



# The influence of collaboration on facilitating and accelerating the circular economy transition

A comparative study of initiatives fighting food waste in  
Amsterdam and Barcelona

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Thesis Code:	PAP80336
Date:	December, 2021

## Abstract

Our current food production and consumption habits are based on a linear economy and are unsustainable. Approximately one third of food intended for human consumption is wasted every year. It is well established that a circular economy approach can reduce food waste. Some scholars suggest that collaboration is key to the circular economy. However, there are limited empirical and comparative studies investigating this claim. This thesis aims to bridge this gap by studying how circular economy initiatives in Amsterdam and Barcelona (labelled as small wins) collaborate with other actors. Specifically, it looks at how the collaboration's internal dynamics (i.e. its involvement) and entanglement in broader networks (i.e. its embeddedness) influences the creation of innovation effects and mechanisms that multiply small win initiatives. It is assumed that collaborations with higher involvement and embeddedness create more innovation effects, and that collaboration might relate to the mechanisms that multiply small win initiatives. To test these assumptions, this thesis applies collaboration theory and a small win approach to transition to a comparative study. Data is collected through semi-structured interviews and grey literature, and it is analysed through content analysis and simple quantitative strategies. The analysis reveals that higher involvement and embeddedness does not lead to more innovation effects. Instead, a combination of higher involvement than embeddedness is preferred. Small win initiatives can modify these qualities by changing the characteristics of their existing collaborations, finding new partners or using four mechanisms in different ways. The analysis also reveals that collaboration activates and influences three mechanisms, accelerating the circular economy transition. These findings are used to give recommendations to small win initiatives and policy makers, on how to positively influence the creation of innovation effects and mechanisms that may facilitate and accelerate the circular economy transition.

### **Keywords:**

Collaboration, circular economy, small wins, food waste, city

## Acknowledgments

Throughout the writing of this thesis I have received a great deal of support. I would first like to thank my supervisor, dr. Tamara Metze, for giving me the freedom to pursue my own research path while still providing me with inputs that strongly enhanced my thesis. A word of thanks goes to my second supervisor, Olga Schagen, for being there when I needed her and for her patience. I would also like to thank prof. dr. Katreen Termeer for being the examiner. My sincere thanks to the employees of the initiatives who made the fieldwork possible. I am profoundly grateful to my parents, for supporting me throughout my studies. Last but not least, to my partner, who helped me stay tuned during long working days.

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## List of abbreviations

CE	Circular Economy
EU	European Union
FW	Food Waste
GHG	Greenhouse Gas
IO	International Organization
NGO	Non-Governmental Organization
NPO	Non-Profit Organization
RQ	Research Question
SQ	Research Sub-Questions

## 1. Introduction

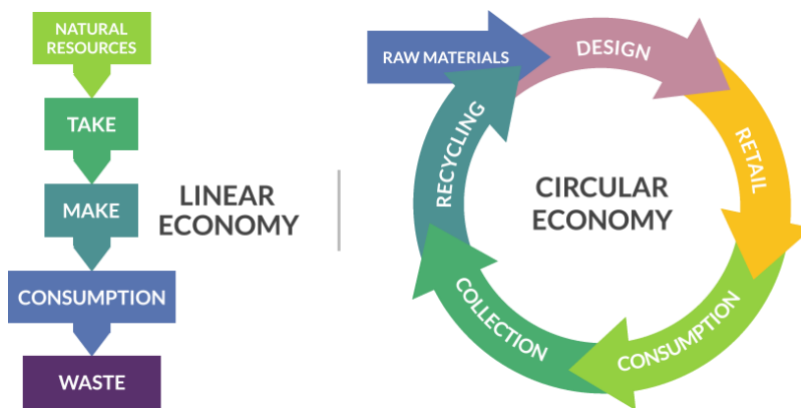
This chapter is divided in four subchapters. The first one describes the research problem that this thesis aims to contribute to solving. The second one presents the research objectives and the third one the research question and sub-questions. Last but not least, the fourth one presents a brief outline of this thesis.

### 1.1. Problem description

Our current production and consumption habits of food are unsustainable. Food production requires natural resources and generates various negative environmental impacts, such as greenhouse gas (GHG) emissions and biodiversity loss (Jurgilevich, et al., 2016). As per different estimates, approximately 20% to 30% of food produced for human consumption is wasted at different stages of the food supply chain (FAO, 2017a; IPES, 2019). Food waste has been recognized as a global issue, due to its environmental, economic and social consequences. Globally, food waste consumes 25% of water used in agriculture each year (Searchinger et al., 2019) and 23% of all cropland (Kummu et al., 2012). It generates 8% of global GHG emissions (IPCC, 2019) – if food wastage were a country, it would be the third largest GHG emitter in the world (UNEP, 2021). In the European Union (EU), food is wasted at a cost of €143 billion a year, including wasted resources and environmental impact (IPES, 2019). Furthermore, the excessive consumption of high-income countries versus the undernourished 815 million people possess ethical concerns and exacerbates inequality (FAO, 2017b).

Food wastage is partly the consequence of an economic system embedded in a *take-make-dispose* model that represents the traditional linear economy. In the linear economy, resources are used to generate products that are simply thrown away, with the wrong assumption that there is abundance of resources and unlimited waste disposal (Jurgilevich et al., 2016). In recent years, the circular economy (CE) has emerged as an alternative to the current linear economy and as a solution to reduce food waste (Jurgilevich et al., 2016). The CE substitutes the *end-of-life* concept and treats waste as a secondary resource, striving for closed-loop systems (Mhatre, Panchal, Singh, & Bibyan, 2021) (see Figure 1). The CE is based on the principles of reduction of natural resource extraction, minimization of waste and pollution, and extension of useful life of products and materials. Adopting these principles to reduce food waste would benefit the environment, save nutritious food for those in need and generate economic benefits by reducing financial losses and capturing financial gains through new markets (Mhatre et al., 2021, p. 188; EC, 2018).

Figure 1. Linear economy vs circular economy



Source: End Of Waste Foundation (2021)

Various actors are increasingly paying attention to the possibilities of transitioning from current linear systems to circular systems. Supranational bodies and governments are developing ambitious policy plans to achieve more circularity, such as the EU's 2015 *Circular Economy Strategy* and The Netherlands' 2016 *A Circular Economy in The Netherlands by 2050*. Municipalities are also developing strategies to enhance circularity, for instance Amsterdam's *Circular Economy Strategy*. Others, such as Barcelona, are planning to do so in the nearest future (Ajuntament de Barcelona, 2018). Cities are particularly well suited to drive circularity, due to high concentration of resources, capital and talent (Bolger & Doyon, 2019). In cities, businesses are increasingly adopting circular principles and communities are getting together to solve environmental issues (Prendeville, Cherim, & Bocken, 2018). NGOs such as The Ellen Macarthur Foundation and research institutes serve as a source of knowledge and inspiration for all those actors interested in transitioning from a linear system to a circular system. Despite all these efforts, the implementation of a CE still appears to be in the early stages and the CE transition seems to advance at a slow pace (Kirchherr et al., 2018).

Even if cities are fitted to drive circularity (Bolger & Doyon, 2019), transitioning to the CE will require collaboration between various actors within the city, including the municipality, the market, the community and the third sector (i.e. NGOs, research institutes and others) (Avelino & Wittmayer, 2016). In collaborations, two or more independent parties plan or execute operations for solving problems or fulfil common goals (Cao & Zhang, 2011, p. 163). Scholars argue that collaboration is necessary to close loops in supply chains, as it enables the extension of useful life of products and it increases the number of times that these are used (Mishra et al., 2019). Moreover, collaboration is able to generate environmental benefits as it has the potential to reduce natural resource consumption, waste disposal and CO<sub>2</sub> emissions (Mishra et al., 2019). It is also well established in the literature that collaboration can reduce food waste. For instance, collaboration between retailers and food service businesses can reduce over

buying, easing the possibility of having to discard unconsumed food (Bhattacharya & Fayezi, 2021). Despite all these benefits, which are strongly linked to the CE principles, there is a lack of knowledge regarding collaboration in the CE transition, and especially in the food waste domain. More research is needed to explore the importance of collaboration as an enabler for the CE, and how collaborating actors can manage food waste in the CE (Mishra et al., 2019; Dora, 2020). Hence, this study aims to fill this gap by investigating collaboration for transition towards the CE in the food waste domain.

Through its focus on closing loops, the CE conflicts with many existing routines underlying the linear economy (Termeer & Metze, 2019). Innovation has been recognized as a mean to change the *status quo*, and is therefore necessary to the CE transition (Jesus & Mendoça, 2018). In this study, *innovation* refers to the “introduction of an ingenious proposition” (Jesus et al., 2018, p. 3000). This results in innovation effects on practices, values and technologies (Lawrence, Hardy, & Phillips, 2002). Collaboration is an important source of innovation. In collaborations, partners are able to innovate through a multistage process. First, new practices, values and technologies emerge within the collaborative relationship. Later, these can be adopted beyond the boundaries of the collaborative relationship, by other organizations and society in general. When these new practices, values or technologies are adopted by other actors, they are assumed to be meaningful innovations (Lawrence et al., 2002). Thus, collaboration plays a critical role in the CE transition through the creation of new practices, values and technologies.

A collaboration is designed to create some sort of innovation and its characteristics influence its ability to innovate (Lawrence et al., 2002). Therefore, it is important to understand what these characteristics are and how they influence innovation. Lawrence et al. (2002) divide the characteristics into three categories: (1) the patterns of interaction, (2) the structure type and (3) the information flow. The characteristics relate to two qualities of collaboration: its involvement and its embeddedness (Lawrence et al., 2002). Involvement relates to the first stage of the collaborative innovation process, and facilitates the creation of new practices, values and technologies within the boundaries of the collaborative relationship. A collaboration with deep interaction, a partnership structure and bilateral information flow has high involvement. Embeddedness relates to the second stage of the collaborative innovation process, and facilitates the spread of new practices, values and technologies beyond the boundaries of the collaborative relationship. A collaboration with broad interaction, a representation structure and multilateral information flow has high embeddedness. Therefore, both qualities are important in the creation of innovation effects.

Lawrence et al. (2002) suggest that collaborations with higher levels of involvement and embeddedness are able to create more innovation effects. This is consistent with other authors, who argue that intense collaborations are more likely to lead to learning and

innovation, and communication and cooperation are associated with organizational interconnectedness (Powell, Koput, & Smith-Doerr, 1996; Shan, Walker, & Kogut, 1994). However, to the researcher's knowledge, an approach that studies the characteristics of collaboration as a source of innovation has not been extensively used before. By empirically testing Lawrence et al.'s (2002) theory, this study aims to explore the assumption that higher involvement and embeddedness of collaboration lead to more innovation effects, which may contribute to the CE transition and reduce food waste.

This research adopts a small win approach to the CE transition, in which transitions are understood as continuous processes, constantly shaped through series of small wins (Termeer & Metze, 2019). In the literature, *small wins* are defined as concrete in-depth changes of moderate importance which are a step forward in a shared ambition (Termeer & Dewulf, 2019). Here, small wins are conceptualized as CE initiatives that have created an innovation effect (a new practice, value or technology) which reduces food waste and contributes to Amsterdam or Barcelona's circular and climate change ambitions. For example, The Waste Transformers has created an on-site containerized anaerobic digester which can be placed anywhere in the city. Its technology is allowing businesses to reduce food waste and is contributing to Amsterdam's ambition to be circular by 2050 (The Waste Transformers, 2020; Gemeente Amsterdam, 2020). It is therefore, a small win initiative. As previously explained, collaboration can be a source of innovation (Lawrence et al., 2002), therefore, it could be that one of the reasons why small win initiatives are able to innovate is because they collaborate. As far as the researcher knows, this has not been previously explored. This research aims to narrow this gap by studying the collaboration between small win initiatives and their partners. In this study, small win initiatives are led by, and can collaborate with, all the actors involved in the CE transition: the state, the market, the community and the third sector.

Seemingly, a single small win initiative will not result in the transformation to a CE. To achieve the CE transition, small win initiatives (and their innovation effects) need to amplify and accumulate (Termeer & Metze, 2019). This occurs when they are upscaled (they become larger or more numerous), broadened (their consequences escalate in other areas) or deepened (they are intensified and become more radical) (Termeer & Metze, 2019, p. 6). Small win initiatives can amplify and accumulate through propelling mechanisms. These are defined as a "chain of events that reinforce themselves through feedback loops" and result in small wins being upscaled, broadened or deepened (Termeer & Dewulf, 2019, p. 305). For example, The Waste Transformer makes use of the learning by doing mechanism: by receiving feedback from the anaerobic digester itself and their partners, they are constantly improving the container, for example by adding more functions and making it even more circular. This means that the initial small win initiative is being amplified because it is becoming more circular through the mechanism learning by doing.

Based on two previously explained assumptions (one: collaboration may enable small win initiatives to innovate, and two: propelling mechanisms amplify and accumulate small win initiatives) it could be presumed that collaboration is related to propelling mechanisms. For example, a collaboration with high involvement could influence the learning by doing mechanism if the partners learn by doing together or from each other's experiences. However, to the researcher's knowledge, this has not been investigated before. Through an exploratory approach, this research intends to address this gap by investigating how collaboration relates to propelling mechanisms, thereby, contributing to accelerate the CE transition and reducing food waste.

Various authors highlight the lack of studies exploring CE practices at the city-level (Campbell-Johnston et al., 2019; Bolger & Doyon, 2019). Some scholars also emphasise the need for future research on cross-country comparison of CE implementation (Mhatre et al., 2021). This study undertakes a comparative assessment of Amsterdam and Barcelona, two post-industrial cities pursuing more sustainable development strategies (Prendeville, Cherim, & Bocken, 2018). Amsterdam is considered a frontrunner of the CE in Europe (Campbell-Johnston et al., 2019). It has published a CE Strategy which describes its ambitions to be completely circular by 2050 (Gemeente Amsterdam, 2020). The city has a large number of community-owned initiatives, and several state and business-led circular projects, including an independent institute for urban sustainability research (Prendeville et al., 2018). Barcelona provides insight into an early-stage case, as it has not defined CE ambitions yet (Ajuntament de Barcelona, 2018). It has a strong resident-movement that advocates for networking and collaborative initiatives. Residents even collaborate in the design of policy proposals, which are later reviewed by the city government (Prendeville et al., 2018). Differences in their ambitions, strategy-stage and strategy-approach offer a good comparative base to study the role of collaboration in the CE transition. Comparing both cities may shed light on the most efficient collaborating practices, possibly offering opportunities to learn from each other.

## 1.2. Research objective

This research has two main objectives:

1. Contribute to making the role of collaboration in the CE more explicit, by studying how the involvement and embeddedness of collaboration between small win initiatives and their partners positively influences (1) innovation effects that may facilitate the CE transition, and (2) propelling mechanisms that may accelerate the CE transition.

2. Give recommendations to small win initiatives and policy makers fighting food waste in Amsterdam and Barcelona on (1) how to create innovation effects that may facilitate the CE transition and (2) how to positively influence propelling mechanisms that may accelerate the CE transition, through their collaborations.

### 1.3. Research questions

Based on the problem description and the research objectives, the main research question (RQ) of this study is:

*How does collaboration between small win initiatives fighting food waste and their partners facilitate and accelerate the circular economy transition in Amsterdam and Barcelona?*

This RQ links collaboration with the CE on the basis of two assumptions. First, collaboration between small win initiatives and their partners may facilitate the CE transition through the creation of innovation effects on practices, values and technologies (Lawrence et al., 2002). Second, these collaborations may accelerate the CE transition through their relation with propelling mechanisms (Termeer & Metze, 2019). Building up on this, the following sub-research questions (SQ) are formulated:

1. *What is the level of involvement and embeddedness of collaboration between small win initiatives fighting food waste and their partners?*
2. *How do involvement and embeddedness of collaboration influence innovation effects on practices, values and technologies; that may facilitate the circular economy transition?*
3. *How do involvement and embeddedness of collaboration relate to propelling mechanisms; that may accelerate the circular economy transition?*

Table 1 shows the RQ and SQs at a glance. It also explains the aspects that are investigated to answer the SQs, their main theoretical objective, their methodological tool and main chapter where they are addressed.

Table 1. *Research questions at a glance*

RQ	SQ	Aspects of SQ	Main theoretical objective	Main methodological tool	Main chapters
How does collaboration between small win initiatives fighting food waste and their partners facilitate and accelerate the CE transition in Amsterdam and Barcelona?	What is the level of involvement and embeddedness of collaboration between small win initiatives fighting food waste and their partners?	Identify the most relevant actors collaborating with small win initiatives	Develop a method to identify the level of involvement and embeddedness of small win initiatives and cities	Content analysis on semi-structured interviews and grey literature	4.2 4.5
		Identify the characteristics of their collaborations in terms of interaction, structure and information flow		Content analysis on semi-structured interviews	
		Identify the level of involvement and embeddedness of the collaborations		Simple quantitative strategies based on content analysis	
	How do involvement and embeddedness of collaboration influence innovation effects on practices, values and technologies; that may facilitate the circular economy transition?	Identify new practices, values and technologies created by small win initiatives	Develop an approach that combines involvement and embeddedness of collaboration with innovation effects	Content analysis on semi-structured interviews and grey literature	4.3 4.5
		Identify if and how involvement and embeddedness of collaboration explain the creation of new practices, values and technologies		Simple quantitative strategies based on content analysis	
	How do involvement and embeddedness of collaboration relate to propelling mechanisms; that may accelerate the circular economy transition?	Identify propelling mechanisms used by small win initiatives	Develop an approach that combines involvement and embeddedness of collaboration with propelling mechanisms	Content analysis on semi-structured interviews (networks and themes)	4.4 4.5
		Identify if and how involvement and embeddedness of collaboration relate to propelling mechanisms			



#### 1.4. Thesis outline

The structure of this thesis is as follows. The first chapter has introduced the reader to the topic, describing its relevance, the research objectives and the research questions. The second chapter reviews literature on collaboration and the small win approach to transition. The theory is used to build the conceptual framework underlying this study. The third chapter explains the research approach, as well as the data collection and data analysis methods. The fourth chapter presents the findings of the research and the fifth one discusses their theoretical and practical implications. The sixth chapter presents the conclusion of this study. Last but not least, chapter seven gives recommendations to small win initiatives and policy makers fighting food waste in Amsterdam and Barcelona, on how to positively influence the creation of innovation effects and propelling mechanisms, which may facilitate and accelerate the CE transition.

## 2. Literature review

This chapter describes the most relevant concepts used in this study. The first subchapter explains the relationship between collaboration, CE and innovation effects. The second subchapter explains the relationship between collaboration, small wins and propelling mechanisms. The relationship between some of these concepts has not been extensively investigated before (see e.g. Lawrence et al., 2002; Mishra et al., 2019; Dora, 2020). This section explains the broadly-accepted relations found in the literature, as well as the research gaps. These insights are used to build the conceptual framework underlying this thesis, which is presented at the end of this chapter.

### 2.1. Collaboration in the circular economy

There is no strict definition of the CE. Different descriptions are used to discuss circularity at different levels, whether that is on a product-level, company-level, city-level or even beyond. In broad terms, and to encompass all levels, the CE is understood 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 CE strives for closed-loop systems and stands in contrast to the linear economy, based on a *take-make-dispose* model. In doing so, it outlines three key principles: reduction of natural resource extraction, minimization of waste and pollution, and extension of useful life of products and materials (Mhatre et al., 2021). One of the most studied sectors within the CE is waste (Merli, Preziosi, & Acampora, 2018). However, there are currently few studies about the CE in the context of food systems and food waste (Jurgilevich, et al., 2016). Jurgilevich et al. (2016) state that a circular approach in the food system implies changing diets towards more diverse and more efficient food patterns (such as shifting from a meat-based diet to a plant-based diet), re-using food, reducing the amount of waste generated in the food system, utilizing by-products and food waste and recycling nutrients.

Through its focus on closing loops, the CE conflicts with many existing routines, norms and structures underlying the linear economy (Termeer & Metze, 2019). Changes are necessary in the transition from a linear to a circular economic system and innovation has been identified as a core driver of change (Jesus & Mendoça, 2018). In the CE, innovation can preserve resources, recover value from used materials and mitigate environmental degradation (Jesus & Mendoça, 2018). Thereby, innovation facilitates the CE transition. In broad terms, *innovation* refers to the “introduction of an ingenious proposition” (Jesus et al., 2018, p. 3000). Thus, innovation is not just *newness* per se, but it can also be a new combination of existing ideas. In the CE context, innovation can be understood as “socio-technical solutions” (Jesus & Mendoça, 2018, p. 77). That is to say, innovation is not simple science or technology, but it also involves the social and cultural

environment. Hence, this study looks at innovation in the CE that appears in the form of new practices, values and technologies, hereinafter referred to as innovation effects (Lawrence et al., 2002).

Several actors attempt to generate change and innovate during transitions. These are: the municipality, the market, the community and third sector actors (Fischer & Newig, 2016; Avelino & Wittmayer, 2016). Municipalities are setting ambitions and developing policy plans and strategies (Termeer & Metze, 2019), while the market, the community and the third sector are pursuing more circular practices (Prendeville et al., 2018). Third sector actors act as intermediaries between the three others. This includes the non-profit sector, but also many intermediary organizations that cross boundaries between the other actors, such as NGOs, research institutes and associations (Avelino & Wittmayer, 2016). Actors' accomplishments and capacities often assigns them a role in transitions, be it *policy maker*, *frontrunner* or *intermediary* (Avelino & Wittmayer, 2016). However, less attention has been placed at how these different actors collaborate with each other (Dora, 2020). Actors are geographically together in cities, where there is also a concentration of resources, capital and talent. This makes cities particularly well placed to drive circularity (Bolger & Doyon, 2019).

Several scholars have highlighted the importance of collaboration in sustainable transitions. Collaboration can generate environmental benefits as it has the potential to reduce natural resource consumption, waste disposal and CO<sub>2</sub> emissions (Mishra et al., 2019). Collaboration is also necessary to close loops in supply chains, as it extends the useful life of products and increases the number of times that these are being used (Mishra et al., 2019, León-Bravo et al., 2017). These benefits are also true within the food system. In fact, several authors have highlighted that collaboration can reduce food waste. Bhattacharya and Fayezi (2021) found that joint planning and resource sharing supports efficiency in the food supply chain and has the potential to decrease food waste. Moreover, collaboration between retailers, food service businesses and consumers could reduce over ordering and over buying, thereby, easing the possibilities to discard food. Similarly, collaboration between NGOs and food businesses could help in the redistribution of food to people in need. In addition, Dora (2020) argues that the proximity of collaborating partners can determine the waste disposal methods used. Despite these benefits, which indicate that collaboration is key to the CE transition, there is a lack of information on how collaboration can facilitate and accelerate the CE transition (Mishra et al., 2019; Dora, 2020).

In collaboration, two or more independent parties work hand in hand to plan or execute operations for solving problems or fulfil common goals and mutual benefits (Cao & Zhang, 2011, p. 163). Here, collaboration is studied as a tool to achieve circularity, with the ultimate goal to reduce food waste. Collaboration can facilitate the CE transition because

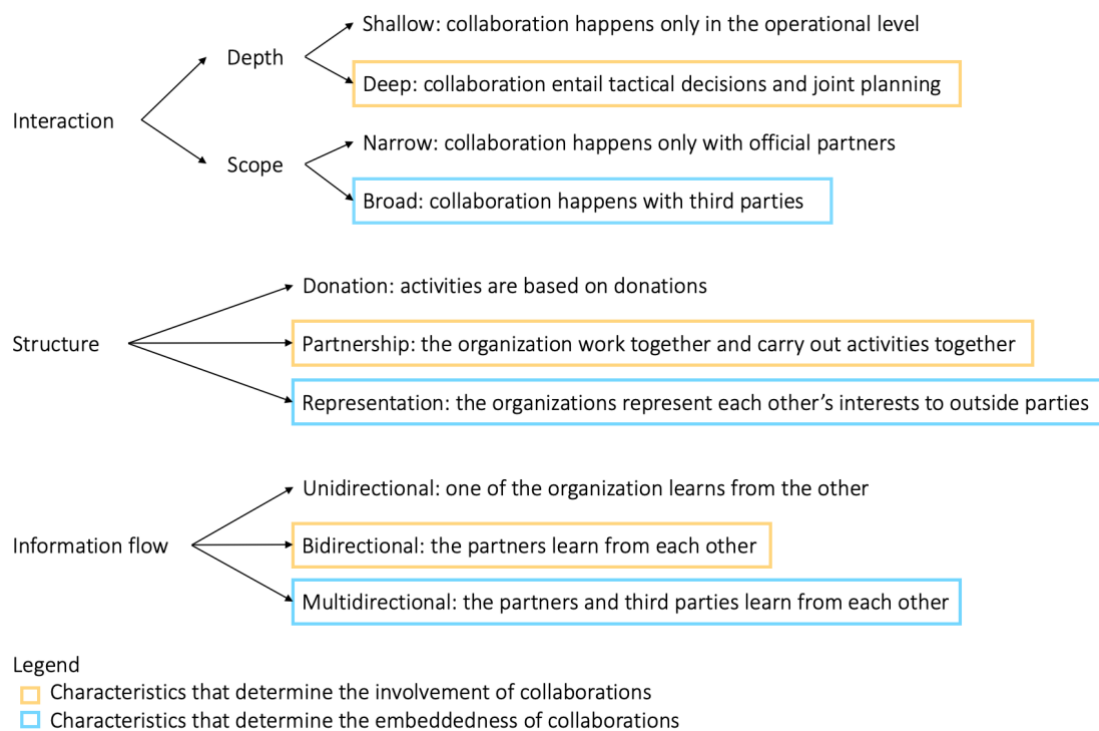
it is an important source of innovation (Lawrence et al., 2002; Bhattacharya & Fayezi, 2021). More precisely, collaboration creates innovation through a multistage process. First, new practices, values and technologies emerge within the collaborative relationship. This is possible when actors within a collaboration share expertise and knowledge through joint activities (Lawrence et al., 2002; León-Bravo et al., 2017). Second, these new practices, values and technologies can be adopted beyond the boundaries of the collaborative relationship, by other organizations and society in general. This is because a collaboration is embedded in broader networks through which innovation effects become available to others (Lawrence et al., 2002). Once these new practices, values and technologies are adopted by other actors outside the initial collaboration, they are assumed to be of meaningful innovations (Lawrence et al., 2002). For instance, a collaboration between an NGO and a food service business could develop a new practice to redistribute food surplus to people in need. If this NGO starts a collaboration with another food service business, the same new practice could be used.

