your own concept? (Did you make certain adaptations? If yes, what did these consist of?)
10. Which characteristics of regional contexts were helpful to creation and operation of zero-packaging grocery stores? Which aspects were unhelpful?
11. What measures have you taken or could be taken in order to deal with these barriers?

Supplier related questions

12. Who are your main suppliers?
13. What problems did you encounter when looking for suppliers that support your concept of local, organic and zero waste food supply?
14. How did you deal with those problems?
15. How are you dealing with packaging of products that are being delivered? Do you know if ecostores and supermarkets are dealing with it differently?

Regulation related questions

16. Are there certain regulations supporting your operation?
17. Are there certain regulations hindering your operation?
18. Does the government offer you any assistance or incentives?

Society related questions

19. Why are zero-packaging grocery stores from your perspective occurring in our society? Why did it not happen earlier?
20. Have you worked with NGOs or other relevant organisations? Did this prove helpful? In what way?
21. What forms of media do you use to promote your business?
22. How do you see media creating barriers for your business? How do you see media creating opportunities for your business?

Other general questions:

Do you expect the number of zero-packaging stores to grow strongly? If so, how could this work?

Do you have some advice for other entrepreneurs?

Do you have any more comments to add?

Appendix 2: Questions for the interviewees of conventional supermarkets

Introduction

This interview will be used for writing my thesis for the master Sustainability Science & Policy at Maastricht University. The research objective is to investigate possibilities for a local economy and more sustainable food supply chains in Belgium through a comparative analysis of zero-packaging stores, ecostores and conventional supermarkets. So I'm looking at how the concept of local, organic and zero-packaging food can become more mainstream by investigating the barriers and incentives retailers are facing. Feel free to ask me questions if something is not clear.

Can I record this conversation?

The interview is structured as follows: First I will ask you questions about your background and function in the store and then more specifically about the barriers and incentives you have faced or are facing. The questions are organised in four groups, questions related to market aspects, regulation, society and suppliers.

Questions

Background questions

- Can you shortly introduce yourself and your supermarket?
- Can you shortly explain the concept of the store and his operation processes?

The overall question: Are conventional supermarkets giving attention to moving to a zero-packaging, organic and local concept?

1. Is OKay giving attention to reducing the amount of **packaging**?
    i. Do you know the concept of "zero waste"?
    ii. Is your store considering to become zero waste? If so, how? Are there plans for the future?
    iii. Is selling in bulk a possible plan for OKay?
    iv. Have you visited a zero waste shop before?

Some questions regarding the limitation of packaging:

b. Market related questions:
    i. Is there consumer demand for less packaging?
    ii. Are your competitors adopting zero waste strategies?
    iii. If they are doing it, why are they doing it?
c. Regulation related questions:
    i. Are there certain regulations supporting the adoption of zero waste strategies?
    ii. Are there certain regulations hindering this?

iii. Does the government offer you any assistance or incentives for limiting packaging?

d. Supplier related questions:
    i. Do your suppliers provide zero-packaging options for a wide range of products?
    ii. Do they discourage you from adopting those policies? If so, can you give an example?
e. Social related: how is media influencing this?
f. What measures can be taken to limit the amount of packaging used for conventional supermarkets?
    i. Market related: Would it give the management an incentive to limit the amount of packaging if the number of zero waste shops grow strongly? Can alternative eco-friendly packaging be a solution?
    ii. Regulatory: Should the government intervene more regarding the issue?
    iii. Resource related: Can selling more local products influence positively the amount of packaging used?
    iv. Social related: Can a higher consumer preference for zero waste influence the adopted packaging strategies?

