

*Master's Thesis Internship -  
Master Sustainable Business and Innovation*

## **Joint efforts for circular food packaging**

How focal firms find and set-up collaborations  
for reusable and recyclable food packaging

**Student:**

Joana Kleine Jäger (6206883)  
j.i.kleinejager@students.uu.nl

Date: 07.04.2020

Word count: 27.182

**University Supervisor:**

Utrecht University  
Dr. Laura Piscicelli  
l.piscicelli@uu.nl

**Internship Organisation and Supervisor:**

Circle Economy  
Tamara Veldboer



**Utrecht University**



## Abstract

Globally, 40% of plastics are converted into packaging, of which half is food packaging (Rhim et al., 2013). After a short first-use cycle, it is estimated that 95% of plastic packaging material value is lost annually to the economy, while 32% escapes collection systems and accumulates in the natural environment (EMF, 2017a). As a solution, food packaging in a Circular Economy (CE) aims to cycle material and energy flows, most frequently via recycling or reuse. For this, focal food firms must introduce new circular business models challenging the traditional make-use-dispose thinking. Although firms and policy are increasingly addressing circular food packaging, its implementation remains limited. This is attributable to a high degree of cross-chain collaboration required. Literature on collaboration in a CE, however, is scarce and provides little guidance on how to build successful circular partnerships. Therefore, this research aims at analysing the collaboration set-up and partner selection for reusable and recyclable primary retail food packaging. Due to limited insights in this area, an explorative research was followed, whilst incorporating descriptive elements to deliver empirical evidence. In line with abductive theory modification, a preliminary theoretical framework was refined. For this, 17 semi-structured qualitative interviews were conducted with food producers, brands, retailers, reuse system providers, and circular food packaging experts (selected based on a three-step purposive sampling). The transcripts were coded and analysed via thematic analysis. The results unveil that food companies engage in four types of collaboration, which is largely depended on the development stage of the reusable/recycling system. Extending and slightly amending existing literature, the collaboration set-up process typically follows nine steps. Moreover, alongside four generic partner characteristics as selection criteria, five CE-specific ones are identified: 'commitment', 'open communication', 'goals alignment', 'strategic fit', and 'creativity/open mindedness'. Furthermore, even though food companies necessarily require collaborations, the type of partners they seek differ based on the type of project, position in the supply chain, location of operations, food type packaged, and company size. Lastly, 14 partner roles are identified, which are either assigned to three project phases (starting, developing, realising) or two orientations (collaboration, outward-world). A number of these roles are found to be of particular importance for either circular, reusable, or recyclable food packaging. The findings of this research can guide food companies when identifying and establishing successful collaborations for circular food packaging. Other CE fields, geographies, key stakeholders, and the collaboration set-up steps in isolation call for further exploration.

**Keywords:** Circular Economy; reusable food packaging; recyclable food packaging; cross-chain collaboration; collaboration set-up; partner selection

## Acknowledgements

I conducted this research in collaboration with Utrecht University as part of the master's programme Sustainable Business and Innovation and Circle Economy in Amsterdam. I would like to thank those, who supported me in course of my research.

First of all, I would like to thank Dr. Laura Piscicelli, supervising my thesis and providing reliable support, constructive feedback, great ideas, and asking the right questions to continuously improve my research. Thanks also goes to my second reader, Dr. Matthijs Janssen, for the helpful feedback during my proposal phase.

I would like to thank Circle Economy, an inspiring organisation, where I spent my 8-months thesis-internship. During this time, I was lucky enough to meet a lot of bright-minded individuals striving towards a circular world. This environment did not only enrich my research and provided me with sufficient flexibility to follow my aspired research outcomes, but also allowed me to get involved in other interesting projects. A special thank-you goes to Tamara Veldboer as my internship supervisor for her continuous support, feedback, and positive attitude - both on my thesis as well as on how to translate those insights into actionable recommendations in form of a practitioner's guide. In addition, I would like to thank Jacco Verstraeten-Jochensen and Caspar von Daniels for our clarifying conversations, especially at the beginning of my research.

Moreover, this research would not have been possible without the 17 experts I interviewed. Thank you for taking the time to share your valuable experience and knowledge with me. I learned a lot during those conversations, which present an integral part of this research.

Lastly, a thanks goes to Rachel Gallagher and Josephin Schulz for their assistance in improving this thesis. Also, I would like to thank my former internship team at Danone, which introduced me to the subject of food packaging in a Circular Economy and provided me with practical learnings and insights being greatly beneficial for this study. In addition, a thanks goes to the Ellen MacArthur Foundation, running the thought-provoking "from linear to circular" programme, expanding my horizon on the Circular Economy and thereby contributing to this research. Finally, I would like to thank EIT Climate-KIC for the inspiring journey and mobility opportunities during my master's degree, allowing me to gain practical experience.

# Table of Contents

<b>LIST OF ABBREVIATIONS.....</b>	<b>.....</b>
<b>1. INTRODUCTION.....</b>	<b>1</b>
1.2 FOOD PACKAGING IN A CIRCULAR ECONOMY .....	2
1.2.1 RECYCLABLE FOOD PACKAGING .....	5
1.2.2 REUSABLE FOOD PACKAGING.....	6
1.3 THE ROLE OF COLLABORATION FOR CIRCULAR FOOD PACKAGING.....	7
1.4 RESEARCH QUESTION.....	11
<b>2. THEORETICAL FRAMEWORK.....</b>	<b>13</b>
2.1 COLLABORATION SET-UP .....	13
2.2 PARTNER ROLES (TASK-RELATED SELECTION CRITERIA).....	15
2.3 PARTNER CHARACTERISTICS (PARTNER-RELATED SELECTION CRITERIA) .....	17
<b>3. METHODOLOGY.....</b>	<b>19</b>
3.1 RESEARCH METHOD AND SAMPLING .....	20
3.2 DATA COLLECTION AND ANALYSIS .....	21
<b>4. RESULTS.....</b>	<b>23</b>
4.1 CIRCULAR FOOD PACKAGING STRATEGIES AND TYPES .....	23
4.2 COLLABORATION SET-UP .....	25
4.3 PARTNER CHARACTERISTICS.....	30
4.4 PARTNER ROLES .....	33
4.4.1 PARTNERS FOR STARTING THE PROJECT .....	34
4.4.2 PARTNERS FOR DEVELOPING THE PROJECT .....	36
4.4.3 PARTNERS FOR REALISING THE PROJECT.....	39
4.4.4 PARTNERS RELATED TO THE COLLABORATION.....	42
4.4.5 PARTNERS BEING OUTWARD-ORIENTED .....	45
<b>5. DISCUSSION.....</b>	<b>48</b>
5.1 PREREQUISITES.....	49
5.2 UNDERSTANDING .....	49
5.3 PREPARATION .....	51
5.4 PARTNER INVOLVEMENT.....	55
5.5 AGREEMENTS .....	57
5.6 LIMITATIONS OF THE RESEARCH .....	57
5.7 FUTURE RESEARCH .....	58
<b>6. CONCLUSION .....</b>	<b>59</b>
<b>7. PRACTICAL RECOMMENDATIONS.....</b>	<b>61</b>
<b>REFERENCES.....</b>	<b>62</b>
<b>APPENDICES.....</b>	<b>70</b>

## List of Abbreviations

BM	Business model
CE	Circular Economy
CFP	Circular food packaging
DRS	Deposit return/refund system
EC	European Commission
EMF	Ellen MacArthur Foundation
EPR	Extended Producer Responsibility
EU	European Union
FP	Food packaging
HDPE	High-density polyethylene
IFCO	Containers used in retail to transport fish, fruit, vegetables
LDPE	Low-density polyethylene
MNC	Multinational corporation
NDA	Non-disclosure agreement
PET	Polyethylene terephthalate
PP	Polypropylene
PR	Public relations
PRO	Packaging Recovery Organisation
PS	Polystyrene
PVC	Polyvinyl chloride
R&D	Research and development
SCM	Supply chain management
SME	Small and medium-sized enterprise

# 1. Introduction

The importance of plastics in our economy has continuously grown over the last 50 years. In light of increasing living standards and population growth, plastic demand can be expected to keep growing (EC, 2018; Barnes et al., 2009). In 2017, a global plastic production of 348 Mt was reached. In Europe, only 31% of the 64 Mt of produced plastic was recycled, 41% incinerated, and 27% landfilled (PlasticsEurope, 2018). Globally, even 79% of the approximately 6300 Mt of the total plastic waste generated till 2015 has been landfilled or ended in the natural environment. Here, it accumulates due to the non-biodegradability of commonly used plastics (Geyer et al., 2017). In coastal countries, un-captured waste is likely to become plastic marine debris, presenting an increasing concern due to its persistence and effects on oceans, wildlife, and humans. The weathering of the debris causes fragmentation into microplastics, which oceanic wildlife ingests (Jambeck et al., 2015). Smaller plastics are in this way incorporated into marine food chains and were found in air, drinking water, and other foods, with unknown impacts on human health (Eriksen et al., 2014; EC, 2018). As it is extremely difficult and costly to remove plastic debris from the open ocean, effective mitigation strategies need to aim at reducing plastic inputs into the ocean and terrestrial environments (Jambeck et al., 2015).

At the same time, caused by its after-use externalities, plastic pollution generates significant economic costs. For instance, the productivity of vital natural systems is reduced or activities such as tourism and fisheries damaged (WEF et al., 2016; EC, 2018). Substances of concern<sup>1</sup> linked to plastics similarly cause health and environmental impacts. For instance, monomer styrene or phthalates might be carcinogen/toxic, heavy metals in packaging enter the food chain, or hazardous substances contaminate recycling streams (Kaur et al., 2018). Besides the critical end-of-life, plastic production is energy intense and (just like plastic incineration) releases many greenhouse gas emissions contributing to climate change (WEF et al., 2016). As conventional plastics are derived from fossil hydrocarbons, they are reliant on non-renewable resources, consuming around 6% of the global oil production (Geyer et al., 2017; Kaur et al., 2018).

Within plastics, globally, 40% are converted to packaging and half of those to food packaging (FP) (Rhim et al., 2013). Around 95% (\$80-120 billion) of the value of plastic packaging material is, however, lost to the economy after a first-use cycle of typically less than one year (EMF, 2017a). Packaging itself can be split up into primary (in direct contact with the goods), secondary (larger packaging carrying a number of primary packaging), and tertiary packaging (e.g. pallets to assist in the transport of large quantities of goods) (Davis & Song, 2006). While secondary and tertiary packaging shows less material variation, primary packaging materials are more contaminated and mixed, hampering their separation in sorting processes. This presents a challenge for recycling and reuse, which are common strategies for well-managed (plastic as well as other material) packaging, as elucidated later. As a consequence, primary packaging is discarded more often (Davis & Song, 2006). In particular to package food, food-safety concerns present obstacles towards recycled or reused packaging.

---

<sup>1</sup> A substance of concern (SoC) is any substance, other than the active substance, which has an inherent capacity to cause an adverse effect on humans, animals, or the environment. Such a substance is normally classified as dangerous; hazardous; or persistent, bio-accumulative, and toxic (VCI, 2019).

## 1.2 Food Packaging in a Circular Economy

To address the outlined issues linked to plastic packaging, FP needs to operate in a Circular Economy (CE). Whereas a linear economy converts natural resources via production into waste, a CE restores any damage (Murray et al., 2013). A CE is defined as “an economic system that replaces the ‘end-of-life’ concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes” (Kirchherr et al., 2017, p. 229). The concept ultimately aims to “make development sustainable - to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987, p. 8). It challenges business to rethink traditional make-use-dispose business models (BM).<sup>2</sup> The CE is expected to promote economic growth by e.g. creating new business and job opportunities, saving costs of materials, lowering price volatility, and improving the security of supply (Kalmykova et al., 2018).

To achieve this, cyclic material and energy flows need to be created (Korhonen et al., 2017). While overall 10 value retention options are distinguishable (Reike et al., 2018)<sup>3</sup>, Figure 1 presents an overview of seven value retention options applicable to FP described in literature (Potting et al., 2017; Schmidt Rivera et al., 2018; Pauer et al., 2019; WEF et al., 2016; KIDV, 2019). The figure is inspired by the system diagram of the Ellen MacArthur Foundation (EMF) (2017b),

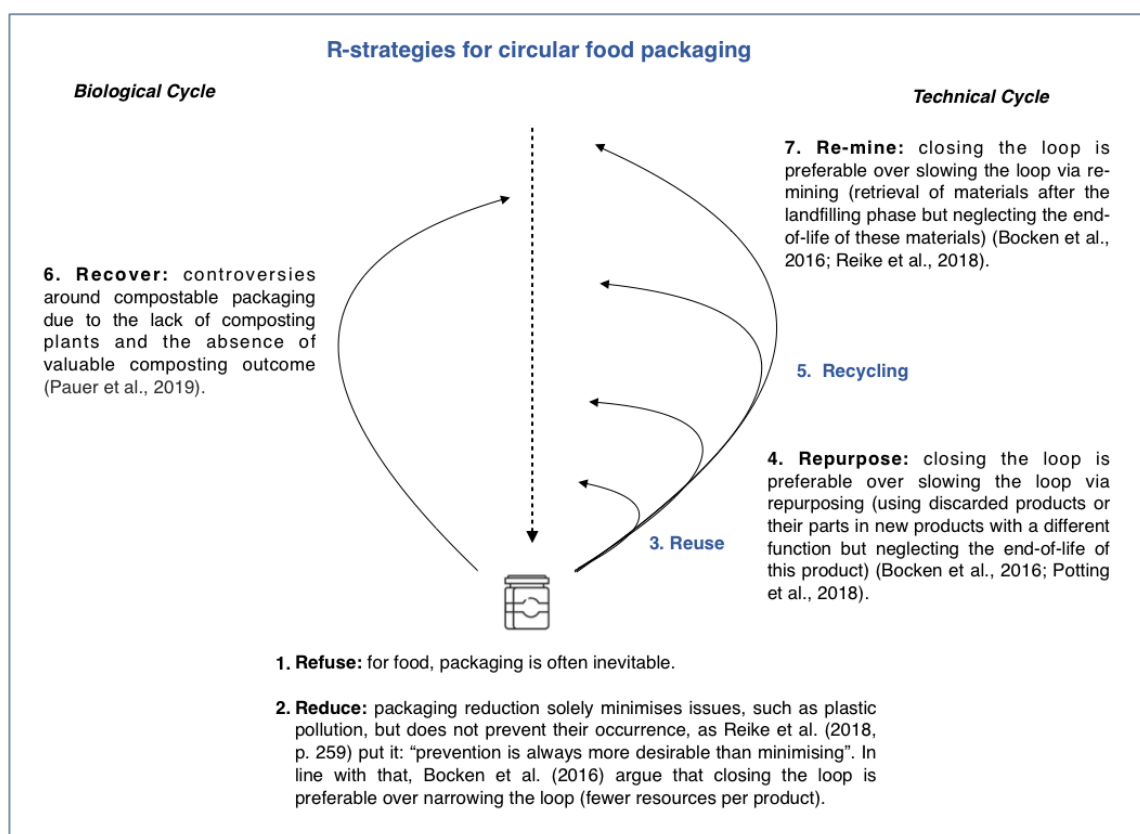


Figure 1: Possible R-strategies for CFP and focus of this research.

<sup>2</sup> A business model generally “describes the logic, process and architecture for value creation and capture systems between stakeholders” (Brown et al., 2018, p. 172).

<sup>3</sup> The 10R typology of Reike et al. (2018) includes: short loops (Refuse, Reduce, Resell/Reuse, Repair), medium long loops (Refurbish, Remanufacture, Repurpose), and long loops (Recycle, Recover, Remine).

differentiating between the biological (consumption and design of food and materials to feed back into regenerative living systems) and technical cycle (recovering and restoring products, components, and materials). Reusable and recyclable FP is focused in this research as the other five R-strategies were found controversial, less feasible, or less preferable, as highlighted in Figure 1. Thereby it is distinguished between closing, slowing, and narrowing the loop.<sup>4</sup> Since closing the loop is preferable, reusable FP needs to be either infinitely reused or, more realistically, recycled at the end-of-life to not only slow the loop via (several) reuse cycles. Assessing the prevalence of CFP strategies, the UK-based study of Clark et al. (2019) found the following ranking starting from the most to the least popular: recycling, re-design, reusable, refillable, and systems design. Moreover, all value retention options can either refer to input-related circularity during production and design phase (e.g. material type, renewable content, or recyclability), or output-related circularity at the end-of-life phase (e.g. recycling rates or waste management) (Pauer et al., 2018; Schmidt Rivera et al., 2019).

To drive the uptake of a CE and CFP specifically, different policies were introduced by national and international bodies. More than 60 countries already introduced bans and levies for single-use plastic packaging (Meherishi et al., 2019). The EU CE Package or the EC Directive on Packaging and Packaging Waste, including the EPR approach<sup>5</sup>, urge higher recycling and reuse rates. Similarly, on industry level, initiatives such as the New Plastics Economy<sup>6</sup>, sustainable packaging coalitions, labelling initiatives, or single-firm programs mirror the current interest in circular packaging. Overall, the CE concept gained attention in the last years (Kirchherr et al., 2018; WEF et al., 2016; Pauer et al., 2019; PAC, 2017; EC, 2018; ten Brink et al., 2018).

Nevertheless, CE still presents a niche discussion at this stage (Kirchherr et al., 2018). Specific topics such as CFP are even less explored in academic research. The limited existing research on circular (food) packaging include (a) comparisons of specific packaging, materials, or regions (van Eygen et al., 2018; Davis & Song, 2006); (b) design and material guidelines (Clark et al., 2016); (c) CFP indicators (Schmidt Rivera et al., 2019; Pauer et al. 2019; Niero & Kalbar, 2019); (d) technical explorations such as on recycling (KIDV, 2019; Kazulyte, 2019; Geueke et al., 2018; Hahladakis & Iacovidou, 2018); (e) measurement models/tools for packaging (Niero & Hauschild, 2017; de Koeijer et al., 2017); (f) an industry study on motivation and barriers to initiatives of FMCG (fast-moving consumer goods) companies in the UK following the UK Plastic Pact (Gong et al., 2019); or (g) a study on the UK CFP supply chain identifying stakeholder challenges and the enabling role of transformative technology (Clark et al., 2019). To add,

---

<sup>4</sup> Closing the loop refers to the reuse of materials through recycling; slowing to the prolonged use and reuse of goods through design of long-life goods and product life extension; and narrowing to the use of fewer resources per product (Bocken et al., 2016).

<sup>5</sup> The Extended Producer Responsibility (EPR) policy approach extends the responsibility of a product to the post-consumer stage and consists of two elements: “1) shifting of responsibility, physically and/or economically, fully or partially, upstream from municipal authorities to producers; and 2) to provide incentives to producers to incorporate environmental considerations in the design of their products” (Rubio et al., 2019, p. 2017f.).

<sup>6</sup> The New Plastics Economy brings together key industry stakeholder to create a CE for plastics, starting with packaging. The initiative is led by the EMF in collaboration with a group of leading companies, cities, philanthropists, governments, academics, students, NGOs, and citizens. As part of it, leading firms commit to 100% reusable, recyclable, or compostable packaging by 2025 (WEF et al., 2016).

Meherishi et al. (2019) ascertained that studies in the sustainable packaging supply chain management (SCM) field are aligned with the CE concept. Thus, sustainable packaging know-how can also be of value for CFP. Furthermore, some guidelines for plastics/FP in a CE can be found. For example, the EMF (2017a) highlights important efforts for circular plastics as redesigning packaging formats and delivery models, introducing reusable packaging, and improving plastic recycling quality and economics. Similarly, Barra and Leonard (2018) demands seven goals for circular plastics. These goals are comparable to the CE transition model for sustainable packaging SCM developed by Meherishi et al. (2019), as depicted in Appendix I. The authors set four foci: CE Design, new BMs (e.g. zero packaging), reverse cycles (reduce/reuse/recycle), and enabler/favourable system conditions (collaboration, financing/incentives, governments).

Despite such insights and an increasing number of industry initiatives, Gong et al. (2019) came to the conclusion that comprehensive and relevant CFP studies are lacking. Similarly, Meherishi et al. (2019) call for deeper investigations through the development and examination of sustainable/CE packaging SCM theories. Equally in practice, improvements are needed: an estimated 53% of plastic packaging in Europe could potentially be economically and environmentally effectively recycled with existing design, technologies, and systems. Notwithstanding, CFP innovation and improvement efforts are fragmented and uncoordinated and many initiatives are still in their infancy. Therefore, re-use and recycling rates remain low in all countries (WEF et al., 2016; ten Brink et al., 2018; EC, 2018). Further, waste management is only seen as an end-of-pipe approach instead of a strategic partner for CE BMs. Lastly, markets for secondary raw materials (i.e. that have been used, recycled, and sold again) are still relatively young and vulnerable to e.g. fluctuations in oil prices (Lee et al., 2017).

Examining the underlying causes of these issues, Kirchherr et al. (2018) and Gong et al. (2019) emphasise barriers to the CE and its BMs as cultural/societal (lack of consumer interest and awareness, hesitant company culture), managerial, financial, and market related. Specific CFP barriers would be an inadequate collection/sorting infrastructure and technical issues related to packaging (e.g. usage of recycled plastic) (Gong et al., 2019). In addition, food safety, protection, shelf-life increase (especially for perishable foods), logistics, and consumer convenience need to be taken into account. Such holistic considerations of the overall product-packaging combination would often fall short (Robertson, 2013; Meherishi et al., 2019).

With respect to potential enablers to these barriers, Gong et al. (2019) emphasise the ability of society to pressure industries. At the same time, internal and particularly external collaboration would be a key component for successful CE practices. Lee et al. (2017) argue that patterns of production, consumption, and waste management need to be closely interlinked in the market. For instance, recycling practices should inform product design requirements. Equally important would be secondary material markets, assigning value to waste to boost recycling.

Recyclable and reusable FP, as R-strategies under examination in this research, are briefly explored in the following section. Even though reusing presents a higher and thus more desirable value retention option, recycling is to date the most widely applied on scale.

### 1.2.1 Recyclable Food Packaging

The term *recyclable* needs to be defined carefully. Whereas *recycling* solely refers to the recovery operation of reprocessing materials, the term *recyclable* refers to an entire system of recycling. Even though it might be technically feasible to *recycle* a packaging, it can only be called *recyclable* if “successful post-consumer collection, sorting, and recycling is proven to work in practice and at scale” (EMF, 2018, p. 12). At the same time, it needs to be financially viable in terms of attractive secondary material markets (Ameripen, 2018). The purpose of recycling packaging is to return resources as raw materials into the production cycle (Kazulytė, 2019). While closed-loop recycling reprocesses resources into products with equivalent properties, open-loop recycling results in lower properties and thus downgrades resources (Hopewell et al., 2009). It has to be kept in mind, though, that a truly CE cannot solely be achieved by recycling (Haas et al., 2015).

Besides the recycling process itself, several other steps and players are required, as depicted in Figure 2. In particular, waste separation by consumers, collection, sorting, or waste size reduction present major issues towards recycling (Hopewell et al., 2009). In addition, the recycling value chain is highly fragmented and complex, hampering the alignment between different organisations and interests (Hahladakis & Iacovidou, 2018).<sup>7</sup>

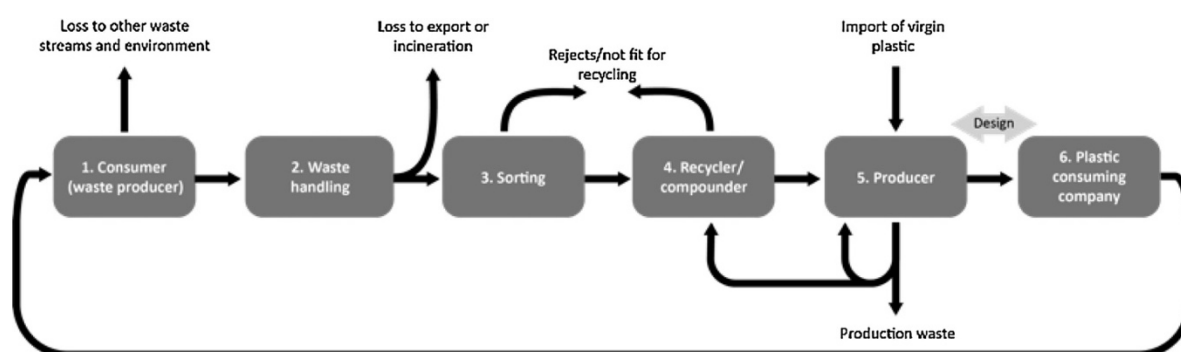


Figure 2: The plastic waste recycling value chain outlined by Milios et al (2018).

This study focuses on recyclable plastic packaging because plastic (a) presents the most commonly used packaging material, (b) its production is expected to grow, (c) is inexpensive, (d) high-performing (e.g. barrier properties protecting food and reducing food waste), (e) lightweight (reducing transportation impacts), while (f) showing low recycling rates (WEF et al., 2016). In accordance, the European Commission classifies plastics as priority area requiring progress (Hahladakis & Iacovidou, 2018).

Due to an increase of plastic packaging as well as its recycling, the demand for recycled plastic is projected to increase by 5 to 7.5 million metric tons by 2030 (Closed Loop Partners, 2019). Currently though, only a few plastics are recycled due to differing waste streams and plastic

---

<sup>7</sup> For instance, while recyclers may invest in “Autosort” technologies to separate multi-layer packaging, manufacturing tends to move away from such non-recyclable multi-layer packaging, questioning the future need of those technologies (Hahladakis & Iacovidou, 2018).

qualities (Gong et al., 2019).<sup>8</sup> At the moment, mechanical recycling presents the preferred recycling method with the downside of changing the structure of plastic polymers and thus also the material properties (Hahladakis & Iacovidou, 2018). In contrast, “chemical recycling has the advantage to recover the petrochemical constituents of the polymer, which can be then used to remanufacture plastic or make other synthetic chemicals” (Hopewell et al., 2009, p. 2118). Even though chemical recycling is technically feasible, virgin material underpricing recycled material, makes it (still) widely uneconomic (Hopewell et al., 2009).

To maximise the recovery of plastic packaging, industries are continuously investing in R&D and innovations. Achievements include new sorting technologies increasing the recyclability of plastic packaging as well as PET and PE as food-grade recyclable plastics (Hahladakis & Iacovidou, 2018). Despite these achievements, recycling packaging is still facing technical, economic, environmental, social, and legal issues (Kazulytė, 2019). Some issues identified are (a) downcycling of materials (decreasing material purity, cascading to lower value applications, hindering repeated recycling), (b) potential of hazardous chemicals in the packaging, and (c) legal requirements (e.g. for food-grade recycled) (Kazulytė, 2019; Geueke et al., 2018; Hahladakis & Iacovidou, 2018).

To tackle these issues, on one hand, recycling technologies need to be improved, which in the past took providers on average 17 years to reach growth scale. On the other hand, all stakeholders of the packaging supply chain (see Figure 3) as well as decision-makers and civil society need to work together. To illustrate, manufacturers need to design recyclable packaging with an after-use value, which requires a proper working waste management at source (Closed Loop Partners, 2019; Geueke et al., 2018; Hahladakis & Iacovidou, 2019).