This study looks at the collaboration between small win initiatives and their partners. The precise characteristics of small win initiatives are explained in the next subchapter, however, it is important to know now that small win initiatives are intrinsically innovative because they create in-depth changes (Termeer & Dewulf, 2019). Given that small win initiatives are intrinsically innovative (Termeer & Dewulf, 2019), and collaboration is a source of innovation (Lawrence et al., 2002), one could study how small win initiatives innovate through collaboration. As far as the researcher knows, this has not been previously explored. This understanding could help small win initiatives to know how can they modify their collaborations or find new ones in order to be more innovative. Therefore, this research studies the collaboration between small win initiatives and their partners. Here, small win initiatives are led by, and can collaborate with, all the actors involved in the CE transition: the municipality, the market, the community and the third sector (Avelino & Wittmayer, 2016).

Collaborations between small win initiatives and their partners are designed to create some sort of innovation (Lawrence et al., 2002). However, designing and managing collaboration can be complex and difficult. Actors struggle with decisions surrounding “with whom and when to collaborate, for what reasons and how to implement collaboration” (León-Bravo et al., 2017, p. 3). The characteristics of the collaboration influences their ability to create meaningful innovations (Lawrence et al., 2002). For example, partners that share information bidirectionally will be able learn from each other and this will enable them to create more innovation effects within the collaborative relationship (Lawrence et al., 2002). Therefore, it is important to understand what these characteristics are and how they influence innovation. This will also shed light on how collaborations can be modified to achieve more or better innovation effects that may facilitate the CE and reduce food waste (León-Bravo et al., 2017).

Lawrence et al. (2002) divide ten characteristics of collaboration into three categories: (1) the pattern of interactions between actors, (2) the structure of the coalition, and (3) the pattern of information sharing among actors (see Figure 2). First, the nature of the interaction is defined by its depth and scope. The depth of the interaction ranges from *shallow*, when collaborations are restricted to managers, to *deep*, for interactions that extend to other personnel. Lawrence et al. (2002) used their theory to study the collaborations of one organization and its counterparts. However, due to the many actors and collaborations involved in this study, it would be more appropriate to study the depth of collaborations based on the type of activities that both parties carry out together. Therefore, in this study, a collaboration is *shallow* when the activities carried out are only at an operational level, and *deep* when the activities entail tactical decisions and joint planning. This characteristic has been previously studied by Bhattacharya and Fayezi (2021). The scope of the interactions ranges from *narrow*, when collaborations happen only with official partners, to *broad*, when collaborations extend to third parties.

Figure 2. *Characteristics and qualities of collaboration*



Source: own figure, based on Lawrence et al. (2002) typology of collaboration

Second, collaborations can have three types of structure. In the case of a *donation*, one of the actors receives funds or other forms of help from another actor. In the case of a *partnership*, the actors work and carry out activities together. In the case of a *representation*, the collaborating organizations represent each other's interests to outside parties (Lawrence et al., 2002). Third, the authors identified three patterns of information flow: *unidirectional flow*, in which one actor learns from the other;

*bidirectional flow*, in which all actors learn from each other; and *multidirectional flow*, in which actors also learn from third parties from outside the official collaboration. This particular characteristic has been previously studied by multiple authors (see e.g. (Bhattacharya & Fayezi, 2021; Dora, 2020).

To understand how these different characteristics influence innovation, the authors collapsed them into two broader qualities of collaboration: involvement and embeddedness. These two qualities relate to the multistage process through which collaboration creates innovation. Involvement relates to the first stage, in which new practices, values and technologies emerge within the collaborative relationship. It refers to the internal dynamics of collaboration and it encompasses the following characteristics of collaboration: (1) deep interaction, (2) partnership structure and (3) bidirectional information flows. Embeddedness relates to the second stage, in which the previously created new practices, values and technologies are adopted by other actors beyond the collaborative relationship. It encompasses the following characteristics of collaboration: (1) broad interaction, (2) representation structure and (3) multidirectional information flows.

Lawrence et al. (2002) argue that collaborations with higher involvement and embeddedness are able to create more innovation effects. To prove their point, they developed an involvement and embeddedness scale and they classified collaborations according to their level of involvement and embeddedness (*low, medium or high*). As explained before, involvement and embeddedness encompass each three different characteristics of collaboration. If the collaboration has the three mentioned characteristics, then it is classified as having *high* involvement or embeddedness. If the collaboration has two or one of the mentioned characteristics, then it is classified as having *medium* or *low* involvement or embeddedness, respectively. The notions underpinning Lawrence et al.'s (2002) theory are consistent with other authors, who argue that intense collaborations are more likely to lead to learning and innovation (Franco, 2021), and communication and cooperation are associated with organizational interconnectedness (Powell et al. 1996; Walker & Kogut, 1994). However, to the researcher's knowledge, this methodological approach has not been tested in the CE and food waste domain. Thus, this study explores the assumption that higher involvement and embeddedness of collaboration lead to more innovation, facilitating the CE transition and reducing food waste.

## 2.2. A small win approach to the circular economy transition

Realizing circularity in the food system in order to reduce food waste requires fundamental changes in technology, social practices, regulations, markets and networks. This fundamental change is also referred to as a transition or transformative change (Termeer & Metze, 2019, p. 2). Debates on how to achieve circularity usually result in a call to realise in-depth, large scale and quick changes. However, recent papers suggest that this approach is not suited to understand social settings and, in particular, the CE transition (Termeer & Dewulf, 2019; Termeer & Metze, 2019). Achieving changes that are simultaneously in-depth, large scale and quick is impossible because of inherent trade-offs between them (Vermaak, 2013; Termeer & Metze, 2019). In-depth changes require individuals to change their routines and values. This is not a quick process and cannot be enabled through large scale interventions. Furthermore, large-scale changes are more visible and they will face more institutional lock ins, which will take more time to overcome. Thus, large scale changes cannot be quick. The impossible aspiration to create radical innovations that are in-depth, quick and large can cause inaction and frustration and can hinder the development of meaningful interventions (Weick, 1984; Termeer & Metze, 2019). The only solution is, therefore, concentrate on creating in-depth small changes, labelled as small wins (Weick, 1984; Termeer & Metze, 2019).

The term *small win* was defined by Weick as a “concrete, complete, implemented outcome of moderate importance” (1984, p. 40). In this study, CE initiatives fighting food waste are the starting point of small wins. CE initiatives are acts or strategies that employ circular principles with the *intention* to resolve a difficulty or improve a situation (Dictionary, n.d.), in this case, they seek to increase circularity and reduce food waste. Small wins however, go beyond promises or ideas and achieve concrete outcomes (Termeer & Dewulf, 2019). Therefore, only CE initiatives that, have *actually* achieved concrete outcomes can be considered small wins. Small win initiatives are intrinsically innovative and are able to create in-depth changes in the form of new practices, values or technologies (Termeer & Dewulf, 2019). For instance, The Waste Transformers is a CE initiative which has created a new technology to reduce food waste (an on-site containerized anaerobic digester that can be placed anywhere in the city), and therefore has created an innovation effect in the form of new technology, which has also led into new practices. With this, it has achieved a concrete outcome: the amount of food waste sent to the municipality’s waste streams has been reduced (The Waste Transformers, 2020).

Small win initiatives are able to create change at the local level, where people can effectively handle uncertainty, and not in the large scale (Vermaak, 2013). Following the example, the containerized anaerobic digester of The Waste Transformers can be placed anywhere in the city and enables surrounding businesses to bring their kitchen waste and

produce energy from it (among other outcomes), having a concrete outcome at the local level (The Waste Transformers, 2020). Small win initiatives are steps that have a positive outcome which relates to a shared ambition, and therefore can be considered a win and not a loss (Termeer & Dewulf, 2019). In this study, small win initiatives are fighting food waste and their outcomes relate to Amsterdam and Barcelona's circular and climate change ambitions. Because The Waste Transformers is reducing food waste through a circular treatment, it is contributing to Amsterdam's ambition to halve food waste by 2030 and to achieve circularity by 2050 (Gemeente Amsterdam, 2020). The Waste Transformers is a CE initiative that meets all the characteristics of a small win. Thus, it is a small win initiative. See Table 2 for an overview of the characteristics of small win initiatives.

Table 2. *Characteristics, indicators and examples of small win initiatives*

Characteristic	Indicator	Example: The Waste Transformers
Concrete outcomes	Visible results	Reduces the amount of FW sent to the municipality's waste stream
In-depth changes	Innovation effects: new practices, values, technologies	New technology: an on-site containerized anaerobic digester. New practice: businesses bring their kitchen waste
Moderate importance	Local level	Available to local businesses and residents
Contribute to the CE	Follows a circular treatment Step forward, improvement Relates to shared CE ambitions	It contribute to Amsterdam's circular and FW ambitions

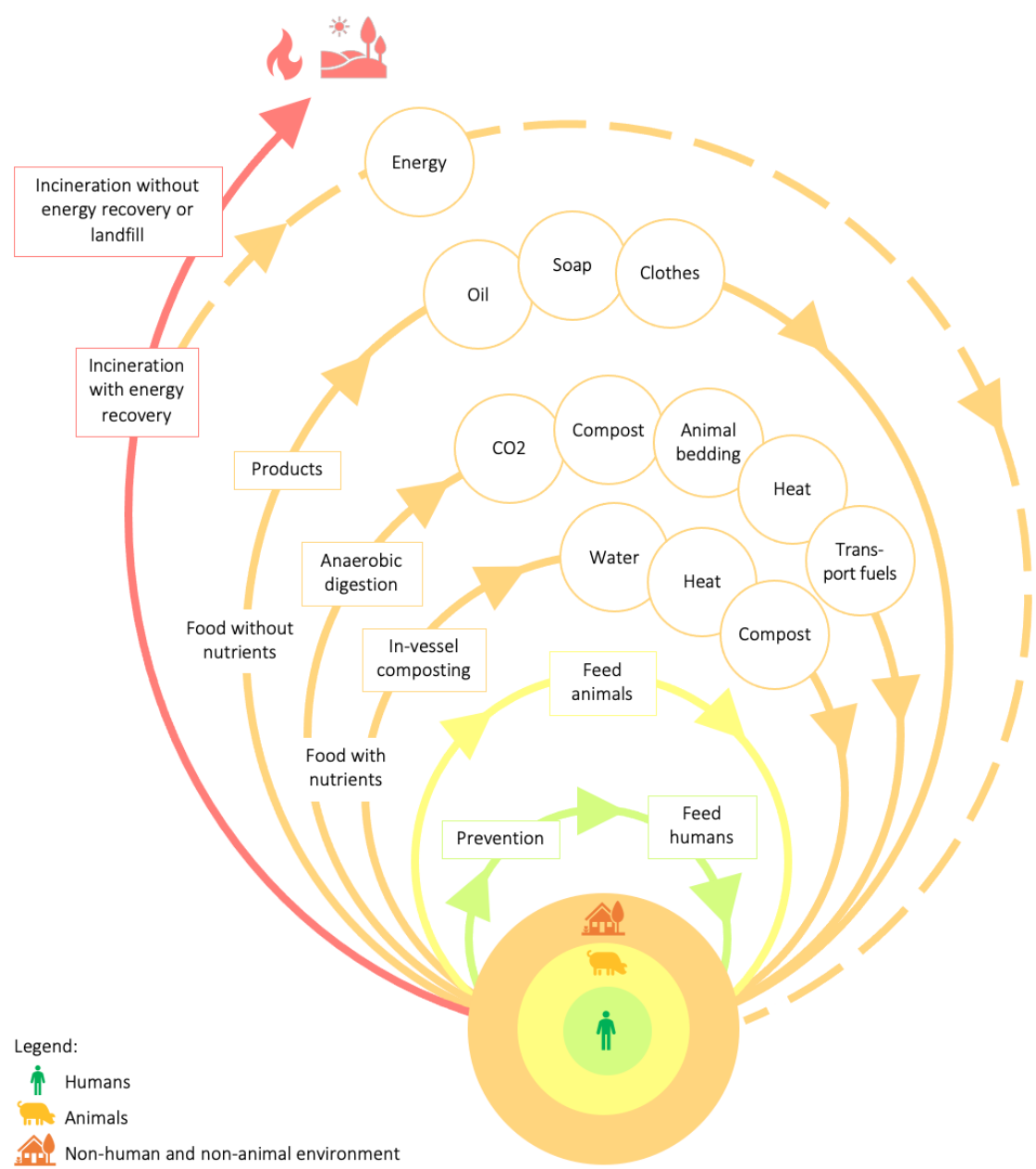
Source: based on (Termeer & Dewulf, 2019) and (Termeer & Metze, 2019)

As shown in the table, one of the characteristics of small win initiatives is that they employ a circular treatment to reduce food waste. The term *food waste* is often used to encompass three different concepts: *food surplus*, *food loss* and *food waste*. These concepts are different and they are closely linked to different stages of the food supply chain. This indicates that they have distinct drivers, and, as a result, small win initiatives develop distinct solutions. *Food surplus* is discarded for socio-economic reasons, including food produced beyond nutritional needs. Its definition denotes that it must be redistributed to humans, if this is not the case, then it is considered food waste. *Food waste* is often associated with the final stages of the chain (consumption) (Teigiserova, Hamelin, & Thomsen, 2020). In the EU, 65% of wasted food occurs in the consumption stage, therefore many initiatives are directed to decrease food waste in households and food services (UNEP, 2021). *Food loss* is usually associated with the first stages of the food supply chain (production and processing) and it is often linked to the agricultural sector (Teigiserova et al., 2020). From a CE perspective, where all waste is seen as a resource, it makes sense to use the term food waste to encompass the three concepts.



This study presents the food waste circle, which shows different circular treatments that small win initiatives can use to reduce food waste (see Figure 3). It follows the foundation of the food waste pyramid, much used by scholars and practitioners to identify priorities and treatment to reduce food waste (Teigiserova et al., 2020). The pyramid has served as a reminder that certain food waste treatments are preferred over others (due to socio-ethical and environmental reasons). However, its rigid and linear structure makes it hard to understand the many, and constantly emerging, circular treatments that small win initiatives can use to reduce food waste (Teigiserova et al., 2020).

Figure 3. *The food waste circle*



Source: own figure, inspired by the food waste pyramid in Teigiserova et al. (2020)

The food waste circle attempts to provide clarity and flexibility around food waste treatments in the context of the CE. Its goal is not to designate treatment preferences but to indicate which receiver has priority (first humans, second animals and later the rest). A closed loop means that food waste is treated to produce other outcomes which re-enter the environment. It is important not to set priorities among these different treatments and to remain flexible, because food waste can take different path-combinations. For example, orange peels can be used to create oils. Later, these can be treated through anaerobic digestion or be used to feed animals (PeelPioneers, 2021). Moreover, these path combinations are constantly being explored. For instance, The Waste Transformers is now exploring how can they use compost from their anaerobic digester to produce clothes (The Waste Transformers, 2020). When food waste does not take a circular path, it is incinerated or thrown at a landfill. It does not have a receiver and it is therefore, the least favoured option. Small win initiatives produce a concrete outcome that reduces food waste through a circular treatment, and therefore can be located within the food waste circle. By taking one of these paths, they contribute to increase circularity and reduce food waste in Amsterdam and Barcelona.

The small win approach sees the CE transition as a continuous process, in which change is achieved through series of small wins (Termeer & Metze, 2019). Both Amsterdam CE Strategy and Barcelona's Climate Plan are based on the idea that the sum of initiatives will, in the long-term, allow them to achieve the ambitions that have been set (Gemeente Amsterdam, 2020; Ajuntament de Barcelona, 2018). Therefore, multiple and more radical small win initiatives are needed to meet Amsterdam's ambition to be completely circular by 2050 and Barcelona's ambition to be carbon neutral by 2050. Small win initiatives are scattered but they move in the same general direction (Weick, 1984; Termeer & Dewulf, 2019). The CE transition can be achieved by amplifying and accumulating them. This occurs when small win initiatives are upscaled (they become larger or more numerous), broadened (their consequences escalate in other areas) or deepened (they are intensified and become more radical (Termeer & Metze, 2019).

Various propelling mechanisms are used to amplify and accumulate small win initiatives. Propelling mechanisms are defined as "chain of events that reinforce themselves through feedback loops" (Termeer & Dewulf, 2019, p. 305). The words *chain* and *loop* are important here. Small win initiatives create new practices, values and technologies and these trigger actors to pursue certain actions towards the direction of creating more small wins. They target both the actors involved in the initial small win as well as a broader audience (Termeer & Dewulf, 2019). This chain of events creates a loop in which an initial small win is upscaled, broadened or deepened. *Logic of attraction*, for example, is a propelling mechanism whereby small wins attract new resources, such as more funding, which enables actors to pursue even more small wins (see Figure 4). Mechanisms can

also reinforce each other, therefore, the more mechanisms that are activated, the stronger the effect (Termeer & Dewulf, 2019).

The list of propelling mechanisms is not fixed, it is shaped by the small win initiatives themselves, their partners and the local government (Gorissen et al., 2018), who can activate them by setting the right policies and interventions (Termeer & Metze, 2019). After exploring various propelling mechanisms identified in the literature, this research focuses on five mechanisms explained by Termeer and Dewulf (2019): (1) energizing, (2) learning by doing, (3) logic of attraction, (4) bandwagon effect, and (5) coupling. These are described below. The reason for this choice is because these mechanisms can be understood as a *loop* of events, while others refer to, for example, a technique to multiply small wins (e.g. replicating or transferring) or to an amplifying effect (e.g. deepening or scaling up). This study does not intend to provide an exhaustive list of propelling mechanisms working across small win initiatives, but rather provide a better understanding of how collaboration between small win initiatives and their partners relates to the selected propelling mechanisms.

Figure 4. Chain of events in the learning by doing mechanism



Source: own figure, inspired by Termeer and Dewulf (2019)

The **energizing** mechanism is based on motivational drivers (Termeer & Dewulf, 2019). The concrete outcome and visible result of a small win give actors a sense of positive accomplishment and the conviction that they can make a difference (Weick, 1984). This excitement gives them hope, confidence and optimism and encourages them to look ahead to the next potential small win (Reay, Golden-Biddle, & Germann, 2006). The energizing mechanism can also reinforce personal and political agency in other localities, expanding small wins to other territories, thus activating the coupling mechanism (Termeer & Dewulf, 2019).

Each attempt to achieve a small win, whether it is successful or not, might activate a **learning by doing** loop because the outcome provides feedback on the effectiveness of the strategy (Foster-Fishman & Watson, 2012). Additionally, resources and barriers which were previously invisible are uncovered and the risks associated with a new step or experiment are reduced (Weick, 1984). Subsequently, actors are more willing to experiment with new understandings and to welcome complexity. Thus, actors use the

learning outcome as a guide for new experiments. Even when those bring disappointment or unexpected outcomes, they are not discouraged. Instead, they learn from their mistakes and carry on with new experiments (Termeer & Dewulf, 2019)

The *logic of attraction* mechanism means that the visible results of small wins attract more partners and resources. This is because positive accomplishments may guarantee more chances of success and actors mobilize resources so that larger wins can be attempted (Weick, 1984). External actors can become particularly interested and excited about a small win, and this makes them more willing to invest time and money in it. More resources, such as money, employees or partners, allow actors to pursue new ideas, potentially becoming small wins. At the same time, the logic of attraction mechanism discourages usual opponents and small wins face less competition (Weick, 1984; Termeer & Dewulf, 2017).

The *bandwagon effect* mechanism is based on a psychological phenomenon whereby people do something because other people are doing it (Behn, 2002). The visible outcome of small wins may inspire others to see more concretely what an alternative way of organizing would look like, and they may imitate, adopt it or take similar actions (Reay, et al. 2006). Furthermore, the inherent human desire to accumulate things can be an engine of change (Bushe, 2011; Termeer & Metze, 2019). To activate this mechanism, it is important that small wins are publicly acknowledged and celebrated. These psychological phenomena may result in an infectious pattern if small wins occur at the same time in different places (Reay, et al. 2006). This is the case of small wins fighting food waste in Amsterdam and Barcelona, which have become part of a broader movement for transformative change in the food system.

The *coupling* mechanism is based on the idea that small wins can accumulate if they are combined with other geographical scales, policy domains or societal problems (Termeer & Metze, 2019). This is because the outcome of a small win in one part of the system can set off a chain reaction and generate cumulative effects in other parts (Termeer & Dewulf, 2019). Small wins can be connected across geographical scales, for example when an initiative operates in two countries, or across political scales, for instance when an initiative is able to influence the State's political agenda. Coupling also occurs when small wins connect various societal problems, for example an initiative that reduces food waste may enhance social cohesion or reduce unemployment.

Based on two previously explained assumptions (one, collaboration may enable small win initiatives to innovate and two, propelling mechanisms amplify and accumulate small win initiatives) it could be presumed that collaboration is related to propelling mechanisms. For instance, some authors have pointed out that intense collaboration is more likely to lead to learning (Powell et al. 1996; Franco, 2021). Thus, high involvement could influence

the learning by doing mechanism, in which two partners learn by doing together or from each other's experiences. High embeddedness could influence the energizing and the bandwagon effect mechanism: as small win initiatives are entangled in broader networks, they could be more aware of current trends and they could be more easily energized by others. Collaboration in the food waste domain could influence the coupling mechanism, because when small win initiatives tackle food waste, other societal problems (such as social exclusion and hunger) are also addressed. To the researcher's knowledge, the relation between collaboration – more precisely, involvement and embeddedness – and propelling mechanisms has not been previously studied. Through an exploratory approach, this research intends to address this gap by investigating how collaboration relates to propelling mechanisms, thereby, contributing to accelerate the CE transition and reducing food waste.

### 2.3. Conceptual framework

This thesis seeks to understand *how collaboration between small win initiatives and their partners facilitates and accelerates the CE transition in Amsterdam and Barcelona*, with the ultimate goal to reduce food waste. Based on this RQ and previous literature, in particular Lawrence et al.'s (2002) typology of collaboration and Termeer, Dewulf and Biesbroek's (2017) small win approach to the CE transition, a conceptual framework is presented (see Figure 5). The following paragraphs explain the framework in detail.

This research studies how small win initiatives fighting food waste and their partners collaborate. Four types of partners are relevant in the CE transition: the municipality, the market, the community and the third sector (Avelino & Wittmayer, 2016). This study focuses on ten characteristics of collaborations, encompassed in three categories: the interaction patterns in the collaboration, the structure of the collaboration and the information flow between the partners. Based on this, it is possible to assess two qualities of collaboration: their involvement and their embeddedness. The involvement of a collaboration refers to its internal dynamics whereas the embeddedness refers to its connections with other organizations and society in general (Lawrence et al., 2002). SQ 1 explores the level of involvement and embeddedness of collaboration between small win initiatives and their partners.

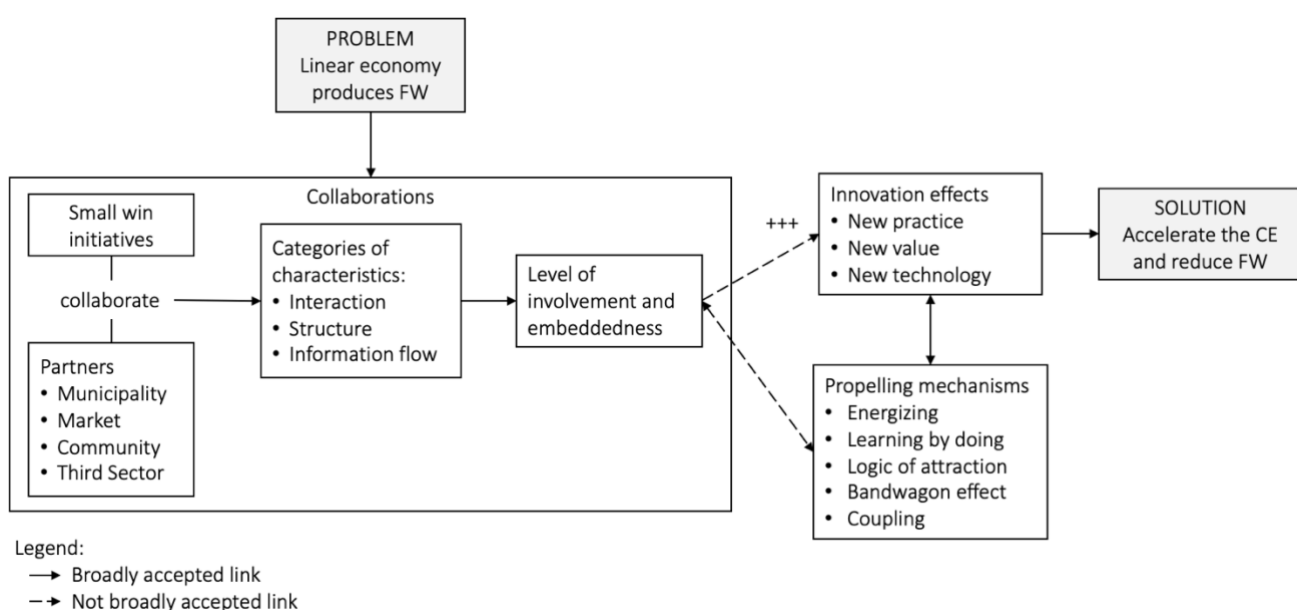
Previous research indicates that collaboration facilitates the CE transition through innovation (Jesus & Mendoça, 2018). The two qualities of collaboration are relevant here. Through the involvement of collaboration, partners can learn from each other and share resources, which facilitates the creation of innovation effects on practices, values and technologies within the collaborative relationship. Through the embeddedness of collaboration, small win initiatives are entangled in broader networks, which facilitates the spread of innovation effects beyond the collaborative relationship, where they are

adopted by others. It is expected that collaborations with higher levels of involvement and embeddedness are able to create more innovation effects (Lawrence et al., 2002), however, this has not been extensively studied. Thus, this research examines if and how the level of involvement and embeddedness of collaboration influences the ability of small win initiatives to innovate, which may facilitate the CE transition. This is explored in SQ 2, using the results from SQ 1.