2. Is your supermarket giving attention to provide more **local** products and/or food coming from more local farmers?
    a. What percent of the products come from Belgium and / or surrounding countries?
    b. What makes it difficult to provide more local products?
        i. Market related: Does the fact that other stores provide a wide range of products (coming from abroad) have an influence?
        ii. Regulatory: Should the government intervene more regarding the issue?
        iii. Resource related: Are there enough local suppliers? Do you notice that more and more farmers in the area are closing their farm?
        iv. Social related: Is there a demand for local products?
    c. What can be done to deal with these difficulties?
        i. Market related: Would it give the management an incentive to support local strategies if the number of local grocery shops grow strongly?
        ii. Regulatory: Would it help if you get support or incentives from the government?
        iii. Supplier related: Are there enough local suppliers to meet the amount of food sold?
        iv. Social related: Can more media attention to the importance of buying local products (and effects on climate change) have an influence here?

3. Is your supermarket giving attention to provide more **organic** products?
    a. Is this already happening? For how long?
    b. Why did your store start with selling organic products?

Other general questions:

Do you think that adopting a local, organic and zero waste food supply will attract new customers (those currently going to zero waste shops and ecostores)?

Will the negative discussion on plastics have important implications for packaging?

Appendix 3: Questions for the interviewees of ecostores

Introduction

This interview will be used for writing my thesis for the master Sustainability Science & Policy at Maastricht University. The research objective is to investigate possibilities for a local economy and more sustainable food supply chains in Belgium through a comparative analysis of zero waste packaging stores, ecostores and conventional supermarkets. So, I'm looking at how the concept of local, organic and zero-packaging food can become more mainstream by investigating the barriers and incentives retailers are facing. Feel free to ask me questions if something is not clear.
Can I record this conversation?

The interview is structured as follows: First I will ask you questions about your background and function in the store and then more specifically about the barriers and incentives you have faced or are facing. The questions are organised in four groups, questions related to market aspects, regulation, society and suppliers.

Questions

Background questions

- Can you first shortly introduce yourself?
- Can you shortly explain the concept of Bio-Planet and its operation processes?
- What triggered the opening of Bio-Planet?

Overall question: To what extent are ecostores adopting the concept of zero-packaging, local and organic food?

1. Is Bio-Planet giving attention to reducing the amount of packaging?
    i. Do you know the concept of "zero waste"?
    ii. Is your store considering to become **zero waste**? If so, how? Are there plans for the future? Is selling in bulk a possible plan for Bio-Planet?
    iii. Have you visited a zero waste shop before?

Some questions regarding the limitation of packaging:

b. Market related questions:
    i. Is there consumer demand for less packaging?
    ii. Are your competitors adopting zero waste strategies?
    iii. If they are doing it, why are they doing it?
c. Regulation related questions:
    i. Are there certain regulations supporting the adoption of zero waste strategies?
    ii. Are there certain regulations hindering this?

iii. Does the government offer you any assistance or incentives for limiting packaging?

d. Supplier related questions:
    i. Do your suppliers provide zero-packaging options for a wide range of products?
    ii. Do they discourage you from adopting those policies? If so, can you give an example?
e. Social related: how is media influencing this?
f. What measures can be taken to limit the amount of packaging used?
    i. Market related: Would it give the management an incentive to limit the amount of packaging if the number of zero waste shops grow strongly? Can alternative eco-friendly packaging be a solution?
    ii. Regulatory: Should the government intervene more regarding the issue? (For example: by making every store responsible for its waste, taxes, subsidies,…)
    iii. Resource related: Can selling more local products influence positively the amount of packaging used?
    iv. Social related: Can a higher consumer preference for zero waste influence the adopted packaging strategies?

2. Is your store giving attention to provide more **local** products and/or food coming from more local farmers?
    a. What makes it difficult to provide more local products?
        i. Market related: Does the fact that other stores provide a wide range of products (coming from abroad) have an influence?
        ii. Regulatory: Is their regulation that prohibits the supply of local products?
        iii. Resource related: Are there enough local suppliers? Do you notice that more and more farmers in the area are closing their farm?
        iv. Social related: Is there a demand for local products?
    b. What can be done to deal with these problems?
        i. Market related: Would it give the management an incentive to support local strategies if the number of local grocery shops grow strongly?
        ii. Regulatory: Would it help if you get support or incentives from the government?
        iii. Supplier related: Are there enough local suppliers to meet the amount of food sold?
        iv. Social related: Can more media attention to the importance of buying local products (and effects on climate change) have an influence here?