### 1.2.2 Reusable Food Packaging

A *reusable* packaging is defined by *ISO 14021: 2016* as one which “has been conceived and designed to accomplish within its lifecycle a certain number of trips, rotations or uses for the same purpose for which it was conceived.” Similarly to recyclable packaging, it also requires a system for its realisation, i.e. either a program for used packaging collection and reusing/refilling, or facilities allowing purchasers to reuse/refill themselves (Ameripen, 2018). The EMF (2019) distinguishes between four reuse models as depicted in Figure 3, details of those being outlined in Appendix II. The application of deposit-return-systems (DRS) or standardised containers could, according to Geueke et al. (2018), facilitate the realisation of such reuse models.

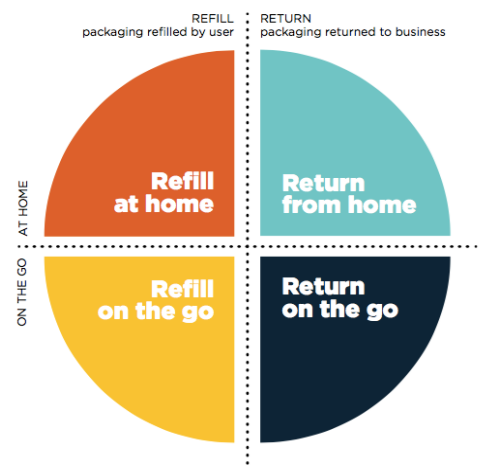


Figure 3: The four reuse models (EMF, 2019).

<sup>8</sup> From seven plastic recycling categories, only three are commonly recycled (PET, HDPE, PP), one sometimes (LDPE), and the rest nearly never (PVC, PS, others) (Gong et al., 2019).

Reusable packaging can play a decisive role in achieving a CE by e.g. decreasing material or impact of processes (Rigamonti et al., 2018; Ameripen, 2018). At the same time, it presents an untapped business potential by enabling (a) the adaptation to individual needs, (b) optimisation of operations, (c) intelligence gathering via digital technologies, (d) improvement of user experience, (e) brand loyalty, and (f) cost cutting (EMF, 2019). The cost-saving potential is, however, subject to a number of factors (e.g. handling, transport, storage, unpacking operation, initial investment) (Mollenkopf et al., 2005). Therefore, an intelligent reuse-system design is key.

Despite the potential business opportunities, in practice, to date, only a few systems reusing primary FP can be found (Ameripen, 2018).<sup>9</sup> In spite of this, recently, some models were launched, including bulk and reusable containers delivered to homes or to purchase in shops.<sup>10</sup> For beverages, DRS allowing the return of bottles at vending machines, are relatively prevalent in Europe. For food, reusable packaging, however, poses more issues such as (a) regulatory restrictions, (b) tamper-proof packaging, (c) collection, cleaning, refilling infrastructure, (d) centralised product-filling factories causing logistical challenges, and (e) a variety of packaging due to branding/marketing (Ameripen, 2018; Hopewell et al., 2009). Common formats for reusable FP include cleanable glass or stainless-steel containers (Geueke et al., 2018). Still, other materials are possible. Therefore, in this study, reusable FP is not limited to certain materials.

### 1.3 The Role of Collaboration for Circular Food Packaging

The two research areas, (1) the CE/CFP and (2) collaboration (specifically the collaboration set-up and partner selection criteria) are combined in this section to delineate the **research gap**.

#### *Collaboration as a key element of CFP*

Despite some recent CFP efforts, recyclable and reusable FP solutions working on scale are lacking. This is, alongside other issues elucidated earlier, caused by a lack of understanding and a disjointed communication between packaging producers/designers (introducing new materials) and waste management (ensuring their after-use) (Ordoñez & Rahe, 2012). As a consequence, the progress of innovative solutions is delayed, stakeholders are left with insufficient information on CFP challenges, and local initiatives remain fragmented and uncoordinated. Therefore, **solutions to overcome the lack of coordination across complex CFP value chains, which presents a major implementation challenge, lie in collaboration and dialogue of all actors** (WEF et al., 2016; PAC, 2017). **When successfully realising internal and external collaboration, major CFP challenges, such as high financial barriers, can be overcome.** Thus, partners need to collaborate for common goals, communicate regularly, and exchange knowledge (Clark et al., 2019; Gong et al., 2019). In particular industries, which heavily rely on single-use plastic packaging, such as the FMCG industry, require collaboration to transition towards CFP (Gong et al., 2019).

---

<sup>9</sup> In contrast, for secondary and tertiary packaging, reusable industrial containers and pallets, as well as reusable shopping bags are more disseminated (Hopewell et al., 2009).

<sup>10</sup> Examples of recent reusable models include (1) home delivery of bulk (e.g. the Wally Shop), (2) bulk shops/sections (e.g. Original Unverpackt or Waitrose Unpackaged), (3) vending machines to buy from bulk (e.g. Algramo), or (4) home-delivery of (premium) reusable packaging (e.g. Loop) (EMF, 2019).

### *The role of collaboration in a CE*

Collaboration is defined as when “a group of autonomous stakeholders of a problem domain engage in an interactive process, using shared rules, norms, and structures, to act or decide on issues related to that domain” (Wood & Gray, 1991, p. 146). The relational view argues that firm’s critical resources may span firm boundaries. Inter-firm collaborations can therefore create relational rents leading to competitive advantage (Dyer & Singh, 1998). Compared to linear operations, in a CE, the need for collaboration is even increased. Circular SCM needs to take elements such as waste collection, reverse logistics, product design, sales/marketing, and different value retention options into account. To illustrate, waste from one supply or process chain may become a resource for another one (Kazancoglu et al., 2018; De Angelis et al., 2018; Lacy, 2015; Farooque et al., 2019). Hence, creating collaborative networks is commonly seen as a crucial pillar of a CE transition (Dora, 2019; De Angelis et al., 2018; Pagell & Wu, 2009; Seuring & Müller, 2008; Witjes & Lozano, 2016).

Potential benefits, which collaboration in a CE can, according to Mishra (2019) and Brown et al. (2018), enable are: technology transfer; organisational learning; increased resources, knowledge, skills, capabilities, and finance; innovative ideas and mutual problem solving; value creation; resource efficiencies; market and customer engagement; and risk reduction. When aligning efforts, common CE inhibitors such as high upfront investment, less accessible and expensive technology, lack of clear guidance and consensus, information sharing systems, or uncertainty with respect to regulatory changes could be overcome. Besides vertical collaboration (along the supply chain with suppliers and customers), also horizontal collaboration (outside the supply chain with competitors and other organisations including regulators), as well as firm-internal collaboration is needed (Barrat, 2004; De Angelis et al., 2018; Farooque et al., 2019).

### *Partners for food companies to transition to CFP*

To realise CFP, collaboration with all stakeholders of the value chain (e.g. suppliers, producers, recyclers), all spheres (e.g. technology, logistics, waste management, legislation), and all actors (e.g. customers, consumers) is necessary (Clark et al., 2019; KIDV, 2015). As this list shows, the number and complexity of required collaboration is high, while potentially being geographically dispersed. Nevertheless, for plastics in a CE, such “collaboration would be required to overcome fragmentation, the chronic lack of alignment between innovation in design and after-use, and lack of standards” (WEF et al., 2016, p. 19). For CFP, such collaborations allow improving packaging design and developing viable packaging prototypes taking market expectations, legal compliance, and consumer trust into account (Guillard et al., 2018; Meherishi et al., 2019). Moreover, based on Brown et al. (2019), collaboration can facilitate the creation of sharing platforms for reusable FP or the mutual development of new recycling technologies. Whereas for such achievements all CFP actors are inevitable, life-cycle-thinking demands particularly food companies to assume the responsibility for all life-cycle stages of their products, i.e. from production till second life/life-time-extension (Kriwet et al., 1995). Olsson et al. (2004) though found that usually, packaging would be chosen based on manufacturers’ perception of customer demands (without actual investigation/understanding) and production/distribution demands (e.g. available equipment, machinery, and materials). Other demands would be neglected. To sum up, **as food companies significantly influence CFP, e.g. via product design, material sourcing, or new BMs, they need to enhance their collaboration efforts (ten Brink et al., 2018).**

### *The current status of CE collaboration*

Even though collaborative engagement already occurs in the CE, Stewart and Niero (2018) found that this would mainly regard other businesses but rarely consumers or other actors. For CFP specifically, collaboration efforts across the value chain are lacking (WEF et al., 2016; PAC, 2017). This might be due to risks and complexities emerging when collaborating with new subcontractors and actors such as co-operative customers, suppliers, designers, regulators, or competitors (“coopetition”). In addition, novel organisational forms, which are required to enable short product cycle loops and the utilisation of all interdependencies between organisations, may be constrained by a linear institutional system. For instance, sufficient institutions facilitating circular collaboration, e.g. in regard to property rights, regulations, or standards, are missing (Fischer & Pascucci, 2017; De Angelis et al., 2018).

Existing literature provides insights into (1) (non-CE-related) collaboration rationales, strategies, and elements (Simatupang & Sridharan, 2002; Barrat, 2004; Dietrich et al., 2010) as well as (2) (non-collaboration-related) circular SCM and technical reverse flows (Kazancoglu et al., 2018; Morana & Seuring, 2011; Winkler, 2011; De Angelis et al., 2018; Genovese et al., 2015; Farooque et al., 2019; Pagell & Wu, 2009; Witjes & Lozano, 2016). Academic insights on the combination of both fields, i.e. collaboration in a CE, is, however, limited. Still, some CE collaboration studies were recently published, including: (a) Brown et al. (2018) identifying collaboration types for CE BMs; (b) Brown et al. (2019) analysing collaboration rationales of companies for CE-oriented innovation; (c) Fischer and Pascucci (2017) analysing CE collaboration in the textile industry; (d) Mishra (2019) analysing collaboration as CE enabler in developing countries; (e) Dora (2019) studying CE collaboration practices of farmers; (f) Karhu and Linkola (2019) conducting a case example of collaboration for CE in the Built Environment; (g) Liliani et al. (2020) examining the co-innovation process between bioplastic-packaging producer and product manufacturer; and (h) Rizzi et al. (2013) developing factors to assess the impact of collaborative strategies to implement EPR in open-loop supply chains. Despite those insights, Dora (2019) points out to a lack of studies on collaborative CE supply chain relationships. **Similarly, Meherishi et al. (2019) identify the need for future research on collaborative approaches enabling CFP and on how such collaborative/cooperative integration of all supply chain players may look like.**

### *The collaboration set-up and partner selection phase*

Examining the field of collaboration, three elements are commonly studied in literature (Bryson et al., 2015; Brown et al., 2019; Davis & Cobb, 2010). First, the conditions, drivers, and antecedents of emerging collaboration are analysed. Second, enabling factors for successful collaboration such as structures, processes, accountabilities, outcomes, leadership, or governance are of interest. Third, potential conflicts and tensions (for instance related to collaboration interdependence, uncertainty, loss of control, or opportunistic behaviour) need to be understood. For all three elements, the most common barriers impeding successful collaboration are seen in technology, information, or in relation to people. The latter for example include cultural barriers inhibiting the creation of enthusiasm, trust, or willingness to change. By choosing and establishing collaborations with fitting (to the conditions/needs of the firm/project) internal and external people/partners, alongside auxiliary training/education, such difficulties can be avoided (Barson et al., n.d.; Fawcett et al., 2008; Ingirige & Sexton, 2006). Partner selection as essential step of the collaboration set-up phase, therefore, presents a major

collaboration-specific challenge determining later issues just as success (Brown et al., 2018; Solesvik & Westhead, 2010; Kelly et al., 2002). The phase, though, is characterised by difficulties such as acting on unfamiliar territory, a lack of clear reference frames, cultural differences, and tensions (Kelly et al., 2002). **As a consequence, understanding how collaborations can be set-up despite those difficulties to ensure their future success is of relevance.**

During the collaboration set-up, firms choose attractive partners in terms of “the degree to which the initiating firm in a particular alliance project sees a partner as desirable, favourable, appealing, and valuable” (Shah & Swaminathan, 2008, p. 473). To assess such attractiveness, partner selection criteria are defined by traditional collaboration literature (Geringer, 1991; Solesvik & Westhead 2010; Shah & Swaminathan, 2008; Dietrich et al., 2010; Barrat, 2004; Goodman et al., 2017). According to Geringer (1991), task-related can be distinguished from partner-related selection criteria. The former refer to the ability of a partner to fulfil a function for the firm via needed knowledge, skills, resources, competences, network links, or influence (Solesvik & Westhead, 2010). Partner-related selection criteria, on the other side, refer to the strategic fit with the collaboration partner in terms of cultures, processes, or systems. Such fit can be attained via, for instance trust, a good reputation, or enthusiasm for the collaboration (Solesvik & Westhead, 2010; Dyer & Singh, 1998). Such relational criteria often tend to be forgotten when launching agreements but are key to mutually successful alliances (Kelly et al., 2002). Further, **even if literature on partner selection criteria exists, in-depth as well as more recent studies are lacking (Solesvik & Westhead, 2010; Cao et al., 2010).**

#### *Collaboration set-up and partner selection in the CE*

Besides this knowledge gap, specifically for CE collaboration, neither the collaboration set-up process, nor the partner selection criteria were ever analysed. As only reference, the model of Brown et al. (2018) lists partner roles for circular businesses. Those resemble the above-mentioned task-related selection criteria. The authors, however, raise the concern that “specific knowledge and understanding of required capabilities, gaps and systemic change across stakeholder interactions and types of partners required linked to performance [in terms of improvement of circularity] is lacking” (Brown et al., 2018, p. 195). Similarly, the CE theory review of Lahti et al. (2018) calls for research on the development of CE networks, and their contract design and transactions. The authors state as research question of relevance: “How will collaborative alliances be set up to enable system-level changes and radical innovation, and how will they be governed?” (Lahti et al., 2019, p. 13). Besides these research gaps addressing the collaboration set-up phase and partner roles, also partner characteristics required to implement CE BMs, such as trust, connectedness, or information sharing lack insights (Lahti et al., 2019).

## 1.4 Research Question

Building on the previous insights, the CE presents a promising approach to solve issues caused by the current inefficient production, use, and disposal of FP. Within CFP, reusable and recyclable FP are identified as the most desirable and frequently applied R-strategies. Recycling or reusing packaging for food, however, entails some specific challenges such as ensuring food preservation or safety. Even though, recently, CFP receives growing attention and application, little academic insights and on-scale solutions can be found. As one key enabler for CFP, collaboration was identified. Here, particularly food companies as central player can wield power over and enable internal, vertical, and horizontal collaboration. Their set-up and selection of partners is thereby key to ensure the overall success of CFP collaborations. This initial phase, however, lacks insights. Combining all three research streams as depicted in the Venn Diagram (Figure 4), leads to the research question of this study:

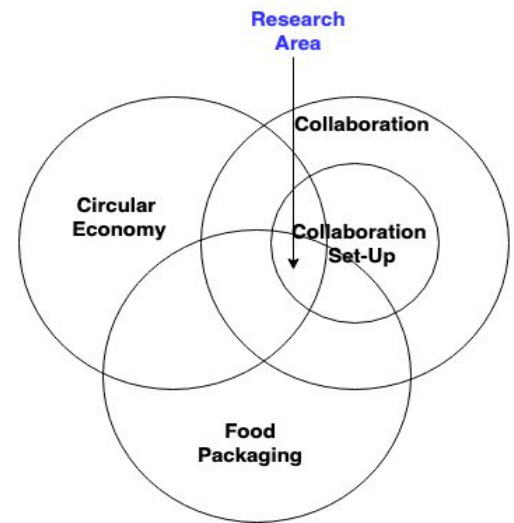


Figure 4: Venn Diagram delineating the research area

*How do focal firms set up and choose collaborations for circular food packaging?*

As this collaboration phase was never investigated for CFP, a set of elements should be explored:

- The type of collaborations for reusable and recyclable FP
- The collaboration set-up phase of focal food firms for CFP collaborations
- Roles to be fulfilled for CFP and their potential fulfilment either by food producers and retailers as focal firms or other partners along and outside the value chain
- Characteristics that partners for CFP should fulfil
- Factors influencing the collaboration set-up and partner selection

The research question is of relevance as a higher degree of collaboration and coordination can significantly enhance the CFP performance of focal firms. Specifically, recycling/reusing infrastructure needs to be aligned across geographies to enable realisation of CFP solutions on scale. For companies, CFP collaboration allows pursuing common goals and drive shared value for all players (Clark et al., 2019; Dora, 2019). When sharing resources and knowledge, complementarities can arise, which reinforce CFP efforts. Moreover, CFP asks for high investments, such as in technologies or new material development, while having to compete with cheap disposable packaging. Sharing costs and increasing volumes and scale, therefore, can enable economically viable BMs.

As the above remarks show, collaboration can help to overcome a range of obstacles towards CFP. The specificities of such collaboration and its establishment still need to be understood though, as also Clark et al. (2019) point out. Hence, this study can contribute to CFP research, where comprehensive and relevant studies are lacking (Gong et al., 2019). Whereas most CFP studies focus on technical or material explorations, in accordance with Meherishi et al. (2019),

only a few examine (supply chain) management practices. To close this research gap, this study takes the perspective of focal food firms and determines their CFP network required and its establishment. Further, this study does not only advance CFP, but also literature on the CE generally, still constituting “a niche discussion among sustainable development professionals” (Kirchherr et al., 2018, p. 265). Collaborative CE approaches are even explored to a lesser extent (Meherishi et al., 2019), while the set-up and partner selection for CE projects is barely covered. Since as a starting point to this study, traditional collaboration literature is taken, linear collaboration models will be contrasted to the novelties emerging in circular collaboration.

Moreover, this research provides practical insights on CE, CFP, and collaboration fields. These can also support their effective implementation in the future, since analysis of CE implementation strategies is still lacking (Kalmykova et al., 2018). By analysing past and current CFP collaboration efforts, empirical evidence can be delivered. Based on this, practical advice for focal firms with major influence over the initiation, sourcing, and design of CFP can be developed (ten Brink et al., 2018). Since these companies, to date, only limitedly consider demands or collaborate with the whole CFP supply chain, such advice is much needed (Stewart & Niero, 2018; WEF et al., 2016; PAC, 2017). Food producers and retailers can find guidance in the envisaged CFP collaboration set-up process and the lists of CFP partner roles and characteristics. This way they may identify and enhance own capabilities and be able to find required and attractive partners. To further guide the operationalisation, based on the insights, strategic/managerial tools and methods can be designed to assist decision makers working towards circular offerings.

Lastly, this research can provide guidance for the host organisation *Circle Economy*. The impact organisation strives to realise practical and scalable CE solutions by accelerating, connecting, and empowering businesses, cities, and governments. Therefore, it is of particular interest for *Circle Economy* to understand the collaboration set-up and partner selection process for CFP, alongside its own potentially facilitating role within this process. For instance, it may be determined how the organisation can interact with food companies in terms of roles to be fulfilled. At the same time, the findings can be of use for *Circle Economy* in future CE research and advisory projects or may serve as starting point for further explorations of the topic of CE collaboration in a CE.

## 2. Theoretical Framework

To analyse the choice and set-up of CFP collaborations, existing literature is used as a starting point. Since literature in this specific field lacks, traditional collaboration set-up and partner selection literature as well as CE collaboration literature is consulted. This way, a theoretical framework is developed, whose applicability to CFP is tested in this study. The framework consists of three-sub-frameworks on (1) the collaboration set-up process, (2) the partner roles, and (3) the partner characteristics as selection criteria. The partner selection criteria present an integral part of the set-up process as they are developed and applied in its course. All three frameworks are introduced in the following sections.

### 2.1 Collaboration Set-Up

As outlined earlier, many collaboration barriers develop in the early precondition stage (i.e. before the collaboration take-off), often related to relationship issues between the partners. At the same time, the phase entails difficulties itself. As a consequence, this initial phase should be “a period of mutual discovery, sense making and trust building by the partners and those involved” (Kelly et al., 2002, p. 12). To understand important steps that focal firms need to take during the set-up of collaborations, Czajkowski (2007) can be consulted. The first of the three action steps of the author’s collaboration success measurement model – the precondition stage – constitutes the base of the developed framework. Other theories are added to holistically cover all elements of potential relevance, namely: (a) Kelly et al. (2002) developed management implications to tackle challenges when starting collaborations, (b) George and Farris (1999) identified four formative alliance stages, (c) Bryson et al. (2015) summarised existing theoretical collaboration design and implementation frameworks, (d) Duysters et al. (1999) developed four building blocks of “High Touch Partnering”, and (e) Brown et al. (2019) outlined major steps of collaborative circular oriented innovation. From this literature review, a collaboration set-up phase of six main steps was developed. Thereby, similar concepts of different authors were grouped. Figure 5 presents the condensed version of this theoretical sub-framework.

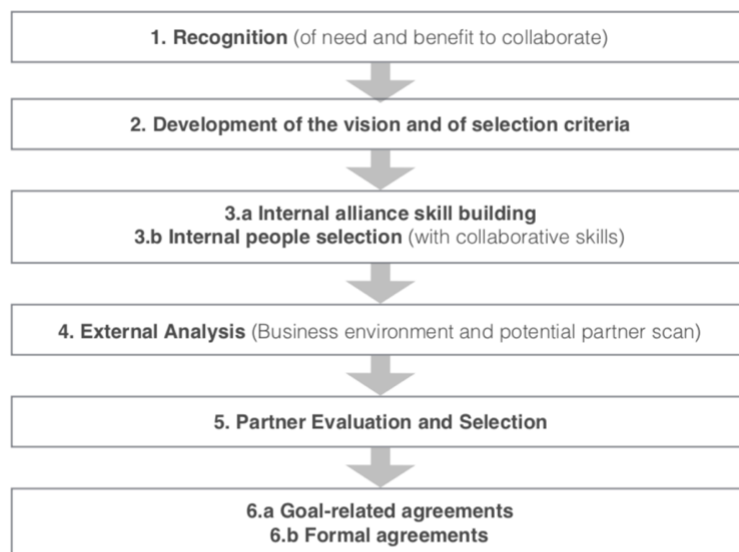


Figure 5: Theoretical sub-framework A: Steps of the collaboration set-up process.

Setting Figure 5 out in detail, as a first step, organisations need to **recognise the need and potential benefits of collaborating**. This could be a problem insoluble alone, spreading risks, or the need of additional expertise, technology, relationships, or financial resources (George & Farris, 1999; Czajkowski, 2007; Bryson et al., 2015). Secondly, the **vision, goal, and criteria for partner selection** should be developed. This way, those partners adding value to the company can be identified (Duysters et al., 1999; Czajkowski, 2007; Brown et al., 2019). Subsequently, the organisation should prepare internally for collaborating via **developing required skills**. Firms need a company-wide collaboration capability, which can be supported by various instruments, such as tools, human resource management skills, or management techniques. Literature argues that value can only be gained from collaboration if a collaborative mind-set, orientation towards learning, and the ability to share and absorb knowledge/skills exist (Duysters et al., 1999; Bryson et al., 2015). Besides, George and Farris (1999) underline that firms would need to allocate resources for planned collaboration early enough. For this purpose, firms need to **commit to human resources**, such as managers and staff. Those employees should possess interpersonal and collaborative skills, as well as required qualifications (Czajkowski, 2007; Kelly et al., 2002; Bryson et al., 2015). According to Kelly et al. (2002), particularly the collaboration manager needs to be capable of managing both, diverse perspectives and technical aspects. After the internal preparation, literature calls for an examination of the **external business environment and potential partners**. In this manner, firms become aware of market, technological, political, and social developments (George & Farris, 1999; Duyster, 1999; Czajkowski, 2007). Rohrbeck et al. (2013) mention that such “roadmapping” “gives an indication of needed competencies and necessary steps” (p.14) and thus supports planning and decision making. Based on the internal and external scan, **partners can be selected** following a systematic assessment. Throughout this, partner- and task-related selection criteria are taken into account. Those are treated separately in the other two theoretical sub-frameworks (see chapters 2.2. and 2.3). Finally, coming to **agreements** with selected partners is important. On the one hand, informal goal-related agreements include, for example positive atmosphere creation, a shared vision, values, objectives, purpose, and contributions from the partners (Kelly et al., 2002; Czajkowski, 2007; Duysters et al., 1999; Bryson et al., 2015). On the other hand, formal agreements need to be obtained such as for accountability, implementation, administration, or authoritative purposes (Duysters et al., 1999; Bryson et al., 2015; George & Farris, 1999).

## 2.2 Partner Roles (Task-Related Selection Criteria)

The complexity of the initial collaboration set-up phase is also mirrored in research on partner selection criteria being diverse (Solesvik & Westhead, 2010). Criteria of partner characteristics used by managers vary per alliance project type and the context's task and information characteristics (Shah & Swaminathan, 2008). Within the CFP context, therefore, criteria can be expected to resemble. According to Geringer (1991), it is possible to distinguish between task-related (roles) and partner-related (characteristics) selection criteria. The former refer to partners with the best skills and resources available. Goodman et al. (2017) identified eight roles, which stakeholders in sustainability-oriented innovation processes may play: the stimulator, initiator, broker/mediator, concept refiner, legitimator, educator, context enabler, and impact extender. These roles serve as a starting point for developing a list of partner roles for CFP. They are complemented by insights from Solesvik and Westhead (2010) and Brown et al. (2018). The latter define and classify circular players based on their specific knowledge and capabilities being of relevance for a CE. Figure 6 presents an overview of the eleven identified roles, assigned to three collaboration phases and two foci as explained below.



Figure 6: Theoretical sub-framework B: Partner roles (task-related selection criteria).

In reference to Figure 6, literature mentions two partner roles of importance when **starting a project**. First, the **initiator** initiates, inspires, and generates ideas for an innovation, either at the beginning or at a later stage of a project (Goodman et al., 2017). Second, the **financier** provides initial funding (Solevik & Westhead, 2010; Brown et al., 2018). Here, Goodman et al. (2017) highlight that besides direct financing, this partner may call for ideas/proposals to fund those. Often governments or municipalities fulfil this role. Once an idea for a project/innovation and the required funding is ensured, when **developing a project**, the **piloter/refiner** is important. This actor can either develop new products/services or support organisations in experimentation, piloting/testing, learning-by-doing/feedback, and identification of obstacles (Solevik & Westhead, 2010). With sufficient technical expertise, this way, the product/service can be made more attractive to end-users and customer experience can be improved. At the same time, the CE performance can be enhanced and required partners for the projects identified. Source of such feedback can stem, e.g. from consumer research or open innovation consultancies (Goodman et al., 2017; Brown et al., 2018). Furthermore, Brown et al. (2018) define the **closed loop material expert** as a CE-specific role. This actor can support the “development of closed network functions for materials” (p. 193), mainly via research and joint learning on material recovery, end-of-life processing, resource sharing, or reuse potentials. When **realising** projects, in a CE, the **use-phase supporter** as service-oriented partner can support the product-life-extension, for instance by offering repair (Brown et al., 2018). Goodman et al. (2017) add the role of the **impact extender**, who can promote the increased usage of products/services, e.g. in other lifestyles areas. Similarly, this partner can extend the (social or environmental) positive impact.