In addition, research shows that various propelling mechanisms amplify and accumulate small win initiatives (Termeer & Metze, 2019). Thereby, amplifying and accumulating the innovation effects that the small win initiatives have created in collaboration with their partners. This accelerates the CE transition, and in this context, reduces food waste (Termeer & Metze, 2019). The relation between collaboration and propelling mechanisms has not been previously studied. However, based on the assumptions that collaboration enables small win initiatives to innovate (Jesus & Mendoça, 2018) and that these are amplified and accumulated through propelling mechanisms (Termeer & Metze, 2019), it could be expected that there is some sort of relation between collaboration and propelling mechanisms. Therefore, SQ 3 explores if and how collaboration influences or is influenced by propelling mechanisms.

By addressing these three SQs and keeping this conceptual framework in mind, this study hopes to understand how collaboration between small win initiatives and their partners facilitates and accelerates the CE transition. This framework, and the theories used to develop it, guide the research's methodology and the structure of the Findings chapter.

Figure 5. *Conceptual framework: the influence of collaboration in facilitating and accelerating the circular economy transition*



### 3. Methodology

This chapter explains the research approach, the data collection and the data analysis methods used. A cross-national comparative study approach was used to examine the collaborations of 20 small win initiatives fighting food waste in Amsterdam and Barcelona. This was done by collecting qualitative information from grey literature and semi-structure interviews, and analysing it through content analysis and simple quantitative methods.

#### 3.1. Research approach

This study sought to understand how collaboration between small win initiatives and their partners facilitated and accelerated the CE transition in order to reduce food waste. To link collaboration with the CE, this study built on Lawrence et al.'s (2002) typology of collaboration and the small win theory, described by Termeer et al. (2017). Due to the partly exploratory nature of this study, the importance of solving food waste and the researcher's beliefs, this research took a pragmatic approach. This approach is not committed to a specific reality, instead, it emphasises the research problem and use all methods available to understand it (Creswell, 2014).

This research employed a cross-national comparative study between Amsterdam and Barcelona. The case selection was done purposively due to differences in the cities' ambitions, strategy stages and policy approaches (these are explained in chapter 4). Moreover, both cities were familiar to the author, which is useful for comparative studies. Using a comparative approach to study collaboration can be helpful to understand if small win initiatives and their partners collaborate differently in particular contexts. For instance, because the cities' policies influence the actors with whom small win initiatives chose to collaborate. It may also be possible to understand if these differences have an impact on their ability to create innovation effects or to influence propelling mechanisms. In this case, this comparison may offer an understanding on whether an approach that focuses on research and innovation is more efficient than an approach that focuses on co-designing and sharing-responsibility.

This study used a mixed method approach, a common choice in pragmatic research (Creswell, 2014). Qualitative data was collected through grey literature and semi-structured interviews. Content analysis was used to analyse the data, combining inductive and deductive coding. The results are presented using qualitative and quantitative language. This proved to be a good combination: the richness of qualitative data was useful to understand the poorly understood relation between involvement and embeddedness of collaboration, innovation effects and propelling mechanisms (Gorissen et al., 2018), while quantitative language facilitated the recognition of patterns and the comparison between Amsterdam and Barcelona (Fakis et al., 2014). To the researcher's

knowledge, a mixed method approach has not been used before to study these relations. Some researchers may disagree with it, on the basis that quantitative language reduces the rich interpretation of people's experiences to numbers. However, a fully qualitative analysis would similarly reduce people's experience to words. It is not the researcher's position to judge whether one reduction is better or worse than the other. It is, however, a duty to acknowledge that different methods lead to different conclusions, and in the case of policy issues, actions (Bernard, 1996).

### 3.2. Data collection methods

The data for this research was collected in two different ways. Secondary research using grey literature sources such as official government documents, websites, reports, newspapers, blogs and social media pages was conducted through a two-month period. In addition, primary research was collected through semi-structured interviews during a period of four months.

#### 3.2.1. Grey literature

Grey literature consisted of official government documents, government websites and reports, newspapers, blogs and social media pages. Amsterdam's CE Strategy and Barcelona's Climate Plan were particularly useful, as they provided a better understanding of the context in which small win initiatives had to navigate on (Gemeente Amsterdam, 2020; Ajuntament de Barcelona, 2018). These sources, together with the researcher's knowledge on local initiatives, were used to create an inventory of 40 CE initiatives fighting food waste in Amsterdam and Barcelona (see Appendix A). This list was narrowed down to 20 initiatives, using a selection criterion, partly based on the small win definition provided by (Termeer & Dewulf, 2019) (see Table 3). The initiatives' ability to be interviewed shaped the list, but it was not a requisite. The final number of studied small win initiatives (20 in total, 10 in each city) was in line with the timeframe and scope of this research.

Once the final list of small win initiatives was compiled, information from their websites was extracted. Only the relevant sections were selected, focusing on information that could be useful to answer the RQ and leaving out sections such as *Contact*, *News*, *Work at* or *Team*. This information was translated to English using the automatic translator function of Google Chrome. When it was not possible to schedule an interview with the small win initiative, the lack of information was compensated with more non-peer reviewed sources. This was the case for Taste Before You Waste, for which its Annual Report was used, and Nevera Solidaria, for which a newspaper article was used. See Appendix B, Table B 1 and Table B 2 for an overview of sources and documents used for each city and small win initiative.



Table 3. *Selection criterion for studied initiatives*

Location
<ul style="list-style-type: none"> <li>• They were based and operated in the city region of Amsterdam and Barcelona</li> </ul>
Collaboration
<ul style="list-style-type: none"> <li>• They collaborated with at least two different actors</li> </ul>
Small wins characteristics
<ul style="list-style-type: none"> <li>• They created a concrete outcome and not simply promises or ideas</li> <li>• They created in-depth changes; an innovation effect on practices, values or technologies</li> <li>• They were not quick wins or low hanging fruit</li> <li>• They had moderate importance in the local level and not in a large scale</li> <li>• They contributed to the CE transition: represented improvement and were related to shared ambitions</li> </ul>

Source: adapted from Termeer and Dewulf (2019), Termeer and Metze (2019) and Lawrence, et al. (2002)

### 3.2.2. Semi-structured interviews

In total, 17 semi-structured interviews with small win initiatives were conducted, 8 in Amsterdam and 9 in Barcelona. Only members of small win initiatives, and not their partners, were interviewed. This was based on the assumption that members of small win initiatives had a clearer understanding of how their own collaborations affected their ability to innovate. Initiatives were led by different actors, the majority being businesses, NGOs or NPOs. Only one small win initiative in Barcelona was run by the municipality, which led to an interview with two civil workers. Every initiative had a different organization structure and the interviewees' position varied per initiative, usually being the founder or project coordinator. See Appendix C, Table C 1 for an overview of interviews. Participants were contacted by email, and some of them were located via snowball. Due to Covid19 limitations, a change in the culture of online meetings, and the nature of a cross-national study, most of the interviews were conducted online. Only two interviews were conducted face-to-face. These interviews varied in time from around half an hour to over an hour, where the average was 40 minutes. All the interviews, except an informal phone call with the Director of Mediamatic about the Myco Insulation Project, were recorded and manually transcribed.

A semi-structured interview was designed keeping the RQ in mind and using Lawrence et al.'s (2002) collaboration theory and Termeer et al.'s (2017) small win approach to transition. The interview had three sections, each one designed to answer one of the SQs: (1) the collaborations' characteristics, (2) innovation effects, and (3) propelling mechanisms. The information extracted from grey literature was useful to adjust the questions to the small win initiative's projects and to set priorities when interviewees had limited time available. Overall, the semi-structure format ensured comparability across small win initiatives but also flexibility to adapt to interviewees' responses. The complete semi-structured interview guide can be found in Appendix D.

Several ethical considerations took place before conducting the interviews. Interviewees were first approached by email, giving them freedom to reject the petition. Participation was voluntary and participants had the right to withdraw from the study at any stage if they wished to do so. Respondents were informed about the purpose and objective of this study and any form of exaggeration was avoided. Last but not least, participants were asked if they, and the initiatives they were working for, wished to remain anonymous throughout the study. Before starting the interviews, all interviewees gave their consent to have the meeting recorded and transcribed, only for educational purposes.

Qualitative information collected through grey literature and semi-structured interviews – more specifically the website content of 19 initiatives, 17 semi-structured interviews, one annual report and one news article – was used to create Table 4 and Table 5. The tables describe the small win initiatives selected in this study, as well as the food waste treatment(s) they used, the actors with whom they collaborated and the collaboration's main purpose. The food waste circle, previously presented in the literature review, is used again to show clearly which circular treatments are used by the studied small win initiatives (see Figure 6).

Table 4. *Summary of selected small win initiatives in Amsterdam*

Small win initiative's FW treatment	Actors that collaborate with the small win initiative
Café De Ceuvel <sup>1</sup> : Plant-based café, with cultural programmes, workshops and movies that are used to educate people on sustainable topics. Reuse FW for animal feed. Experiment attempted in the past: recovery of nutrient and energy using a Biogas Boat.	Municipality: land contract De Ceuvel Association: group of tenants working in De Ceuvel Community: visitors and customers Architect firm: plot design Farmers: supply food, pick up FW to feed animals Metabolic Lab: research institute that works on funky projects
The Waste Transformers <sup>2</sup> : A company that developed an on-site containerized anaerobic digester (no smell and no sound). It turns kitchen waste into biogas, electricity, heat, fertilizer and compost. It can be placed anywhere in the city. It is located in Amsterdam West, Cape Town and Freetown.	Businesses: restaurants, theatres and other retailers bring their kitchen waste Municipality: funds and gives permits Community and farmers: use the outcome of the digester
GROWx <sup>3</sup> : A vertical farm located in Amsterdam Southeast. It uses state-of-the-art technology to increase the shelf-life of products. It is 100% circular and uses a biodigester to produce energy.	Restaurants: buy their products and provide feedback Research institutes: share knowledge and implement projects Municipality: gives permits
Myco Insulation Brewery <sup>4</sup> : A project from the Mediamatic art centre that used waste generated from brewing beer to build an insulation material. Organized exhibitions.	Breweries: supply waste Research institutes: share knowledge
I Can Change The World With My Two Hands <sup>5</sup> (hereinafter, I Can Change): An initiative that helps residents to engage with nature by participating in a city garden in Amsterdam West. Residents take care of the vegetable garden and can bring their kitchen waste to make compost.	Residents: bring their kitchen waste and rent gardens Municipality: land contract De Gezonde Stad: supports frontrunners and brings initiatives together ANMEC: educates and brings initiatives together
PeelPioneers <sup>6</sup> : A company that transforms orange peels into ingredients that are used to produce foodstuffs, cosmetics and cleaning products. The pulp that remains goes to farmers for use as animal feed.	Supermarkets and other businesses: supply the orange peels and buy the foodstuffs produced by PeelPioneers Transport companies
Wormenhotel <sup>7</sup> : A company that builds vermicompost structures for public and private actors. These are placed in the city, where residents and workers bring their organic waste and produce compost.	Municipality: gives permits, funds projects Market: customers, use Wormhotels Community: coordinates and uses Wormhotels Compost Networks: share information
Too Good To Go The Netherlands <sup>8</sup> : A mobile app that connects customers to restaurants, supermarkets and other stores that have unsold food surplus.	Businesses: supply unsold food surplus at a discounted price Community: buys the unsold food surplus Research institutes: occasional research Municipality: Too Good To Go influences policies Other (FW) initiatives: e.g. Food Banks
Buurtbuik <sup>9</sup> : An initiative that collects food surplus from restaurants and supermarkets. Organizes dinners for residents in need.	Businesses: provide food surplus Community: participates in activities and receives food surplus Municipality: gives permits Other (FW) initiatives: e.g. Food Banks, Zoo
Taste Before You Waste <sup>10</sup> : An initiative that collects food surplus from restaurants and supermarkets. Organizes Community Dinners, Food Cycle Markets, Educational Workshops and Event Caterings.	Businesses: provide food surplus Community: participates in activities and receives food surplus Other (FW) initiatives: e.g. Wij Zijn Hier, Nieuwland Network of like-minded organizations

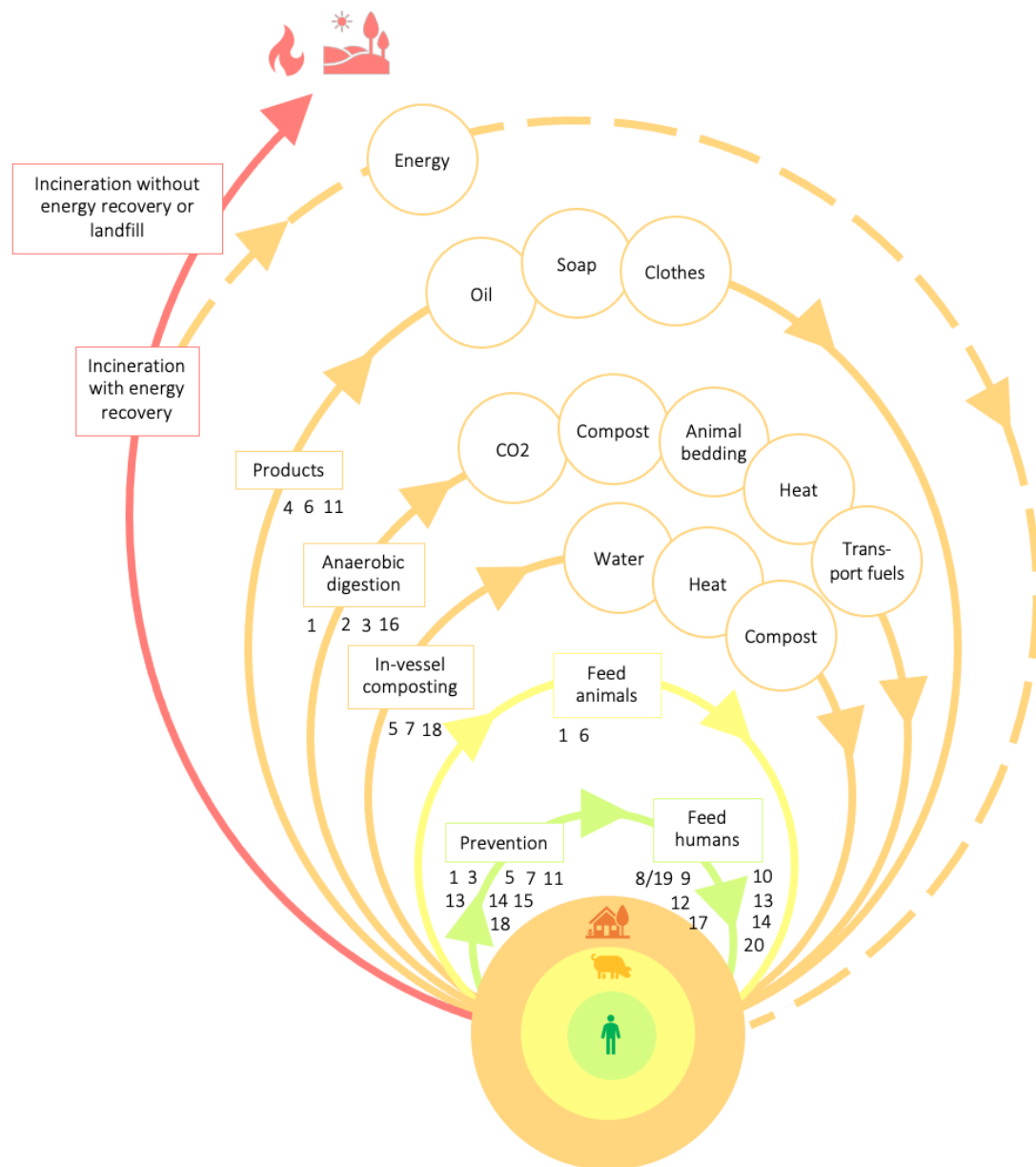
Sources: <sup>1</sup> (De Ceuvel, 2021); <sup>2</sup> (The Waste Transformers, 2020); <sup>3</sup> (GROWx, 2021); <sup>4</sup> (Lakeman & Veen, 2021); <sup>5</sup> (I Can Change The World With My Two Hands, 2021); <sup>6</sup> (PeelPioneers, 2021); <sup>7</sup> (Wormenhotel, 2021); <sup>8</sup> (Too Good To Go, 2021a); <sup>9</sup> (BuurtBuik, 2021); <sup>10</sup> (Foundation Taste Before You Waste, 2021)

Table 5. *Summary of selected small win initiatives in Barcelona*

Small win initiative's FW treatment	Actors that collaborate with the small win initiative
Fundació Espigoladors <sup>11</sup> : A NPO that promotes gleaning to save food left in the agricultural field. This is given to people in need and it is used to produce foodstuff, such as jam.	Community, farmers: volunteers glean in the agricultural field Other (FW) initiatives: e.g. Food Banks Municipality: funds projects Businesses: receive workshops and educational activities
Soy Comida Perfecta <sup>12</sup> : An online supermarket connecting food surplus from supermarkets to consumers. It does not exist anymore, due to financial reasons during Covid19.	Businesses: supply unsold food surplus at a discounted price Community: buys the unsold food surplus Other (FW) initiatives: e.g. Food Banks
Pont Alimentari <sup>13</sup> : Creates a network between donor companies and initiatives, giving support to vulnerable people. It does environmental education campaigns and diagnosis of FW in the retail sector.	Businesses: donate unsold food surplus Other (FW) initiatives: receive unsold food surplus Municipality: funds projects
Menjador Ca La Rosa <sup>14</sup> : A NPO aiming to create jobs for vulnerable people. Uses food surplus to cook children's school menus. Does educational activities for children.	Community: school children eat there during their lunch break; residents collect food surplus Municipality: funds project Market: donates food surplus Other (FW) initiatives: e.g. Revolta, Nutrició Sense Fronteres Networks: e.g. Food Network La Sagrera
ColorSensing <sup>15</sup> : A company that developed a food freshness indicator, for packaged food.	Market: manufacturers and retailers use technology to reduce FW Research institutes: the initiative is a Spin-off from University of Barcelona EU, IOs: funds project
Revolta <sup>16</sup> : A sustainability project led by the company Tarpuna. They created a small compost machine that can be placed anywhere in the city. It is easy to use and it is located in schools, community gardens and businesses.	Community, businesses: schools, residents, hotels and restaurants buy and use the machine Farmers: use the output (compost) Municipality: funds projects Other (FW) initiatives: collaborate in projects to use the machine Networks: Schools for Sustainability in Catalonia EU, IOs: funds project, organizes networking events
Nutrició Sense Fronteres <sup>17</sup> : A NGO with various projects to reduce FW and help vulnerable people. In their project, We Share Food, they collect food from businesses and donate it to vulnerable people.	Businesses: donate food Community: received food Municipality: funds project Other (FW) initiatives: e.g. Food Banks, Menjador Ca La Rosa Network: e.g. Network For The Right To Adequate Food EU, IOs: funds project
La Fàbrica del Sol <sup>18</sup> : A government-owned initiative with several projects to educate people on sustainability, including a demonstrative building. Manages community composting gardens. Created a city map of sustainable initiatives.	Municipality: owns and takes care of the project Other (FW) initiatives, businesses and community: collaborate on building the city map Community: use the community composting gardens Networks: e.g. Sustainable Barcelona Network
Too Good To Go Spain <sup>19</sup> : A mobile app that connects customers to restaurants, supermarkets and other stores that have unsold food surplus.	Businesses: supply unsold food surplus at a discounted price Community: buys the unsold food surplus Research institutes: occasional research Municipality: collaborate on some projects Other (FW) initiatives: e.g. Food Banks Networks: e.g. Sustainable Barcelona Network
Nevera Solidaria <sup>20</sup> : An initiative that has placed Solidarity Fridges around Spain, where the community can share food surplus.	Community: donates and receives food Other (FW) initiatives: take care of the management Municipality: funds project Networks: e.g. Solidarity Fridge Network

Sources: <sup>11</sup> (Espigoladors, 2021); <sup>12</sup> (Social Enterprise España, 2018); <sup>13</sup> (Pont Alimentari, 2021); <sup>14</sup> (Menjador Ca La Rosa, 2020); <sup>15</sup> (ColorSensing, 2021); <sup>16</sup> (Tarpuna, 2021); <sup>17</sup> (Nutrició sense fronteres, 2021); <sup>18</sup> (Ajuntament de Barcelona, 2021); <sup>19</sup> (Too Good To Go, 2021b); <sup>20</sup> (Solidarity Fridge, 2015)

Figure 6. Studied small win initiatives in the food waste circle



Legend:

- Humans
- Animals
- Non-human and non-animal environment

Amsterdam

1. Café De Cuevel
2. The Waste Transformers
3. GROWx
4. Myco Insulation Brewery
5. I Can Change
6. PeelPioneers
7. Wormenhôtels
8. Too Good To Go NL
9. BuurtBuik
10. Taste Before You Waste

Barcelona

10. Espigoladors
11. Soy Comida Perfecta
12. Pont Alimentari
13. Menjador Ca La Rosa
14. ColorSensing
15. Revolta
16. Nutrició Sense Fronteres
17. La Fàbrica del Sol
18. Too Good To Go ES
19. Nevera Solidaria

### 3.3. Data analysis methods

The data analysis of this study consisted of two stages. First, content analysis using deductive and inductive coding was used to break down and gain understanding about the content of the text. Then, this information was treated with simple quantitative strategies, which facilitated data comparison between small win initiatives in Amsterdam and in Barcelona.

#### 3.3.1. Content analysis

Content analysis was used to code qualitative information collected from grey literature and semi-structure interviews. This method enabled to “systematically break down, categorize and describe” the content of data (Boréus & Bergström, 2017, p. 36). This was done using the ATLAS.ti software. The first step was to familiarize with the data by listening to the recordings, transcribing and reading notes and transcripts. The second step was to conduct deductive coding, using a code book made from the literature which included 28 codes (see Appendix E, Figure E 1). The third step was to conduct inductive coding. This time the information was read and data that appeared to be interesting was coded with new codes. These steps were a highly iterative procedure that involved moving between the existing theory and the raw data. The analysis continued until there was enough repetition in the data. Patterns and consistencies helped to define the final list of codes consisting of 88 codes, from which a code forest was built (see Figure 7 for a simplified code forest; see Appendix F, Figure F 1 for a complete code forest). The fourth step of the process was to look for relations between codes, creating networks and themes. This was particularly useful to answer SQ 3, due to the lack of information relating collaboration with propelling mechanisms. 24 themes and 12 networks were generated, underlining links between the codes (see Appendix G, Figure G 1, G 2 and G 3).

Figure 7. Simplified code forest from content analysis



Note: this code forest is partly built upon Avelino and Wittmayer (2016) classification of actors in transition, Lawrence et al. (2002) typology of collaboration and the small win approach described by Termeer et al. (2017), Termeer and Dewulf (2019) and Termeer and Metze (2019).

### 3.3.2. Simple quantitative strategies

Simple quantitative strategies were used to analyse some of the results of the content analysis. This facilitated comparison between the 10 small win initiatives in Amsterdam and the 10 small win initiatives in Barcelona. Identifying the presence of a code and frequency count was helpful to answer SQ 1 and SQ 3, while assessing score was useful to answer SQ 1 and SQ 2.

- Identifying the presence of a code and frequency counts

First, the presence of a code in each small win initiative's text was identified by noting *yes* or *no*. Second, simple frequency counts were conducted to identify how many small win initiatives in Amsterdam and Barcelona were associated with a code. The order of these two steps was important: without identifying the presence of a code in each small win initiative, the frequency count would have been on the basis of how many times a code appeared in the text. Due to the difference in the amount of information analysed per initiative, this would have yielded imbalanced results. These methods allowed the researcher to extract conclusions such as: how many initiatives in Amsterdam collaborate with the government? or how many initiatives in Barcelona experiment? This was useful to compare the elements of the different theoretical categories in both cities. The results from this method were usually presented in the form of graphs.

- Assessing score

Identifying the presence of codes in the text was used to identify the actors that collaborated with small win initiatives (e.g. Does Café De Ceuvél collaborate with the government? *Yes*) and to understand the characteristics of collaboration (e.g. Do they have a broad collaboration? *No*). Based on this, it was possible to identify the level of involvement and embeddedness of collaboration. Two tables were designed in order to understand what characteristics of collaboration made *low*, *medium* and *high* involvement and embeddedness (see Table 6). The tables have four sides, one for each category of the studied characteristics: *shallow* and *deep* refer to the depth of the interaction; *narrow* and *broad* refer to the scope of the interaction; *donation*, *partnership* and *representation* refer to the structure of the collaboration; and *unidirectional*, *bidirectional* or *multidirectional* refer to the information flow of the collaboration.