3. Is your supermarket giving attention to provide more **organic** products?
    i. Why did your store start with selling organic products?
    ii. Is organic agriculture less efficient than conventional agriculture? Could organic agriculture feed the entire population in Belgium?

Other general questions:

Do you think that adopting a local, organic and zero waste food supply will attract new customers (those currently going to zero waste shops)?

Will the negative discussion on plastics have important implications for packaging?

Appendix 4: Overview of the research

Table 7: Overview of the research

Aims and objectives	Research questions	Methods	Sources
To analyse the emergence and operation of zero-packaging grocery stores	What are the zero-packaging grocery stores operation processes and drivers to improve the social and environmental impacts of the food supply chain?	- Media research - Literature review	- Scientific articles - Articles of magazines & newspapers (journalistic material as secondary data) - Websites of zero-packaging grocery stores
To explore what the **barriers** are for expansion of the concept of local, organic and zero-packaging food	- How can the number of zero-packaging stores be expanded? What are the barriers? - How can the concept of zero-packaging grocery stores be implemented by conventional supermarkets? Are conventional supermarkets giving attention to moving to the zero-packaging, organic and local concept? What are the barriers for them? - To what extent are ecostores adopting the concept of zero-packaging, local and organic food? Are there barriers for ecostores and if so, what are those?	- Literature review - Interviews	- Databases for scientific articles - Three zero-packaging grocery stores - Two ecostores - Two conventional supermarkets
To investigate which **measures** can be taken to address the barriers for expansion of the concept for zero-packaging grocery stores, ecostores and conventional supermarkets	- What measures can be taken to overcome the barriers?	- Identifying monetary, regulatory, market-related barriers,… - Literature review - Interviews	- Journalistic material as secondary data - Scientific articles - Three zero-packaging grocery stores - Two ecostores - Two conventional supermarkets
To investigate possibilities for a local economy and more sustainable food supply chains through an analysis of three zero-packaging stores, two eco stores and two conventional supermarkets to retrieve more general conclusions for an upscaling in Belgium (specifically Flanders).	How can the concept of zero-packaging, local and organic food, as implemented by zero-packaging grocery stores, become mainstream?	- Literature review - Media research - Interviews	All sources written above

Appendix 5: List of contacted stores & interviewees

Table 8: List of contacted stores

Classification	Stores	Answered positively?	Interviewed?
Zero-packaging grocery stores	Anders winkelen (Vilvoorde)	+	+
	Ohne (Ghent)	+	+
	Lara kookt voor u (Antwerp)	+	+
	Robuust (Antwerp)	-	-
	Kabas (Mechelen)	+	-
	Chyl (Brussels)	-	-
Ecostores	BE O (Antwerp)	+	+
	Bio-Planet (Wilrijk, Antwerpen)	+	+
	Farm (Brussels)	-	-
	Origin'O	-	-
Supermarkets	Albert Heijn	-	-
	Carrefour	-	-
	Delhaize	+	+
	Aldi	-	-
	Makro	-	-
	Colruyt	+	Interview with Bio-Planet from Colruyt group
	Lidl	-	-
	Alvo	-	-
	Louis delhaize	-	-
	OKay	+	+
	Jumbo	-	-
Other	Bepakt	+	+

Table 9: List of interviewees

Classification	Date	Store	Function
Zero-packaging grocery stores	17/06/2019	Lara kookt voor u	Store owner
	20/06/2019	Ohne	Store owner
	9/07/2019	Anders winkelen	Store owner
Ecostores	21/06/2019	Bio-planet	Regional manager Bio-planet at Colruyt Group
	13/07/2019	BE O	Manager BE O in Antwerp
Supermarkets	4/07/2019	OKay	Marketing manager OKay at Colruyt Group
	24/07/2019	Delhaize	Health and nutrition specialist & member of the sustainability team
Other	11/06/2019	/	Bepakt (website owner & designer)