Unattached to the phases of a project, literature points to two roles **related to the collaboration** itself. First of all, the **mediator** helps to integrate various stakeholders. This partner enables meaningful collaboration, being of particular importance in a CE, which is characterised by high complexity (Goodman et al., 2017). This way not only single collaborations but also networks can emerge to maximise efficiencies and the potential of CE innovations (Brown et al., 2018). For this, firms need to be linked to different stakeholders such as buyers, suppliers, or distribution channels (Solevik & Westhead, 2010). Once a collaboration/network is established, according to Brown et al. (2018), the **knowledge broker** is engaged within collaborations for joint learning. As a prerequisite, this partner requires expertise on the topic at hand (e.g. CE) to facilitate research and leverage existent knowledge. Equally relevant over all three phases of a project are three roles being oriented towards the **outward-world**. First, the **enabler** is a partner with local and international knowledge on regulations and the market, who also has political influence (Solevik & Westhead, 2010). Enabler can support a change/reformulation of infrastructure policies and the regulatory context (e.g. permits, licenses). In this manner, this actor can ease the development and market entrance of innovations. Usually, public authorities fulfil this role (Goodman et al., 2017). Likewise, the role of the **legitimater** is often fulfilled by public authorities and universities. This partner supports organisations in establishing credibility via assurance and promotion (Goodman et al., 2017). Lastly, Goodman et al. (2017) highlight the **educator**, who aims at shifting the perception and behaviour of the public. Since the CE is a relatively new concept, educating and preparing the public accordingly is required to drive CE innovations and lifestyles. By way of example, civil society organisations, public authorities, or academic institutions can set up educational consumer campaigns, guidelines, or blogs.

## 2.3 Partner Characteristics (Partner-Related Selection Criteria)

Partner selection goes beyond choosing partners based on their skills and resources. As outlined earlier, partner-related characteristics should also be taken into account. Although several characteristics might be desirable, partners do not necessarily need to fulfil all of them (Shah & Swaminathan, 2008). As explained in the following, several theories were combined to compile a list of eight partner characteristics, as presented in Figure 7. Theories compiled stem from (a) Solesvik and Westhead (2010) listing partner selection criteria, (b) Shah and Swaminathan (2008) discussing criteria for choosing alliance partners under consideration of the project type, (c) Dietrich et al. (2010) presenting a conceptual framework of collaboration-related elements and their interdependencies, and (d) Barrat (2004) outlining elements of supply chain collaboration.



Figure 7: Theoretical sub-framework C: Partner characteristics (partner-related selection criteria).

Setting Figure 7 out in detail, **strategic fit** presents one partner characteristic of importance (Solesvik & Westhead, 2010). Strategic fit is defined by McGee and Channon (2014) as alignment between the market, internal and external environment, strategy, industry, context, company operation, and management. Dietrich et al. (2010) and Solesvik and Westhead (2010) particularly emphasise the importance of a geographical fit and physical proximity. Besides, partners should achieve **goals alignment**. While goal congruence enables information exchange, similarly, incentives alignment can guarantee the support and achievement of common goals. This presents a key for successful collaboration. Dietrich et al. (2010), however, found that chosen incentives/rewards in collaborations often fail to create crucial motivation if they are solely of extrinsic nature. Further, Barrat (2004) explains that collaborations need to ensure mutual benefits and risk sharing. As an additional characteristic, Shah and Swaminathan (2008) and Solesvik and Westhead (2010) highlight the importance to perceive financial **advantageousness** potentially resulting from the collaboration. This is because financial pay-off, which may result from financial stability of the partner, higher perceived market

opportunities, or cost reductions due to economies of scale, can represent a strategic advantage for the firm. Moreover, according to Solesvik and Westhead (2010), a partner with **good reputation** and high status within an industry is more likely to be chosen. The authors moreover classify **enthusiasm** as important partner selection criteria. Equally, **commitment** to the collaboration in terms of a genuine interest and prioritisation of collaborative tasks would enhance the collaboration quality (Dietrich et al., 2010). Shah and Swaminathan (2008) operationalise commitment into the willingness to supply tangible resources such as money, people, skills, and time, which are required to support and accomplish collaborative objectives. In addition, **trustworthiness** is considered by many authors as crucial to coordinate alliances and ensure high-quality collaboration (Shah & Swaminathan, 2008; Dietrich et al., 2010; Barrat, 2004). Solesvik and Westhead (2010) emphasise the importance of trust between the top management teams. Especially in the case of hardly manageable collaboration processes and high uncertainty and risks, trustworthy partners are essential. In this study, trust is defined as consisting of two dimensions. Whereas benevolence-based trust focuses on motives, intentions, goodwill, and avoidance of opportunism; competence-based trust refers to the willingness to rely on partner's credibility, expertise, capabilities, or judgements (Shah & Swaminathan, 2008). Lastly, Barrat (2004) calls for partners pursuing **open communication**. Hence, the ability and willingness to drive transparent, high-quality, and immediate information flows, openness, and honesty may serve as a partner-related selection criterion. The use of information technology can support such practices, which may facilitate the development of trust, respect, and commitment.

Alongside those eight, **complementarity** may be added as a ninth partner characteristic. This is due to the importance for firms to hold complementary skills, resources, products, or services, which are lacking internally. This way, companies could benefit from financial synergies, economies of scope, or skill transfer across companies. In this study, however, complementarity is equated to task-related selection criteria, i.e. partner roles, and discussed separately (see chapter 2.2).

### 3. Methodology

This research aims at identifying (1) the typical process steps of the collaboration set-up of focal food firms for reusable and recyclable FP and (2) the partner selection criteria applied in terms of (a) roles to be fulfilled and (b) partner characteristics ensuring the collaboration's success. To accomplish this aim, the study is of explorative and descriptive nature. Descriptive empirical evidence is asked for, because CFP initiatives of food companies are relatively young. Thus, this way, the practical implementation and academic literature on CFP can be advanced. Bryman (2012) highlights that such descriptive elements are important (although usually not exclusively concerned) in qualitative research to provide an account of the context. In addition, due to the lack of CFP-specific collaboration insights, this study is also of explorative nature. Nonetheless, some existing literature can be drawn on, as despite the shortcomings of CFP collaboration in research so far, CE insights are increasingly emerging. Equally, traditional (and partly sustainability or CE-related) collaboration literature is deployed to develop an initial theoretical framework. This way, abductive theory modification in three steps is sought for, deeming the differentiation between deductive and inductive research rather as tendency (Bryman, 2012; Dubois & Gadde, 2002). First, available collaboration literature is consulted to develop three theoretical sub-frameworks on the collaboration set-up, partner roles, and partner characteristics (see chapters 2.1, 2.2., 2.3). Second, via qualitative research, the frameworks are applied to the topic of CFP (see chapter 4). Third, the findings are consolidated to end at a refined framework (see chapter 5).

Besides understanding and exploring the collaboration set-up and partner selection for CFP in detail, the research design entails contrasting elements. On the one hand, since the theoretical framework is primarily based on traditional collaboration literature, the findings can determine specificities typical for collaboration in a CE in comparison to a "traditional" linear economy. On the other hand, the influence of different R-strategies is examined. Whereas reusing presents a higher and thus more desirable value retention option than recycling, still, recyclable FP is more widely implemented on-scale. Furthermore, differences between focal food companies are analysed. Retailers are contrasted to food producers and brand owners, whilst SMEs to MNCs.

The research area of CFP is limited to reusable and recyclable primary retail FP in North-Western Europe. This decision was taken as reusable and recyclable FP were earlier identified as most relevant CFP strategies. Also, primary packaging in direct contact with food presents, in comparison to secondary and tertiary packaging (e.g. for transport), a larger challenge for reuse and recycling and is discarded more often. Consequently, improvements are crucial (Davis & Song, 2006). Moreover, retail food is focused, i.e. food (except of restaurant food), which consumers purchase and consume off-premise (Suttle, n.d.). Food items not necessarily requiring packaging (such as fruits or vegetables) are excluded as for those, packaging refusal presents a more desirable option. Lastly, North-Western Europe was chosen as it presents a geographical scope with relatively advanced CFP initiatives being able to deliver empirical evidence. At the same time, social, political, and economic factors influencing CFP are relatively comparable (e.g. CFP (EU) legislation, waste management, consumer behaviour, or firm operations/ management).

### 3.1 Research Method and Sampling

To gain insights into CFP collaborations, interviews delivering qualitative empirical insights were sought for. Those can consider contextual conditions of importance. Moreover, as argued by Eisenhardt (1989), for under-researched phenomena as the one at hand, taking practices and experiences of the field into account can support the aspired theory refinement. The interviewees were defined via a general purposive sampling, which results in a non-probability sample and is most practicable and theoretically justified in explorative research (Saunders et al., 2009; Jacob et al., 2013). This way, information-rich cases for the effective use of limited resources were selected. Additionally, triangulation across sources (e.g. over different organisations or sectors) allows the distinction between common findings and those unique to particular cases to enhance generalisability and external validity (Yin, 2003; Palinkas et al., 2015).

The sampling strategy followed three steps. First of all, on the context-level, organisations working/having worked on reusable and/or recyclable FP were identified by consulting publicly available information, such as press releases on CFP initiatives and member lists of commitments/associations (e.g. the New Plastics Economy). Second, also on a context-level, the experience and operation of focal food firms with respect to their CFP collaboration set-up and partner selection should be understood. This perspective was chosen since focal food firms are central players in CFP value chains, carrying responsibility as well as power to change and influence other players (Gong et al., 2019). Focal food firms were determined as food producers, brand owners, and retailers. A well-balanced sampling including all three type of companies in differing sizes (i.e. MNCs/large firms and SMEs/smaller firms) was aimed for. This can enable conclusions to be drawn on CFP collaboration differences resulting from the size and type of food companies. Since reusable FP is often operated by reuse system providers, those can deliver additional collaboration-related insights on behalf of focal food firms. Moreover, CE/sustainability FP experts such as from research institutions or consultancies are often involved in CFP collaboration projects as external support. Therefore, such experts were interviewed in a second interview phase to test, extend, and better understand the insights gathered in the first phase. To add, including such expert interviews enhances the generalisability of the results by introducing an outside perspective. Overall, by gathering insights from interviewees with different backgrounds, construct validity is enhanced (Yin, 2003). Third, on the participant-level, individuals being especially knowledgeable about or experienced with the CFP collaboration set-up and partner selection processes need to be identified (Palinkas et al., 2015). In food companies, such individuals often, but not necessarily, work in CE, sustainability, or packaging departments. Table 1 presents an overview of the in total 17 interviewees, their respective organisations, functions, and pseudonyms applied in the results section to maintain anonymity. Overall, three multinational food-products corporations (brand owners), two sustainable SME food producers, three multinational retailers, one SME retailer, two reuse system providers, and six CFP experts were interviewed.

Table 1: List of interviewees based on organisation type and function.

Pseudonym	Organisation type	Function
<b>Expert 1</b>	Recyclability initiative	Sustainable packaging consultant
<b>Expert 2</b>	Consulting and assurance firm	Sustainability senior manager
<b>Expert 3</b>	Circular Economy consultancy	Founder; Circular Economy consultant
<b>Expert 4</b>	Circular Economy consultancy	Sustainable packaging consultant
<b>Expert 5</b>	Sustainable packaging organisation	Sustainable packaging expert
<b>Expert 6</b>	Sustainable packaging organisation	Sustainable packaging expert
<b>Practitioner M1</b>	Food-products MNC	Circular Economy packaging director
<b>Practitioner M2</b>	Food-products MNC	Sustainable packaging senior manager
<b>Practitioner M3</b>	Food-products MNC	Sustainability and Circular Economy manager
<b>Practitioner S1</b>	Sustainable SME food producer	Founder
<b>Practitioner S2</b>	Sustainable SME food producer	Manager
<b>Practitioner R1</b>	Multinational retailer	Sustainable packaging specialist
<b>Practitioner R2</b>	Multinational retailer	Sustainability specialist
<b>Practitioner R3</b>	Multinational retailer	Innovation and sustainability specialist
<b>Practitioner R4</b>	Organic SME retailer and wholesaler	Communication & PR specialist
<b>Practitioner U1</b>	Reusable packaging service provider	Founder, Manager
<b>Practitioner U2</b>	Reusable packaging service provider	Co-founder, Advisor

## 3.2 Data Collection and Analysis

After collecting scientific insights during the initial literature research, on the basis of the developed theoretical framework, semi-structured qualitative interviews were conducted. These ensure both, covering main topics to later modify the framework, as well as flexibility with regard to topics. This way, novel partner selection criteria and collaboration set-up steps can emerge. During the period October 2019 - January 2020, 17 interviews were conducted (see Table 1). Due to spread geographies (over North-Western Europe), five were conducted face-to-face while twelve over the telephone. The interviews lasted between 25 and 80 minutes and with the exception of two, were held in English. To enhance the measurability and reliability of the research, two generic interview guides based on the theoretical framework (one for food companies and one slightly amended for experts), were used (see Appendix III). The list of questions served as orientation to ensure the discussion of pre-identified topics. At the same time, the semi-structured nature of the interviews allowed the adaptation to each individual interviewee. For each topic block, initially, open-ended questions were asked to allow the identification of new topics/foci and to gain a true idea of the real-life occurrences (Saunders et al., 2016). Subsequently, the visualisations of the preliminary theoretical sub-framework (see Figures 5,6 & 7) were shared during the interviews as guidance. Oral permission for recording the interviews was granted by all but one interviewee, where notes were taken instead for documentation.

In all other cases, the recorded interviews were fully transcribed. The interview transcripts can be obtained on request. The collected data in the form of transcripts was explored with thematic analysis to identify, analyse, and report patterns and themes (Braun & Clarke, 2006). For this, the data was coded with the software NVivo, which eases the identification of patterns in textual data. After the coding rounds started open, they gradually focused (Corbin & Strauss, 1990). The first open coding deconstructed the data into meaningful chunks to ease the understanding and develop first concepts. In parts, single data was coded to several concepts, allowing the examination of correlations, such as between partner types and partner roles. After the open coding, axial coding compared the developed concepts to the preliminary theoretical framework and examined the interconnections between concepts. By doing so, categories and sub-categories were developed. Since the coding framework was developed in an iterative, progressive manner, emerging codes were constantly refined. Moreover, to improve the internal validity via a rigorous data analysis approach, the interview data was constantly compared to emerging theoretical categories by applying strict coding rules (Bryman, 2012). The interviews were coded until theoretical saturation, which was reached after three coding rounds. Lastly, the categories and sub-categories were refined. The resulted coding framework can be found in Appendix IV. To avoid inconsistent inferences, the analysis intended to stay close to the interview data. Therefore, in the results section, interview quotes support the identified concepts. Finally, the findings were interpreted by referring back and comparing them to the theoretical framework. A modified framework was compiled linking the collaboration set-up process with partner roles, characteristics, collaboration types, and influencing factors (see Figure 9). Overall, the empirical and analytic research approach was well documented to enhance the replicability of this study (Bryman, 2012).

## 4. Results

In the following sub-sections, the results of the qualitative interviews conducted are outlined. As a background to the interviews, initially the vision of the interviewees on CFP and the type of CFP projects identified and analysed in this research are outlined. Subsequently, in line with the preliminary theoretical framework, the results of the collaboration set-up, partner roles, and partner characteristics follow.

### 4.1 Circular Food Packaging Strategies and Types

The topic of CFP is perceived as highly relevant by all interviewees. Nonetheless, Expert 6 questioned the likelihood of firms realising ambitious CFP targets, which they would set. According to Experts 1 and 4 and Practitioners U2 and M3, firms should prevent the plastic issue at source by striving towards long-term system change instead of waiting until the plastic crisis demands dealing with its pollution.<sup>11</sup> Building on this, most interviewees agreed that (plastic) packaging prevention would be the most favourable option from an environmental perspective, followed by rethinking/re-designing, reduction, reusing, and lastly recycling. Thus, reusable was generally favoured above recyclable FP. Yet, the majority argued that achieving a truly CE would be challenging, which is why a recycling economy would be a necessary transitional bridge. In line with this, all food producers and retailers interviewed tend to focus on recyclable FP and implement reusable FP only in small-scale projects. Several interviewees gave the argument of the current system being well adjusted and suited to single-use packaging. As a consequence, recyclable plastic packaging would often be the most efficient and ecologically advantageous option in globally operating supply chains (Experts 1, 2, 3 & 6, Practitioners S2 & R4). Based on this, Expert 1 views plastic recycling and leakage avoidance not only as transitional, but also as final solution. Most interviewees, though, advanced the view of Expert 6.

*“Recyclability seems to be something like a holy grail now, but, you know, it’s actually not, if you move to a CE, recycling actually is not all that circular.” (Expert 6)*

Moreover, three interviewees said that they would find the discussion on plastics disproportionate. Similarly, four interviewees mentioned the importance of considering additional environmental criteria beyond the circularity discussion, such as material usage, climate change impact, land usage, and food waste. Whereas Experts 1 and 4 argue that climate change is a more pressing issue than recycling, Expert 2 adduces that climate change cannot be applied as a suitable impact category to assess recycling.

Examining the forms of reusable FP models mentioned in the interviews, those differ between the location where the food is sold, and the responsibilities of key stakeholders, as shown in Table 2. The material used for the reusable packaging was not discussed in the interviews, but rather there was a focus on the operational system.

---

<sup>11</sup> Practitioner M3: „We should not just go there and clean [the plastic pollution], without addressing the issue at the source. The aim is to close the tap before mopping the floor.”; Practitioner R1: “We need to start turning off the tap.”

Table 2: Reusable food packaging models identified.

Type (location)	Operation/ Logistics by	Refill by	Cleaning by	Examples mentioned in interviews
<b>E-commerce</b>	Reusable service provider	Food producer	Reusable service provider	Loop (US): <i>Loop is a global circular shopping platform. It delivers products in multi-use packaging in tote bags to homes and picks up the empties. Loop cleans and refills. The option of "auto-refill when returned" is possible. A Deposit has to be payed at the first order. Loop partners with big brands for groceries, household, and personal care (Loop, n.d.).</i>
<b>E-commerce</b>	Retailer	Food producer	Reusable service provider	Loop (Europe) with retailers, e.g. Carrefour, Tesco: <i>Based on the Loop (US) concept, but in partnership with retailers, integrating it into their home-delivery services. In addition to brand products, retailer's own brands are offered (Reuters, 2019).</i>
<b>E-commerce</b>	Reusable service provider	Reusable service provider	Reusable service provider	Pieter Pot (Netherlands): <i>Pieter Pot delivers groceries in reusable glass jars and at the same time picks-up the empties again, then cleans and refills. A deposit has to be payed. They offer 250 packaging free items at the same prices as in supermarkets (Pieter Pot, n.d.)</i>
<b>In-store</b>	Retailer	Food producer	Reusable service provider	Loop in store: <i>Planned to sell Loop products in supermarkets of the partnering retailers (Reuters, 2019).</i>
<b>In-store</b>	Retailer	Customer	Customer	No packaging stores, bulk departments, cheese counters in supermarkets: <i>"Original Unverpackt" for example are stores selling food, beverages, household, and personal care items in bulk. Consumers bring their own boxes/jars (Original Unverpackt, n.d.).</i>
<b>In-store</b>	Reusable service provider	Customer	Customer	Miwa operating in supermarkets: <i>Retail solution working without packaging along the whole supply chain. The system is based on reusable capsules and in-store modular units. Producers can fill the reusable capsules with their products. In store, customers then fill their own or returnable boxes with the goods (Startup Valley, 2018).</i>
<b>In-store</b>	Retailer	Retailer	Retailer	Test: <i>Albert Heijn (Belgium) packing in back of store.</i>
<b>Hospitality delivery</b>	Food producer	Food producer	Customer	Hospitality dispenser systems: <i>Nestle Professional: Dispenser e.g. for Coffee or juice, which e.g. the hotel always refills with big refill pouches (Nestle Professional, 2020).</i>

In contrast to reusable FP, for recyclable FP, materials play a distinctive role. Although glass and metal packaging were said to be well recycled materials, three interviewees were concerned of their high environmental impact. This would be caused by the energy-intensive recycling process and their heavy weight being critical during transport (Practitioners S2 & U1, Expert 6). Similarly, even if paper recycling was defined as well established, 100% paper-based primary packaging was classed as unfeasible due to low barrier properties. Still, coated paper packaging was perceived as a feasible option for food. Table 3 summarises the type of recyclability efforts mentioned in the interviews and the differences in their foci.

Table 3: Recyclable food packaging foci identified.

Type (material)	Advantages	Disadvantages	End-of-life efforts	Design efforts
<b>Multi-material plastic packaging</b>	Lightweight, low material usage; high barrier properties to protect and preserve food	Not recycled at the moment, but landfilled	Developing a recycling stream with high-quality material output: collection, separation, (chemical) recycling	Design packaging fit for future system; or simplify packaging and develop mono-material lightweight packaging
<b>Mono-material plastic packaging</b>	Many types of rigid mono-material plastic types are recyclable and recycled	Potentially higher overall environmental impact (weight, high material usage); Shorter shelf-life	Recycling streams existent; but need to develop collection and sorting for materials to ensure their recycling	Design packaging in line with existing local recycling streams: follow design guidelines (e.g. plastic types, colour, size)
<b>Coated paper packaging</b>	Paper recycling relatively easy and well established; Paper: renewable	Low barrier properties of paper	Paper recycling streams existent	Ensure recyclability despite coating; Ensure sufficient barrier properties
<b>Bio-based plastic packaging</b>	Can in theory be recycled; Renewables based	Not recycled at the moment; cannot be recycled with other plastic types	Developing a recycling stream, incl. separation and separate recycling	(Not mentioned in interviews)

## 4.2 Collaboration Set-Up

Regarding the process of establishing collaborations for CFP, interviewees stated that “there is no ideal process” (Practitioner S1), but “common sense” would be followed (Practitioner M2). There was no difference highlighted between the process for reusable and recyclable collaborations, even if goals may differ. As characteristic of CE projects, Practitioner R2 mentioned the need to change the mindset of internal and external people, which could be difficult.

Before initiating any collaboration, as a prerequisite, firms would need to develop a motivation to actually work on CFP. Interviewees described high external pressure, such as committing to a Plastic Pact, as starting point, particularly for MNCs. In contrast, Practitioners S1 and S2 outlined that their small sustainable-oriented company aims for circular packaging rather from their own motivation when re-designing/launching a packaging. Perceptions on the role of SMEs differed.

*“For this [working with government and educational institutions towards recyclability], the company is not big enough, we do not even have an R&D department for that. A Nestle can afford such things, they obviously all have that now.” (Practitioner R4)*

*“If you are very small, you have to rely on what is already in the market. So, then you don't have your own material supplier etc. But then, of course, there are always solutions: to have a solution that is the most environmentally friendly for your product.” (Expert 5)*

As opposed to brand owners, retailers tend to work less proactively on CFP, but rather wait for solutions. This would be due to limited expertise and CFP resources in-house, their powerful positioning over brands, and the fear of losing customer loyalty (Expert 1 & 3, Practitioner R3). In contrast, Expert 2, operating in the German market, claimed that retailers are moving and changing faster than brand owners.

Other motivations for firms to work on CFP mentioned were (1) aligning the strategy with the direction of the industry, (2) the ability to actively steer developments with early action, and (3) improving the CFP system. Economic benefits outlined were (4) potential new business opportunities, (5) a modulated packaging fee incentivising the use of recyclable packaging, and (6) the improvement of reputation and brand valorisation. Moreover, (7) firms evading working on the topic would bear the risks of e.g. bans inhibiting them to sell/import products. (Practitioners M1, M2, M3, U1, U2, R2 & S2 Expert 1, 3 & 6).

#### *(1) Recognition of the need and benefit to collaborate*

The interviews unveiled that their firms are aware of the need to collaborate for CFP. Practitioner M3 added that collaboration “is part by default of all of our roadmaps for sustainability topics” and said it was perceived as necessary by all employees involved.

While Practitioner S2 raised the point of shared responsibility towards environmental issues, all interviewees agreed on collaboration as a premise to enable change at an industry level. Not even large firms could realise CFP in isolation due to lack of finance, significant volumes, or required knowledge. For recyclable packaging, many interviewees pointed out that all firms commonly rely on one decentralised, complex recycling system with many actors involved. To establish this and ensure alignment of packaging design with the end-of-life treatment, collaboration was designated as crucial. In contrast, reusable systems were defined as more competitive. First, their orchestration would usually be executed by one central system operator. Second, several reusable systems could co-exist and compete (Practitioner M1). Still, collaboration for reusable FP would enable sharing capacities and increasing volumes to ensure economic viability and competition with low-cost single-use packaging (Expert 6, Practitioner R2).

Alongside external collaboration, internal collaboration - both across functions/business units and countries for the local establishment of recycling/reusing systems - was mentioned by Practitioners M1 and M3 from multinational food brands.

#### *(2) Development of the vision and selection criteria*

The interviewees agreed that initially developing a clear vision and translating commitments into a strategy is important. In particular for CFP, a multitude of initiatives may, without a clear vision, cause confusion (Expert 2). Still, such a vision could change over time due to uncertainties. Four interviews suggested that this step should precede internal and external people selection. As Practitioner M2 put it: “adapting your resources to where you want to be.” To define a good CFP vision, multiple interests within the firm would need to be considered. On the one hand, ambitious goals and to “put our efforts where we have the most bang for outback”

(Expert 1) was mentioned. On the other hand, goals should be achievable, affordable, and consider diverse interests.

*“[Our business units] don’t have money to experiment, it’s the market, the FMCG now, profitability is very tight.” (Practitioner M1)*

*“Now you suggest to me basically the brown-greyish beer bottle, that we use again and again. ‘I am not such a big fan’, says marketing.” (Expert 6)*

Once goals are set, large firms often appear to translate these into e.g. a handbook or manifesto for suppliers. While Expert 4 criticised a lack of CFP commitments, which would be caused by prioritising profitability and flexibility, Expert 5 explained that the ambitiousness of visions would vary between firms, influenced by their culture and people.

Some interviewees mentioned that not only formulating, but also aligning on a vision would be important. Such alignment would vary between individuals due to different perceptions of the importance of sustainability (Practitioner S2). While this interviewee underpinned that in SMEs total alignment and understanding is required, Practitioners M2 and R2 argued that for MNCs, all employees would never be aligned. A few motivated and engaged employees were named as initiators. Nonetheless, some interviewees highlighted the importance of the alignment and support of the CEO, top-, and middle management. Practitioner R2 argued that although the top-management usually is supportive, middle-management (i.e. those running the business) often lack the time, understanding, or willingness to support.