The colour in each square indicates the level of involvement and embeddedness of the collaboration. According to Lawrence et al. (2002), a collaboration has high involvement when it is a deep partnership with bi-directional information flow. When the collaboration has one or two of these three characteristics, then it has a low or medium level of involvement, respectively. Likewise, a collaboration has high embeddedness



when it is a broad representation with multi-directional flow. When the collaboration has one or two of these three characteristics, then it has a low or medium level of embeddedness, respectively. The cross (X) positions the collaboration according to its characteristics, based on the majority of initiatives. In this example, the collaboration is a shallow and broad partnership in which the actors share information in a multidirectional way. This means that the level of involvement is medium and the level of embeddedness is low. Using this pair of tables for each of the small win initiatives' partners, it was possible to determine the level of involvement and embeddedness of the collaboration between small win initiatives and their partners.

Table 6. Tables to identify the level of involvement and embeddedness

Involvement

Interaction: scope		Interaction: depth									
		shallow			deep						
		do.	par.	rep.	do.	par.	rep.				
narrow								uni.	Info. flow		
								bi.			
								multi.			
broad								uni.	Info. flow		
								bi.			
								multi.			
		Structure			Structure						

Embeddedness

Interaction (scope)		Interaction (depth)									
		shallow			deep						
		do.	par.	rep.	do.	par.	rep.				
narrow								uni.	Info. flow		
								bi.			
								multi.			
broad								uni.	Info. flow		
								bi.			
								multi.			
		Structure			Structure						

Legend:

low involvement

medium involvement

high involvement

low embeddedness

medium embeddedness

high embeddedness

X majority of initiatives

Note: Do.: donation; par.: partnership; rep.: representation; uni.: unidirectional information flow; bi.: bidirectional information flow; multi.: multidirectional information flow.

Three more steps were necessary to be able to compare the level of involvement and embeddedness of each city. First, the written format of identifying the presence of a code was translated into a numerical format (*yes*=1; *no*=0). Second, Lawrence et al.'s (2002) scale on involvement and embeddedness was also translated into a numerical format (*low*=1, *medium*=2, *high*=3). The combination of these two steps gave a score to a collaboration between the small win initiative and its partner. For example, Café De Ceuvel collaborated with research institutes (*yes*=1) and research institutes had medium involvement (*medium*=2) this means that Café De Ceuvel and research institutes had an involvement score of 2 (1x2=2; 2=*medium*). The third step was to add and multiply the involvement and embeddedness score of each collaboration that a small win initiative had. For example:

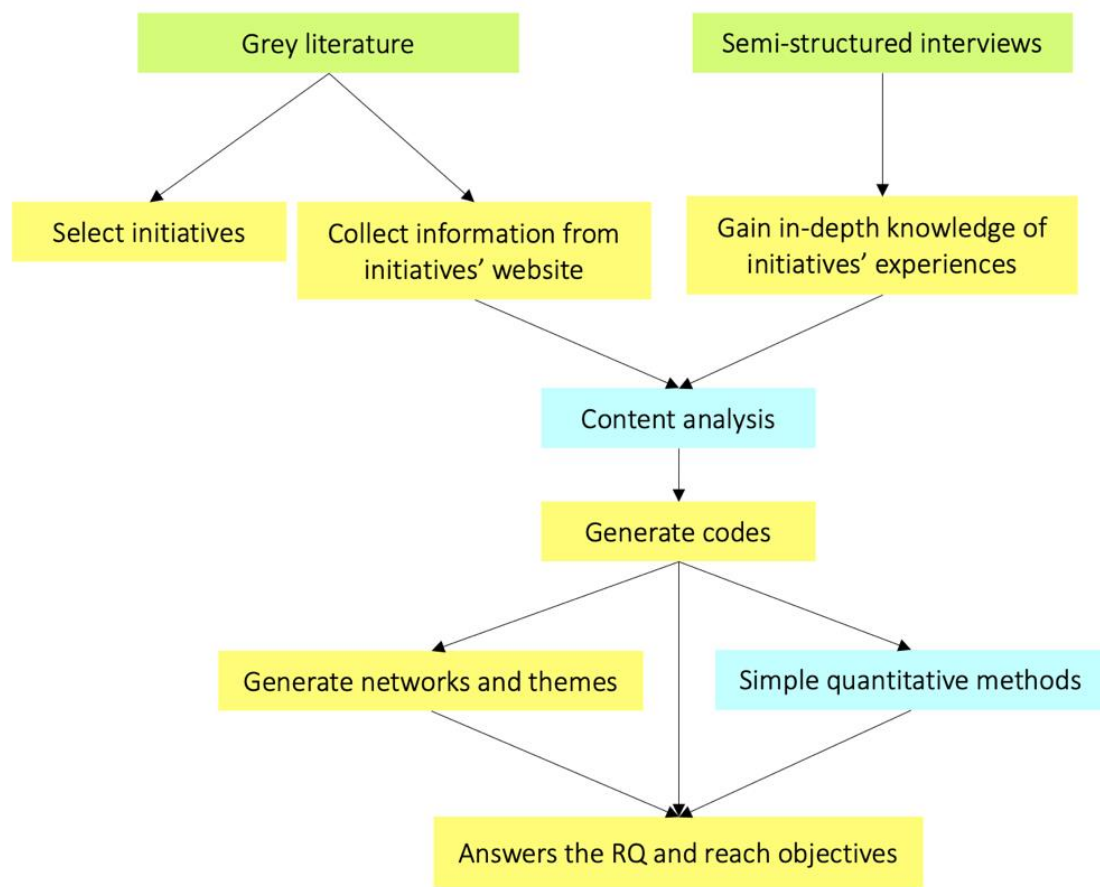
Café De Ceuvel collaborated with the government, the market, the community, research institutes, and networks and associations.

- » Level of involvement: government (1 x 1,5) + market (1 x 2,5) + community (1 x 0,5) + research institutes (1 x 2) + networks and associations (1x 0) = 6,5
- » Level of embeddedness: government (1 x 1) + market (1 x 1) + community (1 x 1) + research institutes (1 x 1) + networks and associations (1 x 3) = 7

This was done for each small win initiative in Amsterdam and Barcelona, and it gave an involvement and an embeddedness score to each city. Considering the number of partners studied (6) and the maximum level of involvement and embeddedness previously identified per each partner, the maximum involvement and embeddedness score that an initiative could have was 8 and 8,5, respectively. Considering that this research studied 10 initiatives per city, the maximum involvement and embeddedness score that a city could have was 80 and 85, respectively. These scores are not meant to be seen as a scale, but rather as a useful method to compare both cities. The results derived from these simple quantitative strategies were backed with quotes from the semi-structure interviews and the websites' content. This helped illustrate the meaning and the implication of quantitative data, especially the involvement and embeddedness score.

Figure 8 shows the steps followed in this study's methodology, which facilitate the concluding remarks of this chapter. The first step was to collect grey literature. This was helpful to find initiatives and to collect information from the initiatives' website. The second step was to conduct semi-structured interviews. This was used to collect in-depth information on the small win initiatives' experience. Information from both steps was analysed through content analysis, which generated codes. These codes were used to build networks, themes, and to conduct simple quantitative strategies. The outputs generated from these steps were used to answer the RQ and reach the research objectives.

Figure 8. *Steps in methodology*



Legend:

- Methods data collection
- Methods data analysis
- Method's goal

## 4. Findings

This section is divided in five subchapters. The first one is an introduction to the cases and it focuses on Amsterdam and Barcelona's CE and food waste policies. The second, third and fourth subchapters answer SQ 1, 2 and 3, respectively. SQ 1 identifies the level of involvement and embeddedness of collaboration between small win initiatives and their partners. This is done by identifying the partners with whom they collaborate and the characteristics of their collaborations. SQ 2 then explains how the collaborations' level of involvement and embeddedness influence innovation effects, which may facilitate the CE transition. Later, SQ 3 describes how collaboration – and if possible, its involvement and embeddedness – relate to five propelling mechanisms, which may accelerate the CE transition in Amsterdam and Barcelona. The fifth subchapter uses the findings from the three SQs to answer the RQ: *How does collaboration between small win initiatives fighting food waste and their partners facilitate and accelerate the circular economy transition in Amsterdam and Barcelona?*

### 4.1. Introduction to the cases: Amsterdam and Barcelona

This study explores collaborations in the City of Amsterdam and the City of Barcelona. Amsterdam is the capital of The Netherlands, it has 219 km<sup>2</sup> and a population of 800.000 people with an average income of 31.400€ (Prendeville et al., 2018). Barcelona is the capital of Catalonia, Spain, it has 102 km<sup>2</sup> and a population of 1.600.000 with an average income of 22.101€ (Prendeville et al., 2018). Both are post-industrial cities pursuing more sustainable development strategies in line with the Sustainable Development Goals set by the United Nations. The EU is increasingly encouraging its Member States to follow CE principles and develop circular policies, partly based on knowledge from the Ellen Macarthur Foundation, an NGO and leading proponent of the CE. In regards to food waste, both cities are signatories of the Milan Urban Food Policy Pact signed in 2015. This is an international agreement where cities from all over the world committed “to develop sustainable food systems” and “to minimize waste” (MUFPP, 2021). The pact gives 6 recommendations to the signatories, including, for instance, “identify, map and evaluate local initiatives” (MUFPP, 2021).

Amsterdam is in the preliminary phase of implementing a CE strategy whereas Barcelona provides insight into an early-stage case (Prendeville et al., 2018). Amsterdam is considered a frontrunner of the CE in Europe (Campbell-Johnston et al., 2019). It recently published its CE Strategy, which describes the city's ambition to be completely circular by 2050 and to halve food waste by 2030. It plans to do so by strengthening short food supply chains, reducing meat consumption and developing high quality organic waste streams (Gemeente Amsterdam, 2020). Additionally, it is working on a CE Food Strategy, which will supposedly tackle food waste. Barcelona has not yet designed a CE strategy,

but it plans to do so by 2025. Its current Climate Plan describes the city's ambitions to be carbon neutral by 2050 and it presents (what are now outdated) ambitions to reduce food waste (e.g. fight food waste and optimize waste collection routes by 2020) (Ajuntament de Barcelona, 2018).

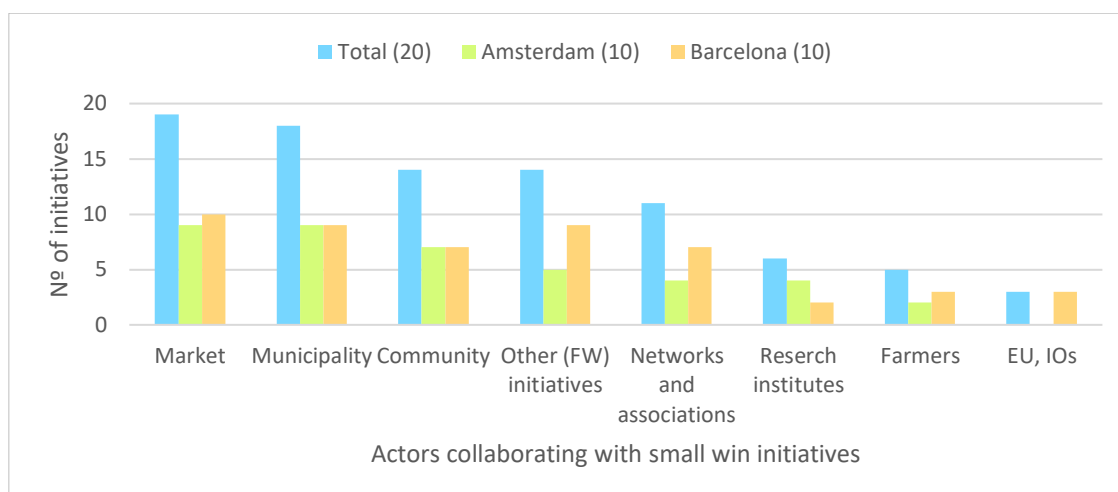
The existence of these documents indicates that both local governments use a top-down approach. However, Prendeville et al. (2018) argue that Barcelona has adjusted it to be more inclusive to citizen and community views. Barcelona's Climate Plan acknowledges that the municipality has a key role in setting an ambition and in coordinating. However, it aims to create strategies that are "co-designed between the municipality and residents" in which all actors "share responsibility" (Ajuntament de Barcelona, 2018, p. 3). The Plan highlights the importance of creating initiatives that tackle more than one problem at once, that can be replicated and that are co-produced by multiple actors. Amsterdam's CE Strategy states that the municipality must take the lead and set example. It encourages actors to collaborate, and it highlights the importance of creating collaborations between the municipality, knowledge institutions and businesses in order to "research, innovate, and implement" (Gemeente Amsterdam, 2020, p. 17). The city has several state and business-led circular projects and multiple knowledge development projects, including an independent institute for urban sustainability research (Prendeville et al., 2018).

#### 4.2. Sub-question 1

*What is the level of involvement and embeddedness of collaboration between small win initiatives fighting food waste and their partners?*

The results demonstrate that the two most frequent partners of small win initiatives were the municipality and the market, followed by the community (see Figure 9). All but one of the studied initiatives in Barcelona collaborated with other (food waste) initiatives, which usually tackled food waste or other societal problems in their own way, for example food banks or NGOs. Also relevant is that several studied initiatives in Barcelona were collaborating together, for example Pont Alimentari with Nevera Solidària or Menjador Ca La Rosa with Nutrició Sense Fronteres. Interestingly, Barcelona's initiatives collaborated more often with networks and associations, such as the Social Network of Barcelona (interviewee 11). This network approach could explain why small win initiatives in Barcelona collaborated on average with five partners, one more than Amsterdam's. In contrast, more initiatives in Amsterdam collaborated with research institutes. A small number of initiatives collaborated with farmers and International Organizations (IOs) or bodies such as the EU, usually because they received funding from them. Because this was only the case for less than one third of the studied initiatives, this study focuses on the first six collaborating actors.

Figure 9. *Actors collaborating with small win initiatives*



Note: see Appendix H, Table H 1 for detailed information per small win initiative

This SQ has looked into the characteristics of the collaboration between the small win initiatives and their partners. Based on these characteristics, it is possible to identify the collaboration's level of involvement and embeddedness (Lawrence et al. 2002) (see Figure 2 in chapter 2.1). The involvement of a collaboration refers to its internal dynamics. High involvement entails deep interaction, a partnership structure and bilateral information flow. A collaboration with such characteristics will be able to create innovation effects within its boundaries (Lawrence et al., 2002). The embeddedness of a collaboration refers to its connections with other organizations and society in general. High embeddedness entails broad interaction, a representation structure and multilateral information flow. A collaboration with such characteristics will be able to spread these innovation effects beyond its boundaries. Both involvement and embeddedness are important qualities of collaboration, as they enable them to create innovation effects which can be used by society in general (Lawrence et al., 2002).

The following lines describe the characteristics, as well as the level of involvement and embeddedness, of collaborations between small win initiatives and their partners. For this, the involvement and embeddedness tables explained in the methodology chapter were used (see Table 6 chapter 3.3.2). This study found that the characteristics of collaboration between small win initiatives and each of their partners is similar in both cities. Thus, so are the collaborations' level of involvement and embeddedness. Therefore, the findings presented below are equally representative for both cities.

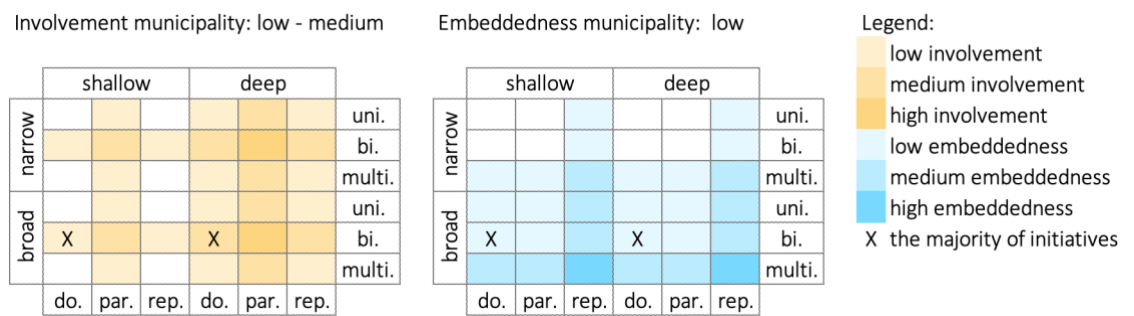
Collaborations with the **municipality** had always a donation structure, in which the municipality funded the small win initiatives' projects. In general, these collaborations were broad because the municipality often brought or suggested new partners to broaden the collaboration. For example, Too Good To Go Spain was contacted by the municipality, who was "interested in having the tool [a Too Good To Go stand] in the local

markets”, where the company was able to “weave alliances” with other partners (interviewee 17, para. 89). Communication between small win initiatives and the municipality was in general bidirectional: the municipality learned from the initiatives that navigated and explored the transition towards a CE, while the initiatives received advice from the municipality. The Waste Transformer explained it this way:

The City of Amsterdam never thought about having this kind of solution [an on-site containerized anaerobic digester], so they are learning from us and we're learning from them what we can do and which are the best solutions for our technology. So yeah, it's a mutual learning process, I would say. (Interviewee 2 para. 26).

Having a deep or shallow interaction varied per initiative. For example, La Fàbrica del Sol aimed to have a deep collaboration with the various districts in Barcelona. To do so, they “tr[ie]d to have a common axis in a series of activities that [were] carried out in each of these facilities [districts] every four months” (interviewee 16, para. 18). In contrast, Wormenhotels described what seems like a shallow interaction with the municipality: “just because it grew so quickly there [in Amsterdam], I think it's more just the practical day-to-day management of the wormhotels” (interviewee 9, para. 199). Considering these characteristics, collaboration with the municipality had low or medium involvement and low embeddedness (see Table 7).

Table 7. *Level of involvement and embeddedness of collaboration between small win initiatives and the municipality*

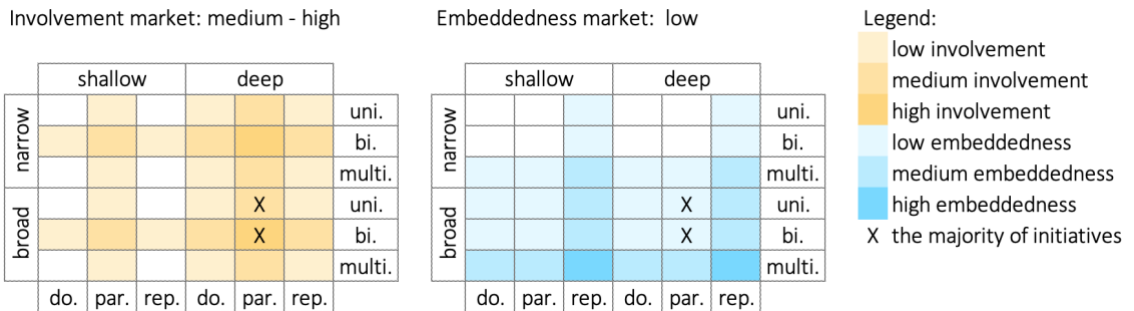


Note: see Appendix H, Table H 2 for detailed information per small win initiative

Usually the small win initiatives and the **market** had a partnership structure, where they worked and carried out activities together. These activities were varied, for example: PeelPioneers used the services of transport companies (interviewee 6), GROWx sold their products to restaurants (interviewee 3) and Soy Comida Perfecta acted as intermediary between supermarkets and community (interviewee 8). In general, these collaborations had a broad interaction, because the initiatives gained new partners through their usual and official collaborations. In fact, GROWx mentioned that existing chef-partners brought them in contact with new chefs and “that is how [they] started growing” (interviewee 3,

para. 27). The information flow was sometimes unidirectional, usually because small win initiatives felt that they were educating others. For example, PeelPioneers mentioned that they “[taught] supermarkets in order to work with this new method [recycling orange peels], and let them believe that it [was] the best way to work” (interviewee 6, para. 39). In other cases, the information flow was bidirectional, for example between ColorSensing and retailers, who gave them feedback on “what could be the future implementation of [their] technology” (interviewee 12 para. 59). Overall, these collaborations had medium to high involvement but low embeddedness (see Table 8).

Table 8. *Level of involvement and embeddedness of collaboration between small win initiatives and the market*



Note: see Appendix H, Table H 2 for detailed information per small win initiative

The characteristics of the collaborations between small win initiatives and the **community** varied per initiative. Usually, they were shallow and had a donation structure. For instance, the community answered the Espigolador’s call to volunteer and glean in the agricultural field, but there was no strategic and joint planning between them (interviewee 7). The information flow was generally unidirectional because usually initiatives carried out awareness campaigns and educated the community on sustainable practices. For example, Too Good To Go’s campaign to teach consumers “the difference between best before and expiry date” (interviewee 17, para. 47), or Revolta training’s to “both teachers and children on how to compost” (interviewee 14, para. 63). The combination of these characteristics meant that the level of embeddedness between these two actors was low, and the level of involvement was generally absent. In some cases, however, the level of involvement could be low or even medium. For instance, in I Can Change, some volunteers started renting plots in the community garden (interviewee 5), transforming the structure of the collaboration from a donation to a partnership. In Wormenhoteles, the initiative and employed residents had a bidirectional information flow, in which residents were “basically [the] ears and eyes on the streets ( ... ) notic[ing] all the little details where [Wormenhoteles] could improve” (interviewee 9, para. 227). See Table 9.



Table 9. *Level of involvement and embeddedness of collaboration between small win initiatives and the community*

Involvement community: generally absent, sometimes low										Embeddedness community: generally low										Legend:																																							
																				low involvement																																							
																									medium involvement																																		
																														high involvement																													
																														low embeddedness																													
																																			medium embeddedness																								
																																								high embeddedness																			
																																													X the majority of initiatives														
																																																		x more than half of the majority of the initiatives									

Involvement community: generally absent, sometimes low									
		shallow			deep				
narrow									uni.
									bi.
									multi.
broad	X	x							uni.
	x	x							bi.
									multi.
		do.	par.	rep.	do.	par.	rep.		

Embeddedness community: generally low									
		shallow			deep				
narrow									uni.
									bi.
									multi.
broad	X	x							uni.
	x	x							bi.
									multi.
		do.	par.	rep.	do.	par.	rep.		

Several small win initiatives collaborated with broader **networks and associations**. The degree of involvement was absent because these collaborations were shallow and had a representation structure. This indicates that even though small win initiatives were part of these networks and associations, they were not able to plan strategies together. Wormenhôtels provided a reason why: “[the Community Composting Network] is not very useful for us because it’s so broad that there is not a specific interest for us” (interviewee 9, para. 125). On the positive note, these collaborations had a high level of embeddedness because they were broad and had multidirectional information flows. In practice, this means that networks and associations enabled small win initiatives to meet other partners. Wormenhôtels referred to them as “conferences where you can meet other colleagues” (interviewee 9, para. 123) and Revolta used the network Schools for Sustainability in Catalonia to find new school-partners (interviewee 14). Networks and associations facilitated mutual learning between partners. Espigoladors, for instance, used them to learn from other’s experiences and experiments. They stated: “we always try to be on these platforms ( ... ) to see what others do, and how they are evolving ( ... ) you see what others are doing and we too can get ideas” (interviewee 7, para. 103). See Table 11.

Table 11. *Level of involvement and embeddedness of collaboration between small win initiatives and networks and associations*

Involvement networks & associations: generally absent										Embeddedness networks & associations: high										Legend:		
																				<div></div> low involvement	<div></div> medium involvement	<div></div> high involvement
																				<div></div> low embeddedness	<div></div> medium embeddedness	<div></div> high embeddedness
																				X the majority of initiatives		

Note: see Appendix H, Table H 4 for detailed information per small win initiative

Only a few small win initiatives, and mostly in Amsterdam, collaborated with **research institutes**. These collaborations seemed to be shallow because they were only occasional and for research purposes or advice. There was no strategic and joint planning involved. For instance, Too Good To Go said that they “do not have a solid and permanent relationship with universities” (interviewee 17, para. 19), and Café De Ceuvel mentioned that “[they] only go to [research institutes] if [they] have an issue or a thing, it’s mostly this kind of funky projects like the biogas boat” (interviewee 1, para. 119). Communication between these actors was bidirectional and both partners learned from each other. GROWx described it this way:



could have been 8 and 8,5, respectively. However, these scores are not meant to be seen as a scale, but as a way to compare small win initiatives and cities. I Can Change and Nevera Solidaria had the lowest involvement scores. This is because neither of them were collaborating with the market nor research institutes, the two partners with the highest level of involvement. Too Good To Go achieved the highest involvement possible, while many others were rather close, for example Café De Ceuvel. These small win initiatives collaborated with 4 to 6 actors, and always with the market. In practice, small win initiatives with higher involvement scores (such as Too Good To Go and Café De Ceuvel) are expected to create more innovation effects within their collaborations than small win initiatives with lower levels of involvement (such as I Can Change and Nevera Solidaria).