Appendix 6: Codes for the analysis of the transcribed interviews with Atlas.ti

- Concept of the store
- Other information
- General barriers
- General measures
- Packaging: barriers (market)
- Packaging: barriers (regulation)
- Packaging: barriers (supplier)
- Packaging: barriers (social)
- Packaging: measures (market)
- Packaging: measures (regulation)
- Packaging: measures (supplier)
- Packaging: measures (social)
- Other info about packaging
- Local: barriers (market)
- Local: barriers (regulation)
- Local: barriers (supplier)
- Local: barriers (social)
- Local: measures (market)
- Local: measures (regulation)
- Local: measures (supplier)
- Local: measures (social)
- Other info about local
- Organic: barriers (market)
- Organic: barriers (regulation)
- Organic: barriers (supplier)
- Organic: barriers (social)
- Organic: measures (market)
- Organic: measures (regulation)
- Organic: measures (supplier)
- Organic: measures (social)
- Other info about organic

Other specific ones for zero-packaging grocery stores:

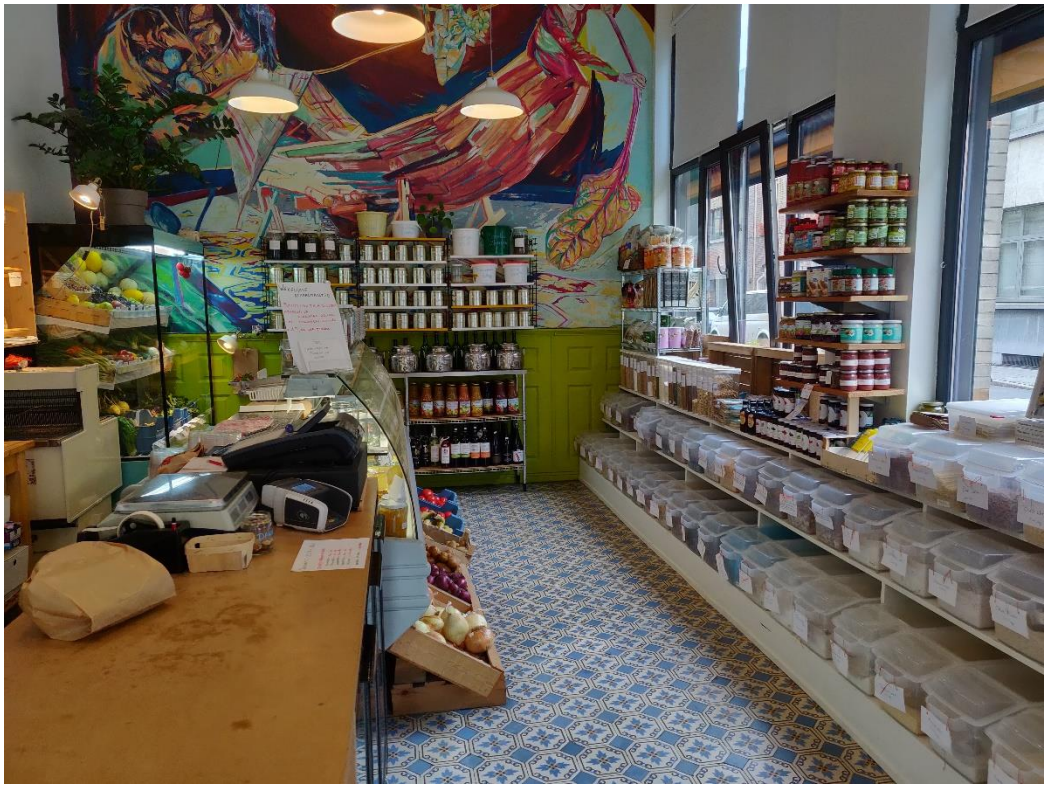
- Adaptations
- Help from the government
- Inspiration
- Rising awareness

- Customers
- Suppliers

Appendix 7: Pictures of interviewed stores

Zero-packaging grocery stores

“Lara kookt voor u”



Ohne

Ecostores

BE O

Bio-Planet