*“In every revolution it takes two generations, why? Because the mindsets need to change. And sometimes people are educated in a way that makes it very hard for them to change.” [...] “People in their 40s, 50s, these guys clearly lack vision. They don’t understand the modern world. They think, because they are trained and experienced people, that they are right. But they are mistaken. The problem is: they are the people in power.” (Practitioner R2)*

To overcome such resistance to change, the same interviewee suggested to accentuate opportunities for business improvement. Additionally, people’s sensitivity should be identified in inspirational and transparent conversations. Moreover, Practitioner M2 and Expert 3 stressed the need to educate on the vision, knowledge, and strategies all over the company (to all business levels and countries). Lastly, Practitioners R2 and R3 predicted that many people would be enthusiastic, but in the end reluctant to act accordingly.

Results on the partner selection criteria in form of partner roles, which should be developed in this step, are outlined separately in chapter 4.4.

### *(3) Internal alliance skill building and people selection*

Developing a collaboration capacity was ranked as relatively unimportant in the interviews. Expert 5 argued that collaboration would, nowadays, be part of any education and occupation, which would make firm-internal alliance skill building redundant. Instead, the cultures and individual employees of an organisation would make a difference. Practitioner R2 is of the opinion that people could collaborate if they feel the need for it.

In regard to internal employees needed, all three interviewees of multinational brands underpinned the importance of support in all countries, businesses, and functions. While they agree that projects are usually centrally organised, Practitioner M3 argued that this responsibility ideally should be evenly distributed. Furthermore, the interviewees' views aligned on the need of young, motivated, open-minded individuals, who should "know exactly what is going on" (Practitioner R3) in the CE. Packaging technologists with knowledge, such as on materials or recyclability, are required to develop new ideas. This was represented within brands but lacked amongst retailers. For start-ups, the situation is described differently.

*"In a start-up, you're really an entrepreneur. So, you don't know anything. But you collect all the knowledge and make it into a workable system. You are never as smart as the experts. You are just really good at bringing all these people together."*  
(Practitioner S2)

#### *(4) External analysis and outreach*

Even if Practitioners R2 and R3 rejected the need for a structured external analysis of potential partners, Expert 2 and Practitioner S2 still underlined the importance of developing an understanding of the local market, material flows, recycling capacities, current price for recycled materials, or packaging usage scenarios to enable negotiation and a well-informed partner choice.

Reaching out to potential partners was a step frequently mentioned in the interviews. Expert 6 and Practitioner R3 described this as a re-occurring step for each new tender, but also in the course of projects: "it's not an end goal, it's a process" (Practitioner S2). During reach-out, open discussions with potential partners should take place. A difference between company size was brought up. SMEs proactively need to contact partners in their local environment, while external support (e.g. SME-communities) would be lacking (Practitioner S1 & S2). MNCs and well-known organisations, however, were found to be often contacted. Moreover, Expert 4 and Practitioner R3 explained that prolonging existing partnerships would usually be preferred over new ones. Four interviewees highlighted the importance of existing networks and key players to find and reach out to new partners.<sup>12</sup> Similarly, six interviewees agreed that attending conferences or working sessions are key to exchange and networking. Lastly, Practitioner S2, Experts 4 and 5 mentioned the role of experts such as consultants or sector organisations to connect different stakeholders.

#### *(5) Partner evaluation and selection*

The results on the selection criteria in terms of partner characteristics of importance are outlined in chapter 4.3. Practitioner R2 pointed out that collaborations are not only selected based on the best fitting organisation, but people within the organisation. It was found that for SMEs packaging often needs to be the second priority. This is because SMEs would choose their suppliers based on the product (i.e. food) offering. Since suppliers often deliver a product-

---

<sup>12</sup> To ease the outreach, being part of or in contact with key players such as the transnational waste management company VEOLIA, the Platform for Accelerating the CE (PACE), the New Plastics Economy of the Ellen MacArthur Foundation, or the Consumer Goods Forum (CGF) was named crucial.

packaging combination, therefore, the packaging may be predetermined and leverage on this may be limited.

*“But right now, we're such a small company, we can't really influence the people we work with that much yet. [...] the ingredients and the packaging. But if you cannot find both in combination, then the ingredients would win.” (Practitioner S2)*

The interviewees mentioned that conversations (“put forward a value proposition”, Practitioner U2), tests and trials should be conducted, which however can be time-consuming and complex. Two interviewees noted that there are many existing initiatives on CFP (which would not always pursue “sustainable packaging norms” (Expert 2) or reinforce each other). Therefore, of those, firms would need to choose a few manageable and good ones.

#### *(6) Goal-related and formal agreements*

Aligning on goals, visions, and roles of/within a collaboration through transparent discussion was found to be crucial to enable the later translation into action (Practitioner R2). This interviewee also mentioned formal agreements, such as NDAs, as necessary formality. Practitioners M1 and S2 highlighted that a CFP collaboration would still be a business-transaction-exchange, which is why e.g. prices would need to be discussed. On the other hand, Practitioner S2 also mentioned partnerships without monetary transfer but network advantages of other types. Additionally, retailers were found to be the leading player in agreements when forwarding policies to suppliers (Practitioner R3). As partners in larger collaborations may not share their objectives, impacts, or costs (e.g. caused by differing packaging put on the market), finding agreements could be difficult (Practitioner M3). However, Expert 1 argued that full consensus is not always a prerequisite for functioning collaborations.

### 4.3 Partner Characteristics

The interviews delivered insights into the characteristics as partner-related selection criteria. One characteristic mentioned by all interviewees was the ability of partners to fill resource/expertise gaps and to “be able to perform what’s needed” (Expert 3). This characteristic is covered separately under the partner roles as task-related selection criteria in chapter 4.4.

#### *Strategically fitting*

Some interviewees highlighted the importance of choosing a partner who has a fitting and similar company culture, CFP vision, and issues. Experts hired, such as consultants, should (ideally) adapt to the firm:

*“They’re really easy because they adapt to us, like they really work for us, for everything that we embody, on our own set of requirements, our own needs.” (Practitioner S2)*

Larger companies appear to select supply chain partners with whom they can dictate their CFP standards, for instance as part of guidelines (Expert 6). SMEs, in contrast, were found to prioritise fitting (sustainable) food suppliers, with whom they can scale. As a second priority, they aim for CFP within the possibilities of the existing production line (Practitioners S1& S2).

In addition, the majority of interviewees noted the influence of the geography. Practitioner R3 and Expert 2 emphasised that partners should be chosen under consideration of the local context. This would be due to the influence of existing recycling/reuse capacities, facilities, markets, or reverse logistics systems on efforts being required. Moreover, (logistics) partners should be able to cope with the geographical scope of the company. Further, in the majority of interviews, local collaborations were regarded as necessary to ensure local understanding of the potential impact. For example, waste management systems, recycling streams, or reusable systems call for local implementation. The latter were even said to be only ecologically favourable if operated locally. Besides, also global collaborations were mentioned. On the one hand, packaging would often be produced globally. For recyclable FP this may cause difficulties in guaranteeing local recyclability; for heavy reusable FP this may increase the climate impact through shipping. On the other hand, global collaboration could also be beneficial if facilitating the establishment of local collaboration.

*“We try as much as possible to have also some key global partners and collaborations that our markets and countries can benefit from and can leverage. [...] We have a global partnership with Veolia, [...] then our markets, [...] they have local contacts with the local Veolia teams, and they explore what they could potentially do together.” (Practitioner M3)*

Lastly, the partner organisations’ size should be regarded as it could influence the collaboration process. Larger organisations were outlined as complex, less flexible, and more difficult to change than smaller ones. This is why they may be no ideal supplier for smaller companies. Although some interviewees therefore seem to prefer small organisations as partners, still, large ones may offer e.g. more resources or a good reputation. Large organisations were seen as good partners when having CFP anchored in their sustainability goals (Practitioners U1 & S2).

*“You’ve got to go for the right company. It’s unfortunate, but we won’t ever convince a company that doesn’t care and has huge sales and that really is going well. And it*

*doesn't have environmental sustainability [...] embedded in their culture.”*  
(Practitioner S2)

### *Aligning on goals*

Sharing a challenge, interest, and aligning on goals was stated as a prerequisite and the foundation of successful CFP collaborations by many interviewees. Practitioner U2 argued that flexibility is required in innovative reusable projects and “that flexibility will arise if they're aligned with your mission.” Practitioner R3 regarded the overall industry as needing to align goals to “get a lot more done and move the industry in the right direction”. If creating synergies, goals such as increased recyclability could be achieved by pursuing common instead of individual (potentially opposing) solutions.

### *Enthusiastic*

Partners were found to show sufficient enthusiasm when collaborating with large companies. Nonetheless, Practitioners M2, R2, R3 and Expert 6 were of the opinion that although enthusiastic partners could help, it is no guarantee of a successful CFP collaboration. Enthusiasm was described as a potentially temporary state, originating from only one person, or not being translated into action. People, who are willing to innovate and are committed, would be more important.

*“I mean the enthusiasm: I need to be committed, the enthusiasm can go and come.”*  
(Practitioner M2)

### *Committed*

The interviews unveiled that committed partners (particularly the individuals in the partner organisation) in terms of wanting the change and investing resources (e.g. time, money, people) are important. This is particularly relevant for CFP, where value is not necessarily translated into short-term profit (Practitioners M1, M2 & R2, Expert 6). This commitment, though, appears to be lacking at times.

*“On every topic I see people that are reluctant to help us, because it's complicated in their day-to-day business life, they don't have the time. And this is what needs to change.”* (Practitioner R2)

According to Practitioner S2, MNCs may have more resources to commit. Alongside committing resources, Practitioner M3 underlined the importance of top-level commitment, e.g. via a steering committee at senior level. In contrast, SMEs should “go to these companies that care about it [sustainability], but not enough to commit their own time and resources to it” (Practitioner S2) to create benefits for both parties. Generally, “the more progressive the organisation, like NGOs, like some businesses as well” (Practitioner R2), the higher the commitment would be.

### *Trustworthy*

Three interviewees mentioned trustworthiness as an important partner characteristic. The interviewees defined trustworthiness as adhering to promises and words. Expert 3 was of the opinion that trustworthy individuals would generally translate their promises into reality in the partner organisation.

### Open

In four interviews the importance of open and honest communication, in particular at the beginning of collaborations, was mentioned. Two interviewees accentuated that it should be (but would not yet be) the norm of businesses to share their knowledge and insights into pilots and struggles. Practitioner R2 advocated an open data project, while Practitioner S2 proposed that SME communities could share knowledge, especially as their food (and not CFP) would be their value proposition.

*“Also, the things that we struggle with internally, we're pretty open about. [...] I think that needs to happen if we all want to achieve the same goal and going to make mistakes, being open about them only makes sure they don't happen again.”*  
(Practitioner S2)

Practitioner R3 was of the opinion that competing brand owners would not openly share information with each other, but rather with retailers. Besides open communication, open-mindedness and creativity were also mentioned.

*“Realistic, open minded, and creative, that's I think the main background skills that someone has to have.”* (Expert 5)

While such thinking is required for any packaging design, where different users need to be considered, for CFP “you just add a little bit more boundaries, but that's not impossible” (Expert 5). Four interviewees mentioned that openness/willingness to innovate and change, rethinking, questioning the current status, and out-of-the box thinking are all methods to create the best possible results. For CFP in particular, Expert 5 outlined the need to be realistic. Specifically, a recycling economy would be needed as realistic, intermediate solution towards a CE. Practitioners M2 and R2 explained that young, new employees might be more willing and open to change compared to their long-standing counterparts.

### Advantageous

Four interviewees highlighted that collaborations for CFP always need to make financial sense. As Practitioner M1 put it: “money is important”, which particularly top management would focus on. An interviewee of a multinational retailer therefore concluded:

*“My external ecosystem is very enthusiastic and willing to work with us because [it] [...] will bring financial benefit.”* (Practitioner R2)

However, an interviewee of a sustainable-oriented SME highlighted that in their case, impact maximisation would be prioritised over profit maximisation.

### Good reputation

Practitioners M1 and M2 pointed out that they would not work with organisations with a bad reputation caused by e.g. scandals. Practitioner R3 mentioned the importance to “have credible partners to back you up” due to the high pressure on plastics. Participation in large-scale collaborations with frontrunners can showcase impact and add communication value (Practitioners R3, M2 & M3). Additionally, a well-known partner with a good brand image would enable networking (Practitioner U1). In contrast, for small unknown partners, a good reputation would be irrelevant (Practitioner R2). Also, Expert 5 depicted that the outspokenness would not necessarily mirror the true CFP efforts of a firm and thus reputation may be deceptive.

## 4.4 Partner Roles

Figure 8 provides an overview of all the partner types needed for CFP as mentioned in the interviews. Those were mapped along the value chain (vertical collaboration) and outside the value chain (horizontal collaboration). Yellow arrows mirror collaborations specific for reusable FP, blue ones for recyclable FP. The numbers indicate how many roles (based on the previously developed framework) the partner types were found to potentially fulfil. Appendix V clarifies which specific roles the partners may fulfil, distinguishing between CFP generally, reusable, and recyclable FP. Here, also the numbers of interviewees, who instanced partner types fulfilling a certain role, are indicated.

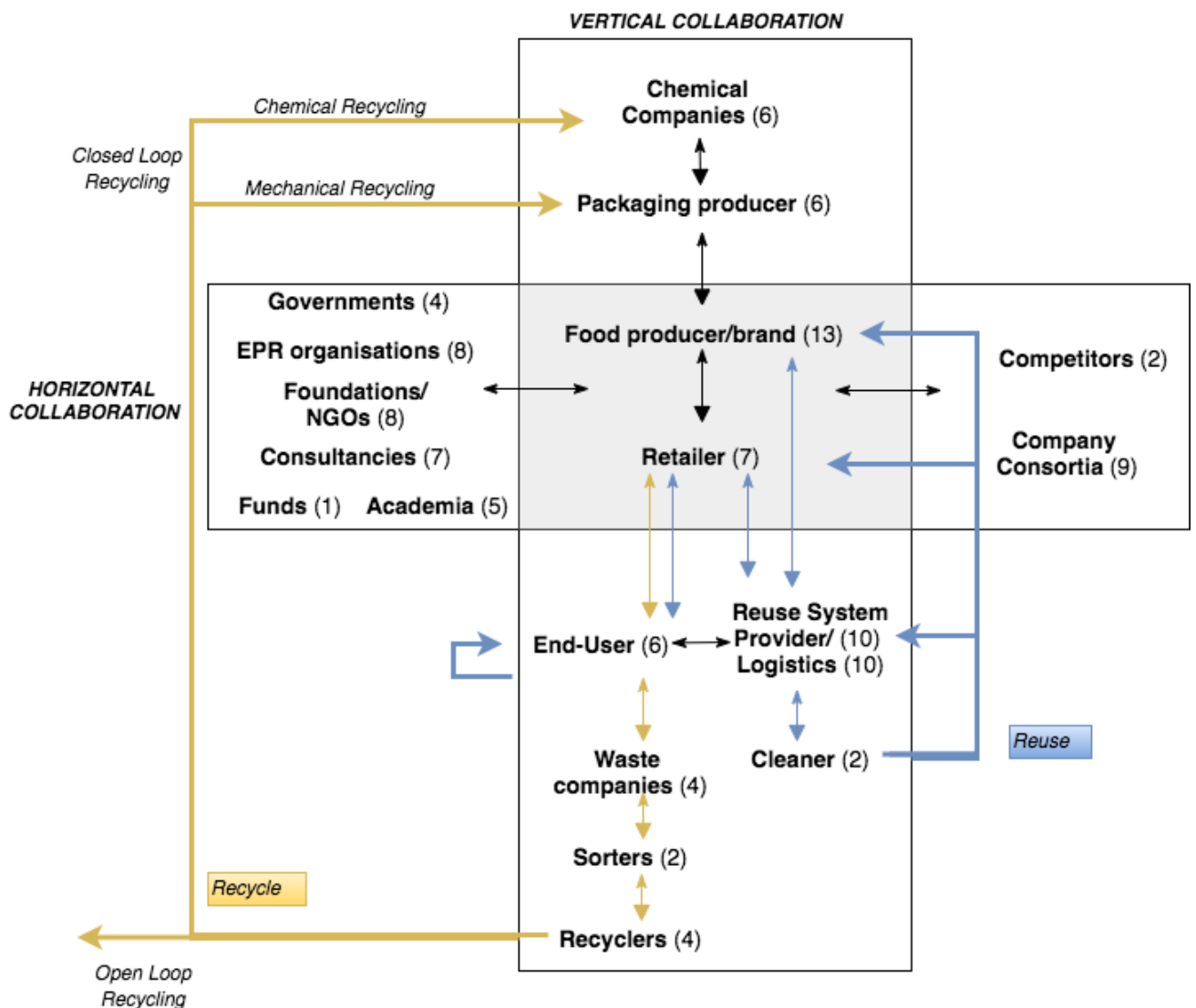


Figure 8: Partner types along and outside the value chain for CFP as identified in the interviews.

#### 4.4.1 Partners for Starting the Project

##### *Financier*

Seven interviewees outlined that food brands/producers and retailers should bear the costs for **recyclable** FP since they would put the packaging on the market. In line with that, brands (more frequently than retailers) would finance new packaging developments, working groups such as consortia, the Extended-Producer-Responsibility (EPR) scheme, (chemical) recycling, or firm-internal funds (Experts 1, 4 & 5, Practitioners R3, M1 & M3). Still, one expert urged food companies to increase developments and innovation budgets.

*“And they [brands and retailers] do have a choice of packaging. So, what they say [...] is that the packaging market has to bring the solution. That they're not willing to invest, [...] that the packaging market has to invest in this, and also the recycling, the waste management industry.” (Expert 4)*

For medium-sized companies, Practitioner R4 argued that changing all production processes would be too expensive, while multinationals with higher volumes could change step-by-step. Practitioner S2 explained that start-ups aiming for recyclable FP, should simultaneously develop temporary solutions in order to generate income, which they could invest in better solutions.

Interviewees agreed that food companies would need financial support as first, otherwise, CFP would be too costly for businesses with tight profits. Second, competitive disadvantage should be minimised by involving the whole value chain. Five interviews outlined that governments have an important role to play in creating “completely different financial structures” for waste management; steer via taxing/subsidising (non-)recyclables or recycled/virgin input; or fund innovation programmes/pilots (Experts 1, 4 & 5, Practitioner M1).

According to eight interviewees, governments should set up EPR schemes, whereby the fees (ideally modulated fees based on packaging's recyclability) are paid by food producers. Other players acting as financiers would be chemical companies and suppliers (the latter only if requested by the majority of clients) investing into new recycling/packaging technologies (Practitioners M1, M2 & R3, Experts 4 & 5). Seven interviewees agreed that financial mechanisms to push recycling should be introduced to enable its profitability by creating markets with value for recycled materials.<sup>13</sup> Similarly, in terms of sorting, “today the issue is that the sorters do not start. Because sorting is costly” (Practitioner M1).

For **reusable** FP, Practitioners R2, M3, and Expert 4 mentioned that firms would be reluctant to invest since the overall BM would change. However, three interviewees explained that the operators of reuse systems, which also conducted the cleaning, would usually be the investor hoping for a pay-off when scaled. Therefore, efforts and investments required from businesses intending to participate in such reuse systems would be relatively small (Practitioner U2).

Notwithstanding, small food companies could not participate in reuse systems due to a limited budget “to just fill the pipeline, to have them [the products] on the shelf at every supermarket”

---

<sup>13</sup> Examples given include Germany, where mandatory recycled input quotas for firms are discussed, or the Closed Loop Fund, which supports recyclers to extend their capacities.

(Expert 6). For smaller reuse operators, crowdfunding may be an option (Practitioner U1). Three interviewees criticised the current lack of funds and incentives to move from disposable to reusable FP, which would be associated with higher risk of failure and costs (Practitioners R2 & S2, Expert 3).

*"Let's become economically sustainable, specifically in a system of single use that is now very much fine-tuned to become so efficient that margins in supermarkets are quite small. You know, there's hardly any other model possible because they don't have the room to have a large reusable system." (Expert 6)*

Finally, for **CFP** generally, company consortia or alliances, which firms fund themselves, would invest their money in CFP projects, trials, or consultancies (Expert 1, Practitioner M3).

### *Initiator*

One expert summarised the importance of food companies to initiate **CFP**.

*"Everything is dependent on the brand owners and the retailers as they make the decision of what gets put onto the market: packaging-, material-wise. But they also pay the EPR contribution." (Expert 1)*

Eleven interviewees saw retailers, in particular, as powerful gatekeepers. They would have leverage over their food suppliers by directing packaging guidelines/material bans: "the power is in the shelf" (Expert 2). At the same time, eleven interviewees saw brands as the main decision maker and having power over the packaging producer and thus the packaging specifications. Whereas Experts 2 underlined that retailers would more frequently initiate packaging improvements than brands, Expert 3 dissented.

*"If someone kicks [retailers] with the broom then they move. [...] They truly see the urge for them to move, but they will not move any faster than it's needed. Whereas some of the major brands that are really out there, stating ambitions and doing the extra mile. That's totally different." (Expert 3)*

Practitioner M3 was of the opinion that compared to the past, retailers would today be on the right track by e.g. publishing CFP roadmaps. SMEs, however, would wait for solutions being developed by MNCs due to limited finance and influence. They would only change their packaging if (re)-launching a product (Expert 3, Practitioners S1 & R4). In contrast, another SME, works on CFP from its own motivation (Practitioner S2).

External initiators were equally assigned importance. The interviewees mentioned (1) governments/authorities creating plastic/packaging strategies, bans, or EPR schemes with (modulated) fees; (2) NGOs and institutions creating external pressure and powerful statements; (3) consultancies or working groups developing and suggesting solutions; and (4) consumers demanding CFP and changing their buying behavior, especially regarding reusable FP.

For **reusable** FP, retailers were named as possible initiators since they could set up the infrastructure (e.g. dispenser models) in their supermarkets (Experts 2 & 3, Practitioners R2 & S1). Nonetheless both retailers and food producers would often be reliant on reuse system operators developing innovative concepts.

*“Usually these guys [reusable service provider] come to us and say okay we have this crazy innovation, key product, can you test it in one of your stores?” (Practitioner R2)*

For **recyclable** FP, the initiating force to develop new packaging and create recycling streams seems to be vague: “it’s like a chicken and egg, who’s [food companies, their suppliers, or recyclers] going to move forward first” (Expert 3). Lastly, while EPR schemes could initiate businesses to change, MNCs themselves were described to be at the same time involved in the creation and enhancement of those (Practitioners M1, M2, & M3, Expert 1).

#### **4.4.2 Partners for Developing the Project**

##### *Closed loop material expert*

The interviews unveiled that multinational brands have **CFP** experts on closed networks and material functions in-house, e.g. in dedicated R&D teams or packaging research institutes (Practitioners M1 & M3). In contrast, six interviewees found that retailers would have little resources and experts on CFP due to packaging’s relatively small impact compared to e.g. energy or sourcing. Still, Expert 1 and Practitioner M2 suggested that retailers should not abuse their powerful position but instead enhance their education and engagement to (collectively with the whole value chain) make CFP a reality. SMEs, however, could not have experts on CFP topics in-house, meaning non-specialist employees would need to continuously educate themselves (Practitioner S2).

Notwithstanding, the interviewees highlighted the need of any firm to collaborate with packaging and circularity experts, who would (currently) lack in most organisations (Expert 4, Practitioner M2). Such expert-knowledge was frequently mentioned to stem from (1) academic institutions/research programmes for scrutinising and specific insights, (2) consultancies to define strategies and provide knowledge, (3) institutes/NGOs to provide publicly available, ideally local, knowledge, (4) or company consortia/working groups being facilitated by a neutral overhead.

*“The main benefit [of the consortium] is education, understanding where we will be going, but we also run webinars for the stakeholders and we provide advice, documentation. There’s knowledge coming out of each of the work streams.” (Expert 1)*

To understand and potentially improve local waste management for **recyclable** FP, interviewees agreed that firms need to work with waste companies, sorters, recyclers, and chemical companies. This way they could understand current challenges of e.g. food-grade recycling or downcycling (Expert 1). Practitioner M2 and Expert 5 mentioned that governmental (e.g. EPR) organisations could provide important local waste management information to food companies. Ideally, Expert 6 would like to see one central European EPR organisation unifying all knowledge. Moreover, according to several interviewees, to co-develop recyclable FP, food producers/retailers need to work closely with their packaging suppliers (not only the converter). Those would possess the technical knowledge needed. Due to the high costs of packaging machines, suppliers would usually prefer optimising existing packaging lines (Expert 5). Only if the majority of their production would be affected, they may change. SMEs with a low share would, therefore, lack the ability to influence their packaging suppliers (Practitioners R3 & S2).

Most interviewees differentiated between two type of development efforts needed for CFP. First, if a recycling stream for a material is available (e.g. for rigid mono-material plastics), food companies develop packaging guidelines based on these, which their suppliers must follow. Second, if a recycling stream is not yet developed (e.g. for flexible multi-material packaging), design for a future system is needed. In this case, ensuring the primary function of packaging (to protect food) is crucial.

*“The tricky thing of the exercise is: we don't want to be in the inertia mode either, like we do nothing because we wait. But how can we imagine what the recycling systems of the future will look like? And bringing some iconic products to the market, today, that will have been designed for this future system. So, by doing this first of all, I prove that I can do it in my production lines.” (Practitioner M2)*

For **reusable** FP, Practitioners M2, S2, and U1 regarded finding a packaging supplier as non-critical. Still, choosing a reusable packaging, “it's not so straightforward as it might seems” (Practitioner M2). The packaging should be environmentally advantageous compared to single-use packaging, which can be influenced by e.g. sourcing locations or weight. Practitioner S2 added that LCA centres could support in this determination. Additionally, food protection and an attractive appearance should be ensured. Whereas brands may be involved in the packaging design, it was found that the design of the reusable packaging system is often taken over by the service provider, who is at the same time the use-phase supporter (Practitioners U1 & U2). Overall, the role of the closed loop material expert was mentioned less frequently for reusable FP than for recyclable FP. Instead, consumer and market-related knowledge was named more critical. This links back to the required behavioural changes, away from single-use packaging.

*“We need to understand what drives the behaviour and how we can change it, what we do to ensure that we bring customers on the journey with us.” (Practitioner R1)*

As the reusable concept creates “a lot of mental obstacles” (Expert 3) due to the need to change mindsets and BMs, developing consumer knowledge was said to be mainly influenced by reusable system providers. These providers would conduct tests to understand the consumers' preferences on price, appearance, and their (adaption) behaviour (Practitioner U2). Practitioner U1 suggested to directly speak with consumers to understand their needs and desires.

**Recyclable** packaging may be less novel for consumers and businesses. Nevertheless, low recycling rates were mentioned even in countries with good waste management infrastructure. Therefore, understanding the consumer to enable correct waste disposal would be important.