Table 13. *Level of involvement and embeddedness in Amsterdam and Barcelona*

	Total partners (max. 6)	Level of involvement (max. 8 / 80)	Level of embeddedness (max. 8,5 / 85)
Café De Ceuvel	5	6,5	7
The Waste Transformers	3	4,5	3
GROWx	3	6	3
Myco Insulation Project	2	4,5	2
I Can Change	3	3,5	3,5
PeelPioneers	3	5,5	3,5
Wormenhotels	4	4,5	6
Too Good To Go NL	6	8	8,5
BuurtBuik	4	6	4,5
Taste Before You Waste	5	6	7,5
Total Amsterdam	4	55	48,5
Espigoladors	5	6	7,5
Soy Comida Perfecta	3	5,5	3,5
Pont Alimentari	3	5,5	3,5
Menjador Ca La Rosa	5	6	7,5
ColorSensing	2	4,5	2
Revolta	5	6	7,5
Nutrició Sense Fronteres	5	6	7,5
La Fàbrica del Sol	5	6	7,5
Too Good To Go ES	6	8	8,5
Nevera Solidaria	4	3,5	6,5
Total Barcelona	5	57	61,5

Note: see Appendix H, Table H 5 for detailed information per initiative

Multiple small win initiatives in Amsterdam, scored rather low in embeddedness, for example Myco Insulation Project. These initiatives collaborated only with 2 or 3 partners, and did not collaborate with networks and associations, the actor with the highest level of embeddedness. Again, Too Good To Go achieved the highest embeddedness score, because it collaborated with all the studied partners. Many small win initiatives in Barcelona had high embeddedness scores, for instance, Espigoladors and Menjador Ca

La Rosa. These collaborated with 5 to 6 partners, and always with other (food waste) initiatives and networks and associations, which provided them with high embeddedness. In practice, these small win initiatives should be able to make innovation effects available beyond the collaborative relationship, where they could be used by other organizations and society in general.

The level of involvement of the collaborations in Amsterdam and Barcelona was very similar, 55 and 57 respectively. However, the level of embeddedness was lower in Amsterdam than in Barcelona, 49 and 62 respectively. These differences are explained by the actors with whom small win initiatives were collaborating. More small win initiatives in Amsterdam collaborated with research institutes, which provided them with high involvement scores. This is in line with Amsterdam's CE Strategy, which emphasises the importance of collaborating with knowledge institutions and doing research (Gemeente Amsterdam, 2020). Barcelona's initiatives did not usually collaborate with research institutes, but, because they collaborated with more partners, the involvement score between cities was balanced. More small win initiatives in Barcelona collaborated with other (food waste) initiatives and networks and associations. These provided initiatives with high embeddedness scores. These traits are in line with Barcelona's Climate Plan, which supports initiatives that tackle more than one societal problem and has a strong network and collaborative approach (Ajuntament de Barcelona, 2021; Prendeville et al., 2018). According to Lawrence et al.'s (2002) theory small win initiatives in Barcelona are expected to be more innovative than small win in Amsterdam. This will be explored in the following section, discussing SQ 2.

### 4.3. Sub-question 2

*How do involvement and embeddedness of collaboration influence innovation effects on practices, values and technologies; that may facilitate the circular economy transition?*

Innovation effects were those new practices, values and technologies that were not only used within the collaborative relationship, but were also available to other organizations and society in general (Lawrence et al., 2002). Thus, other actors could make use of the innovation if desired. Lawrence et al. (2002) claim that higher levels of involvement and embeddedness lead to more innovation effects. Therefore, according to the authors' theory, small win initiatives in Barcelona should have created more innovation effects. However, this study found that small win initiatives in Amsterdam created more innovation effects than initiatives in Barcelona, 23 and 16 respectively (see Table 14 for an overview). Only one initiative in Barcelona (Soy Comida Perfecta) did not create any innovation effect, as it was forced to close during the Covid19 crisis and does not exist anymore (interviewee 8). Thus, this study does not support Lawrence et al.'s (2002) claim.

Table 14. *Innovation effects on practices, values and technologies in Amsterdam and Barcelona*

	Amsterdam	Barcelona
New practice	<p><b>Café De Ceuvel</b><sup>1</sup>: an economically viable plant-based café, that occasionally carried out circular experiments</p> <p><b>The Waste Transformers</b><sup>2</sup>: changed businesses' routine from using regular waste streams to using an onsite anaerobic digester, giving them clean energy, heat and fertilizer; created an entrepreneurship program which supports local entrepreneurs abroad</p> <p><b>GROWx</b><sup>3</sup>: brought food production back to the city using vertical farming</p> <p><b>Myco Insulation Brewery</b><sup>4</sup>: changed businesses routine of throwing away spent grain; used it to create new materials while making a tasty beer</p> <p><b>I Can Change The World</b><sup>5</sup>: changed community's routine from using regular waste streams to composting; the community weighted and composted their organic waste</p> <p><b>PeelPioneers</b><sup>6</sup>: changed businesses' routine of throwing orange peels in the regular waste streams; used empty trucks to collect orange peels; processed them into functional ingredients for the food industry.</p> <p><b>Wormenhotels</b><sup>7</sup>: changed community's routine from using regular waste streams to using wormenhotels, giving them compost; organized parties to bring the community together; residents collectively took care of wormhotels.</p> <p><b>Taste Before You Waste</b><sup>8</sup>: cooked and used businesses' food surplus to feed people in need; created a pay-as-you-feel market with discarded food.</p> <p><b>BuurtBuik</b><sup>9</sup>: cooked businesses' food surplus to feed people in need</p>	<p><b>Espigoladors</b><sup>10</sup>: brought back the practice of gleaning</p> <p><b>Pont Alimentari</b><sup>11</sup>: changed businesses' routine from throwing food away to giving it to people in need</p> <p><b>Menjador Ca La Rosa</b><sup>12</sup>: a cafeteria where children could have lunch and learn a more direct way of dealing with FW using e.g. a composting machine.</p> <p><b>Revolta</b><sup>13</sup>: a composting machine that allowed the community and businesses to compost on their own; recovered the city-agriculture relationship by giving farmers the compost to farmers</p> <p><b>Nutrició Sense Fronteres</b><sup>14</sup>: changed businesses' routine from throwing food away to giving it to people in need</p> <p><b>La Fàbrica del Sol</b><sup>15</sup>: an interactive map and itineraries to showcase initiatives, which was financially supported by the municipality but where all actors could equally participate</p> <p><b>Nevera Solidària</b><sup>16</sup>: a fridge where the community could bring and take away leftovers</p> <p><b>Too Good To Go</b><sup>17</sup>: created a win-win-win model; changed businesses' routine from throwing away eatable food to selling it to customers for a reduced price; created the idea of a Magic Box and Magic Dinners.</p>
New value	<p><b>Café De Ceuvel</b><sup>1</sup>: changed community's values towards FW</p> <p><b>The Waste Transformer</b><sup>2</sup>: changed businesses' values towards FW</p> <p><b>I Can Change</b><sup>5</sup>: changed community's values towards FW</p> <p><b>PeelPioneers</b><sup>6</sup>: made it visible to retailers that there is value in their waste</p> <p><b>Wormenhotels</b><sup>7</sup>: changed community's values towards FW</p> <p><b>Taste Before You Waste</b><sup>8</sup>: increased awareness about FW</p> <p><b>BuurtBuik</b><sup>9</sup>: increased awareness about FW</p>	<p><b>Espigoladors</b><sup>10</sup>: increased awareness about food loss in the primary sector</p> <p><b>Pont Alimentari</b><sup>11</sup>: changed businesses' values towards FW</p> <p><b>Menjador Ca La Rosa</b><sup>12</sup>: increased children's awareness of what they eat and what happens to FW when it is composted</p> <p><b>Revolta</b><sup>13</sup>: increased awareness about FW</p> <p><b>Nutrició Sense Fronteres</b><sup>14</sup>: changed businesses' values towards FW</p> <p><b>Too Good To Go</b><sup>17</sup>: changed the mindset of businesses and community towards FW; changed the shelf-life label policy; uncovered the FW taboo</p>
New technology	<p><b>The Waste Transformer</b><sup>2</sup>: an on-site containerized anaerobic digester, which could be placed anywhere in the city</p> <p><b>GROWx</b><sup>3</sup>: fully roboticized zero waste vertical farm powered by green electricity; a data-driven plant management system</p> <p><b>Myco Insulation Brewery</b><sup>4</sup>: insulation panels from brewer's spent grain</p> <p><b>PeelPioneers</b><sup>6</sup>: a 100% circular solution from orange peels, e.g. dietary fibres</p> <p><b>Wormenhotels</b><sup>7</sup>: underground worm composting</p>	<p><b>ColorSensing</b><sup>18</sup>: a QR code that changes colours and indicates the freshness of packaged-food.</p> <p><b>Revolta</b><sup>13</sup>: a small-size, easy to use and affordable composting machine, which sanitizes the waste, lowering its volume and stabilizing it.</p>

Note: Too Good To Go's innovation effects are described in Barcelona's column but are valid in both cities.

Source: <sup>1</sup> Interviewee 1; <sup>2</sup> Interviewee 2; <sup>3</sup> Interviewee 3; <sup>4</sup> Interviewee 4; <sup>5</sup> Interviewee 5; <sup>6</sup> Interviewee 6; <sup>7</sup> Interviewee 9; <sup>8</sup> Website 18; <sup>9</sup> Website 19; <sup>10</sup> Interviewee 7; <sup>11</sup> Interviewee 10; <sup>12</sup> Interviewee 11; <sup>13</sup> Interviewee 14; <sup>14</sup> Interviewee 15; <sup>15</sup> Interviewee 16; <sup>17</sup> Interviewee 13 and 17; <sup>18</sup> Interviewee 1

There are two possible reasons that explain why Lawrence et al.'s (2002) theory is not supported. The first one is that Amsterdam has created more innovation effects on technology (see Figure 10), possibly because more small win initiatives in Amsterdam collaborated with research institutes. The collaboration between research institutes and small win initiatives had a medium level of involvement, which could have facilitated innovation within the collaborative relationship, and in this particular case, the development of new technology. Furthermore, several interviewees indicated that creating new technology helped to create new practices and values. At the same time, new practices helped to create new values (interviewee 2, 6, 10). For instance, the on-site anaerobic digester of The Waste Transformers changed businesses' routine from using the city's organic waste streams to using the digester, while generating value from their waste (interviewee 2, para. 55). PeelPioneers developed new technology that allowed them to extract more materials from orange peels and produce food products from it, increasing the value of the orange peels (interview 6, para. 51). Thus, this study suggests that innovation effects on technology, favoured the appearance of innovation effects on practices and values. New technology was, therefore, the most powerful innovation effect an initiative could create. See example below, Figure 11.

Figure 10. *Nº and type of innovation effects created in each city*

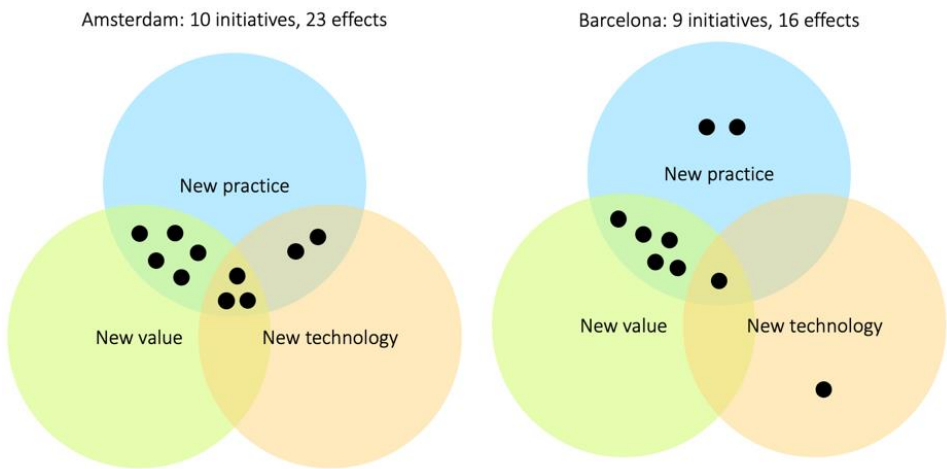
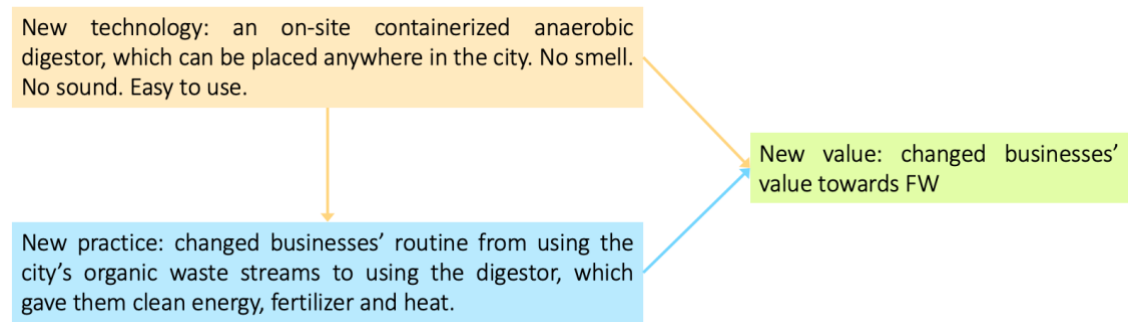


Figure 11. *An innovation effect on technology creates innovation effects on practices and values*



Source: interviewee 2



The second explanation for this mismatch is that more small win initiatives in Barcelona struggled with their collaborations. Seven initiatives in Barcelona mentioned difficulties in collaboration, whereas only three in Amsterdam did so. The two most mentioned difficulties were complexity and time (see Figure 12). Time was seen as an obstacle to the collaboration's involvement. For instance, when interviewee 5 was asked if they shared information with one of their partners, he answered that "no ( . ... ) that really takes time" and he added that "a lot of information and possibilities are lost because ( ... ) people are tired and exhausted" (para. 55 and 59). Likewise, interviewee 1 explained how solving problems with one of their partners "always takes long time", thus they prefer to do it on their own because they "are a lot quicker" (para. 123). Time was also a constraint to start new collaborations, and therefore an obstacle to the collaboration's embeddedness. For instance, La Fàbrica del Sol explained that they have not promoted their tool (a map where circular solutions can be located) because it "is not exclusively managed by the municipality, but also by many other initiatives involved ( ... ) therefore, [they] haven't had time yet, nor money" (interviewee 16, para. 62). On the positive note, interviewees recognized that collaborations are efficient in the long term. Pont Alimentari described it this way: "it's true that it's a slow way of working... that sometimes it's not the most... effective, but it's the most efficient. Eventually, the things you're doing end up being more accepted by everyone" (Interviewee 10, para. 51).

Several interviewees mentioned complexity as an obstacle to collaboration (e.g. interviewee 14, 15 and 17). They also argued that complexity was related to the number of actors involved in the collaboration: the more actors involved, the more complicated it is to collaborate (interviewee 14 and 15). Furthermore, small win initiatives believed that complexity was an obstacle to effectively coordinate initiatives (interviewee 16 and 17) and as a result, there was duplicity of initiatives in the city (interviewee 10, 11 and 15). Interviewee 11 explained that, even though it is important to collaborate, it is complex, and a source of duplicity of initiatives:

Interviewer: How do you think these [collaborations] help you?

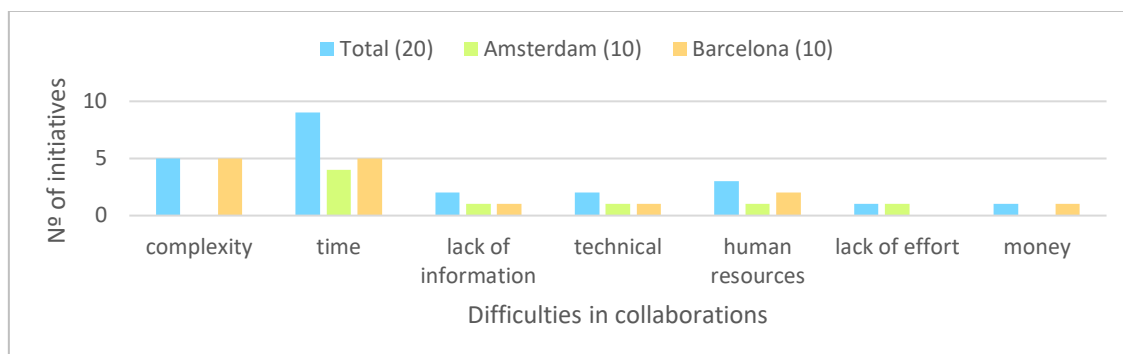
Interviewee 11: We are in the Social Economy Network of Sant Andreu, which at the same time belongs to the Social Network of Barcelona and at the same time has social representations throughout Catalonia. So all it does is... it echoes what you're doing, and you feel less lonely. Your job, together with that of others, makes sense. [...] it's very important to collaborate, but even in collaborations you see that initiatives from the same labour sector are doing the same... so collaborating also has its mistakes (interviewee 11, para. 176).

Interviewee 15 described how "there are a lot of tables, meetings, but in the end, [initiatives] don't go as a team" and so there are "duplicity of projects" (para. 59). She went on to explain how the municipality is starting projects that "are already working"



and being managed by existing initiatives, “which already have the experience” and “have been working with it for many years” (para. 163). This highlights the lack of coordination in the city.

Figure 12. *Nº of small win initiatives that experienced difficulties in collaborations*



Note: see Appendix H, Table H 6 for detailed information per small win initiative

To sum up, the findings from this comparative study suggest that having higher levels of involvement and embeddedness does not necessarily lead to more innovation effects. Instead, what seems more important, is to have the right combination of involvement and embeddedness. As shown, a combination of higher involvement than embeddedness (Amsterdam’s case) led to more innovation effects than a combination of higher embeddedness than involvement (Barcelona’s case). This indicates that, if small win initiatives want to create more innovation effects, they should focus on their level of involvement first, and later on their level of embeddedness. This is understandable, because a collaboration that is not able to create new practices, values and technologies within their boundaries, will not have innovation effects to spread beyond their boundaries. The findings also indicate that the partners with whom small win initiatives collaborate can be decisive to their involvement and embeddedness, as well as the number and type of innovation effects that are created. Collaborating with research institutes increased Amsterdam’s involvement and allowed small win initiatives to create more new technology, which at the same time triggered new practices and values. Collaborating with networks and associations increased Barcelona’s embeddedness, however, this did not seem to give initiatives an advantage to innovate. Last but not least, it is important to minimize the difficulties of time and complexity in Barcelona’s collaborations, as they could have reduced the initiatives’ ability to produce innovation effects.

#### 4.4. Sub-question 3

*How do involvement and embeddedness of collaboration relate to propelling mechanisms; that may accelerate the circular economy transition?*

This research has found evidence of the five studied propelling mechanisms, previously studied by Termeer and Dewulf (2019) and Termeer and Metze (2019). The following lines describe how the studied small win initiatives activate and use each mechanism, how some mechanisms reinforce each other and how do they relate to collaboration. If identified, their links with involvement and embeddedness of collaboration are also explained.

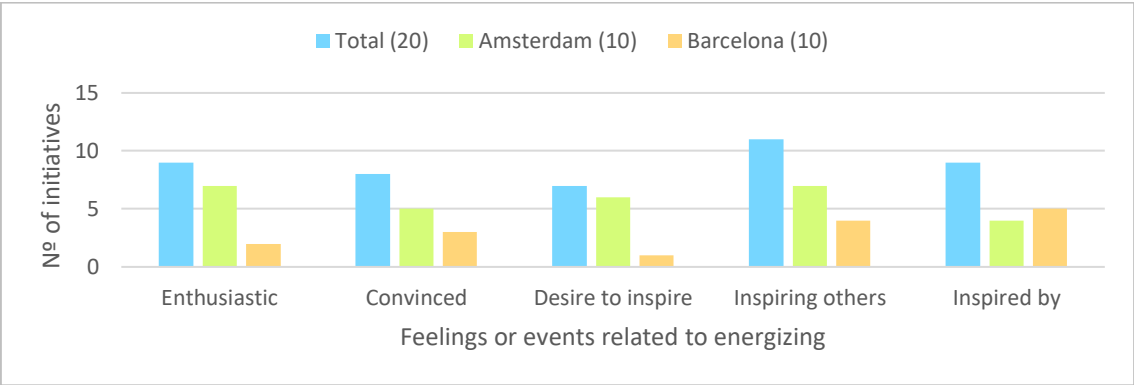
From the interviews, it became clear that the **energizing** mechanism occurred regularly. Interviewees described feelings and situations that were encompassed in two adjectives “enthusiastic” and “convinced”. Feeling “enthusiastic” was used by small win initiatives to describe how their partners felt. Wormenhôtels, for instance, described how the members of the municipality “were just themselves personally very enthusiastic about the idea, and so that made a lot of difference”, referring to the fact that they received a lot of support which enabled them to grow (interviewee 9, para. 35). This feeling was also used to describe how others might feel about the success of their initiatives. GROWx, for example, explained that “everyone started seeing: ‘oh they can do something’, and ‘they are growing’”, which led other initiatives to “try and work something out” (interviewee 3, para. 83). The studied small win initiatives used the feeling “convinced” to describe how others might feel about their success. Interviewee 2 explained how they had given “an example of what is possible” and “proof” of new technology (para. 75). Others outside the initiative were then convinced and inspired to pursue similar ideas (interviewee 1-4, 6, 17). Similarly, Too Good To Go argued that “[they] have done it, [they] have proved it can work [thus] everyone can do it”, referring to the fact that they are a profit-oriented business fighting food waste (interviewee 17, para. 227).

Several initiatives in Amsterdam indicated that they have the desire to inspire others. For example, Café De Ceudel “try[s] to inspire and involve like-minded individuals into a growing movement of innovation and transition” (Website 1, para. 26). This could explain why more initiatives in Amsterdam than in Barcelona believe they had inspired others (see Figure 13). A common reason to believe so is the fact that they had been contacted by other actors who were interested in replicating their idea (interviewee 3, 5 and 8). Sometimes, these requests came from other countries (interviewee 2, 4, 7 and 9). The Waste Transformers, for example, claimed that they were “getting requests from almost every country in the world” (interviewee 2, para. 62). Moreover, some small win initiatives were also inspired by other initiatives around the world. For instance, I Can Change was inspired by an initiative from New York (interviewee 5), BuurtBuik was

inspired by an initiative from Portugal (website 19) and La Fàbrica del Sol was inspired by an initiative from the United States (interviewee 16). Therefore, the energizing mechanism influenced the coupling mechanism, because the “positive energy” of an initial small win activated actions in other territories.

Overall, collaboration seemed to influence the energizing mechanism, which occurred more often outside the collaboration than inside – only feeling “enthusiastic” occurred within the collaborative relationship. Thus, this mechanism was mostly influenced by the embeddedness of collaboration. For instance, if small win initiatives were entangled in broader networks, they could have more chances to inspire and be inspired. Moreover, they could also have more chances to show proof of their outcomes and convince others, who might want to replicate their idea. These would therefore activate the energizing mechanism.

Figure 13. *Nº of initiatives that have mentioned feelings or events related to the energizing mechanism*



Note: see Appendix H, Table H 7 for detailed information per small win initiative

Evidence indicates that **learning by doing** happened via solving problems, experimenting or adapting to needs. Almost all the small win initiatives improved by solving problems. Experimenting appeared more dominant between initiatives in Amsterdam, while adapting to needs appeared slightly more dominant between initiatives in Barcelona. See Figure 14. Interestingly, four initiatives in Amsterdam argued that one of the reasons why they were now using a circular solution to food waste was because the municipality’s organic waste stream was expensive. The need to solve this inconvenience incentivised them to think differently and find a new and cheaper solution. A common solution was to partner with another organization who viewed waste as a resource and would, therefore, not charge these initiatives for picking up their organic waste (interviewee 1, 4, 6 and 9).

Several small win initiatives improved their projects or products “along the way, as problems [came]” (interviewee 14, para. 123). For instance, when Wormenhotels was overwhelmed by the number of requests of worm hotels, they decided to make it harder

for businesses to join, by asking them to make a public promise of their commitment to be free of organic waste within a year. When companies agreed, Wormenhôtels hosted multiple sessions with all the employees in the company with the goal to find solutions together (interviewee 9, para. 207 and 227), which deepened their partnership. Similarly, when I Can Change realized that its users were not engaging with the initiative enough, they asked them to enter the community garden to weight their kitchen waste and to start the process of composting, which showed them “the beauty” of it (interviewee 5, para. 79). This, not only deepened the collaboration between the small win initiative and the residents, but it also attracted more members from the community, increasing both involvement and embeddedness of collaborations.

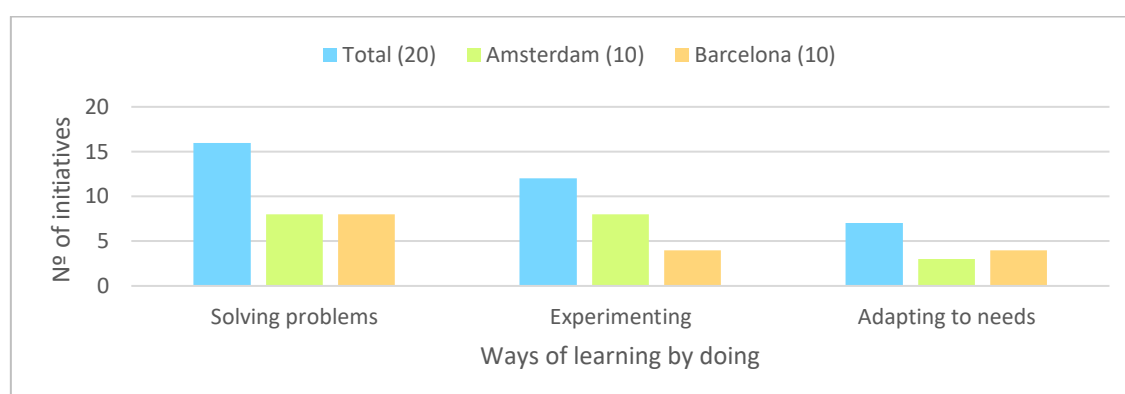
Initiatives experimented by trying to figure out “what works and doesn’t work” (interviewee 5, para. 52; interviewee 9, para. 42). They learned new things through these experiments and they used this knowledge to improve their project or product, which led to their next experiment (interviewee 3, 5, 9, 13 and 17). Some of them used feedback from collaborating partners, especially from the community (interviewee 9, 13 and 17) or the market (interviewee 3, 12, 13 and 17). Receiving feedback helped initiatives to understand what needed to be improved. For example, GROWx was constantly experimenting by modifying the environment of its vertical farm, where their greens grow. Some of their chef-partners gave them feedback about the quality of the greens. GROWx used this information to make new modifications and improve their product (interviewee 3). I Can Change went a step farther and shared the information they gained from residents (the weight of their kitchen waste bags) with the municipality, which created a multidirectional information flow (interviewee 5). Thus, asking partners to give feedback created bidirectional or multidirectional information flows which increased the involvement or embeddedness of collaborations.