Seven interviewees mentioned sector organisations/consortia as potential partners to acquire knowledge on consumers, the market, and legislation. They would deliver technical CE knowledge while also defining the direction of the industry, via expert and peer exchange. Moreover, the interviewees agreed that hired experts would need to consider the local context, market, consumer behaviour, and legal aspects when advising firms on CFP. As an example, to better understand consumers' behaviour and barriers towards reusability, one retailer (Practitioner R1) outlined their participation in a larger university research project. This included an ethnographic in-store research.

### Piloter

For **recyclable** FP, food producers were found to lead (in the case of start-ups) or be involved in piloting, whereas retailers would rather transfer this task to their producers.

*"If you're a producer yourself then you need to do the research. [...] When we started with products, at that point we were really ordering a lot of samples to figure out which packaging was most sustainable and good looking et cetera. So that is different than working with a producer because that's what you're paying for as well." (Practitioner S1)*

Besides piloting new packaging, MNCs mentioned piloting and advocating EPR systems in collaboration with other businesses (Practitioners M1 & M3). For piloting packaging design or recycling systems (or the alignment of both), some interviewees highlighted the need of a range of partners. Those could either be set up as individual collaborations or as multi-stakeholder research programmes. According to some interviewees, potential partners for piloting would include academic institutes, waste managers, chemical companies, recyclers, EPR schemes, or packaging suppliers. Thereby the requirements of brands and retailers would be accounted for when piloting new packaging. For this, "it can take three years just for one packaging to make it completely recyclable." Two interviewees outlined that competitors would share the costs of pilots.

Some food producers and brands mentioned conducting small-scale pilots for **reusable** FP in controllable environments (e.g. as part of the own hospitality service or shops) (Practitioners S1 & M3). Retailers, however, would have the infrastructure to tests either in their stores or as part of their e-commerce delivery systems (Practitioners U2 & R2). Notwithstanding, pilots often tend to be conducted by the reuse system operators, who have to initially tackle a range of uncertainties. For instance, they need to ensure that consumers are on board with these relatively unconventional BMs.

*"[Firms] don't know if they can keep [reusable packaging] for 20 cycles, when it starts making economic sense. So sometimes you just need to start doing it and you know, fingers crossed and hope it works. And it might disappear because it turns out to be far more expensive." (Expert 6)*

Expert 2 highlighted that setting up reusable packaging systems in the past worked best in multi-stakeholder processes, because "if you do that without inclusion of the industry and retail then developments can miss the point." In line with that, Practitioners U2 and R2 mentioned that innovative reuse system operators would approach retailers to test their pilots in store.

For CFP generally, company consortia were also mentioned as having set up pilots and conduct trial work (Expert 1, Practitioner R1). Similarly, consultancies could pilot packaging for a firm or create and include various players in pilots (Expert 3, Practitioner M1).

#### 4.4.3 Partners for Realising the Project

##### *Impact extender*

Ten of the interviewees supported and called for an increased uptake of a pre-competitive approach for **CFP**. Practitioner R3 for instance opined that food brands would not share (sustainability) strategies amongst each other. Retailers, on the contrary, would do so in order to reduce the risk of losing consumer loyalty. Brands and retailers would also collaborate, since retailers could exert pressure over brands and rely on their R&D packaging knowledge. Active participation of retailers in initiatives to align directions would be lacking, which would hamper their constructiveness and increase costs for their members (Expert 1). Overall, both brands and retailers could increase their impact by working with competitors. This could either be via direct one-to-one collaborations or as part of larger networks, such as consortia or sector unions. Although SMEs could not participate in such consortia, Practitioner R4 outlined that their firm would still be in contact with federations to utilise their expertise and political influence. Moreover, Practitioner S2 highlighted the importance of smaller food producers collaborating with each other (e.g. via a shared packaging supplier) to increase volumes to find, finance, and source innovative packaging solutions.

Furthermore, firms could only stay competitive and afford **recyclable** FP if developing new materials together. This would be due to high required investments, e.g. to develop food grade recycled plastics. Also, waste management systems and chemical recycling would need to be financed by several players. Only by such reduction of individual costs, scalability could be enabled (Practitioners M1, M3, S1 & S2). Expert 6 and Practitioner R1 advocated for one central EPR organisation and consistency of collection across authorities, ideally across countries.

*“The second [focus] is consistency of collection, the number of different global authorities and collection method, to achieve some kind of plastic consistency across all local authorities.” (Practitioner R1)*

For **reusable** FP, competitors were found to share reuse platforms to increase scale. This would include reverse logistics, cleaning, and potentially standardised packaging. The coordination would be taken over by service providers, which is why a direct interaction with competitors is usually avoided (Practitioner U2, Expert 2 & 6). To further extend impact, consumers (frontrunners) could promote and drive the uptake by a larger group.

*“So, I think that the reusable business will mainly be driven by the what I will call the dark-green or light-green consumers.” (Practitioner M2)*

Some interviewees highlighted that reusable concepts should ideally address a broader societal group/the mass consumer to increase impact, e.g. by creating “Instagramability” (Expert 6) or by offering the typically consumed products (Practitioner U2).

##### *Use-phase supporter*

The use-phase supporter, enabling the extension of the packaging’s lifetime, was predominantly identified for **reusable** FP. Practitioners M2 and M3 mentioned the operation of some brand-owned refilling concepts, either in their store or within the hospitality sector (e.g. brand refilling dispensers in hotels). In comparison, retailers tend to operate large-scale food dispenser systems in (sections of) their supermarkets (Practitioners S1 & R2, Experts 2 & 3). Additionally, they could

also integrate reusable FP concepts in existing infrastructure such as in e-commerce home delivery models. This would be beneficial since retailers would already have all infrastructural elements such as warehouses or logistics, except for the cleaning element (Practitioner U2).

*“And in an ideal world in the long term, they [retailers] would also then take care of the cleaning to centralise everything.” (Practitioner R2)*

Therefore, brands would need to collaborate with retailers to realise reuse systems in a retail environment (Practitioners M1, M3). Despite own efforts of brands and retailers, they were found to also often collaborate with external partners, who can support the use-phase. To illustrate, reuse system operators could facilitate reusable FP as (1) time and space requirements of cleaning and logistics would be high, (2) economic viability in light of cheap single-use packaging need to be ensured, and (3) the time to market reduced. Practitioners S2 and Expert 3 indicated the need for more reusable platforms, uniting different food companies. The reusable systems identified (see chapter 4.1 for an overview of concepts) were found to differ between the responsibility of (re-)filling.

Other partners required for the use-phase of reusable FP mentioned were refillers, and (more frequently mentioned) cleaners. Cleaning packaging appears to entail some challenges, such as (re-)establishing its trust, compliance to quality and food safety standards, high investments, or large storage requirement (Practitioners U2, R2, M3 & S2, Expert 6). Furthermore, seven interviewees highlighted the need of smart (reverse) logistic systems for reuse, which need to be adjusted to each location (Expert 6) and consumer needs (Practitioner U1). Existing logistics companies could do so (Practitioners U1 & U2, Expert 6). Practitioner R2 mentioned that a company who owns and handles the reusable packaging (as the example of ‘IFCO’ for reusable plastic containers<sup>14</sup>) would be ideal.

Other identified partners supporting the operation of reusable FP were the hospitality sector (operating and refilling a brand dispenser system) and the end-consumer (buying, using, and returning the packaging). To ensure consumers’ support, pricing and convenience were seen as central influencing factors. Eleven interviewees stated that reuse concepts would need to be designed to be as convenient as possible (e.g. easing the return of packaging by offering home delivery and pick-up), alongside incorporating education, marketing, and (financial) incentives (e.g. deposit). Practitioner M2 summarised: “a solution that we don’t bother them.” Some interviewees raised the concern that consumers would not accept, buy, treat, clean, or return reusable packaging correctly, e.g. due to perceived hygienic risks. Therefore, regulation would need to be enforced (Expert 6, Practitioners S1, R3 & R4). Lastly, one interviewee outlined cultural differences influencing the uptake of reusable FP.

*“In Greece a lot of the fruit, vegs, bread, meat, and fish are all sold in bulk. [...] and this type of system, where people are used to having a service aspect or being served in a store: you don’t have to pack everything for self-checkout and be all about efficiency.” (Practitioner R3)*

---

<sup>14</sup> IFCO is the world’s biggest supplier of transport packaging for fresh products. They produce over 70 models of Reusable Plastic Containers (RPCs) in 20 facilities, clean them in 89 wash centres, operate a pooling system, and are being used in over 50 countries (IFCO, 2020).

For **recyclable** FP, the use-phase supporter was seen as less relevant in the interviews. Still, retailers and consumers may have to accept and change their behaviour. For instance, recyclable packaging may decrease the shelf-life or require the cooling of a product (Practitioners S2 & M3, Expert 6).

*“If you put 12 months to your pack of coffee that usually means the supermarket says: ‘we want 8 months of that, so, your product can only be 4 months old before you have to ship it to us. Then we need 8 months in our internal logistics and warehousing, consumers...’ So, suppose you want to move from 12 to 6 months. It basically means that you need to say to the supermarkets: ‘you go from 8 months to 4’.” (Expert 6)*

In addition to the use-phase supporter, the interviews identified the need for **support at the end of life** of a packaging. When a packaging’s lifetime could/would not be extended (as in the case of reuse), a second life may be given via recycling. Both food producers/brands and retailers were found to never be responsible for the end-of-life treatment themselves, but of solely supportive function. To recycle FP, several steps were determined by all interviewees: waste separation, disposal, collection, sorting, recycling, and recycled content usage. Six interviewees pointed out that the “key actor in that circle are consumers” (Practitioner R1) as they must dispose and separate their packaging waste correctly. This would currently be too complicated. Therefore, sorting should be simplified at home and on-the-go, e.g. by mixed waste collection (Experts 2 & 4, Practitioners M2 & R1). Also, many interviewees pointed at the need to educate consumers on waste separation, potentially via the retailer. Alongside educating, retailers could also take packaging back in their stores (Expert 2, Practitioner M3). In spite of that, Practitioner M2 is of the opinion that “we cannot count on the consumer to do the right thing.”

As a next step, the packaging needs to be collected, hence local waste companies would be key partners (Practitioner M2). Many interviewees said that the best way to set-up/improve waste management was by establishing EPR schemes organised by Packaging Recovery Organisations (PROs). These are established in some countries but are desirable in all countries a firm operates in (Experts 1, 2 & 6, Practitioner R3 & M3). Mainly brands, but also retailers, were found to push and volunteer the creation (which “is taking forever”, Practitioner M2) or enhancement of EPR schemes.

*“That’s why we are pushing for EPR, because it will allow us to have a level playing field, and then it’s not just a few or couple of companies contributing, but it’s everybody.” (Practitioner M3)*

In addition, retailers would need to partner with organisations running Deposit-Return-Schemes (DRS) as central collection and handling points (Practitioner M1). However, Experts 2 and 6 questioned the desirability of such systems in light of complications of the German DRS<sup>15</sup> and the length of building the Dutch central beer bottle pooling system up.

Once packaging is collected, improving waste sorting would be of major importance.

---

<sup>15</sup> In Germany, since 2003, beverage packaging is collected through a deposit scheme (“Pfandsystem”), which enabled high collection and recycling rates and counteracted littering. Shortfalls are, however, fraud in the deposit system, loss of material, and the reduction of reusable bottles on the market from 80% to 50% since its introduction, as brands and retailers switch to non-reusable PET bottles (Deloitte & Cistri, 2018; Oltermann, 2018, March 30).

*“Where do we need to make the biggest change? If we really want to start recycling more, then the sorting facilities have to expand, they have to sort out much more, with new sorting technology, so we can get better streams of materials to be recycled.”*  
(Expert 4)

Issues mentioned were the powerful position of sorters over the market by dictating sortability (Expert 4), high costs hampering sorting (Practitioner M1), and new sorting technologies to be implemented (Practitioner U2, Experts 2,4 & 6).

Following sorting, the interviewees highlighted the importance of recyclers and chemical companies. The latter can create a second life by using the oil/gas from chemical recycling to produce new plastics (Practitioner M2). Food companies were found to collaborate with recyclers (seen as powerful players shaping the future of recycling) to develop/enhance recyclable materials and recycling technology (Experts 1, 3, 4 & 5, Practitioners R1, M1 & M3). A range of recycling challenges to overcome were mentioned by most interviewees.<sup>16</sup> Overall, many interviewees raised the point that “chemical recycling is one of the only possible solutions that we might have” (Practitioner R1) as it could allow food-grade recycled materials and make packaging design and materials chosen irrelevant. “Hopefully in a few years” (Expert 6) it would be operational, whereby an overall positive calculation in light of energy and chemical consumption would need to be ensured (Practitioners R1, M & M2, Expert 6).

#### 4.4.4 Partners Related to the Collaboration

##### *Mediator*

One interviewee mentioned that large food firms can bring **CFP** partners together to discuss problems e.g. as part of field labs (Expert 6). However, external partners were mostly found to connect players. Experts 1, 2, 5, and 6 stated that company consortia, sector organisations, or institutes could build networks by bringing together companies along the value chain, facing similar challenges, e.g. in communities of practice/innovators. Similarly, the Ellen MacArthur Foundation would host conferences or working sessions (Practitioners M2, M3 & R3). As such organisations would usually operate globally, Expert 2 bore in mind their limited knowledge on geographical differences, which may be needed to determine regional collaborations. As an additional partner, consultancies would often be sought by food companies to support the network building (Expert 3, 4 & 5, Practitioner M1). To this, one CE consultant added:

*“Not really just building a network, but that's not what we do, we're not like a broker. We only build a network if its geared towards certain results.”* (Expert 3)

For **recyclable** FP, PROs could bring different companies together to run EPR systems. Also, they would have relationships with local authorities and governments and would thus serve as connector (Practitioner M1). For **reusable** FP, several companies could join the same reuse platform, which connects them to each other (Practitioners U1 & U2).

---

<sup>16</sup> The challenges included creating a bridge from recycled material to (food-grade) recycled content for more materials than PET (“truly closed loop applications”, Practitioner R1); addressing downcycling, quality degradation, and the need to add virgin input; creating markets for recycled materials competing with cheap virgin plastic prices; and understanding locally differing recycling facilities and capabilities.

### Knowledge broker

In two interviews, food brands were characterised as capable of orchestrating and leading collaborations for **CFP** (Experts 3 & 6). Regardless of whether they are leading a collaboration or not, Practitioner M<sub>3</sub> highlighted that all parties involved would always need to be (partly) steering collaborations. Installing a steering committee was instanced.

*"Sometimes it can happen that we are not happy about how it's going. And that's where having the steering committee at high-level helps. In some of the collaborations I am managing, from time to time, we have a top-to-top meeting just to ensure that the messages are re-reclarified and the push is really given to have the right drive."*  
(Practitioner M<sub>3</sub>)

Moreover, some external partners could manage CFP collaborations and function as neutral overhead, such as sector organisations, company consortia, foundations, or institutes (Experts 1, 3 & 6, Practitioners M<sub>2</sub> & R<sub>2</sub>). One CE consultant highlighted the importance of such external project leaders, especially for cross-value-chain collaborations.

*"We really need players that can see other trends and developments within different sectors, linking it, and actually driving that project forward, because it's a very different thinking then within a company or within a value chain. If you're talking about cross-value-chain coalitions, I've only seen it work if there was an external project leader."* (Expert 3)

Practitioners M<sub>2</sub> and R<sub>2</sub> added that these project managers would require CE knowledge e.g. on recyclability. Additionally, Expert 1 outlined the example of a business school undertaking the task of setting up a process for contested issues via workshops. This collaboration would aim at reaching agreements in the exemplary recycling initiative.

Lastly, specifically for **reusable FP**, the reusable service provider would link partners under their platform and would be responsible for the partner management, testing, and creation of learnings (Practitioners U<sub>1</sub> & U<sub>2</sub>).

### Educator

Educating consumers on **CFP** was stressed as important by many interviewees since first, retailers would react to consumers' pressure (Expert 1). Second, consumers' behaviour in terms of buying, consuming, and disposing/returning would need to change (Expert 6, Practitioner S<sub>2</sub>). For sorting and collecting **recyclable FP**, a "huge education or influence programme" (Practitioner M<sub>2</sub>) should be introduced. At the same time, required behavioural change due to e.g. shortened shelf-life (caused by better recyclable packaging) should be ensured (Expert 6, Practitioner S<sub>2</sub>). For **reusable FP**, consumers should be educated towards rethinking buying single-use packaging and returning reusable packaging (Experts 6, Practitioners S<sub>1</sub>, U<sub>1</sub> & U<sub>2</sub>).

The type of education needed would be on one hand CE-generic:

*"Yes, education everywhere. But you need kind of an education, maybe some basic one for people to understand that CE is different than just doing less bad and reducing impacts."* (Practitioner M<sub>2</sub>)

On the other hand, four interviewees thought that education should address CFP in a holistic manner. Misunderstandings surrounding CFP should be clarified (Practitioner S2) and the overall product-packaging combination examined (Practitioner M3, Expert 5). Additionally, one expert working on recyclable packaging called for presenting plastics in relation to other issues, such as climate change.

*"Consumers need to understand that standing in the shower for 20 minutes using hot water, actually has a far higher impact than perhaps all the packaging that they use in the entire week." (Expert 1)*

Regarding communication channels, food companies could print recycling labels on-pack (potentially in alignment with competitors) or retailers could collect commonly non-recyclable packaging in-store (Experts 2 & 6, Practitioners R1, R3 & S2). Practitioner M3, though, pointed out that logos would often remain unseen. Therefore, targeting messaging via different (social media) channels, activities, and educational campaigns would be needed to change consumers' behaviour. The obligation to do so would lie with food companies. Nonetheless, also reuse service providers and EPR schemes would adopt the education (Practitioners M2 & U2). In addition, one food SME (Practitioner S2) expressed the desire to provide broad CE education, even unrelated to their own products.

External partners acting as an educator mentioned in the interviews were: (1) higher level education institutions for packaging-specific education (Expert 5) and (2) NGOs/foundations/institutes educating the public, e.g. via school programmes or public information/tools (Practitioners M1, M2 & R1, Experts 5 & 6). Some interviewees particularly underlined the importance of CE/CFP education in schools. On the contrary, Expert 1, raised the concern that industries would need to adopt this as governments may spread false facts.

*"Relying on the governments to do this is, I think, naïve. Because the governments love having plastic packaging as a vehicle to communicate with the electorate, the general public. So, they have no incentive to find a solution or to communicate a message: actually, what they've been telling consumers for the last 20 or 30 years is wrong. And consequently, they don't care about the facts anymore. They just do and say what consumers want to hear, and what gets them emotionally wound up and then they deliver legislation like thinking of single use plastic legislation, which is a travesty." (Expert 1)*

Besides educating consumers, the interviews unveiled that firm-internal education on CFP is equally important. Larger food companies would need to educate staff across all business units and countries, which may require time and the development of progressive educational programmes (Practitioner M2 & R2). Practitioner R3 and Expert 3 emphasised that such education should not address the technical details of CFP, but the bigger picture.

*"The overall mission [to set the man on the moon] is clear. He [the cleaning man at NASA] has no clue how to do that thing, but he knows how he can prove to contribute in his daily job to work towards that goal. [...] You don't need to understand the full picture, but you need to understand how in your daily job you can contribute to that goal. If you don't have that it's just a smear, it's just a finishing layer that makes it look nice, but it's not the company culture." (Expert 3)*

SMEs, however, to establish a basic understanding of CFP, would be challenged to educate themselves (Practitioners S1 & S2). Overall, Expert 1 gave importance to firm-internal education.

According to six interviewees this would be to address the current lack of understanding, particularly within retailers. According to Expert 3, consultancies could support food companies to “prove that there's potential.” Experts 2, 3, 5, and 6 outlined that NGOs/institutes could educate firms on sustainability/CE and its approaches, e.g. via seminars and trainings aimed at shifting mindsets as “creative fertile soil for innovations and sustainability” (Expert 3).

#### *4.4.5 Partners being Outward-Oriented*

##### *Enabler*

The task of enabling **CFP** via political and market influence was mainly assigned to external partners, but to some extent also to food companies. Two interviewees raised the point that businesses should influence governmental bodies as “legislation is not always written with the final users in mind” (Practitioner R3). They should therefore assess the feasibility of CFP undertakings and provide feedback (Expert 3). Expert 3 added that it “takes forever for someone to really move government.” Hence, the right moment and contact person in government should be found. Enabling tasks of food companies were outlined as: (1) advocating the creation of EPR schemes or recycling streams (Practitioner M1); (2) lobbying via PR spokespersons or industry lobbies (Expert 3, Practitioner R3); and (3) retailers using political instruments such as material bans (Practitioner M2 & R2, Expert 2). Practitioner R4 argued, that SMEs, however, would have no role to play in political debates due to their small size. Instead, they would be represented in industry federations holding political influence and expertise. Larger food companies would not only be represented but active in such federations, sector unions, or consortia. In this way they could exercise political power and push topics (Practitioner M3, Expert 6). Ideally, these would even include players “outside of the immediate stakeholder group [...], public legislators and other key opinion formers” (Expert 1).

A frequently mentioned enabler for CFP were governments: “in a CE (...) one of the most efficient tools to make things down is a regulation” (Practitioner M1). National governments were assigned particular importance as they could define and implement strategies.<sup>17</sup> Still, Practitioners M2 and R1 highlighted the potential advantages if the EU would harmonise waste management systems.

For **recyclable** FP, interviewees agreed that governments could push collection, sorting, and recycling with legislative frameworks such as incentive schemes, innovation programmes/funding, or packaging norms. Together with local authorities, PROs, and businesses, they could establish DRS or EPR schemes to create a level-playing-field between companies and ease waste management. Moreover, governments would have a steering power via taxes and subsidies, which could support the creation of markets for recycled materials (Practitioners R1, M1, M2 & M3 Experts 1, 2, 4 & 6). Proposed taxes aiming to remove competitive disadvantages of CFP, which interviewees mentioned, were on non-recyclable packaging,

---

<sup>17</sup> Interviewees instanced national Plastic Pacts and governmental bodies working on CFP such as WRAP in the UK (Practitioner R1, M1, M3). In Europe, governments may be more involved than in emerging countries (Practitioner M1).

discounted on recyclable packaging, or on virgin plastic (Experts 4 & 6). Expert 1 and Practitioner S2, though, preferred the application of subsidies instead of taxes.

*“Unfortunately, those taxes normally disappear into the treasury of the country and you never see them again. [...] The preferred way is to subsidise the recycled materials, such as there is always a slight advantage to use recycled materials versus virgin materials. That means that the EPR schemes need to have a mechanism which doesn't exist today, whereby when the virgin price is high, they fill the bank, when the virgin price is low, they subsidise the price.” (Expert 1)*

Whereas Practitioners M1 and S1 outlined the importance of regulations such as the plastic bag ban, where “immediately things changed”, Practitioner M2 and Expert 1 criticised such top-down decisions. Such actions would not encourage companies to do their best, but solely to meet legislative targets at the lowest costs. They continued that food companies should instead work proactively and voluntarily towards CFP.

For **reusable** FP, Practitioner S1 explained that the “consumer will never make that big change, maybe 10%. I think regulation is needed if you really want change”. Practitioner R2 thinks that for reusable FP “we lack support of political bold people.” On the contrary, Practitioner U2 argued that governments (especially the EC) would work on reusable FP. This would be because, currently, the political climate would incentivise and promote such legislations. In this manner, regulation was seen as a potential enabler for reusable FP, either in an incentivising or, if needed, in a constraining fashion (Practitioners S1 & U2, Expert 3).

Expert 1, however, cited Germany as an example, where anti-plastic would be lobbied. As a consequence, reusable FP would be promoted while neglecting a holistic climate change perspective. Other interviewees such as Practitioner M3, highlighted the required involvement of governments and cities to incentivise and build reuse infrastructure. Moreover, several interviewees agreed that a range of hurdles and uncertainties regarding legal responsibilities, such as the quality and safety of refilled products, would exist. Therefore, legislation would need to address such grey areas with lack of guidance to reduce risks for companies (Experts 2 & 6, Practitioner R3).

*“The [own, reusable] lunch box, which you pass over the cold-meats counter in the supermarket: you have to understand that the retailer, who accepts this, had to deal with 16 environmental authorities of the federal states of the German market to get a hygienic permit” (Expert 2)*

### *Legitiminator*

The need to convince and change the behaviour of consumers was outlined in the interviews for recyclable and, more importantly, reusable FP. For **reusable** FP, consumers would need to change their standard buying and disposing (empty packaging return) habits (Experts 2 & 5, Practitioners U1, U2 & S1). Ideally, “people [should] get used to it, so they only go to the supermarket when they bring their glass jar” (Practitioner S1). In addition, consumers were described as partially reluctant to use reused packaging, e.g. due to scratches, perceived hygienic risks, or preference of single-use packaging (Expert 6, Practitioner U1). Therefore, food companies may risk losing brand-loyal consumer by introducing reusable FP (Practitioner R3).

To reduce this risk, firms would need to invest into marketing and legitimization, even though “that’s actually a bit of a tricky one” (Expert 6), e.g. when firms only “cherry-pick” projects for marketing purposes (Expert 3). One interviewee argued that in Europe, CFP would not be seen as competitive advantage.

*“And this is what I liked in the US: you have companies that were really trying to shine and to perform better and bring innovation by distinguishing themselves, because it was a competitive advantage. Whereas in Europe we see it more as something that we all need to have. In the US it was more something that I can distinguish myself. And if the others, they don't do it at the end, they will be out of business.” (Practitioner M2)*

Practitioner S2 underpinned the importance of communicating and taking consumers along the sustainability philosophy and journey. Expert 6 called this “good cause marketing.” Practitioners M1 and M3 pointed out that brands would present “the biggest tool for communication” as they could engage with consumers, promote products, and create a brand identity. Therefore, sustainability should be embedded in all brand offerings, not only related to packaging. Marketing channels of brands would be social networks, specific activities, educational campaigns, commercials, and on-pack, e.g. via recycling logos (Practitioners M3 & S2, Experts 2 & 6).

As packaging would be the easiest marketing instruments and often functions as a unique selling point, introducing standardised packaging would present a marketing challenge (Expert 2). Despite this potential disadvantage, one interviewee highlighted the competitive advantages of reusable FP for retail. “Retail saw this [home delivery of reusable FP] as a way to react to e-commerce, to compete with Amazon and others, as an opportunity to have a competitive edge” (Practitioner U2). If new reusable FP platforms are introduced, marketing would be important to attain publicity. For small platforms, external agencies could take this over until a sufficient size is reached.

Partners potentially supporting marketing for CFP were listed by one expert:

*“Could be different: big companies usually have advertisement agencies or whatever, marketing, design agencies. Or their marketing department would devise a strategy.” (Expert 6)*

Other than marketing, for legitimising CFP, two interviewees mentioned the role of CE-related NGOs/foundations, who would either promote reusable FP generally or communicate and flagship particular companies, case studies, and initiatives at events (Practitioners M1 & U1). A need to (re-)build the legitimacy of cleaning reusable FP was mentioned since this would, in the current “make-pack-use-discard model”, not be relevant (anymore) (Expert 6, Practitioner U2).

For **recyclable** FP, one interviewee explained that switching to a recyclable packaging could remain unnoticed by consumers, which is why reporting on this change would not be necessary (Practitioner R1).

## 5. Discussion

In response to the lack of knowledge on collaboration in a CE, this study provides a qualitative analysis and ends at a refined theoretical framework on collaboration for CFP. The framework contributes to existing CE/CFP literature by specifying the collaboration set-up steps and selection criteria as partner roles and characteristics. The discussion is organised following the structure of this refined framework as depicted in Figure 9. This framework takes the collaboration set-up process that food companies may follow as baseline. The sub-frameworks of the selection criteria are, besides several influencing factors, incorporated under their associated steps. The discussion shows that the results go beyond existing collaboration and CE literature by identifying two novel set-up steps, three partner roles, and two partner characteristics. Additionally, two set-up steps, three roles, and one characteristic are revised compared to the preliminary framework. At the same time, the study provides empirical evidence for all seven previously identified set-up steps (Czajkowski, 2007; Kelly et al., 2002; George & Farris, 1999; Bryson et al., 2015; Duysters et al., 1999; Brown et al., 2019); all initial 11 partner roles (Goodman et al., 2017; Brown et al., 2018; Solesvik & Westhead, 2010); and seven of the eight partner characteristics originally identified (Solesvik & Westhead, 2010; Shah & Swaminathan, 2008; Dietrich et al., 2010; Barrat, 2004). The discussion particularly highlights all revised and complemented elements and sets them into relation to the existing theory. Further, the limitations of this research are discussed before ending with recommendations for future research.

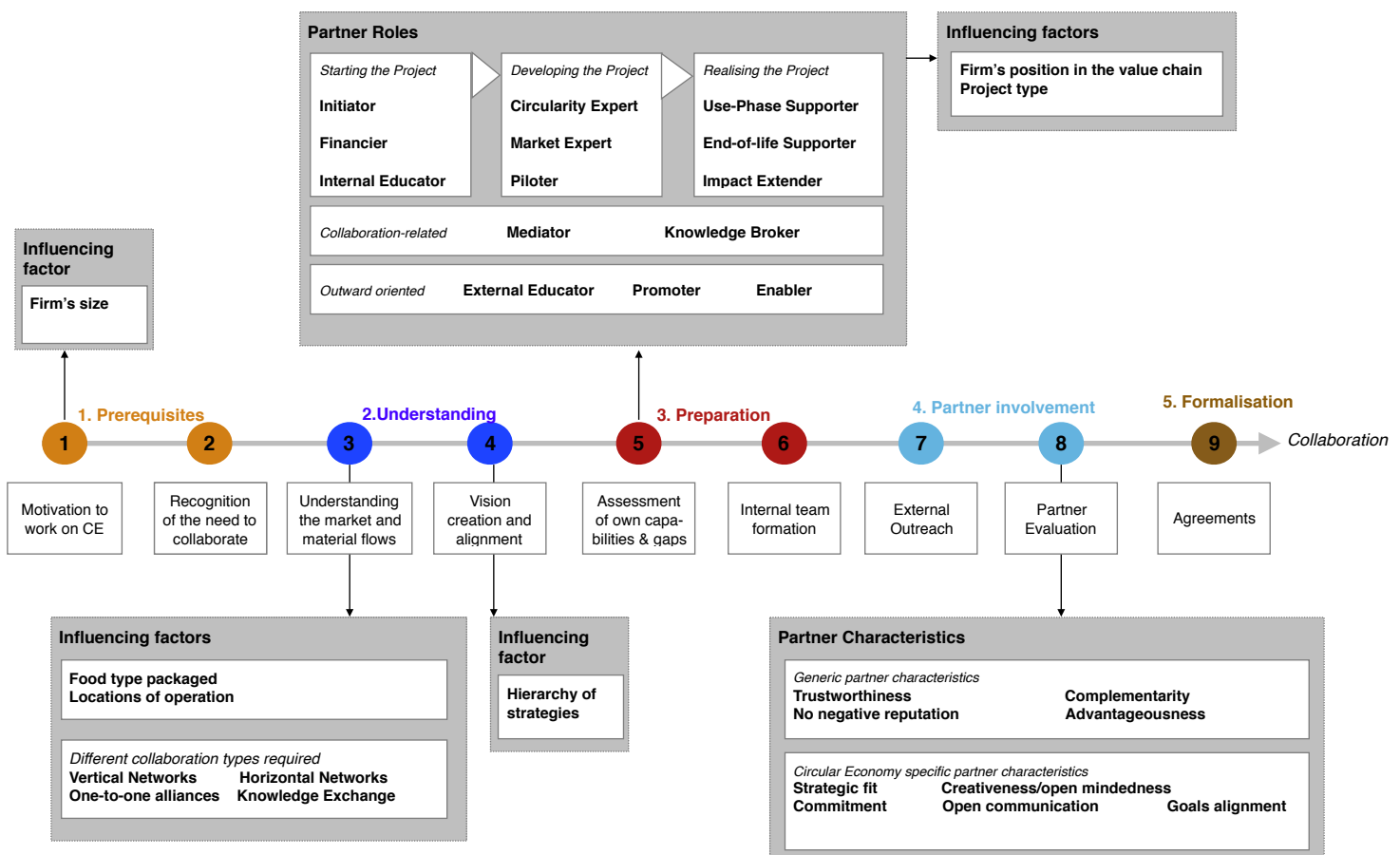


Figure 9: Revised framework of the collaboration set-up and partner selection for CFP.

With respect to the collaboration set-up process, the identified steps largely resemble those of traditional collaboration literature. As detailed in the following sections, steps 1, 5, and 7 of the framework (see Figure 9) are, however, newly detected. Also, step 3 should be accomplished earlier in the process than assumed and an element is added to step 4. Moreover, the step of building internal alliance skills was identified as redundant since instead, rather a collaborative company culture and collaborative individuals may enable successful collaboration. Overall, the nine set-up steps, which food companies may follow, can be broken down into five phases: (1) prerequisites, (2) understanding, (3) preparation, (4) partner involvement, and (5) formalising.

## 5.1 Prerequisites

Before any CFP collaboration can be identified or even set up, two prerequisites need to be fulfilled. One of those was not mentioned in traditional collaboration literature, namely the **motivation to work on the topic, i.e. CFP** (see step 1 Figure 9). It was found that often, a few engaged employees/leaders drive and advocate change towards CFP. Such lead is, according to Lueneburger and Coleman (2010), important for successful sustainability initiatives. Due to risks and uncertainties related to entering the CE, a strong motivation to work on CFP would be needed. Despite those risks, in line with Lahti et al. (2018), the study found that perceived market opportunities and risk avoidance suffice as drivers to work on CFP. The degree of CFP involvement was found to be influenced by the **size of a food firm**. Due to high external pressure, responsibility, and potential leverage due to (e.g. human and financial) resources held, MNCs would show higher involvement. Their CFP requirements and speed of change, though, might be lower. In comparison, SMEs would either count on larger firms' achievements to later follow suit or, as sustainable-oriented SME, pursue CFP themselves. In that case, they may benefit from agility and possibly higher CFP requirements.

As a second prerequisite, in line with the previously investigated collaboration literature, firms need to **recognise the need and potential benefits of collaboration** (see step 2 Figure 9). For CFP, those benefits were identified as the ability to commonly change the industry, financial viability, and knowledge sharing and alignment. Compared to recyclable FP, where competitors need to jointly use/establish waste management systems, reusable FP may be less collaborative but more competitive. This is due to reuse service providers acting as orchestrators, which bypasses direct collaboration between competitors. Still, collaboration enhances the economic viability of reusable FP.

## 5.2 Understanding

Once the decision to collaboratively work on CFP is taken, in line with literature, the food company should **understand the market and material flows** (see step 3 Figure 9). This fundamental step informs all subsequent ones, such as the vision development or project planning. Therefore, it should be, other than previously assumed, conducted before any visioning, planning, or outreach takes place. In particular, food firms should understand the influence of the **food type being packaged** since each product-packaging combination requires different packaging barrier properties, packaging lines, filling techniques, or shelf lives. Moreover, **the locations of operation** and the respective development stage of reuse/recycling

systems influence CFP possibilities and collaborations needed. This study identified **four collaboration types** for CFP as outlined in Table 4, namely **vertical** and **horizontal networks**, **one-to-one alliances**, and **knowledge exchange**. The four types differ between their partner numbers, the collaboration type (vertical along the value chain vs. horizontal outside of the value chain), and the focused efforts. Further, based on EMF (2017) and Hahladakis and Iacovidou (2018), CFP efforts can either address the packaging/technology design or circular systems (i.e. value chain networks such as waste management).

*Table 4: Four Types of Collaboration identified for CFP.*

Name	Description	Focused efforts	Coll. Type	Partner Number	Example Recyclable FP	Example Reusable FP
<b>Vertical Networks</b>	If reuse/recycling systems (including resource extraction, processing, usage, end-of-life stage, resource cycling; technologies, infrastructure, markets) are not yet existing, they need to be build up with partners along the value chain.	Circular System	Vertical	Several	Develop: recycling streams for multi-material packaging or bioplastics	Develop: reuse system
<b>Horizontal Networks</b>	If reuse/recycling systems are existing, they are operated and improved; or packaging fitting the system is developed with partners outside of the value chain such as competitors, governments, or knowledge institutions.	Circular System AND Design	Horizontal	Several	Improve/ operate recycling stream and follow design guidelines: mono-material packaging	Improve/ operate or develop (standardised) packaging: reuse system
<b>One-to-one alliances</b>	Technologies or packaging is improved with one player for existing systems.	Design	Vertical or Horizontal	1	Design: coated paper packaging	Design: reusable packaging
<b>Knowledge Exchange</b>	Informal collaboration to enable learning and creating impact for all states of recycling and reuse systems.	Circular System AND Design	Vertical or Horizontal	1 or several	Informal alignment of strategies: brands and retailers	Informal learning exchange on reuse: between competitors

After understanding the market and its flows, a clear **CFP vision** and its translation into a strategy is important (see step 4 Figure 9). In addition to traditional collaboration literature, this study found that a CFP vision requires the support of top management to ensure its success. At the same time, employees of all levels, business units, and countries need to **align on the vision**. Such alignment would depend on a company's culture and individuals, who need to be capable of and committed towards a CE change (Lahti et al., 2018). In this manner, Cohen and Levinthal (1990, p.128) call for "absorptive capacity", which is the "ability of a firm to recognise the value of new, external information, assimilate it, and apply it to commercial ends." Since "radical change towards a new circular business logic" could cause "organisational inertia" (Lahti et al., 2018, p.7), absorptive capacity is important. To enhance internal alignment, early transparent communication with employees and exertion of influence may help, which is in line with Lewin (1947). In addition, when formulating a CFP vision, firms need to define the specific strategy in terms of choosing a value retention option. In the interviews, the **hierarchy** of those options (R-strategies) was ranked in accordance to literature (Reike et al., 2018). Thus, recycling as less desirable option than reuse may rather present a transitional solution towards a truly CE. Nevertheless, the choice of strategy was found to be influenced by a range of factors. Neither recycling nor reusing would, also according to WRAP (2010), be generically environmentally preferable.

### 5.3 Preparation

Food firms need to prepare internally for collaborating. As also stated by Duysters et al. (1999) and Czajkowski (2007), a clear picture of future needs eases the development of partner selection criteria. This study additionally showed that for this, first, own **internal capabilities and gaps** may be **assessed** (see step 5 Figure 9). This way, as argued by Dyer and Singh (1998), complementary resources and capabilities of partners can enable interorganisational competitive advantage. To determine roles (i.e. tasks) firms can fulfil internally and those where collaborative support is needed, **14 partner roles** for CFP were identified. Those are either of particular importance for one of three project phases (starting, developing, and realising projects) or in relation to the collaboration or the outside-world. Overall, in this study, the three roles of the realisation phase ('use-phase supporter', 'end-of-life supporter', 'impact extender') were found to be the most important ones, due to their core position in CFP projects. Only in the case of their fulfilment, the value of circular BMs can be delivered, created, and captured. Hence, for them, ideally, all nine partner characteristics (see chapter 5.4) should be fulfilled.

Whereas this study confirmed all 11 partner roles of the theory (Goodman et al., 2017; Brown et al., 2018; Solesvik & Westhead, 2010), the 'internal-educator', 'market-expert', and 'end-of-life supporter' were added. Also, the roles of the 'impact extender', 'enabler', and 'promoter' (previously named legitimator) were slightly amended, as explained in the following section. Overall, it was found that food companies necessarily require collaboration since they cannot fulfil all roles internally. The number and type of partners needed, tends to be influenced by the **firm's position in the value chain**. Food producers/brands can potentially fulfil all 14 roles except the 'end-of-life supporter'. This can be attributed to their influence on CFP as packaging gatekeeper on the market. At the same time, they may be pressured by governments and the public to assume responsibility for their packaging. In contrast, retailers were found to potentially fulfil seven of the 14 partner roles. For many roles they rely on partners, which is attributed to less pressure and their powerful position over brands/suppliers. Furthermore, the findings do not only identify CFP partner roles and illustrate actors fulfilling those roles but go further in showing the importance of roles depending on the **project type**. As highlighted in the following, the roles were grouped by their importance as (1) CE-enabler, (2) CE-educator, or for (3) recyclable FP, (4) reusable FP, (5) projects generically.

#### *CE-enabling roles*

Based on this study's starting point, i.e. the importance of collaboration in a CE/for CFP, roles enabling a CE via collaboration and political support are found essential. Therefore, as also Goodman et al. (2017) highlight, the '**mediator**' was identified as partner-connecting actor building one-to-one collaborations or networks. Next to food brands, who may invite partners themselves, formats such as conferences/working sessions, as well as neutral partner-connecting organisations/overheads function as such connectors. In line with Solesvik and Westhead (2010), 'mediators' benefit from a good network and from CE/CFP knowledge. Often going hand in hand with this role is the '**knowledge broker**'. This actor is found responsible for managing collaboration processes, determining topics discussed, facilitating discussions, and creating learnings and research outcomes. The particular importance of possessing CE/CFP expertise to steer collaborations on a content-level is indicated by the findings as well as by Brown et al. (2018). Hence, the combination of the 'knowledge broker' and the 'circularity expert' is

identified powerful. Commonly, external partners tend to enable collaborative learning. Nevertheless, this study shows that all partners of a collaboration need to contribute. In that sense, also food firms may develop knowledge sharing routines, which are “regular pattern of interfirm interactions that permits the transfer, recombination, or creation of specialised knowledge” (Dyer & Singh, 1998, p. 665). A third CE-enabling role is represented by the ‘**enabler**’, who (co-)creates, steers, and pushes legislation, norms, and the market towards CFP. These findings corroborate those of Solesvik and Westhead (2019) and Goodman et al. (2017). Unlike those authors though, the study found possessing market knowledge a rather decisive feature for another partner role, the ‘market expert’. The ‘enabler’, however, was found to primarily require political influence to ensure political support. Such support would be essential as neither consumers nor businesses could be expected to strive towards CFP without (economic) incentives. Even if the study found food companies being capable to exert political influence themselves (e.g. lobbying, advocating, bans), associations such as sector unions/federations represent additional key ‘enablers’. Via cooperation between politics and businesses, regulations in a CE could be jointly changed and firms could better manage uncertainties of future CFP legislation (Masi et al., 2017; Clark et al., 2019). Collaborations with public authorities/governments are important for food companies as those actors set up (EPR) policies, taxes, subsidies, bans, norms, infrastructure, or (quality) control. Overall, a desired European-wide legislation was found to have the potential of easing the scale-uptake of CFP.

### *CE-educating roles*

Since the CE requires a novel economic system, both customers and businesses need to change their behaviour. Businesses have to rethink make-use-dispose BMs, for which they are in need of knowledge on CE practices and BMs. Even though company-internal education remained unaddressed in the examined collaboration literature, this study found a general understanding and support (of CFP and its business importance) relevant. The ‘**internal educator**’ can transfer and disseminate knowledge in firms. As explanation, Nonaka et al. (2000) highlight that knowledge and its creation/utilisation influences the ability of companies to innovate and improve. MNCs (especially retailers), who may employ or engage experts as ‘internal educators’, were found devoting too little attention to knowledge dissemination. In contrast, small companies with usually steep learning curves, need to agglomerate knowledge independently. Next to internal education, the public may be equally stimulated to rethink, make informed choices, and change their behaviour with respect to packaging. As a consequence, based on Goodman’s et al. (2017) educator role, this study shows that the ‘**external educator**’ on the one hand addresses consumers. As indispensable actors in a CE, consumers would require (enhanced) packaging education. On the other hand, also individuals holding powerful positions, e.g. at governments/local authorities, may require CFP education. Generally, CFP education was found to ideally be holistic and transparent while practical. Next to public authorities and academia representing key ‘external educators’, this study found that also food companies can educate via social media, on-pack, or in store.

### *Roles for recyclable FP*

Recycling FP was, among others, found to face technical (e.g. downcycling), legal/safety (e.g. food-grade recycling), and economic (e.g. currently uneconomic chemical recycling) challenges. Roles of importance for recyclable FP mirror these challenges. To start, as for CFP generally, but particularly for recyclable FP, required technological investments are high, the ‘**financier**’ is

inevitable (Clark et al., 2019; Meherishi et al., 2019; Masi et al., 2017). In line with literature, this actor can provide/enable direct and indirect financing. In this study, potential actors and tasks of this role are complemented. For CFP, first, required R&D financing is often taken over by (several) larger food companies. Second, food companies invest into knowledge accumulation, such as expert or educational support. Third, the financing of CFP systems is either transferred to food companies via EPR schemes or taken over by reuse service providers. Lastly, governments should create financially attractive (e.g. recyclates) markets and a level-playing field. As additional actor, the '**circularity expert**' is important. This is due to required technological recycling improvements and the insufficient alignment of packaging design and waste management (PAC, 2017; Lee et al., 2017). This actor, expanding on the role of the closed loop material expert of Brown et al. (2018), was found to hold knowledge on, advise solutions for, and support the development of CFP networks. Required knowledge of the '**circularity expert**' regards the (technical) product level, CFP innovations/challenges, and local material/cycling flows. Actors fulfilling this role are, problematically, underrepresented. Moreover, in conformity with the '**use-phase supporter**', the '**end-of-life supporter**' was newly identified. This actor aims at closing the loop at the end-of-life, being of importance for reuse but particularly for recyclable FP with shorter lifetimes (Bocken et al., 2016). Food companies cannot fulfil this role alone, but consumers need to separate and dispose of the packaging (which retailers can facilitate). Subsequently, the collection and sorting of packaging is often organised via EPR schemes, which brands may influence. EPR schemes demand companies to take (financial) responsibility at the packaging's end-of-life. Moreover, recyclers as important partners are ought to improve recycling technologies (Clark et al., 2019; Hopewell et al., 2009; Kazulytė, 2019). Lastly, chemical companies need to accept the secondary materials as input. Overall, the end-of-life treatment was found to vastly differ between locations, causing complexities for food companies and hampering closed loop recycling.

### *Roles for reusable FP*

For reusable FP, new service-oriented BMs, particularly ensuring consumers' convenience, are needed. For such BMs, food companies require collaborative support, e.g. from consumers or competitors. As '**impact extender**', consumers can, in line with Goodman et al. (2017), promote CFP to reach a critical mass. In this manner, according to Rogers' (1995) innovation diffusion theory, early adopters of reusable FP could use their role model qualities to activate the early majority. Going beyond literature, the findings suggest that the '**impact extender**' can also be found in competition. By pursuing a pre-competitive approach, in a CE, hurdles can collectively be overcome and learning and change enabled. Often, platforms or central organisations orchestrate such "coopetition" (Masi et al., 2017; De Angelis et al., 2017; Mishra, 2019). This study found that competitors as partners can extend the impact by increasing volume/scale, sharing investments, standardisation, and reinforcements via strategy/industry alignment. For instance, a pool of companies affiliated with a reuse platform, allows for its feasibility and economic viability. As an additional role, based on Goodmans' et al. (2017) legitimator, the '**promoter**' can communicate and promote the firm's CFP story and products. The renaming of the role is due to its focus on establishing credibility and publicity via promotion, rather than via assurance. Thus, this study stresses the marketing-related tasks of the role, which aims at keeping/winning consumers and gaining a good sustainability reputation. According to Lahti et al. (2018), a solid reputation would be particularly essential for larger firms. The role turned out to be crucial for reusable FP, where packaging has to be returned/reused by consumers, which

requires promotion. Moreover, in light of a current packaging system tuned on convenient, low-cost, single-use packaging, reusable FP has to offset perceived (hygienic) risks, increased efforts, and costs. Reusable FP has to become accepted and ordinary (again). Even though food companies can act as ‘promoter’ themselves, external partners may assist. Lastly, to realise reusable FP, in line with Brown et al. (2018), the ‘**use-phase supporter**’ builds-up, operates, and utilises value chain networks extending the life of CFP. Food brands but more frequently reuse system providers support the use-phase by establishing innovative, service-oriented reuse models. Those require the support of (reverse) logistics, cleaning, and refilling. The findings back up literature, which classifies a shortage of those actors as challenge (Ameripen, 2018; Hopewell et al., 2009). Besides those, as “ultimately the consumer is key” (Clark et al., 2019), convenient reuse systems need to ensure consumers’ support. Governments can additionally facilitate packaging’s return by operating DRS systems.

### *Generic roles*

Besides CE and CFP specific roles, this study identified three roles being important for projects generically. First, projects require an ‘**initiator**’, who was found to be either idea-spreading (in line with Goodman et al., (2018)), or alternatively, as determined in this study, pressure-creating or action-oriented. As pressure-creating ‘initiator’, NGOs/initiatives, consumers, retailers, and governments can push and demand CFP. Food brands identified as actionable ‘initiators’ for recyclable FP are ought to increase their efforts to accelerate the transition towards CFP. In contrast, smaller firms may, in line with Lathi et al. (2018), experience difficulties to orchestrate system-level activities, invest in R&D, or influence policymakers. As actionable ‘initiators’ for reusable FP, reuse system providers may develop new circular BMs. Additionally, another generic partner role defined in this study is the ‘**piloter**’. In line with Solesvik and Westhead (2010) and Brown et al. (2018), this actor was found to develop, pilot, and improve (regarding the customer experience and CE performance) materials/technologies and reuse/recycling systems. Piloting CFP may serve as decision-making base. Besides a few own tests conducted by food companies, collaborative research programs along the supply chain, often with a neutral overhead, would represent powerful ‘piloters’. Such research programs should, according to Roux et al. (2010), be organised to facilitate learning, knowledge co-production, and incorporate the needs/expectations of all stakeholders. Last, since any project requires market insights, this study identified the ‘**market expert**’ as generic partner role. This role builds on the ‘circularity expert’ and incorporates the knowledge task of the enabler outlined by Solesvik and Westhead (2010). The ‘market expert’ was defined to provide knowledge, research, and advise on the market/industry context, legislation, consumer behaviour, and usage scenarios around CFP. Even if also recyclable FP requires such understanding, particularly for reusable FP, firms need to understand how to tap into new BMs, shifting user preferences, and ensure consumers’ willingness to adopt to new packaging models (Clark et al., 2019; EMF, 2019). (Larger) food companies partly possess such knowledge. Still, they require insights from experts or consumers themselves, unless they hand over the ‘market expert’ role to reuse system providers.

After firms have assessed their own capabilities and gaps, which point towards roles to be fulfilled by partners, this study identified the **internal team formation** as subsequent step (see step 6 Figure 9). This is in line with literature. Employees were found to require collaborative skills, right CFP qualifications, and the ability to deal with complexities and uncertainties (see chapter 5.4). The latter was not yet highlighted in literature. Moreover, differences between

companies were detected. In contrast to SMEs, MNCs could hire CFP specialists. However, retailers would rarely do so. As also suggested by Lahti et al. (2018), this study specified that steering committees may allow firms to handle difficulties of CFP projects.

## 5.4 Partner Involvement

Once a team is formed and potential partners are identified, food firms may start the **external outreach** (see step 7 Figure 9). This step was frequently mentioned in the interviews but is rarely discussed in collaboration literature. Still, Goodman et al. (2017), Brown et al. (2018), and Geringer (1991) highlight the need of an actors connecting different players, namely the 'mediator'. In line with Lahti et al. (2018), new (compared to linear packaging) partners were found to be needed for CFP. Despite such new partners, the findings show that prolonging existing relationships is preferred. One reason for such prolongation may be relation-specific investments and knowledge-sharing routines with established partners, resulting in interorganisational competitive advantage (Dyer & Singh, 1998). To subsequently **choose** compatible and attractive partners, endorsing Czajkowski (2007) and Shah & Swaminathan (2008), their desirability, favourability, appeal, and value for the firm should be **evaluated** (see step 8 Figure 9). This study underlines that not only the partner organisations but equally the individuals as contacts within the organisation should be evaluated. In response to a lack of understanding on required CE partner types as highlighted by Brown et al. (2019), this research introduces (a) CFP partner roles to determine potential partners based on their tasks and (b) **partner characteristics** to choose the best fitting among all potential partners. Conversations and discussing value proposition with potential partners may assist when reviewing their fit. Overall, the study points at nine partner-related characteristics, from which, as detailed in the following section, all but one are in line with literature. Further, one characteristic, namely enthusiasm, was ruled out. This is the case as (despite literature mentioning a lack of enthusiasm as a main collaboration barrier (Barson et al., n.d.; Fawcett et al., 2008; Solesvik & Westhead, 2010)), sufficient enthusiasm was perceived for CFP. Moreover, the findings indicate that enthusiasm may be a temporary state, only person-related, or not translated into action. Lastly, this study not only determines characteristics but goes further to show which of those are (1) key CE-specific, (2) general CE-specific, and (3) generic partner characteristics.

### *Key CE-specific characteristics*

The study suggests that '**strategic fit**' with partners can ensure fundamental alignment in CE projects. For CFP, the findings show that an alignment in six of the seven strategic-fit-elements defined by McGee and Channon (2014) are needed. Those are, including CFP examples: *strategy* (CFP vision), *management* (company culture), *markets* (food produced), *company operation* (flexibility), *context* (local cycling capacities), and *internal & external environment*. Regarding the latter, literature calls for local, regional, national, and transnational CE implementation. It was found that, in support of Dora (2019), collaborations concerned with knowledge exchange do not require geographical proximity, whereas those concerned with material exchange do. Such "tight cycles" in terms of geography and activities may improve resource efficiency and profitability (Kalmyakova et al., 2018). As equally important for CFP collaborations but not considered by traditional collaboration literature is '**creativity/open mindedness**'. This characteristic, introduced in this study, allows identifying solutions for complex and uncertain

CFP issues and to collaborate in multiplayer networks. BM innovation literature provides support by calling for creativity and open-mindedness when conceptualising circular BMs (Rohrbeck et al., 2008; Lahti et al., 2018; Pieroni et al., 2018). At the same time, partners should be realistic, e.g. to identify required transitional steps towards a CE. 'Strategic fit' and 'creativity/open mindedness' are detected as characteristics likely important for partners of all 14 roles. To add, '**open communication**' was found important for all eight roles of the project development, realisation, and related to collaboration. Not only for traditional but particularly for CFP collaborations, collaborative learning represents a desired norm. This is substantiated by Clark et al. (2019) and Rohrbeck et al. (2013), who point at progression, company advantages, and the possibility to reduce uncertainties via shared learning in a CE. 'Open communication' as only characteristics does not only presents an initial partner selection criterion but also a continuous and reciprocal achievement by all collaboration partners.