Some initiatives improved by adapting to the market and consumers’ needs. ColorSensing, for example, created a new technology which indicates the freshness of packaged food. However, the information is not easy to read in the supermarket, where consumers would always choose the freshest product, and the industry would suffer from it (interviewee 12, para. 71). Another example was given by PeelPioneers, who, due to an increase on the amount of orange peels that they were asked to collect, changed their decentralized pick-up logistic to a centralized one. To do so, they started a new collaboration with two transport companies (interviewee 6 para. 43). Interestingly, some small win initiatives in Barcelona adapted their projects to people’s needs during Covid19. For example, Nutrició Sense Fronteres received fresh and uncooked food from hotels that were forced to close. They partnered with Menjador Ca La Rosa, who was cooking this food in their kitchen and donated it to people in need (interviewee 11 and 15). Moreover, Menjador Ca La Rosa and Espigoladors recalled having many more volunteers and strengthening local networks during Covid19 (interviewee 11 and 7). This suggests that

initiatives started new projects and collaborations when they were adapting to people's needs (interviewee 10, 11 and 15).

Learning by doing appeared to be interrelated with collaboration. For one, this mechanism increased the involvement and embeddedness of collaborations. For example, by creating deeper collaborations and bidirectional or multidirectional information flows. For another, this mechanism was activated by collaborations in which partners energized each other. Small win initiatives were inspired by other's experiments and solutions and they tried to implement them in their own initiative. This was common in networks and associations (interviewee 7, 9 and 11). Menjador Ca La Rosa, for instance, said that "seeing how other initiatives work inspires them" to try other's solutions and see "if they work" in their own initiative (interviewee 11, para. 99). This suggests that both involvement and embeddedness are important to activate the learning by doing mechanism.

Figure 14. *Nº of initiatives that have mentioned different ways of learning by doing*



Note: see Appendix H, Table H 8 for detailed information per small win initiative

The **logic of attraction** mechanism was noticed when small win initiatives acknowledged an increase in partners, financial support, employees or demand over the years. All small win initiatives except Soy Comida Perfecta, which ceased to exist during Covid19, had an increase in some or multiple resources. More initiatives in Amsterdam than in Barcelona have seen increases in these categories (see Figure 15). Because of a lack of data, assessing the reasons why Barcelona's initiatives had experienced less increases than Amsterdam's initiatives is not possible. However, interviewees in Barcelona did indicate that, nowadays, there were more initiatives fighting food waste, which fragmented the funding given by the municipality (interviewee 7, 10 and 15). This indicates that the logic of attraction mechanism is influenced by the bandwagon effect, which shifts community, market and policy trends.

Remarkably, almost all small win initiatives gained more partners over the years. Interviewees indicated that it became easier to start collaborations after having "proof

of concept” and “showing what they can do” (interviewee 2, para. 75). This, seemed to convince people outside of existing collaborations, who were now more willing to engage with the small win initiative. In fact, some interviewees recalled how they were now being contacted by others (interviewee 2, 7, 10, 13 and 17). For instance, Too Good To Go explained that in the beginning it was hard to get partners that wanted to work with them, but now that their success story was known and that demand for selling food surplus increased, it was much easier to expand their client portfolio (interviewee 13 and 17). Collaborating with networks and associations, which had a high level of embeddedness, helped initiatives to gain more partners.

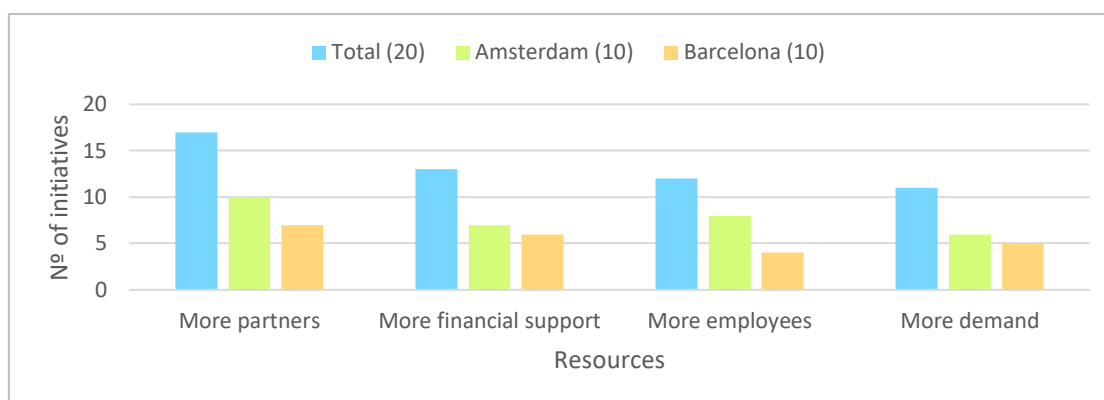
Small win initiatives with visible outcomes also experienced an increase in financial support and employees. For instance, GROWx received more subsidies once it had its “first farm up and running” (interviewee 3, para. 67). Similarly, Too Good To Go hired more employees once they realized that their partners and customers were happy and that their idea was successful (interviewee 13, para. 42). Often, having more demand boosted the initiatives’ resources. PeelPioneers, for example, saw an increase on demand to dispose orange peels. They received more funding, which they used to build a new factory, hired more employees and started new collaborations with transport companies (interviewee 6). Likewise, when Wormenhôtels saw that the demand for having worm hotels was high, they realized the potential of this movement, and they created a network of community composting in Europe (interviewee 9, para. 108).

Evidence indicates that having more resources enabled small win initiatives to amplify or accumulate, for instance by opening a new factory (interviewee 3 and 6) or by placing more worm hotels in the city (interviewee 9). Multiple initiatives have mentioned how having new or more partners helped them to pursue new ideas and start new projects (interviewee 5, 7, 10, 11). Espigoladors explained how collaborations that started because of a “one-day-activity” led to “projects that are co-designed between both initiatives” when they thought they had “similar objectives” (interviewee 7, para. 27). Likewise, Pont Alimentari explained that once two initiatives “have started working and know each other, [they] understand how [they] can do other things” (interviewee 10, para. 67). In fact, Pont Alimentari and Menjador Ca La Rosa begun collaborations with Nevera Solidaria to place the first solidarity fridge in Barcelona. After that, they have worked on more projects together (interviewee 10, para. 63 and interviewee 11 para. 103).

Logic of attraction appeared to be interrelated with the embeddedness of collaboration. This mechanism increased embeddedness of collaboration when, for instance, more demand required small win initiatives to find new partners, which entangled the initiative in broader networks. At the same time, existing collaborations with networks and

associations enabled initiatives to gain more partners, financial support and employees, thereby, activating the mechanism.

Figure 15. *Nº of initiatives that have seen an increase in resources*



Note: see Appendix H, Table H 9 for detailed information per small win initiative

The **bandwagon effect** mechanism was noticeable in both cities. Interviewees stated that the topic of food waste was becoming increasingly popular among the community, the market and in the political agenda. Many initiatives were working on awareness-raising campaigns, for example Pont Alimentari, Taste Before You Waste and BuurtBuik. They believed that people's mindset towards food waste had changed over the years (interviewee 7 and 17), and now "people underst[oo]d that food waste [was] not accepted anymore" (interviewee 13, para. 72). An increase in food waste awareness has led to an increase of initiatives fighting food waste, especially in Barcelona (interviewee 2, 5, 6, 9, 13). Menjador Ca La Rosa described how they experienced this effect: "we see what topics worry us" and we think "I can also join this [fight]" (interviewee 11 para. 103).

According to some interviewees, businesses' views and values towards food waste have also positively changed. Years ago, companies "were ashamed" to admit that they were throwing away food (interviewee 17, para. 201) or were scared of the responsibilities associated with giving away their food surplus (interviewee 8 and 10). Now, things were changing, the topic of food waste was gaining popularity and companies were forced to do something about it (interviewee 17, para. 201). Interviewees argued that nowadays the market is interested in "looking good" and "green" (interviewee 9, 10 and 17). This means that market actors are increasingly interested in starting collaborations with initiatives that reduce food waste. Too Good To Go, for example, has seen how many of the partners they contacted at the beginning of their journey "came back" (interviewee 17, para. 205). Likewise, Wormenhôtels has seen a sharp increase on businesses' demand of worm hotels, so noticeable that they had to modify some internal rules to be able to keep up with the demand (interviewee 9). Thus, shifts on community and market trends induced small win initiatives to adapt to new situations, and therefore, activated the learning by doing mechanism.

“Growing awareness [of food waste] means that the issue is now part of the political agenda” (website 13/17, para. 237). Several interviewees in Barcelona indicated that the municipality is supporting and developing many projects that are fighting food waste (interviewee 7, 14, 15, 16, 17). The topic “is on the table” especially this year, when Barcelona is hosting the 7<sup>th</sup> Milan Urban Food Policy Pact Global Forum (interviewee 10, para. 23). However, interviewees in both cities believed that the government was not celebrating their initiatives (interviewee 5, 8, 9, 11 and 13). Interviewee 8 claimed that “the municipality never promoted [their] initiative” and “never said ‘these companies are fighting food waste’” (para. 51). Small win initiatives doubt about the promoting capacities of the municipality, arguing that municipalities “aren’t very good at that” (interviewee 9, para. 91; interviewee 13). Several interviewees believed that the municipality could take a more prominent role by highlighting the small win initiatives, this would “help people in the city ( ... ) to see what’s happening” (interviewee 9, para. 105). These thoughts are in line with the findings from SQ 2, which indicated that the municipality and small win initiatives had a low/medium level of involvement and low embeddedness.

The **coupling** mechanism occurred when small win initiatives influenced the political agenda or other geographical territories, or when their activities affected other societal problems related to food waste. The findings suggest that more initiatives in Amsterdam operated in other political or geographical scales, whereas more initiatives in Barcelona tackled other societal problems (see Figure 16). Interviewees from initiatives that worked in other scales indicated that working in other countries inspired people in the region, thus activating the energizing mechanism abroad. For instance, The Waste Transformers, who had several containerized anaerobic digestors in Africa, explained how they received more inquiries (and potentially partners) as people saw the success of the container:

In the countries where we have an up and running machine, this is really helpful for us because other people are physically seeing the installation and so they get interested in that and maybe ( ... ) they propose [it] to other companies, or to municipalities. (Interviewee 2, para. 62).

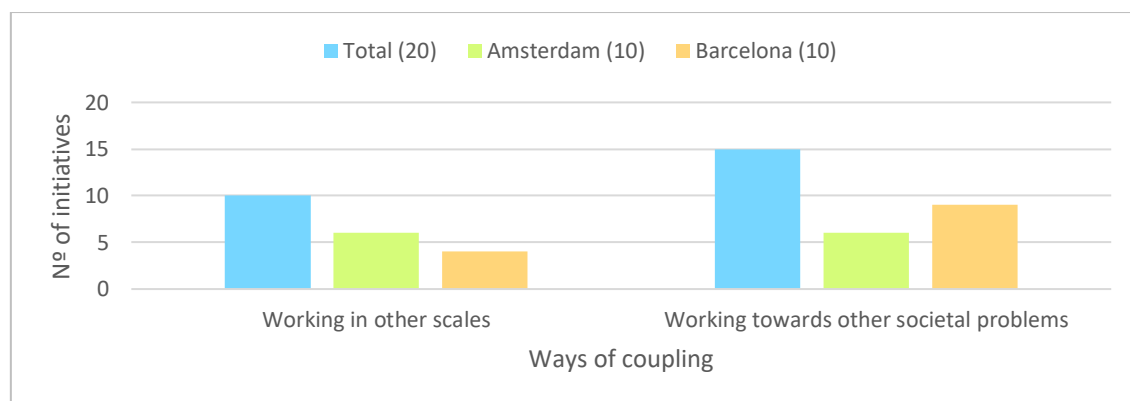
From the analysis, it appeared that some initiatives were having an influence in the political scale. A striking example hereof is the recently approved Catalan Law against food waste (see Law 3/2020 in Departament de la Presidència, 2020). This is a pioneering law in Europe because it prioritizes prevention of food waste through the entire food chain. Several initiatives in Barcelona participated in meetings that were organized by the local government, who wanted to involve as many actors as possible in drafting the law (interviewee 7, 10, 15, 17). In doing so, they were able to influence the Catalan political agenda. This is the case of, for instance Espigoladors, who advocated to include the topic



of gleaning in the law and encouraged the government to focus on the problem of food loss in the agricultural sector (interviewee 7, para. 51). Coupling was therefore a way to increase both involvement and embeddedness: by working in other political scales, initiatives were able to do joint activities and learn from each other, and by working in other territories, initiatives were able to broaden their networks.

Nine initiatives in Barcelona tackled other societal problems related to food waste, while only six initiatives in Amsterdam did so. Usually this was done by NGOs and NPOs, such as BuurtBuik or Espigoladors. Espigoladors, for instance, employed people in risk of exclusion, who transformed food surplus into other food stuff such as jam (Interviewee 7, para. 67). Wormenhôtels strengthened social cohesion in the neighbourhood and his founder claimed that “if it would have been just about composting, [he doesn’t] think [he] would still be doing it” (interviewee 9, para. 25). In most instances, tackling other societal problems led initiatives to increase the involvement of existing collaborations, or to start new collaboration with other (food waste) initiatives or networks and associations, which have a high level of embeddedness. For example, The Waste Transformers, Espigoladors and Pont Alimentari started a new collaboration with organizations that connected them with unemployed people in risk of exclusion (interviewee 2, 7 and 10). Café De Ceuvel deepened its collaboration with the government during Covid19, when they welcomed refugees during the lock down (Interviewee 1, para. 107).

Figure 16. *Nº of initiatives working in other scales and societal problems*



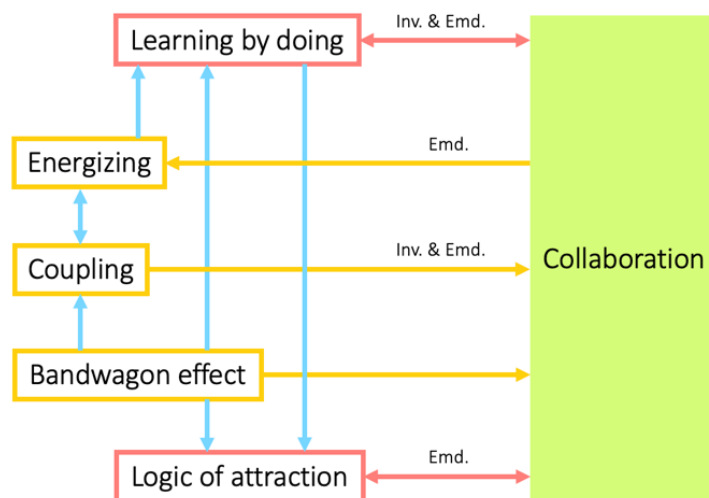
Note: see Appendix H, Table H 10 for detailed information per small win initiative

To sum up, this study found that all the propelling mechanisms were related to collaboration. In some cases, links with the involvement and embeddedness of collaboration were identified (see Figure 17). Learning by doing and logic of attraction were the most relevant mechanisms, because they were interrelated with collaboration, meaning that they influenced and were influenced by collaboration. Collaboration influenced the learning by doing mechanism because when partners were highly involved and embedded, they carried out experiments using other’s solutions. At the

same time, this mechanism increased both involvement and embeddedness of collaborations. For example, when small win initiatives experimented using their partners' feedback they created deep collaborations and multidirectional information flows. The embeddedness of collaboration influenced the logic of attraction mechanism because it was easier to find new partners and resources through broad collaborations. At the same time, when small win initiatives experienced more demand, they were encouraged to find new partners and to be more entangled in broader networks

Embeddedness of collaborations was linked to the energizing mechanism, because small win initiatives were inspired by others when they were entangled in broader networks. The bandwagon effect and the coupling mechanism were found to influence collaboration. New market and political trends triggered new collaborations, for instance because market actors were interested in working with small win initiatives that fought food waste. Working in other political scales deepened existing collaborations, while working in other territories and towards other societal problems increased embeddedness of collaborations as small win initiatives became part of broader networks. Last, but not least, these mechanisms were also related to collaboration because they reinforced each other.

Figure 17. *Relation between collaboration and propelling mechanisms*



Note. Inv.: involvement, emb: embeddedness

#### 4.5. Research question

*How does collaboration between small win initiatives fighting food waste and their partners facilitate and accelerate the circular economy transition in Amsterdam and Barcelona?*

Collaboration facilitates the CE transition because it allows small win initiatives to innovate. The partners with whom small win initiatives collaborated and the characteristics of the collaborations (their interaction, structure and information flow) influenced the initiatives' level of involvement and embeddedness. These are two important qualities of collaboration. Involvement facilitates learning between the partners, and thus, the creation of innovation effects within the collaboration, whereas embeddedness entangles the collaboration in broader networks where partners spread innovation effects beyond the collaborative relationship (Lawrence et al., 2002). Because small win initiatives in Amsterdam and Barcelona collaborated with different actors, they had different levels of involvement and embeddedness. More small win initiatives in Amsterdam collaborated with research institutes, which, together with the market, were the two partners with the highest involvement. On the contrary, more small win initiatives in Barcelona collaborated with other (food waste) initiatives and networks and associations, the two partners with the highest embeddedness. Therefore, Amsterdam had higher involvement than embeddedness, and Barcelona had higher embeddedness than involvement. Overall, both cities had similar involvement, whereas Barcelona had higher embeddedness.

The results show that small win initiatives in Amsterdam were able to create more innovation effects, which may facilitate the CE transition in the city. This proved that higher levels of involvement and embeddedness does not necessarily lead to more innovation effects. Instead, what seemed more relevant is to have the right combination of qualities: having higher involvement than embeddedness proved to be more efficient than having higher embeddedness than involvement. Furthermore, there is reason to believe that the partners with whom initiatives chose to collaborate influence the type of innovation effects that these can create. Small win initiatives in Amsterdam collaborated with research institutes, which may have enabled them to create more innovation effects on technology. Because new technology created more new values and practices, these initiatives were able to create more innovation effects in general.

The findings indicate that collaboration was related to all five studied propelling mechanisms. These amplify and accumulate small wins and may accelerate the CE transition in Amsterdam and Barcelona. Learning by doing and logical of attraction seemed to be the most relevant mechanisms because they were interrelated with collaboration. Different characteristics of collaborations determined how these

mechanisms behaved. For instance, highly involved partners were able to learn from each other and activate the mechanism learning by doing. At the same time, these mechanisms modified characteristics of collaborations. For example, when more demand activated the logic of attraction mechanism, small win initiatives had to find new partners, which broadened their existing collaborations and increased their embeddedness.

The bandwagon effect and the coupling mechanisms influenced collaboration, which means that they can be used to modify existing collaborations or find new ones. The bandwagon effect mechanism led small win initiatives to find new partners, whereas the coupling mechanism influenced the characteristics of collaborations. By working in other territories, small win initiatives were able to broaden their networks and increase their embeddedness, and by working in other political scales or towards other societal problems, they were able to create deeper collaborations and increase their involvement. Last but not least, the embeddedness of collaborations influenced the energizing mechanisms: as initiatives were part of broader networks, they energize and were energized by others.

In answering this RQ, some differences between both cities were found, these are presented in Table 15. Learning by doing, logic of attraction and energizing occurred more often in Amsterdam. Small win initiatives in Amsterdam seemed to inspire others more often and seemed to attract more resources. They also seemed to have more of an experimenting culture, while initiatives in Barcelona seemed more focused on adapting to needs. The bandwagon effect mechanism was especially noticed in Barcelona. Last but not least, the coupling mechanism occurred more often in Barcelona, especially tackling other societal problems.

Overall, the findings indicate that it is important to pay attention to the different characteristics of collaborations and to the actors with whom small win initiatives chose to collaborate. These determine the level of involvement and embeddedness of small win initiatives. In turn, this influences the number and type of innovation effects that initiatives create, as well as the propelling mechanisms that they use. Fortunately, the characteristics and qualities of collaboration are not static. These findings suggest that they can be modified in three ways: (1) by modifying existing collaborations, (2) by carefully selecting new partners, and (3) by carefully deciding how to make use of some propelling mechanisms. Through this understanding, initiatives could work towards modifying the level of involvement and embeddedness of collaborations, which could positively influence their ability to innovate. At the same time, this understanding could be used to activate three propelling mechanisms. This is relevant because innovation effects facilitate the CE transition and propelling mechanisms accelerate the CE transition (Jesus & Mendonça, 2018; Termeer & Dewulf, 2019).

Table 15. *Differences between Amsterdam and in Barcelona*

	Amsterdam	Barcelona
<b>Policies</b>		
Ambitions	To be circular by 2050 To halve FW by 2030 <sup>1</sup>	To design a CE strategy by 2025 No specific ambitions towards FW <sup>2</sup>
Main characteristics	Municipality wants to set example; emphasises collaboration between municipality, knowledge institutes and businesses to research and innovate <sup>1</sup>	Wants to co-design strategies and share responsibility; supports initiatives that tackle more than one societal problem <sup>2</sup>
<b>Collaboration</b>		
Partners	Collaborated more with research institutes	Collaborated more with other (FW) initiatives and networks and associations
Involvement and embeddedness	Together they had a combination of higher involvement than embeddedness	Together they had a combination of higher embeddedness than involvement; together they had higher embeddedness than Amsterdam's
<b>Innovation</b>		
Innovation effects	Created more innovation effects Created more innovation effects on technology	Created less innovation effects
<b>Propelling mechanisms</b>		
Energizing	Used more the mechanism, had more desire to inspire others and believed more often that they had inspired others	Believed more often that they had been inspired by others
Learning by doing	Had more of an experimenting culture	Usually adapted to needs (especially Covid19)
Logic of attraction	Experienced more often an increase in resources	Experienced less often an increase in resources
Bandwagon effect	Referred less to the mechanism	Experienced a surge in initiatives fighting FW Mentioned more often that the topic of FW was popular in the political agenda
Coupling	Worked more in other scales	Worked more towards other societal problems

Sources: <sup>1</sup> Gemeente Amsterdam (2020); <sup>2</sup> Ajuntament de Barcelona (2018)

## 5. Discussion

This study bridges the gap between collaboration and the CE transition in current literature (Mishra et al., 2019; Dora, 2020). It does so by studying how the involvement and embeddedness of collaboration between small win initiatives fighting food waste and their partners positively influences innovation effects and propelling mechanisms. The results indicate that the partners with whom small win initiatives collaborate and the characteristics of their collaborations determine the initiatives' level of involvement and embeddedness. These qualities influence the innovation effects that small win initiatives can create. More precisely, a combination of higher involvement than embeddedness leads to more innovation effects, which may facilitate the CE transition. These qualities also activate and influence three propelling mechanisms, necessary to accelerate the CE transition. Fortunately, small win initiatives are able to modify their involvement and embeddedness, by changing the characteristics of existing collaborations, by finding new partners and by using four propelling mechanisms.

This study has empirically tested Lawrence et al.'s (2002) typology of collaboration. It found that the actors with whom small win initiatives collaborate and the characteristics of the collaborations (specifically their interaction, structure and information flow) are key in determining the level of involvement and embeddedness of small win initiatives. In practice, this means that initiatives can modify their level of involvement and embeddedness by changing the characteristics of their existing collaborations or by finding new partners. This contributes to a better understanding of how different actors collaborate in the CE transition in Amsterdam and Barcelona. Previously, scholars have focused on the role of single actors in transition (e.g. Termeer and Metze (2019) focused on government actors and Mignon and Kanda (2019) on intermediary actors), and have overlooked how actors collaborate with each other (Dora, 2020). This is also the case for Amsterdam and Barcelona's strategies and plans, which do not specifically mention who should collaborate or how (Gemeente Amsterdam, 2020; Ajuntament de Barcelona, 2021).

This comparative study proves that the involvement and embeddedness of collaboration influences the number of innovation effects that small win initiatives can create. However, this study does not support Lawrence et al.'s (2002) claim that *higher* levels of involvement *and* embeddedness lead to more innovation effects. Instead, this study suggests that what leads to more innovation effects is a combination of *higher* involvement *than* embeddedness (as was the case in Amsterdam). This is understandable, because a collaboration that is not able to create innovation effects within its boundaries, will not be able to spread innovation effects beyond its boundaries. Even though this conclusion is in line with existing literature, which indicates that partners in deep collaborations can learn from each other, share resources and innovate (e.g.

Dora, 2020 and Bhattacharya & Fayezi, 2021), previous studies did not discuss the importance of focusing on the involvement of collaboration before focusing on its embeddedness. This understanding could serve as a guide for small win initiatives interested in creating more innovation effects – especially relevant for initiatives in Barcelona.

Collaboration also influences the type of innovation effects that small win initiatives can create. Collaboration with research institutes was particularly relevant: it had medium involvement and it enabled small win initiatives to create more innovation effects on technology (e.g. GROWx and ColorSensing). Several authors have studied the importance of technological innovation in the CE transition (e.g. Jesus & Mendoça, 2018 and Jesus et al., 2018). However, this study goes beyond, and suggests that this is because new technology leads to new practices and values, thus, it multiplies innovation effects. The fact that Amsterdam's CE Strategy encourages actors to collaborate with knowledge institutions and incentivises research on technology (Gemeente Amsterdam, 2020) could explain why more initiatives in Amsterdam collaborated with research institutes and created more innovation effects. This highlights how important it is for policy makers to encourage initiatives to collaborate with research institutes and establish collaborations with high involvement (i.e. with joint planning, partnership structures and bidirectional information flows).