#### *General CE-specific characteristics*

Two characteristics, in line with traditional collaboration literature, were identified as baseline for CE collaborations. First, '**goals alignment**' and interest/benefit sharing between partners may enable later flexibility required in the consequence of CFP uncertainties and difficulties. At the same time, as also endorsed by Pieroni et al. (2018), in a CE, value is not generated by individual actors, but in synergetic interrelationship with others. This requires the alignment on goals. Second, as in any collaboration, partners should be '**commitment**', i.e. wanting the change and investing resources. As in a CE, collaborations are characterised by mutual dependence and reciprocity, committed partners are key (Lahti et al., 2018). Although larger firms may more easily invest resources, the equally important commitment of top management could be more complicated. Smaller firms, in contrast, may circumvent lacking resources by joining forces. For CFP, progressive organisations were found to be more committed since CFP realisation requires extra time and monetary investments while mainly long-term pay-off.

#### *Generic partner characteristics*

This study identified four partner characteristics being mentioned by traditional collaboration literature and, as for any collaboration, also being important when choosing CFP partners. To start, the selection criterion '**complementarity**' is separately covered under the partner roles (see chapter 5.3). Additionally, financial '**advantageousness**' presents, besides the reduction of resource consumption and environmental pollution, a priority of the CE concept (Geissdoerfer et al., 2017). In particular, partners enabling economies of scale via increased volumes or shared costs were found desirable. The characteristic '**no negative reputation**' is based on Solesvik and Westhead's (2010) call for a good reputation. Whereas for small/unknown partners avoiding negative reputation may be sufficient, larger partners may benefit from a good reputation. Especially in the pressured packaging field, a few credible partners are needed to attain legitimacy and enable networking. Lastly, '**trustworthiness**' (in terms of benevolence trust, i.e. adhering to promises), particularly of individuals within an organisation, should serve as CFP partner selection criterion. In a CE, trust is especially demanded due to common mutual dependences and relation-specific investments.

## 5.5 Agreements

Once a partner is chosen based on its role and the assessment of its characteristics, **agreements** with the partner was found as the last step of the collaboration set-up process (see step 9 Figure 9). In line with literature, on the one hand, the study points at the importance of informal agreements, e.g. on collaborative goals and the division of roles. In often diverse CFP multiplayer collaborations, however, reaching full consensus may neither always be possible, nor needed. On the other hand, formal agreements should cover financial and confidentially topics. Since CFP collaboration may also create other than financial advantages, a “win-win deal” (Kelly et al., 2002, p. 18) should be created. This research found that finding agreements in multiplayer collaborations with differing CFP objectives, impacts, and costs, may prove difficult. Therefore, also literature calls for the further exploration of the inter-organisational management, contract/transaction design, and administration of newly organised CE initiatives (Korhonen et al., 2018; Meherishi et al., 2019; Fischer & Pascucci, 2017; De Angelis et al., 2018; Lahti et al., 2018).

## 5.6 Limitations of the Research

This study investigated the North-West European context, different types of possible collaborations, and different reusable and recyclable FP types. As little research has been conducted on the topic of CFP collaboration, this scoping was required. Nevertheless, differences can be expected between countries/regions within the geographical scope, more likely even to other geographies than the one studied. Similarly, the collaboration choice and set-up may differ between one-to-one alliances, vertical networks, horizontal networks, or knowledge exchange collaborations. Likewise, required recyclable FP collaborations likely differ between packaging materials and formats (e.g. flexible vs. rigid plastic), whereas for reusable FP between the type of reusable system (e.g. home delivery vs. in-store bulk). Moreover, resulting from a literature research, this study deliberately chose the two R-strategies of recycling and reusing. Other strategies, such as compostable packaging, may be controversially discussed, but could still present CFP strategies of (future) importance. Additionally, a multitude of frameworks were analysed in this research (collaboration set-up, partner roles, partner characteristics, and their sub-categories), which was deliberately chosen for this explorative study. In-depth insights in single sub-categories fall short though.

Scrutinising the reliability in terms of consistency of the data collection and analysis of this research (Saunders et al., 2009), qualitative studies as this one, entail the risk of a participant or observer bias. Those were, however, minimised by several measures, e.g. by extensive literature research, an interview guide, recording, and transcription. In regard to external validity in terms of generalisability of the results e.g. to other research settings (Saunders et al., 2009), limitations are observed. The sampled size (17 interviews) is too small to be generalised, particularly within an interviewee group (retailers, brand owners, small food producer). Nonetheless, by including expert-interviews, the generalisability is enhanced. Furthermore, interviewees were chosen due to their major responsibility and expertise on CFP collaboration within the firm. As a consequence, they are mainly (but not solely) working on CE/sustainability or specifically CFP. It has to be kept in mind that therefore those may not reflect holistic views of the companies. Interviewing more interviewees and including employees of other business units and those implementing CFP initiatives on-the-ground, could generate a more holistic picture.

## 5.7 Future Research

The research's results present a range of novel findings on collaboration in the field of CFP. Future research either focusing on specific elements or extending insights to other fields could deliver additional insights.

- Replicating the study in other geographical contexts than the North-West-European one would likely add new insights as geographical differences of e.g. legislation, waste management systems, consumer preferences, or company-internal mindsets were identified as factors influencing required partner roles. Similarly, future research should test the applicability of the results to other CE fields than CFP packaging. Many identified elements of the collaboration set-up and partner selection criteria can likely provide guidance for any collaborative CE project.
- Future research should focus on specific topics of this study, such as concentrating on one of the four collaboration types, or on individual influencing factors identified (e.g. specific food or packaging types, or brands or retailers specifically). Moreover, research on CFP collaboration for SMEs should be covered in future research since SMEs play a distinctive role in the transition towards CFP, but current initiatives are mostly driven by MNCs. Support-mechanisms for SMEs such as dedicated communities or funds are, however, lacking. Even though this study delivered some insights on SME CFP collaboration, detailed insights are needed. Janssen and Stel (2017) for instance outline how SMEs can identify and orchestrate collaborating for CE BMs, but do not focus on the CFP context.
- An in-depth analysis of the relation between the partner roles and characteristics, broached in this study, need to be covered in future research. Similarly, examining the correlation and potential patterns between partner roles is of interest. For instance, do 'end-of-life supporter' usually act also as 'circularity experts'?
- Whereas this study analysed collaboration for reusable and recyclable FP, other R-strategies such as recovering (compostable, biodegradable FP), or reducing may ask for a different collaboration set-up phase and partner selection criteria. In addition, future research should focus on the realisation phase of collaborations as well as underlying governance mechanisms. These can already be decided upon during the collaboration set-up but were beyond this study's scope. In line with that, Bryson et al. (2015) demands designing effective processes, structural and governance agreements, management of contingencies, constraints, outcomes, and accountabilities.
- As guidance for practitioners, tools such (a) a guided workflow process for setting-up collaborations, (b) a gap analysis to identify own capabilities and based on that required partner roles and (c) an evaluation checklist for important characteristics of potential partners should be developed. With respect to the characteristics, future research should investigate how organisations can learn/develop certain characteristics. To illustrate, how can firms be open-minded or successfully share knowledge in an open manner? The research field of organisational learning and transformation can assist such investigations.

## 6. Conclusion

This research identified the current inefficient production, use, and disposal of plastic FP as a contributor to environmental and societal issues such as climate change, plastic pollution, and the generation of economic costs by after-use externalities. The CE is often promoted as a solution to this problem by restoring any damage and urging businesses to rethink traditional make-use-dispose BMs. From the CFP strategies, reusable and recyclable FP were identified as the most relevant ones, as other strategies were either found controversial, less feasible, or less preferable from a CE perspective. Although a current uptake of CFP is mirrored in increasing policies alongside industry and single-firm initiatives, scaled recyclable and reusable FP solutions are lacking. Primary FP (in direct contact with food) imposes challenges for reuse and recycling, while a lack of coordination across complex CFP value chains was identified as major implementation challenge. To overcome this challenge, internal and external collaboration needs to be successfully realised, whereby focal food firms present a central player capable of wielding power over the supply chain. For these firms, the phase of selecting partners and establishing collaborations determines later success, while also being characterised by difficulties. Since neither the identification and set-up of collaborations in a CE, nor collaboration for CFP (or the combination of both) is sufficiently investigated in scientific literature, this research aimed to answer the question: **how do focal firms set up and choose collaborations for circular food packaging?**

To answer this question, a preliminary theoretical framework was applied to the topic of CFP and tested via qualitative interviews, which were coded via thematic analysis. This way, a modified theoretical framework was developed, delivering insights into the collaboration set-up, partner roles, partner characteristics, collaboration types, and influencing factors. The study found that food companies necessarily require collaborations for CFP, as all 14 roles (of which three were newly identified in this study) cannot be fulfilled internally. This study not only identified those roles but went further to also introduce influencing factors. First, while brands can potentially fulfil all roles, except the 'end-of-life supporter', retailers never take up seven of the roles since they invest their resources in topics other than CFP and can exert power over brands. Besides the firm's position in the supply chain, likewise, the project type (reusable vs. recyclable FP), size of the food company, and the properties of the food to be packaged (as FP always presents a product-packaging combination) were found to influence CFP activities and required collaborations. Moreover, the location of operations has an influence on CFP collaborations. This is caused, amongst others, by differences in the readiness of the reuse/recycling system, legislation, and culture. Based on this system's development stage, food companies may engage in four types of collaboration: a) vertical networks aiming to develop the packaging reuse/recycling system, b) horizontal networks to develop new materials for and utilise existing systems, c) one-to-one alliances to improve packaging/technologies, and d) informal collaborations for knowledge exchange irrespective of the system's development stage.

In comparison to traditional collaborations, due to its complexities and uncertainties, in a CE, 11 partner roles were found to be by far more important or additionally needed. To add, those roles associated to the project's realisation phase ('impact extender', 'use-phase supporter', 'end-of-life supporter') were shown as particularly relevant. Similarly, the 'external educator' (for reusable FP), the 'financier' (for recyclable FP), the 'mediator', and the 'knowledge broker'

may be particularly impactful for CFP. The latter two network-building partners are relevant as collaboration is a key element for CE/CFP. In CE, compared to non-CE projects, collaboration is intensified since partnering with competitors, governments, and public/research organisations is often required. When choosing CFP, four desired generic partner-related characteristics were identified. In addition, five characteristics specific to circular collaborations should be considered. From those, 'creativity/open mindedness' was not mentioned in previous literature. The complex topic of CFP, however, requires out-of-the-box thinking. Similarly, 'strategic fit' via e.g. geographic proximity or similar circularity visions also needs to be ensured. Lastly, the collaboration set-up process was found to typically follow nine steps, from which three were newly identified. Here, this study identified as important to have initial understanding of the local market/product context to inform the internal vision creation, alignment, and definition of own resources (including specialised employees) and gaps. The process's last step addressing collaboration agreements and governance calls for further research.

Overall, since CE realisation and research is still in its early phase, applying this study to other CE fields, geographies, or specific organisations can deliver even further guidance. To drive the CFP transition, alignment between various players and geographies is required, legislation has to provide incentives, and consumers need to change their behaviour. Additionally, food companies must assume responsibility and implement CFP for all their packaging. Looking into the future from a research perspective, technical CFP explorations need to be increasingly complemented by (supply chain) managerial explorations to guide firms. Furthermore, CFP needs to be examined on a system level, first to understand the interconnectedness between players and whole industries. Second, as demanded by Rockström et al. (2009), our ultimate goal should not be CFP, but on a higher level, living within the planetary boundaries. Therefore, the links between the CE and other topics, such as climate change or biodiversity loss, need to be understood. At the same time, changes such as behavioural consumption or food production, are inevitable. Finally, the societal pressure on CFP can be leveraged as a starting point for collaborations, not only addressing CFP but also other CE topics.

## 7. Practical Recommendations



Figure 10: Main action points for key players towards CFP based on the research.

## References

- Ameripen (American Institute for Packaging and the Environment) (2018). *Packaging Materials Management Definitions: A Review of Varying Global Standards. Guidance Document*. Retrieved from <https://cdn.ymaws.com/www.ameripen.org/resource/resmgr/pdfs/AMERIPEN-Report-RecyclingDef.pdf>.
- Barnes, D. K. A., Galgani, F., Thompson, R. C., & Barlaz, M. (2009). Accumulation and fragmentation of plastic debris in global environments. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 364(1526), 1985–1998.
- Barra, R., Leonard, S. A. (2018). *Plastics and the circular economy*. Scientific and Technical Advisory Panel to the Global Environment Facility. Washington, DC. Retrieved from: <http://stapgef.org/sites/default/files/publications/PLASTICS%20for%20posting.pdf>.
- Barratt, M. (2004). Understanding the meaning of collaboration in the supply chain. *Supply Chain Management: An International Journal*, 9(1), 30–42.
- Barson, R. J., Foster, G., Struck, T., Ratchev, S., Pawar, K., Weber, F., & Wunram, M. (2000). Inter-and intra-organisational barriers to sharing knowledge in the extended supply-chain. *Proceedings of the eBusiness and eWork*, 18–20.
- Braun, V., and Clarke, V. (2006). Using Thematic Analysis in Psychology. *Qualitative Research in Psychology*, 3, 77–101.
- ten Brink, P., Schweitzer, J.-P., Watkins, E., Janssens, C., De Smet, M., Leslie, H., & Galgani, F. (2018). Circular economy measures to keep plastics and their value in the economy, avoid waste and reduce marine litter. *Kiel Institute for the World Economy (IfW)*, Economics Discussion Papers 2018-3.
- Brown, P., Bocken, N., & Balkenende, R. (2018). Towards Understanding Collaboration Within Circular Business Models. In L. Moratis, F. Melissen, & S. O. Idowu (Eds.), *Sustainable Business Models*, 169–201.
- Brown, P., Bocken, N., & Balkenende, R. (2019). Why Do Companies Pursue Collaborative Circular Oriented Innovation? *Sustainability*, 11(3), 635.
- Bryman, A. (2012). *Social research methods* (4th ed). Oxford ; New York: Oxford University Press.
- Bryson, J. M., Crosby, B. C., & Stone, M. M. (2015). Designing and Implementing Cross-Sector Collaborations: Needed and Challenging. *Public Administration Review*, 75(5), 647–663.
- Cao, M., Vonderembse, M. A., Zhang, Q., & Ragu-Nathan, T. S. (2010). Supply chain collaboration: conceptualisation and instrument development. *International Journal of Production Research*, 48(22), 6613–6635.
- Clark, N., Trimmingham, R., & Storer, I. (2019). Understanding the views of the UK food packaging supply chain in order to support a move to circular economy systems. *Packaging Technology and Science*, 32(11), 577–591.
- Closed Loop Partners (2019). Accelerating circular supply chains for plastics: A landscape of transformational technologies that stop plastic waste, keep materials in play and grow markets. Retrieved

from: [https://www.closedlooppartners.com/wp-content/uploads/2019/04/CLP\\_Circular\\_Supply\\_Chains\\_for\\_Plastics.pdf](https://www.closedlooppartners.com/wp-content/uploads/2019/04/CLP_Circular_Supply_Chains_for_Plastics.pdf).

Cohen, W., Levinthal, D.A. (1990). "Absorptive capacity: A new perspective on learning and innovation", *Administrative Science Quarterly*, 35(1), pp. 128-152.

Corbin, J. M., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology*, 13, 3-21.

Czajkowski, J. M. (2007). Leading successful interinstitutional collaborations using the collaboration success measurement model. Chair Academy's 16th Annual International Conference, Jacksonville Florida. CiteSeer.

Davis, G. F., Cobb, J. A. (2010). Resource dependence theory: Past and future, in Claudia Bird Schoonhoven, Frank Dobbin (ed.). Stanford's Organization Theory Renaissance, 1970- 2000, in *Research in the Sociology of Organizations*, 28, 21-42.

Davis, G., & Song, J. H. (2006). Biodegradable packaging based on raw materials from crops and their impact on waste management. *Industrial Crops and Products*, 23(2), 147-161.

De Angelis, R., Howard, M., & Miemczyk, J. (2018). Supply chain management and the circular economy: towards the circular supply chain. *Production Planning & Control*, 29(6), 425-437.

Deloitte & Cistri (2018). *Drink without waste*. Research Report. Deloitte Risk Advisory. Retrieved from <https://drinkwithoutwaste.org/wp-content/uploads/2018/12/deloitte-cn-ra-drink-without-waste-en-181204.pdf>.

Dietrich, P., Eskerod, P., Dalcher, D., & Sandhawalia, B. (2010). The Dynamics of Collaboration in Multipartner Projects. *Project Management Journal*, 41(4), 59-78.

Dora, M. (2019). Collaboration in a circular economy: learning from the farmers to reduce food waste. *Journal of Enterprise Information Management*, ahead-of-print.

Dubois, A., & Gadde, L.-E. (2002). Systematic combining: an abductive approach to case research. *Journal of Business Research*, 55(7), 553-560.

Duysters, G., Kok, G., & Vaandrager, M. (1999). Crafting successful strategic technology partnerships. *R&D Management*, 29(4), 343-351.

Dyer, J. H., Singh, H. (1998). "The relational view: Cooperative strategy and sources of interorganizational competitive advantage," *Academy of Management Review*, 23, 660- 679.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of management review*, 14(4), 532-550.

EMF (Ellen MacArthur Foundation) (2017a): *The new Plastics Economy. Catalysing Action*. Retrieved from: [https://www.ellenmacarthurfoundation.org/assets/downloads/New-Plastics-Economy\\_Catalysing-Action\\_13-1-17.pdf](https://www.ellenmacarthurfoundation.org/assets/downloads/New-Plastics-Economy_Catalysing-Action_13-1-17.pdf)

EMF (Ellen MacArthur Foundation) (2017b). Concept. What is a circular economy? A framework for an economy that is restorative and regenerative by design. Retrieved from: <https://www.ellenmacarthurfoundation.org/circular-economy/concept>.

EMF (Ellen MacArthur Foundation) (2018). *New Plastics Economy Global Commitment*. Retrieved from: <https://www.ellenmacarthurfoundation.org/assets/downloads/Global-Commitment-Document-to-download-on-website-2.pdf>.

EMF (Ellen MacArthur Foundation) (2019). *Reuse. Rethinking Packaging*. Retrieved from <https://www.ellenmacarthurfoundation.org/publications/reuse>.

Eriksen, M., Lebreton, L. C. M., Carson, H. S., Thiel, M., Moore, C. J., Borerro, J. C., ... Reisser, J. (2014). Plastic Pollution in the World's Oceans: More than 5 Trillion Plastic Pieces Weighing over 250,000 Tons Afloat at Sea. *PLoS ONE*, 9(12).

European Commission (EC) (2018). *A European Strategy for Plastics in a Circular Economy*. Retrieved from <https://ec.europa.eu/environment/circular-economy/pdf/plastics-strategy-brochure.pdf>.

van Eygen, E., Laner, D., & Fellner, J. (2018). Circular economy of plastic packaging: Current practice and perspectives in Austria. *Waste Management*, 72, 55–64.

Farooque, M., Zhang, A., Thürer, M., Qu, T., & Huisingh, D. (2019). Circular supply chain management: A definition and structured literature review. *Journal of Cleaner Production*, 228, 882–900.

Fawcett, S. E., Magnan, G. M., & McCarter, M. W. (2008). Benefits, barriers, and bridges to effective supply chain management. *Supply Chain Management: An International Journal*, 13(1), 35–48.

Fischer, A., & Pascucci, S. (2017). Institutional incentives in circular economy transition: The case of material use in the Dutch textile industry. *Journal of Cleaner Production*, 155, 17–32.

Geissdoerfer, M., Savaget, P., Bocken, N. M. P., & Hultink, E. J. (2017). The Circular Economy – A new sustainability paradigm? *Journal of Cleaner Production*, 143, 757–768.

Genovese, A., Acquaye, A. A., Figueroa, A., & Koh, S. C. L. (2017). Sustainable supply chain management and the transition towards a circular economy: Evidence and some applications. *Omega*, 66, 344–357.

George, V., & Farris, G. (1999). Performance of alliances: formative stages and changing organizational and environmental influences. *R&D Management*, 29(4), 379–390.

Geringer. (1991). Determinants of Partner Selection Criteria in International Joint Ventures. *Journal of International Business Studies*, 22 (1), 41–62.

Geueke, B., Groh, K., & Muncke, J. (2018). Food packaging in the circular economy: Overview of chemical safety aspects for commonly used materials. *Journal of Cleaner Production*, 193, 491–505.

Geyer, R., Jambeck, J. R., Law, K. L. (2017). Production, use, and fate of all plastics ever made. *Science Advances* 3(7).

Gong, Y., Putnam, E., You, W., & Zhao, C. (2019). Investigation into circular economy of plastics: The case of the UK fast moving consumer goods industry. *Journal of Cleaner Production*.

- Goodman, J., Korsunova, A., & Halme, M. (2017). Our Collaborative Future: Activities and Roles of Stakeholders in Sustainability-Oriented Innovation: Stakeholder Activities and Roles in Sustainability-Oriented Innovation. *Business Strategy and the Environment*, 26(6), 731–753.
- Guillard, V., Gaucel, S., Fornaciari, C., Angellier-Coussy, H., Buche, P., & Gontard, N. (2018). The Next Generation of Sustainable Food Packaging to Preserve Our Environment in a Circular Economy Context. *Frontiers in Nutrition*, 5.
- Hopewell, J., Dvorak, R., & Kosior, E. (2009). Plastics recycling: challenges and opportunities. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 364(1526), 2115–2126.
- Haas, W., Krausmann, F., Wiedenhofer, D., & Heinz, M. (2015). How Circular is the Global Economy?: An Assessment of Material Flows, Waste Production, and Recycling in the European Union and the World in 2005: How Circular is the Global Economy? *Journal of Industrial Ecology*, 19(5), 765–777.
- Hahladakis, J. N., & Iacovidou, E. (2018). Closing the loop on plastic packaging materials: What is quality and how does it affect their circularity? *Science of The Total Environment*, 630, 1394–1400.
- IFCO (2020). IFCO. Home. Retrieved from <https://www.ifco.com/>.
- Ingirige, B., & Sexton, M. (2006). Alliances in construction: Investigating initiatives and barriers for long-term collaboration. *Engineering, Construction and Architectural Management*, 13(5), 521–535.
- Jacob, R., Heinz, A., & Décieux, J. P. (2013). *Umfrage: Einführung in die Methoden der Umfrageforschung* (3rd ed.). Oldenbourg Verlag.
- Jambeck, J.R., Geyer, R., Wilcox, C., Siegler, T. R., Perryman, M., Andrady, A., Narayan, R., Law, K. L. (2015). Plastic waste inputs from land into the ocean. *Science* 347, 768–771.
- Janssen, K., L.; Stel, F. (2017). Orchestrating partnerships in a circular economy—a working method for SMEs. ISPIM Innovation Symposium Manchester. *The International Society for Professional Innovation Management* (ISPIM).
- Kazulytė, I. (2019). Packaging recycling and using of recycled raw materials in the production of packages, with an emphasis on hazardous chemical substances. *Environmental Research, Engineering and Management*, 74(4).
- KIDV (Kennisinstituut Duurzaam Verpakken) (2015). *Circular economy and packaging: an opportunity for Europe*. KIDV. Retrieved from <https://www.kidv.nl/5763/circular-economy-and-packaging-kidv-augustus-deft.pdf>.
- KIDV (Kennisinstituut Duurzaam Verpakken) (2019). *KIDV Recyclecheck. Vormvaste kunststof verpakkingen*. Retrieved from: <https://www.kidv.nl/8150/kidv-recyclecheck-vormvaste-kunststof-verpakkingen.html>.
- de Koeijer, B., Wever, R., & Henseler, J. (2017). Shaping the Research Agenda: Realizing Product-Packaging Combinations in Circular Systems. *Packaging Technology and Science*, 30(8), 443–460.
- Korhonen, J., Honkasalo, A., & Seppälä, J. (2018). Circular Economy: The Concept and its Limitations. *Ecological Economics*, 143, 37–46.

- Kalmykova, Y., Sadagopan, M., & Rosado, L. (2018). Circular economy – From review of theories and practices to development of implementation tools. *Resources, Conservation and Recycling*, 135, 190–201.
- Karhu, J., & Linkola, L. (2019). Circular Economy in the Built Environment in Finland - A case example of collaboration. *IOP Conference Series: Earth and Environmental Science*, 297.
- Kazancoglu, Y., Kazancoglu, I., & Sagnak, M. (2018). A new holistic conceptual framework for green supply chain management performance assessment based on circular economy. *Journal of Cleaner Production*, 195, 1282–1299.
- Kaur, G., Uisan, K., Ong, K. L., & Ki Lin, C. S. (2018). Recent Trends in Green and Sustainable Chemistry & Waste Valorisation: Rethinking Plastics in a circular economy. *Current Opinion in Green and Sustainable Chemistry*, 9, 30–39.
- Kelly, M. J., Schaan, J.-L., & Joncas, H. (2002). Managing alliance relationships: Key challenges in the early stages of collaboration. *R&D Management*, 32(1), 11–22.
- Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, 127, 221–232.
- Kirchherr, J., Piscicelli, L., Bour, R., Kostense-Smit, E., Muller, J., Huibrechtse-Truijens, A., & Hekkert, M. (2018). Barriers to the Circular Economy: Evidence From the European Union (EU). *Ecological Economics*, 150, 264–272.
- Kriwet, A., Zussman, E., & Seliger, G. (1995). Systematic integration of design-for-recycling into product design. *International Journal of Production Economics*, 38(1), 15–22.
- Lacy, P. (2015). *Gaining an Edge from the Circle: Growth, Innovation and Customer Value through the Circular Economy*. Accenture Strategy. Retrieved from [https://www.accenture.com/t20150708To6o455\\_\\_w\\_/us-en/\\_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Dualpub\\_14/Accenture-Circular-Economy-POV.pdf](https://www.accenture.com/t20150708To6o455__w_/us-en/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Dualpub_14/Accenture-Circular-Economy-POV.pdf).
- Lahti, T., Wincent, J., & Parida, V. (2018). A Definition and Theoretical Review of the Circular Economy, Value Creation, and Sustainable Business Models: Where Are We Now and Where Should Research Move in the Future? *Sustainability*, 10(8), 2799.
- Lee, P., Sims, E., Bertham, O., Symington, H., Bell, N., Pfaltzgraff, L., Sjögren, P., Wilts, H., O'Brien, M. (2017). Towards a circular economy - waste management in the EU: study. EPRS (European Parliament Research Service), STOA (Scientific Foresight Unit). Retrieved from [http://www.europarl.europa.eu/RegData/etudes/STUD/2017/581913/EPRS\\_STU\(2017\)581913\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2017/581913/EPRS_STU(2017)581913_EN.pdf).
- Lewin, K. (1947). Frontiers in Group Dynamics. *Human Relations*, 1 (1), 5–41.
- Liliani, Tjahjono, B., & Cao, D. (2020). Advancing bioplastic packaging products through co-innovation: A conceptual framework for supplier-customer collaboration. *Journal of Cleaner Production*, 252.
- Lueneburger, C., Coleman, D. (2010). The Change Leadership Sustainability Demands. *Management Review* 51(4), 49–55.
- Masi, D., Day, S., & Godsell, J. (2017). Supply Chain Configurations in the Circular Economy: A Systematic Literature Review. *Sustainability*, 9(9), 1602.

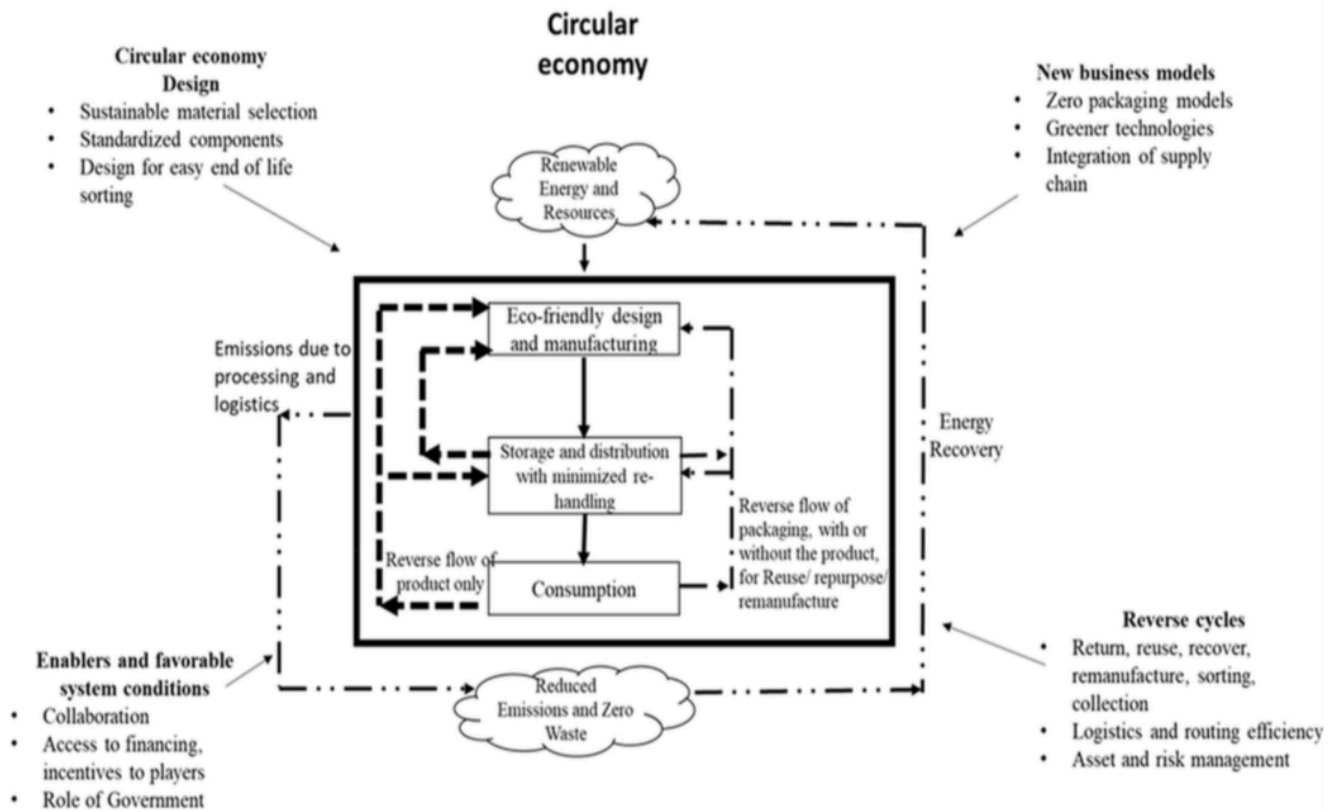
- McGee, J. & Channon, D. (2014). Strategic fit. *Wiley Encyclopedia of Management*, 3(12), publisher: John Wiley & Sons, 2.
- Meherishi, L., Narayana, S. A., & Ranjani, K. S. (2019). Sustainable packaging for supply chain management in the circular economy: A review. *Journal of Cleaner Production*, 237, 117582.
- Milios, L., Holm Christensen, L., McKinnon, D., Christensen, C., Rasch, M. K., & Hallstrøm Eriksen, M. (2018). Plastic recycling in the Nordics: A value chain market analysis. *Waste Management*, 76, 180–189.
- Mishra, J. L., Chiwenga, K. D., & Ali, K. (2019). Collaboration as an enabler for circular economy: a case study of a developing country. *Management Decision*.
- Mollenkopf, D., Closs, D. Twede, D., Lee, S. Burgess, G. (2005). Assessing the viability of reusable packaging: a relative cost approach. *Journal of Business Logistics*, 26(1), 169-197.
- Morana, R., & Seuring, S. (2011). A Three Level Framework for Closed-Loop Supply Chain Management—Linking Society, Chain and Actor Level. *Sustainability*, 3(4), 678–691.
- Murray, A., Skene, K., & Haynes, K. (2017). The Circular Economy: An Interdisciplinary Exploration of the Concept and Application in a Global Context. *Journal of Business Ethics*, 140(3), 369–380.
- Niero, M., & Hauschild, M. Z. (2017). Closing the Loop for Packaging: Finding a Framework to Operationalize Circular Economy Strategies. *Procedia CIRP*, 61, 685–690.
- Niero, M., & Kalbar, P. P. (2019). Coupling material circularity indicators and life cycle based indicators: A proposal to advance the assessment of circular economy strategies at the product level. *Resources, Conservation and Recycling*, 140, 305–312.
- Nonaka, I., Toyama, R., Nagata, A. (2000). A Firm as a Knowledge-creating Entity: A New Perspective on the Theory of the Firm. *Industrial and Corporate Change*, 9(1).
- Olsson, A., Petterson, M., & Jönson, G. (2004). Packaging demands in the food service industry. *Food Service Technology*, 4(3), 97–105.
- Oltermann, P. (2018, March 30). Has Germany hit the jackpot of recycling? The jury's still out. *The Guardian*. Retrieved from <https://www.theguardian.com/world/2018/mar/30/has-germany-hit-the-jackpot-of-recycling-the-jurys-still-out>.
- Ordoñez, I., & Rahe, U. (2013). Collaboration between design and waste management: Can it help close the material loop? *Resources, Conservation and Recycling*, 72, 108–117.
- PAC (Packaging Consortium) (2017). *Packaging Towards a Circular Economy: Addressing Today's Top Packaging Challenges*. Retrieved from <http://www.pac.ca/Programs/Next/Documents/factsheet-primer.pdf>.
- Pagell, M., & Wu, Z. (2009). Building a more complete theory of sustainable supply chain management using case studies of 10 exemplars. *Journal of Supply Chain Management*, 45(2), 37–56.

- Palinkas, L.A.; Horwartz, S.M.; Green, C.A.; Wisdom, J.P.; Duan, N. & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Adm Policy Ment Health*, 42(5), 533-544.
- Pauer, E., Wohner, B., Heinrich, V., & Tacker, M. (2019). Assessing the Environmental Sustainability of Food Packaging: An Extended Life Cycle Assessment including Packaging-Related Food Losses and Waste and Circularity Assessment. *Sustainability*, 11(3), 925.
- Pieroni, M. P. P., McAloone, T. C., & Pigosso, D. C. A. (2019). Business model innovation for circular economy and sustainability: A review of approaches. *Journal of Cleaner Production*, 215, 198–216.
- PlasticsEurope (2018). *Plastics - the Facts 2018. An analysis of European plastics production, demand and waste data*. Retrieved from [https://www.plasticseurope.org/application/files/6315/4510/9658/Plastics\\_the\\_facts\\_2018\\_AF\\_web.pdf](https://www.plasticseurope.org/application/files/6315/4510/9658/Plastics_the_facts_2018_AF_web.pdf).
- Potting, J., Hanemaaijer, A., Delahaye, R., Ganzevles, J., Hoekstra, R., Lijzen, J. (2018). *Circular Economy: what we want to know and can measure*. Framework and baseline assessment for monitoring the progress of the circular economy in the Netherlands. PBL Netherlands Environmental Assessment Agency, The Hague.
- Reike, D., Vermeulen, W. J. V., & Witjes, S. (2018). The circular economy: New or Refurbished as CE 3.0? — Exploring Controversies in the Conceptualization of the Circular Economy through a Focus on History and Resource Value Retention Options. *Resources, Conservation and Recycling*, 135, 246–264.
- Rhim, J.-W., Park, H.-M, Ha, C.-S. (2013). Bio-nanocomposites for food packaging applications. *Progress in Polymer Science*, 38(10-11), 1629-2652.
- Rigamonti, L., Biganzoli, L., & Grosso, M. (2019). Packaging re-use: a starting point for its quantification. *Journal of Material Cycles and Waste Management*, 21(1), 35–43.
- Rizzi, F., Bartolozzi, I., Borghini, A., & Frey, M. (2013). Environmental Management of End-of-Life Products: Nine Factors of Sustainability in Collaborative Networks: Extended Producer Responsibility in Open-Loop Supply-Chains. *Business Strategy and the Environment*, 22(8), 561–572.
- Robertson, G. L. (2013). *Food packaging: principles and practice* (3. ed). Boca Raton, Fla.: CRC Press.
- Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S ....., Foley, J.( 2009). Planetary boundaries: exploring the safe operating space for humanity. *Ecology and Society* 14(2): 32.
- Rogers, E. M. (1995). *Diffusion of Innovations*. 4th Edition. New York: Free Press.
- Rohrbeck, R., Konnertz, L., & Knab, S. (2013). Collaborative business modelling for systemic and sustainability innovations. *International Journal of Technology Management*, 63(1/2), 4.
- Roux, J., Stirzaker, R. J., Breen, C. M., Lefroy, E. C., Cresswell, H. P. (2010). Framework for participative reflection on the accomplishment of transdisciplinary research programs. *Environmental Science & Policy*, 13(8), 733-741.
- Schmidt Rivera, X. C., Leadley, C., Potter, L., & Azapagic, A. (2019). Aiding the Design of Innovative and Sustainable Food Packaging: Integrating Techno-Environmental and Circular Economy Criteria. *Energy Procedia*, 161, 190–197.

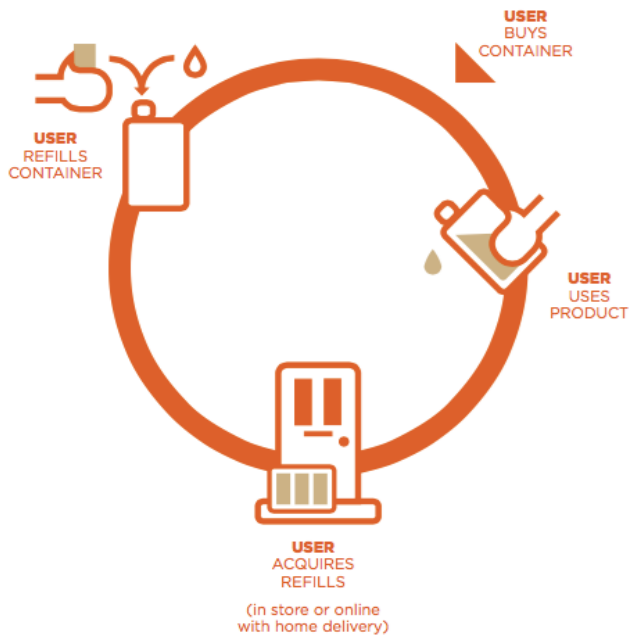
- Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students* (5th ed). New York: Prentice Hall.
- Seuring, S., & Müller, M. (2008). From a literature review to a conceptual framework for sustainable supply chain management. *Journal of Cleaner Production*, 16(15), 1699–1710.
- Shah, R. H., & Swaminathan, V. (2008). Factors influencing partner selection in strategic alliances: the moderating role of alliance context. *Strategic Management Journal*, 29(5), 471–494.
- Simatupang, T. M., Sridharan, R. (2002). The Collaborative Supply Chain: A Scheme for Information Sharing and Incentive Alignment. Massey University.
- Solesvik, M. Z., & Westhead, P. (2010). Partner selection for strategic alliances: case study insights from the maritime industry. *Industrial Management & Data Systems*, 110(6), 841–860.
- Stewart, R., & Niero, M. (2018). Circular economy in corporate sustainability strategies: A review of corporate sustainability reports in the fast-moving consumer goods sector. *Business Strategy and the Environment*, 27(7), 1005–1022.
- Suttle, R. (n.d.). What Is the Meaning of Retail Food? Small Business - chron.com. Retrieved from <http://smallbusiness.chron.com/meaning-retail-food-17255.html>.
- VCI (Verband der chemischen Industrie e.V.) (German Chemical Industry Association) (2019). *Approach to substances of concern in the context of BPR*. Retrieved from <https://www.vci.de/langfassungen/langfassungen-pdf/2019-11-11-vci-position-on-soc.pdf>.
- WCED (World Commission on Environment and Development) (1987). *Our common future*. New York: Oxford University Press.
- Winkler, H. (2011). Closed-loop production systems—A sustainable supply chain approach. *CIRP Journal of Manufacturing Science and Technology*, 4(3), 243–246.
- Witjes, S., & Lozano, R. (2016). Towards a more Circular Economy: Proposing a framework linking sustainable public procurement and sustainable business models. *Resources, Conservation and Recycling*, 112, 37–44.
- Wood, D. J., & Gray, B. (1991). Toward a Comprehensive Theory of Collaboration. *The Journal of Applied Behavioral Science*, 27(2), 139–162.
- World Economic Forum (WEF), Ellen MacArthur Foundation (EMF), McKinsey & Company (2016). *The New Plastics Economy — Rethinking the future of plastics*. Retrieved from <http://www.ellenmacarthurfoundation.org/publications>.
- WRAP (2010). *Final Report: Reusable Packaging – Factors to Consider*. Single Trip or Reusable Packaging – Considering the Right Choice for the Environment. Retrieved from <http://www.wrap.org.uk/sites/files/wrap/FINAL%20Reusable%20Packaging%20Factors%20Report.pdf>.
- Yin, R. K. (2003). *Case Study Research. Design and Methods*. Second Edition. Thousand Oaks, London, New Delhi: SAGE Publications.

## Appendices

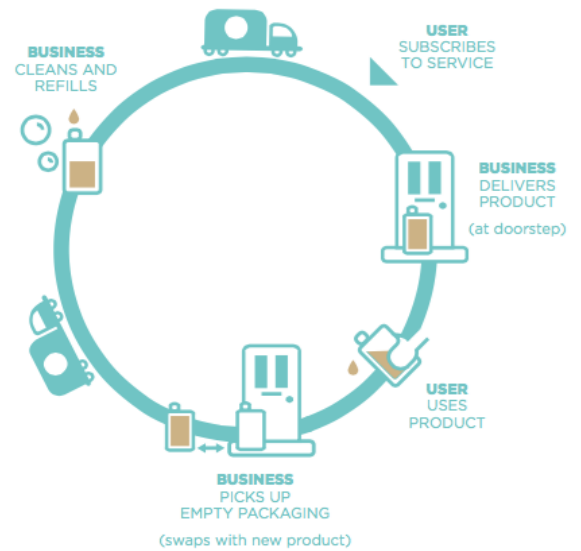
Appendix I: Model of Meherishi et al. (2019) on the transition to a circular economy for sustainable packaging supply chain management (SPSCM).



## Refill at home



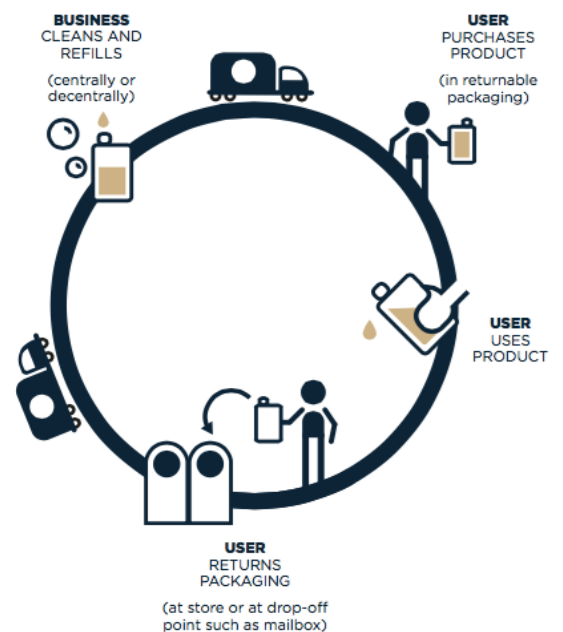
## Return from home



## Refill on the go



## Return on the go



## INTERVIEW GUIDELINE - Collaboration for circular food packaging



Universiteit Utrecht

Copernicus Institute of Sustainable Development

Joana Kleine Jäger with Circle  
Economy & Utrecht University



**o Research** on primary food packaging for retail food in a Circular Economy, focusing on recyclable and reusable packaging. Investigation of collaboration of food producing/processing firms/ supermarkets, in particular the collaboration set-up and partner selection for circular packaging.

---

### I. Demographic Questions

**o** Name, company, position, role

---

### II. Projects and involved Partners

**o List all projects:** Listing all projects first

- *Starting with earlier projects, moving to more recent ones: Which circular food packaging projects are you aware of at your firm - can we deep dive in some (max. 4 of them)?*

**o For each project:** deep-dive in most important ones (max. 4 projects)

*n short: what is the project about?*

*Could you tell me which partners are/were involved in this project?*

*Why did you choose and collaborate with this partner? Which function does the partner fulfill for you in this project?*

---

### III. Task-related functions of partners

**o Thinking about the type of partners (regarding the function they fulfill/ role they play for you) for reusable and recyclable packaging projects generally (see image A)**

- *Which type of partners/ which partner functions are particularly important for you?*

- *Do you also need the support of a partner with the functions as listed below/ in image A for circular food packaging? Why? Why not?*

> related to: (1) Starting a Project: (a) Initiator, (b) Financier

(2) Developing a Project: (a) Piloter/ Refiner, (b) Closed Loop Material Expert

(3) Realizing a project: (a) Use-phase support, (b) Impact Extender

(4) The collaboration: (a) Mediator, (b) Knowledge Broker

(5) Outward oriented: (a) Enabler, (b) Legitimator, (c) Educator

- *In how far do required partners differ per project (e.g. between recyclable and reusable food packaging projects)? Why? Which are the influencing factors?*

- *What are major differences in regards to required functions of partners between those circular and other traditional linear packaging projects? Why to they differ?*

---

#### IV. Partner-related selection criteria

##### ***o Looking at this overview of potential partner-related characteristics when selecting partners (see image B)***

- *For circular food packaging: Which of these criteria are particularly important, which ones not? Why?*
- *Which partner-related characteristics not being listed here are important?*
- *In how far do characteristics of importance when selecting partners differ per projects (e.g. between recyclable and reusable projects) or per type of partner? Why? Which are influencing factors?*
- *What are major differences in regards to partner-characteristics when selecting partners between those circular and other traditional linear packaging projects? Why to they differ?*

---

#### V. Collaboration Set-Up

##### ***o Looking at this ideal model of collaboration set-up steps (see Image C)***

These steps should be (based on literature) generally passed through by organizations when setting up collaborations.

- *Do these steps mirror your way of setting up collaborations for circular food packaging? If not: which elements should be changed or added from your perspective?*
- *Which parts/steps of setting up collaboration are especially important? Why?*
- *Which parts/steps of setting up a collaboration are especially complicated? Why?*
- *In how far do those steps differ per project (e.g. between recyclable and reusable projects)? Why? Which are influencing factors?*
- *In how far does collaboration set-up differ to traditional (linear) projects?*

## Appendix IV: Coding Book.

Name	Files	References
Collaboration set-up process	8	12
Motivation for CE packaging	10	22
Recognition need to collaborate	3	6
Development of the vision and selection criteria	13	31
Internal Alignment Vision	11	19
Internal people and skills	0	0
<i>Internal alliance skill building</i>	2	3
<i>Internal people selection</i>	11	27
External Analysis (incl. outreach)	13	43
Partner evaluation and selection	8	16
Agreements	1	1
<i>Formal agreements</i>	5	7
<i>Goal related agreements</i>	6	10
Starting collaboration	2	2
<i>Adjustment of cultural differences</i>	1	1
<i>Communication and trust building</i>	1	1
<i>Ramp up. initial learning and relationship building</i>	1	2
Company details	0	0
CE Packaging Vision	18	85
Importance Collaboration	0	0
External collaboration	12	37
Internal collaboration/ cross-functional	3	5
Incentives for CE packaging	0	0
Ability to steer	1	1
Expected wins	1	1
<i>Enhanced reputation</i>	6	9
<i>Financial savings</i>	3	4
<i>New consumers, customers</i>	4	9
External pressure	2	2
<i>Along the supply chain</i>	0	0
<i>End-Consumer pressure</i>	2	3
<i>Food supplier pressure</i>	1	2
<i>Packaging supplier pressure</i>	1	1
<i>Supermarket, retailer pressure</i>	1	1
Outside the supply chain	1	1
<i>Legislation, laws</i>	5	7
<i>Media pressure</i>	5	6
Intrinsic motivation	5	9
To stay in business	4	4

Partner characteristics	2	2
Advantageous	6	10
Aligning on goals	8	23
Committed	8	17
Complementary, filling gaps	2	3
Creative, open minded	5	10
Enthusiastic	6	11
Good reputation	7	13
Open communication	6	11
Strategically fitting	12	41
Trustworthy	5	8
Type of project	1	1
Compostable, Biodegradable	6	17
Reduce, Refuse	2	3
Reusable	16	47
<i>Differences between companies</i>	5	16
Recyclable	12	29
<i>Differences between companies</i>	9	45
<i>Per material, type</i>	0	0
<i>Glass</i>	3	7
<i>Metal</i>	3	9
<i>Paper</i>	9	16
<i>Plastic</i>	4	12
<i>Flexibles</i>	10	25
<i>Rigid plastic</i>	4	12
Partner Roles (Recyclable and CFP generally)	0	0
Financier	13	45
Initiator	15	55
Internal Education, Awareness	9	20
Closed Loop Material Expert	15	65
Consumer, Market Expert	1	3
Piloter, refiner	10	30
Impact Extender	5	9
Use-phase supporter	3	4
Knowledge broker	7	12
Mediator	8	18
Educator	10	24
Enabler	11	25
Legitimater	3	3

Type of partners (Recyclable, CFP generally)	0	0
(Local) waste companies	6	19
Academia	6	9
Chemical companies	6	12
Company consortium	10	35
Competitors	6	7
Consultancies	9	20
End consumers	13	32
EPR, Waste management organizations	10	21
Food suppliers, brands	16	51
Foundations, NGOs, Institutes	13	31
Funds	1	1
Government	14	54
Municipalities	3	7
Packaging suppliers	13	58
Recyclers	8	25
Retailers. supermarkets	12	29
Start ups	5	11
Waste Sorting	5	12
<b>Partner Roles Reusable FP</b>	<b>0</b>	<b>0</b>
Financier	6	14
Initiator	7	12
Internal Education, Awareness	1	1
Closed Loop Material Expert	3	4
Consumer, Market Expert	0	0
Piloter, refiner	9	18
Impact Extender	3	11
Use-phase supporter	8	16
User	1	1
Knowledge broker	2	2
Mediator	2	5
Educator	5	6
Enabler	4	6
Legitiminator	5	8

Type of partners Reusable FP	0	0
Academia	1	1
Cleaning operators	6	23
Competitors	1	3
Consultancies	0	0
End consumers	13	39
Food suppliers, brands	9	37
Foundations, NGOs	1	1
Government	8	14
Hospitality sector	1	2
Logistic Partners	5	18
Municipalities	0	0
Packaging suppliers	7	10
Retailers. supermarkets	8	30
Reuse system operator	11	38
<b>Type of reusable system</b>	<b>1</b>	<b>1</b>
E-commerce by independent service provider	6	15
E-commerce by retailer	4	11
For vegetables, fruits	2	5
For water	1	1
In store refillable	7	13
Packaged in back of store	1	1
Reusable for take away food	3	3
Reuse, refill hospitality sector	2	4
Reused in back end (supply)	1	3
<b>Differences between collaboration types</b>	<b>7</b>	<b>17</b>

Appendix V: Partner types mentioned in the interviews and their allocation to the partner roles (including: the number of interviewees having mentioned this partner type; distinction between CFP packaging generally (G/green), reusable FP (U/blue), and recyclable FP (R/yellow).

Partner Role/ Types	Food supplier, brands	Retailers	Waste companies	Academia	Chemical companies	Company Consortium	Competitors	Consultancies	End-consumer	EPR/ Waste manag.	Foundations, Institutes	Funds	Government	Packaging Supplier	Recyclers	Waste Sorters	Cleaning Operator	Logistics	Reuse System Operator
<b>1. Starting the Project</b>																			
Initiator	G 11	R11 U 4			R 2	G 1		G 1	G 7	R 5	G 4		R 5	R 2	R 1				U 7
Financier	R 7 U 4				R 2	G 2			U 1	R 8		R 1	R 5 U 3	R 3					U 3
<b>2. Developing the Project</b>																			
Piloter, refiner	G 3 U 2	R 2 U 2	R 2	R 5	R 2	G 2	R 2	G 2		R 1				R 6	R 3				U 4
Closed Loop Material Expert	G 4		R 3	G 7	R 1	G 8		G 14		R 2	G 13			R 10 U 7	R 4	R 3			U 2
additional: Market/ Consumer Knowledge	G			U 1		G 7		G 4			G 2								
<b>3. Realising the Project</b>																			
Impact Extender	G 10	G 1	R 2		R 2	G 8	G 10		U 4					U 2			U 1		U 3
Use-Phase Supporter	U 5	U 7 R 3							U 11	R 3				U 1			U 8	U 7	U 9
additional: EoL support			R 5		R 2				R 7	R 9					R 15	R 6			
<b>4. Collaboration related</b>																			
Mediator	G 1					G 3		G 4		R 1	G 5								U 2
Knowledge Broker	G 3			G		G 4					G 4								U
<b>5. Outward oriented</b>																			
Educator	G 5	G 3		G 1						R 1	G 5		G 3						U 1
additional: internal education	G 5							G 1			G 4								
Enabler	G 3	G 3				G 4							G 14						
Legitimitor	G 8	U 2						G 2			G 2								U 1
<b>Main overall importance</b>																			
	G	G	R	G	R	G	G	G	G	R	G	R	G	G	R	R	U	U	U