This illustrative study shows abundant examples of how collaboration between small win initiatives and their partners influences and is influenced by propelling mechanisms. The mechanisms were previously described by Termeer and Dewulf (2019). Learning by doing and logic of attraction were the most relevant mechanisms, as they were interrelated with collaboration. Both involvement and embeddedness of collaboration influence the learning by doing mechanism, while embeddedness influences the logic of attraction and the energizing mechanism. These findings are in line with previous studies, which claim that intense collaboration with bidirectional information flow is more likely to lead to learning (Powell et al. 1996; Lawrence et al. 2002; Bhattacharya & Fayezi, 2021) and that collaboration helps initiatives to gain new resources (León-Bravo et al., 2017). These particular findings have theoretical and practical implications. For one, they demonstrate how collaboration can be studied as an enabler for propelling mechanisms and the CE. For another, small win initiatives can now modify their involvement and embeddedness in order to activate and control propelling mechanism, which may accelerate the CE transition in Amsterdam and Barcelona.

In addition, this study has found that four of the studied propelling mechanisms can shape collaboration. For instance, by working towards other societal problems (coupling mechanism), small win initiatives can find new collaborations or deepen existing ones. Thus, small win initiatives can use the mechanisms to modify their level of involvement

and embeddedness and impact the number and type of innovation effects that they create. The municipality can also play a role. Barcelona's Climate Plan prioritizes support to initiatives that tackle two societal problems at once (Ajuntament de Barcelona, 2018). This could explain why more small win initiatives in Barcelona collaborated with other (food waste) initiatives and had higher embeddedness. This indicates how initiatives can use mechanisms for their benefit, and how municipalities can have a positive influence through targeted interventions.

This study provides a new insight into how propelling mechanisms are used differently in various context. In this comparative study, more small win initiatives in Amsterdam made use of the learning by doing and logic of attraction mechanism. Given that these were the most relevant mechanisms to collaboration, this could partly explain why the city is farther in the CE transition. Learning by doing was done through experimenting in Amsterdam, and through adapting to needs in Barcelona. Possibly because more initiatives in Amsterdam attracted more resources, which may have enabled them to experiment, and also because Amsterdam's CE Strategy encourages experimenting (Gemeente Amsterdam, 2020). The energizing mechanism occurred more in Amsterdam whereas the bandwagon effect mechanism occurred more in Barcelona. Amsterdam is considered a frontrunner of the CE in Europe (Campbell-Johnston et al., 2019), thus it is no surprise that its CE initiatives are a source of inspiration for many. Barcelona is at an early-stage phase of the CE transition (Prendeville et al., 2018), thus it is understandable that initiatives believe the topic is becoming more popular. Last but not least, initiatives in Amsterdam activated the coupling mechanism through working in other geographical scales, whereas initiatives in Barcelona activated it through working in other societal problems. This could be explained by the fact that Barcelona's municipality supports initiatives that tackle more than once societal problem (Ajuntament de Barcelona, 2018). These findings indicate that the cities' context and the policies that are designed by the municipalities can be decisive in the way initiatives use the mechanisms.

Altogether, these findings have implications for the policy practice. It became clear that small win initiatives themselves are capable of achieving changes that could greatly impact the CE transition in Amsterdam and Barcelona. The collaborating partners they chose and the characteristics of their collaborations influence the innovation effects that emerge in the city, which may facilitate the CE transition. At the same time, these collaborations impact and modify how the propelling mechanisms operate, which may accelerate the CE transition. Therefore, these findings support Termeer and Metze's claim that government actors should take a "more modest role" and "lean backwards" (2019, pg. 8). Overall this study emphasises the importance of collaboration in the CE transition, and therefore in reducing food waste. Policy plans and CE strategies developed to achieve circularity and reduce food waste should pay attention to how different actors collaborate with each other. Last but not least, this comparative study provides a good



understanding of the most effective collaborating practices, which could enable both cities to learn from each other.

This study contributes to building an understanding of how collaboration between small win initiatives and their partners facilitates and accelerates the CE in order to reduce food waste. More research is needed in this area, as the relevance of the CE to cities, and food waste in particular, is still emerging in the literature (Dora, 2020). More empirical research could strengthen the causality between involvement and embeddedness of collaborations and propelling mechanisms. Future research could identify if there are more mechanisms visible in these cities and if more links are found. This research also raises a number of questions that need to be answered through empirical research. For instance, which collaborating actors lead to which innovation effects? To what extent are difficulties in collaborations affecting the initiatives' ability to innovate? How can policies contribute to accelerate the CE using these findings? This thesis was exploratory and its conclusions need to be taken cautiously, in the context of the studied initiatives, mechanisms and cities. More comparative studies between different cities are needed to strengthen the findings presented in this study.

### 5.1. Research limitations

This study has several limitations that are worth mentioning. First, it is important to keep in mind that this was a comparative study between two cities. This produced detailed results about Amsterdam and Barcelona but it also means that conclusions are based upon differences between these two cities. Therefore, choosing other or more cities, might have yielded very different results. Second, findings are based upon 20 initiatives that have been selected according to a selection criterion and their willingness to be interviewed. Choosing other initiatives might thus have yielded other insights. These are common limitations of studies where cities and initiatives are selected by the authors (see e.g. Gorrisen et al., 2018 and Prendeville et al., 2018). Moreover, only members of the small win initiatives were interviewed, and not their partners, providing detailed results but leaving out other points of view. Future research could compare Amsterdam and Barcelona with other cities and study more initiatives and partners.

Third, the amount of information available per initiative was not equal, for several reasons: two initiatives were not interviewed, some interviews were longer than others and some websites had more information than others. To balance the amount of information as much as possible, more information from grey literature sources such as news or annual reports was used. Moreover, due to the nature of semi-structured interviews and time constraints not all interviewees were asked the exact same questions. This means that not all the studied variables were asked to all the initiatives. This limitation has potentially affected the process of identifying the presence of a code.

Future research could use structured-interviews and could ensure that all studied variables are discussed during the interviews.

Forth, the methods used were highly subjective. The researcher's interpretation of the text is shaped by her intuition and experience about what is important and what is not (Boréus & Bergström, 2017; Bernard, 1996). This affected the selection of quotes, codes and themes, and in turn, the simple quantitative strategies, especially assessing score. Another researcher might thus have yielded other insights with the same information. Last but not least, the findings could have been affected by the researcher's language limitations. Dutch interviewees were not interviewed in their mother tongue, whereas Spanish interviewees did. Furthermore, Dutch information was analysed in English, whereas Spanish information was analysed in Spanish or Catalan, both the researcher's mother tongues. This could have affected the interpretation of the text. Future studies could involve two researchers that speak all the languages spoken by the interviewees.

## 6. Conclusion

This study aimed to understand how collaboration can influence the CE transition and reduce food waste in Amsterdam and Barcelona. Thus, it sought to answer the following RQ: how does collaboration between small win initiatives fighting food waste and their partners facilitate and accelerate the CE transition in Amsterdam and Barcelona? Overall, this thesis supports the notions that collaboration – in particular the partners with whom small win initiatives chose to collaborate and the characteristics of their collaboration – influences the CE transition in two ways. For one, collaboration influences the number and type of innovation effects that small win initiatives create, which may facilitate the CE transition. For another, collaboration activates and influences three propelling mechanisms, which may accelerate the CE transition.

In order to link collaboration with the CE, this study combined two theories: Lawrence et al.'s (2002) typology of collaboration and Termeer et al.'s (2017) small wins approach to transition. Lawrence et al.'s (2002) theory proved useful to analyse the characteristics of collaboration between small win initiatives and their partners, which helped identify the initiatives' level of involvement and embeddedness. These qualities indicated the initiatives' ability to create innovation effects within and beyond their collaborations. This study suggests that a combination of higher involvement than embeddedness enables small win initiatives to create more innovation effects (as was the case in Amsterdam). Therefore, it does not support Lawrence et al.'s (2002) claim that higher involvement and embeddedness leads to more innovation effects. Collaboration with research institutes appeared to be particularly important, as it enabled small win initiatives to create more innovation effects on technology, which in turn, created more innovation effects on practices and values.

Termeer et al.'s (2017) small wins approach to transition was useful to understand how collaboration can accelerate the CE through propelling mechanisms. This thesis identified five propelling mechanisms studied by Termeer and Dewulf (2019) and Termeer and Metze (2019). In general, the authors' claims in regards to how the mechanisms operate were supported by small win initiatives in Amsterdam and Barcelona. This study found that collaboration could activate and influence three mechanisms (learning by doing, logic of attraction and energizing). In addition, it also found that four mechanisms (all except energizing) could be used to influence collaboration. Therefore, the learning by doing and the logic of attraction mechanisms were the most relevant to collaboration, because they influenced and were influenced by collaboration.

This thesis contributes to literature in two ways. First, it suggests a modification to Lawrence et al.'s (2002) theory, in which the collaboration's level of involvement is prioritized over its level of embeddedness. Meaning that, if small win initiatives wish to

be more innovative, they should focus first on creating innovation effects within the boundaries of their collaborations before focusing on how to spread them beyond their boundaries. This might seem an obvious clarification, however, it was not mentioned by the authors and it seems to have been overlooked by others as well (e.g. Bhattacharya & Fayezi, 2021; Dora, 2020). This research also raises a number of questions in regards to collaboration and innovation effects, for instance: Which collaborating actors lead to which innovation effects? To what extent are difficulties in collaborations affecting the initiatives' ability to innovate? Second, this thesis provides a better understanding of how collaboration relates to propelling mechanisms, and it does so by describing how the mechanisms operate in different context. This expands the knowledge on the fairly new small win approach to transition. Future research could identify if there are more mechanisms visible in these cities and if more links are found. Additionally, more empirical research could strengthen the causality between involvement and embeddedness of collaborations and propelling mechanisms.

The practical implications of these findings start by understanding that small win initiatives can modify their level of involvement and embeddedness. This could be done in three ways: (1) by changing the characteristics of existing collaborations, (2) by carefully selecting new partners, and (3) by carefully selecting how four propelling mechanisms are used. These changes and decisions could modify the characteristics of collaboration, which could then modify the initiatives' level of involvement and embeddedness. The findings in this study suggested that if small win initiatives want to create more innovation effects and facilitate the CE, they should aim to have higher involvement than embeddedness. Therefore, they could use these three ways to achieve this combination. Moreover, small win initiatives could use the involvement and embeddedness of collaboration to activate and influence three propelling mechanisms, which would accelerate the CE transition.

A comparative study approach means that the findings can be used by both cities to learn from each other. This thesis provided practical examples of how small win initiatives behave differently in Amsterdam and Barcelona, showcasing what are the most effective strategies. Nevertheless, the aim of this study was exploratory and it comes with limitations. The most important one is that, because this research studied only two cities, conclusions cannot be generalized to other cities. The second most important limitation is that the findings are based on 20 small win initiatives that have been personally selected and only members of the initiatives were interviewed. Choosing more or different cities, initiatives or actors might thus have yielded different conclusions. Future empirical analysis must demonstrate if the conclusions presented in this study can be generalized.

This study has contributed to making the role of collaboration more explicit by studying how its involvement and embeddedness facilitates and accelerates the CE transition in Amsterdam and Barcelona. The findings confirm that involvement and embeddedness of collaboration influence the creation of innovation effects on practices, values and technologies (Lawrence et al., 2002), which may facilitate the CE transition (Jesus & Mendoça, 2018). It also revealed that involvement and embeddedness of collaboration can activate and influence propelling mechanisms, which may accelerate the CE transition (Termeer & Metze, 2019). These findings are used to give recommendations to small win initiatives and policy makers on how positively influence innovation effects and propelling mechanisms. These are presented in the following chapter. Overall, the researcher hopes that this study can contribute to the spread of small win initiatives and reduce food waste in Amsterdam and Barcelona. Nevertheless, more research is needed in this area, as the relevance of the CE to cities, and food waste in particular, is still emerging in the literature (Dora, 2020).

## 7. Recommendations

This section presents three recommendations to small win initiatives fighting food waste and policy makers developing CE strategies and food waste policies in Amsterdam and Barcelona. The specific recommendations respond to key findings, gathered through data collection and analysis, presented in chapter 4. The recommendations are therefore to be considered with the previously mentioned limitations. It is important to keep in mind that this section does not intent to present an exhaustive list of recommendations. A process of prioritization was essential to narrow down the most important findings and provide clear recommendations. Based on the 2<sup>nd</sup> objective of this thesis, recommendations focus on how to positively influence the creation of innovation effects that may facilitate the CE transition (recommendation 1 and 2), and how to positively influence propelling mechanisms that may accelerate the CE transition (recommendation 3). Because this is a comparative study, the recommendations are based on what Amsterdam and Barcelona can learn from each other, which means that these recommendations need to be taken in the context of the studied initiatives and cities.

### **Recommendation 1. Enhance the level of involvement of collaborations before the level of embeddedness**

This study found that small win initiatives in Amsterdam were able to create more innovation effects than small win initiatives in Barcelona. The results suggest that it is because Amsterdam's initiatives had a combination of higher involvement than embeddedness, which proved to be more efficient than a combination of higher embeddedness than involvement. Therefore, in order to strive for more innovation effects, small win initiatives should work towards increasing their level of involvement before increasing their level of embeddedness. In this comparative study, this appears to be more necessary in initiatives in Barcelona. Once initiatives have obtained the desired level of involvement (and are creating innovation effects within the boundaries of their collaborations), they should focus on increasing their embeddedness (in order to allow other actors to make use of their innovation effects). This appears to be the position of Amsterdam's initiatives. Small win initiatives can modify their level of involvement and embeddedness in three ways: (1) improving existing collaborations, (2) carefully choosing new partners depending on their needs and (3) using certain propelling mechanisms in different ways. Table 16 describes the detailed recommendations for the different paths and cities.

Table 16. *Ways to improve involvement and embeddedness*

Ways	Involvement	Embeddedness
Improve existing collaborations	<p><b>Barcelona:</b> Almost all small win initiatives collaborated with <i>networks and associations</i>. These collaborations had a high level of embeddedness, however, they lacked involvement. This could be improved by creating partnerships with the associations and working together in some activities and projects.</p> <p><b>Amsterdam &amp; Barcelona:</b> Initiatives could take advantage of the market's interest in having a green image and create projects that encourages both partners to plan together. Efforts can also be directed towards improving involvement with the municipality and the community, by changing the structure of the collaboration from a donation to a partnership (by, for instance, employing community members), creating feedback loops or planning together.</p>	<p><b>Amsterdam &amp; Barcelona:</b> Embeddedness could be improved in collaborations with the government, the market, the community and research institutes. In these collaborations, partners could represent each other's interests to third parties and could create multidirectional information flows to learn from third parties.</p>
Find new partners	<p><b>Barcelona:</b> The market and research institutes are the partners that bring the highest levels of involvement. Since almost all initiatives already collaborate with the market, they could start new collaborations with research institutes (see recommendation 2).</p>	<p><b>Amsterdam:</b> Initiatives could increase their embeddedness by starting collaborations with <i>networks and associations</i>, and with <i>other (FW) initiatives</i>. These are partners with medium-high levels of embeddedness and could help small win initiatives to take innovation effects beyond the boundaries of the collaborations.</p>
Use propelling mechanisms	<p><b>Learning by doing, Amsterdam &amp; Barcelona:</b> Small win initiatives can use problem solving to deepen their collaborations. During problem solving, partners in collaborations start joint activates together (e.g. Wormenhôtels).</p> <p><b>Learning by doing, Barcelona:</b> Initiatives in Barcelona could start experimenting with the help of their partners. In doing so, they could ask for feedback, which would create bilateral information flows and would increase the level of involvement.</p> <p><b>Coupling, Amsterdam:</b> Initiatives in Amsterdam could start working towards other societal problems. This would incentivise them to partner with other (FW) initiatives, and jointly plan activities with them, which would increase their involvement.</p>	<p><b>Learning by doing, Amsterdam</b> Initiatives in Amsterdam could increase their embeddedness by adapting to new situations and needs, such as Covid19. This would encourage them to tackle other societal problems and start new collaborations with other (FW) initiatives.</p> <p><b>Learning by doing, Amsterdam &amp; Barcelona:</b> This mechanism could be used to start multidirectional information flows with existing collaborations.</p> <p><b>Learning by doing &amp; Logic of attraction, Amsterdam &amp; Barcelona:</b> Any form of learning by doing, as well as the more resources could lead initiatives to start new collaborations. When possible, and especially in Amsterdam, they should start new collaborations with networks and associations.</p> <p><b>Coupling, Barcelona:</b> Initiatives in Barcelona could increase their embeddedness by working in other geographical scales. This could enable them to expand their innovation effects abroad.</p>

## **Recommendation 2. Enhance collaboration with research institutes to produce innovation effects on technology**

The results have shown that collaboration between small win initiatives and research institutes had a medium level of involvement (the second highest after the market). Thus, in these collaborations, partners learned from each other and shared resources, which could have enabled small win initiatives to create more innovation effects on technology. This study suggests that new technology leads to new practices and values, being the most powerful innovation effect that a small win initiative could create. Therefore, in order to create more innovation effects, it is key to enhance collaboration between small win initiatives and research institutes. Only a few initiatives collaborated with research institutes, and mostly in Amsterdam. Initiatives could approach research institutes and suggest projects that can benefit both, as was the case of, for instance, GROWx and Too Good To Go. Existing collaborations with research institutes could also be enhanced by creating deeper relations, in which the research projects happen more regularly and are co-designed between both partners.

Policy makers could also incentivise collaboration with research institutes. Amsterdam's CE Strategy already emphasises the importance of collaborating with knowledge institutions and developing new technology (Gemeente Amsterdam, 2020). This is something to keep in mind in the development of Amsterdam's Food Strategy, yet to be launched. Policy makers in Barcelona could learn from this approach and encourage collaboration with research institutes in their future CE strategy, due in 2025. They could do so by providing practical examples of how this collaboration can benefit initiatives and the CE transition. In addition, they could also provide a list of research institutes and their expertise, which small initiatives could use to locate partners. Both municipalities could prioritize economic support to small win initiatives that collaborate with research institute and develop new technology. Last but not least, they could also organize events in which initiatives meet with research partners.

## **Recommendation 3. Use collaboration to activate and influence the learning by doing and logic of attraction mechanism**

The results suggested that learning by doing and logic of attraction are the two most important mechanisms related to collaboration. For one, they can be used to modify and create collaboration (this has been addressed in recommendation 1). For another, collaboration can activate and influence them. This is relevant because propelling mechanisms can amplify and accumulate small win initiatives. In fact, the more propelling mechanisms that are activated, the stronger the effect (Termeer & Dewulf, 2019). Thus, small win initiatives should focus on activate them in order to accelerate the CE transition. In this comparative study, more small win initiatives in Amsterdam made use of these



mechanisms. This indicates that initiatives in Barcelona could especially use this recommendation. However, it does not mean that initiatives in Amsterdam could not improve and further use and control these mechanisms.

The findings suggest that collaboration with high levels of involvement and embeddedness enables partners to learn from each other's experiments. Small win initiatives are encouraged by other's experiments and try them in their own initiative, activating the learning by doing mechanism. This would potentially create more small wins. Thus, small win initiatives could follow recommendation 1 (Table 16) to improve involvement and embeddedness. The embeddedness of collaboration can reinforce the logic of attraction mechanism. Small win initiatives could broaden their existing collaborations and start new collaboration with networks and associations to gain new partners and resources. This would activate the logic of attraction mechanism. Municipalities can also develop more targeted and effective governance interventions in this regard. They could assist small win initiatives by providing spaces in which they can connect with networks and associations. Municipalities could also enhance a learning by doing approach, based on experimenting, taking risks, tolerating uncertainty and disappointment (Termeer & Metze, 2019, pg. 6). Last, but not least, they could acknowledge and showcase small win initiatives, which would give them credibility and attract more resources (Termeer & Metze, 2019).

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## Appendices

### Appendix A. Inventory of circular economy initiatives fighting food waste in Amsterdam and Barcelona

#### Amsterdam:

1. De Ceuvel
2. Wormenhotels
3. Instock
4. PeelPioneers
5. GROWx
6. Too Good To Go
7. Meerlanden
8. BuurtBuik
9. Taste Before you Waste
10. Samen Tegen Voedselverspilling
11. The Waste Transformers
12. Mediamatic
13. I Can Change the World With My Two Hands
14. Circulaire Proeftuin van West
15. Amsterdam Economic Board
16. BreadDigester
17. GRO together
18. Keuken van Het Ongewenst Dier
19. De Herkomst
20. Metabolic

#### Barcelona:

1. Fundació Espigoladors
2. Soy Comida Perfecta
3. Too Good To Go
4. Nutrició Sense Fronteres
5. Nevera Solidària
6. ColorSensing
7. Pont Alimentari
8. Menjador Ca La Rosa
9. Zero Waste Barcelona
10. Projecte Revolta
11. Ecoparc
12. Promic
13. Plataforma Aprofitem els Aliments
14. We save eat
15. La Fàbrica del Sol
16. Sobres Mestres
17. Food Service Cluster
18. Espai Ambiental: compostatge
19. Escoles contra el malbaratament alimentari
20. La Alimentación No Tiene Desperdicio

## Appendix B. Inventory of analysed documents

Table B 1. *Qualitative information used per city*

Information type	City	Number of small win initiatives
Semi-structure interview	Amsterdam	8
	Barcelona	9
Website	Amsterdam	10
	Barcelona	9
Annual report	Amsterdam	1
	Barcelona	0
News article	Amsterdam	0
	Barcelona	1

Note: semi-structured interviews were conducted between July and October 2021. Information from initiatives' website was extracted between September and October 2021.

Table B 2. *Qualitative information used per small win initiative*

Initiative	Information type
Café De Ceuvel	Semi-structure interview (interviewee 1)
	Website information (website 1)
The Waste Transformers	Semi-structure interview (interviewee 2)
	Website information (website 2)
GROWx	Semi-structure interview (interviewee 3)
	Website information (website 3)
Mediamatic, Myco Insulation brewery project	Semi-structure interview (interviewee 4)
	Website information: 2 posts Mediamatic's blog (website 4)
I Can Change The World With My Two Hands	Semi-structure interview (interviewee 5)
	Website information (website 5)
PeelPioneers	Semi-structure interview (interviewee 6)
	Website information (website 6)
Wormenhotel.nl	Semi-structure interview (interviewee 9)
	Website information (website 9)
Too Good To Go The Netherlands	Semi-structure interview (interviewee 13)
	Website information (website 13/17)
BuurtBuik	Website information (website 19)
Taste Before you Waste	Website information (website 18)
	Annual Report 2021 (report 18)
Fundació Espigoladors	Semi-structure interview (interviewee 7)
	Website information (website 7)
Soy Comida Perfecta	Semi-structure interview (interviewee 8)
Pont Alimentari	Semi-structure interview (interviewee 10)
	Website information (website 10)
Menjador Ca la Rosa	Semi-structure interview (interviewee 11)
	Website information (website 11)
Color Sensing	Semi-structure interview (interviewee 12)
	Website information (interviewee 12)



Table B 2 Continued

Initiative	Information type
Revolta, Tarpuna	Semi-structure interview (interviewee 14) Website information (website 14)
Nutrició Sense Fronteres	Semi-structure interview (interviewee 15) Website information (website 15)
La Fàbrica del Sol	Semi-structure interview (interviewee 16) Website information (website 16)
Too Good To Go Spain	Semi-structure interview (interviewee 17) Website information (website 13/17)
Nevera Solidària	Website information Website information from Ateneu L'Harmonia News article from La Vanguardia (website 20)

## Appendix C. Overview of interviews

Table C 1. *Overview of interviews*

Small win initiative	Interviewee and role	Day, duration and type of interview
Café De Ceuvel	Interviewee 1 Co-owner Café de Ceuvel	26/07, 30 min, face-to-face
The Waste Transformers	Interviewee 2 Sales Developer	27/07, 45 min, online
GROWx	Interviewee 3 Communication Manager	4/08, 30 min, face-to-face
Myco insulation brewery project	Interviewee 4 Director Mediamatic	11/08, 30 min, phone call
I Can Change The World With My Two Hands	Interviewee 5 Project Coordinator	17/08, 50 min, online
PeelPioneers	Interviewee 6 Business Development Manager Spain	18/08, 30 min, online
Fundació Espigoladors	Interviewee 7 Project Manager	8/09, 30 min, online
Soy Comida Perfecta	Interviewee 8 Founder	8/09, 30 min, online
Wormenhotel.nl	Interviewee 9 Founder	10/09, one hour, online
Pont Alimentari	Interviewee 10 Coordinator	16/09, 40 min, online
Menjador Ca la Rosa	Interviewee 11 President	16/09, 30 min, phone call
ColorSensing	Interviewee 12 R&D Project Manager	17/09, 30 min, online
Too Good To Go Netherlands	Interviewee 13 Head of Success	20/09, 30 min, phone call
Tarpuna, Revolta	Interviewee 14 Project Coordinator	21/09, 30 min, phone call
Nutrició Sense Fronteres	Interviewee 15 Logistics, administration and nutritionist	22/09, 50 min, online
La Fàbrica del Sol	Interviewee 16 1) Program Manager, 2) Secretaria Tècnica	4/10, one hour, online
Too Good To Go Spain	Interviewee 17 1) Region Lead, 2) Impact Project Manager	5/10, 40 min, online

## Appendix D. Semi-structured interview guide

First section. Questions addressing the SQ1

1. How did your collaboration with [organization X] come to exist?
2. Do you and [organization X] carry out activities together to achieve the same interests, or do you only represent each other's interests to outside parties?
3. Do you collaborate with [organization X] only at an operational level, or do you also plan and take decisions together?
4. Does collaborating with [organization X] bring you in contact with other parties that you do not collaborate directly with? With who? In what way?
5. How would you describe the information flow between your organization and [organization X]: does one organization learn from the other, do you learn from each other, or do you also learn from third parties involved?

Second section. Questions addressing the SQ2

6. Do you think [this initiative] has created new practices, routines, values or technologies?

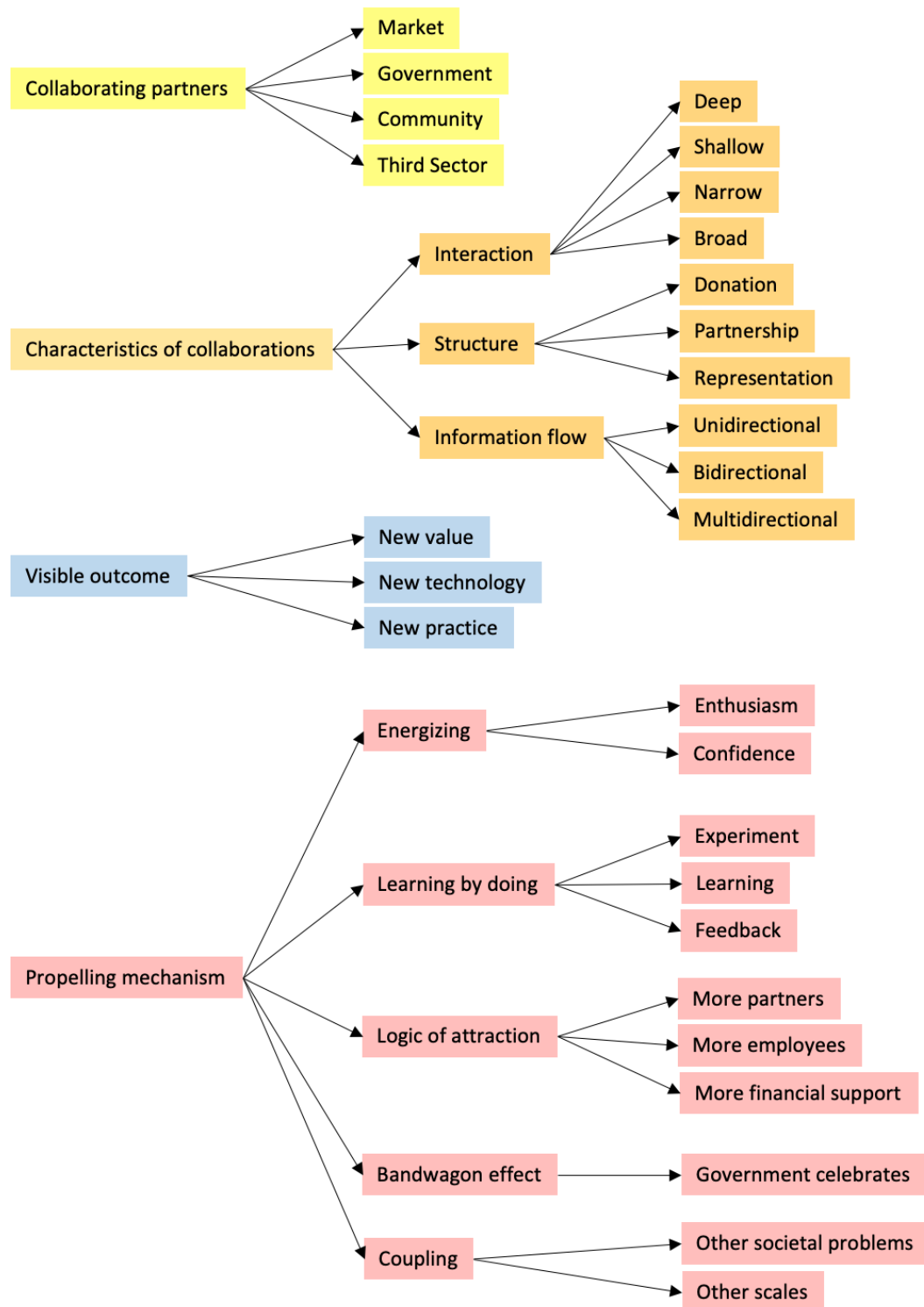
Third section. Questions addressing the SQ3

7. What inspired this initiative?
8. Have your achievements [mentioned in question 6] led you to develop new initiatives or pursue more radical changes? If so, could you give an example?
9. Are you aware of having inspired another organization to start a similar initiative?
10. What have you learned from implementing [this initiative]?
11. Did this learning develop new ideas or initiatives?
12. Do you think your learning experiences have helped other actors to develop new ideas?
13. Did the amount of resources (e.g. funding, employees) increase over time and how did it go?
14. Have your achievements attracted new partners to work with?
15. Is your success story known by the public?
  - a. If yes: how (through you, the government, another organization)?
  - b. If no: why not? Do you feel discourage by it?
16. Besides contributing to reduce food waste, do you think [this initiative] is tackling other societal problems, such as exclusion, unemployment, social cohesion, etc.?
17. In your opinion, what helps initiatives like yours to emerge and multiply?

Note: the list of questions was personalized to fit the small win initiative's story and the interviewee's position; due to time constraints, not all questions were asked, the researcher remained flexible and focused on the most relevant questions according to the story of the interviewee.

## Appendix E. Code book designed from literature review

Figure E 1. Code book designed from literature review

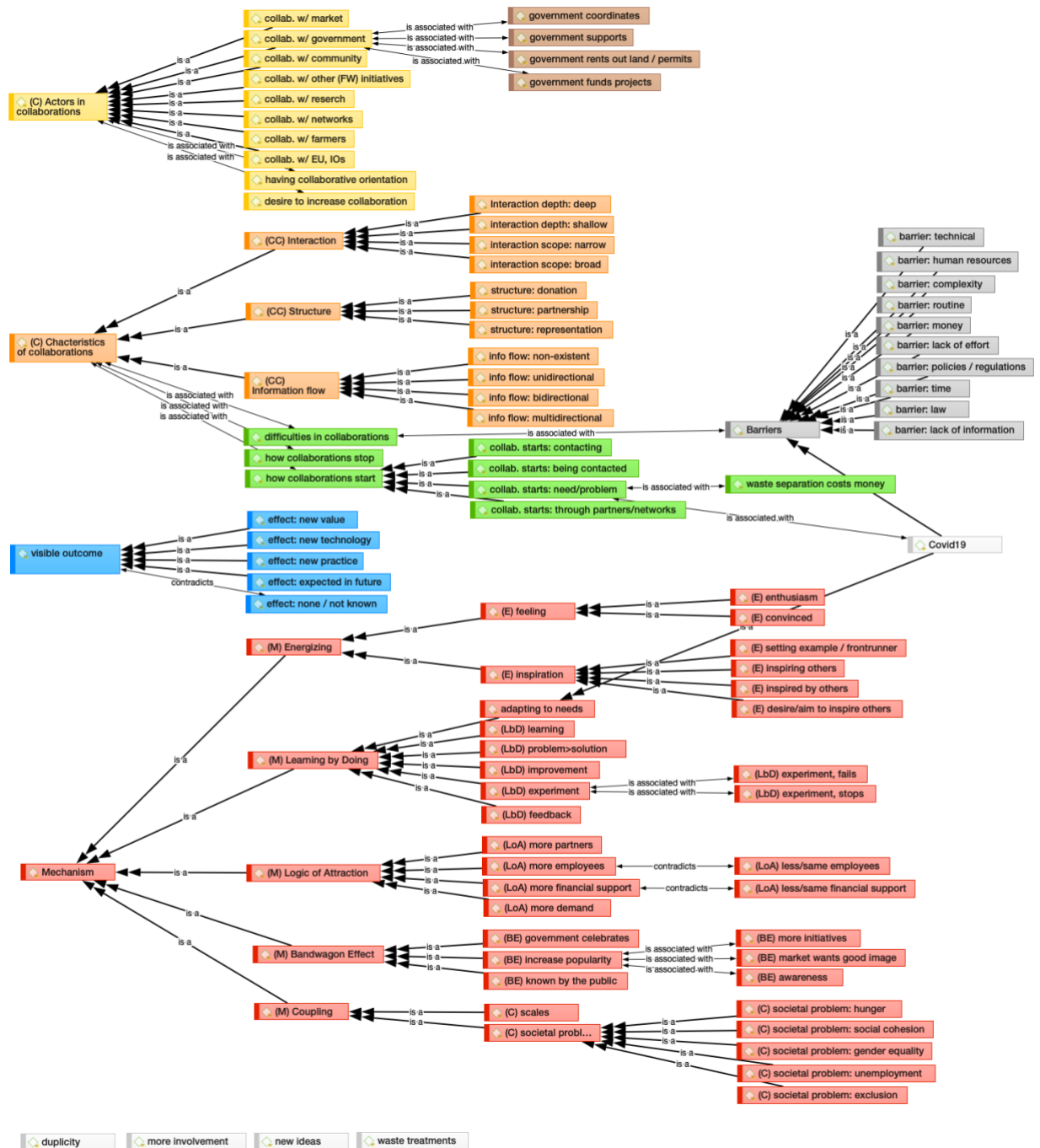


Notes: this code book had 4 code-groups and 28 codes

Sources: Avelino & Wittmayer (2016), Lawrence et al. (2002), Termeer & Dewulf (2019) and Termeer & Metze (2019)

## Appendix F. Code forest

Figure F 1. Complete code forest from qualitative information extracted from Atlas.ti



Note: this code forest had 5 code-groups, 10 code titles and 88 codes

## Appendix G. Themes and networks from content analysis

Themes SQ3:

Energizing mechanism:

- Showing what is possible inspires and leads to more ideas
- Showing what is possible attracts more partners
- Being inspired by other initiatives in other countries
- Being contacted for requests is a sign of inspiration

Learning by doing mechanism:

- Experiments lead to learning, which lead to improving
- Feedback is used to learn from experiments
- Feedback and learning happen with the community and the market
- Feedback and learning happen in bidirectional or multidirectional information flows
- Small win initiatives improve by finding a solution to a problem or need
- Networks are used to learn from each other's experiments
- Learning by doing leads to more partners

Logic of attraction mechanism:

- Visible outcomes convince people, and is a way to gain partners
- Visible outcomes generate more financial support and employees
- More demand leads to more employees and partners
- Collaboration leads to more projects
- Gaining more partners during Covid19
- More initiatives and competitors makes it harder to get funding

Bandwagon effect mechanism:

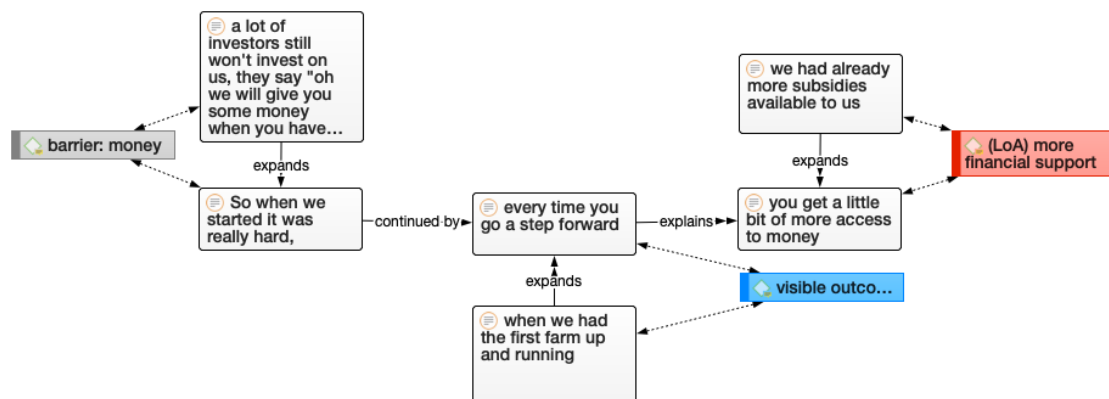
- The municipality doesn't celebrate small wins
- The topic is on the table because Barcelona is hosting an international event
- Companies are changing their minds
- People's awareness is increasing

Coupling mechanism:

- Small win initiatives work in other scales
- Small win initiatives work towards other societal problems
- Trying to solve other societal problems leads to more collaborations

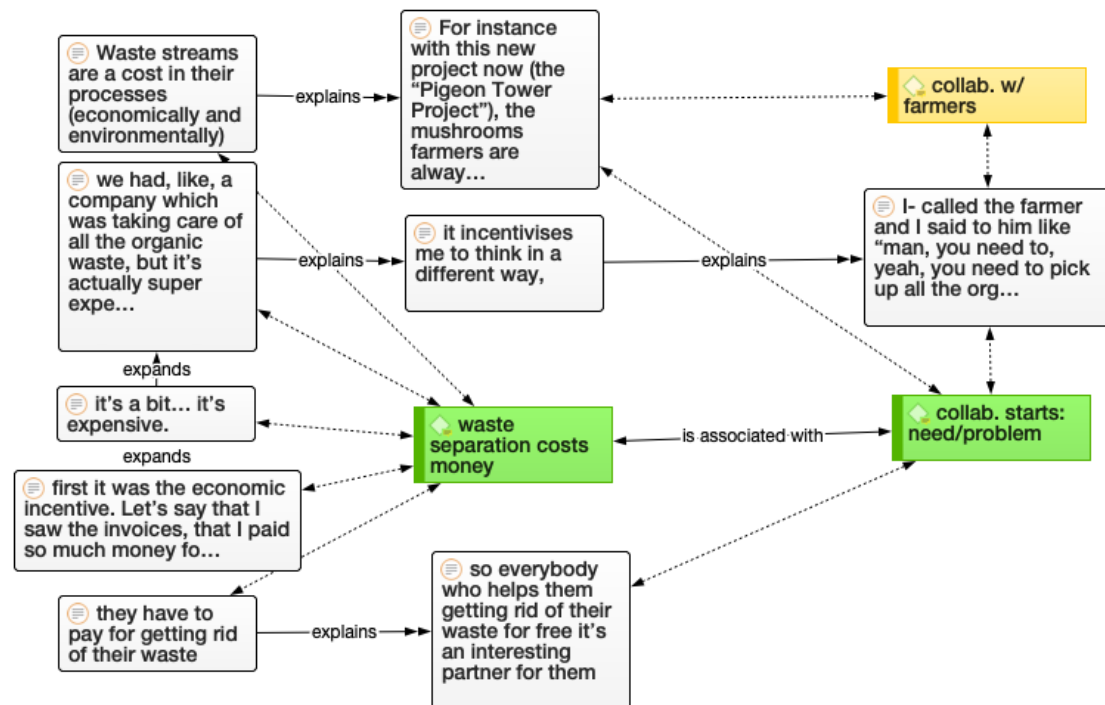
## Network examples:

Figure G 1. Network: logic of attraction mechanism



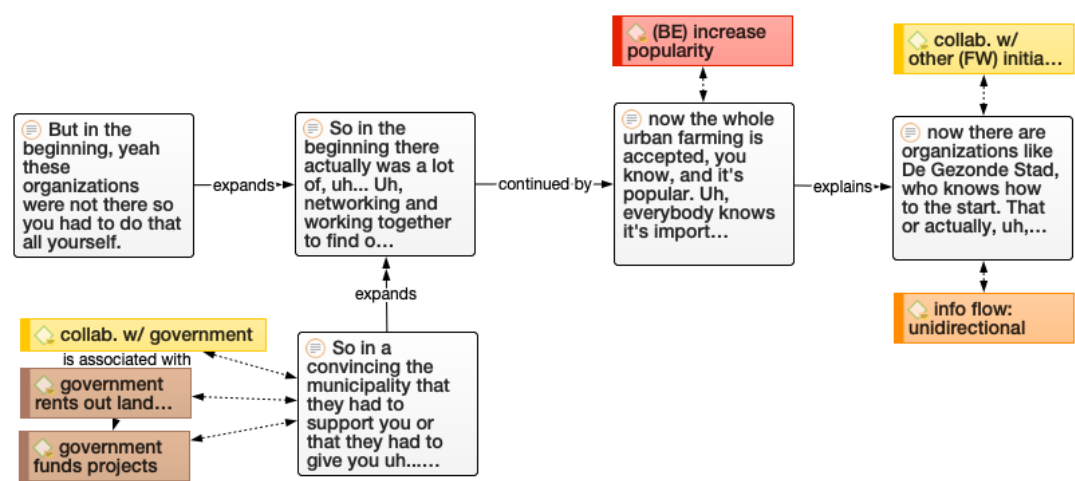
Source: interviewee 3

Figure G 2. Network: learning by doing mechanism



Source: interviewee 1 and 4

Figure G 3. Network: link between the bandwagon effect and the logic of attraction mechanism



Source: interviewee 5



## Appendix H. Results

Table H 1. *Actors with whom small win initiatives collaborate*

Small win initiatives	Partners							
	Municipality	Market	Community	Research institutes	Farmers	Other (FW) initiatives	Networks & associations	EU, IOs
Café De Ceuvel	Yes	Yes	Yes	Yes	Yes		Yes	
The Waste Transformers	Yes	Yes	Yes		Yes			
GROWx	Yes	Yes		Yes				
Myco Insulation Project		Yes		Yes				
I Can Change	Yes		Yes			Yes		
PeelPioneers	Yes	Yes				Yes		Yes
Wormenhotels	Yes	Yes	Yes				Yes	
Too Good To Go NL	Yes	Yes	Yes	Yes		Yes	Yes	
BuurtBuik	Yes	Yes	Yes			Yes		
Taste Before You Waste	Yes	Yes	Yes			Yes	Yes	
Total Amsterdam	9	9	7	4	2	5	4	1
Espigoladors	Yes	Yes	Yes		Yes	Yes	Yes	
Soy Comida Perfecta	Yes	Yes				Yes		
Pont Alimentari	Yes	Yes			Yes	Yes		
Menjador Ca La Rosa	Yes	Yes	Yes			Yes	Yes	
ColorSensing		Yes		Yes				Yes
Revolta	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Nutrició Sense Fronteres	Yes	Yes	Yes			Yes	Yes	Yes
La Fàbrica del Sol	Yes	Yes	Yes			Yes	Yes	
Too Good To Go ES	Yes	Yes	Yes	Yes		Yes	Yes	
Nevera Solidaria	Yes	Yes	Yes			Yes	Yes	
Total Barcelona	9	10	7	2	3	9	7	3
Total	18	19	14	6	5	14	11	4

Table H 2. *Characteristics of collaboration between small win initiatives, the municipality and the market*

Small win initiatives	Characteristics of collaboration with the municipality										Characteristics of collaboration with the market									
	Interaction				Structure		Information flow				Interaction				Structure		Information flow			
	Depth		Scope		Donation	Partnership	Representation	Unidirectional	Bidirectional	Multidirectional	Depth		Scope		Donation	Partnership	Representation	Unidirectional	Bidirectional	Multidirectional
	Shallow	Deep	Narrow	Broad							Shallow	Deep	Narrow	Broad						
Café De Ceuvel	Yes	Yes	Yes		Yes							Yes				Yes	Yes			
The Waste Transformers		Yes		Yes					Yes			Yes		Yes		Yes		Yes		
GROWx				Yes	Yes							Yes		Yes		Yes			Yes	
Myco Insulation Project												Yes								
I Can Change	Yes	Yes			Yes				Yes	Yes										
PeelPioneers												Yes				Yes		Yes		
Wormenhotels	Yes		Yes		Yes						Yes	Yes	Yes					Yes	Yes	
Too Good To Go NL								Yes			Yes	Yes		Yes		Yes			Yes	
BuurtBuik												Yes								
Taste Before You Waste											Yes				Yes					
Espigoladors					Yes															
Soy Comida Perfecta				Yes												Yes				
Pont Alimentari				Yes	Yes						Yes			Yes	Yes			Yes	Yes	
Menjador Ca La Rosa									Yes											
ColorSensing												Yes		Yes		Yes	Yes		Yes	Yes
Revolta	Yes				Yes			Yes	Yes			Yes		Yes		Yes	Yes	Yes	Yes	Yes
Nutrició Sense Fronteres					Yes				Yes						Yes			Yes	Yes	
La Fàbrica del Sol		Yes		Yes	Yes					Yes										
Too Good To Go ES				Yes								Yes		Yes		Yes			Yes	Yes
Nevera Solidaria																				
Total	4	4	2	6	9			2	5	2	4	11	1	7	4	9	3	6	8	2

Table H 3. *Characteristics of collaboration between small win initiatives, the community and research institutes*

Small win initiatives	Characteristics of collaboration with the community										Characteristics of collaboration with research institutes									
	Interaction				Structure			Information flow			Interaction				Structure			Information flow		
	Depth		Scope		Donation	Partnership	Representation	Unidirectional	Bidirectional	Multidirectional	Depth		Scope		Donation	Partnership	Representation	Unidirectional	Bidirectional	Multidirectional
	Shallow	Deep	Narrow	Broad							Shallow	Deep	Narrow	Broad						
Café De Ceuvel					Yes			Yes			Yes					Yes				
The Waste Transformers	Yes							Yes												
GROWx													Yes			Yes				Yes
Myco Insulation Project																			Yes	
I Can Change					Yes	Yes		Yes	Yes											
PeelPioneers																				
Wormenhotels				Yes	Yes	Yes				Yes										
Too Good To Go NL								Yes	Yes	Yes									Yes	
BuurtBuik					Yes															
Taste Before You Waste	Yes				Yes			Yes												
Espigoladors	Yes				Yes														Yes	
Soy Comida Perfecta																				
Pont Alimentari																				
Menjador Ca La Rosa					Yes					Yes										
ColorSensing												Yes		Yes					Yes	
Revolta		Yes				Yes		Yes	Yes											
Nutrició Sense Fronteres				Yes				Yes												
La Fàbrica del Sol	Yes					Yes			Yes											
Too Good To Go ES								Yes	Yes		Yes									
Nevera Solidaria					Yes															
Total	4	1		2	8	4		8	5	3	2	1		2		2			4	1

Table H 4. *Characteristics of collaboration between small win initiatives, other (FW) initiatives and networks and associations*

Small win initiatives	Characteristics of collaboration with other (FW) initiatives										Characteristics of collaboration with networks and associations									
	Interaction				Structure			Information flow			Interaction				Structure			Information flow		
	Depth		Scope		Donation	Partnership	Representation	Unidirectional	Bidirectional	Multidirectional	Depth		Scope		Donation	Partnership	Representation	Unidirectional	Bidirectional	Multidirectional
	Shallow	Deep	Narrow	Broad							Shallow	Deep	Narrow	Broad						
Café De Ceuvel											Yes							Yes		
The Waste Transformers																				
GROWx																				
Myco Insulation Project																				
I Can Change			Yes	Yes	Yes	Yes		Yes												
PeelPioneers						Yes														
Wormenhotels														Yes			Yes			Yes
Too Good To Go NL									Yes											
BuurtBuik																				
Taste Before You Waste					Yes															
Espigoladors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes							Yes			Yes
Soy Comida Perfecta	Yes						Yes		Yes											
Pont Alimentari	Yes	Yes		Yes	Yes				Yes											
Menjador Ca La Rosa	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes							Yes			
ColorSensing																				
Revolta	Yes					Yes								Yes						
Nutrició Sense Fronteres				Yes	Yes					Yes										
La Fàbrica del Sol	Yes									Yes										
Too Good To Go ES														Yes						
Nevera Solidaria																				
Total	6	3	2	5	6	5	3	3	4	4	1			3			3	1		2

Table H 5. *Level of involvement and embeddedness of collaboration between small win initiatives and their partners*

Small win initiatives	Collaborations' level of involvement							Collaboration's level of embeddedness						
	State	Market	Community	Research institutes	Other (FW) initiatives	Networks & associations	Initiative' s involvement	State	Market	Community	Research institutes	Other (FW) initiatives	Networks & associations	Initiative' s embeddedness
Café De Ceuvel	1,5	2,5	0,5	2		0	6,5	1	1	1	1		3	7
The Waste Transformers	1,5	2,5	0,5				4,5	1	1	1				3
GROWx	1,5	2,5		2			6	1	1		1			3
Myco Insulation Project		2,5		2			4,5		1		1			2
I Can Change	1,5		0,5		1,5		3,5	1		1		1,5		3,5
PeelPioneers	1,5	2,5			1,5		5,5	1	1			1,5		3,5
Wormenhotels	1,5	2,5	0,5			0	4,5	1	1	1			3	6
Too Good To Go NL	1,5	2,5	0,5	2	1,5	0	8	1	1	1	1	1,5	3	8,5
BuurtBuik	1,5	2,5	0,5		1,5		6	1	1	1		1,5		4,5
Taste Before You Waste	1,5	2,5	0,5		1,5	0	6	1	1	1		1,5	3	7,5
Total Amsterdam							55							48,5
Espigoladors	1,5	2,5	0,5		1,5	0	6	1	1	1		1,5	3	7,5
Soy Comida Perfecta	1,5	2,5			1,5		5,5	1	1			1,5		3,5
Pont Alimentari	1,5	2,5			1,5		5,5	1	1			1,5		3,5
Menjador Ca La Rosa	1,5	2,5	0,5		1,5	0	6	1	1	1		1,5	3	7,5
ColorSensing		2,5		2			4,5		1		1			2
Revolta	1,5	2,5	0,5		1,5	0	6	1	1	1		1,5	3	7,5
Nutrició Sense Fronteres	1,5	2,5	0,5		1,5	0	6	1	1	1		1,5	3	7,5
La Fàbrica del Sol	1,5	2,5	0,5		1,5	0	6	1	1	1		1,5	3	7,5
Too Good To Go ES	1,5	2,5	0,5	2	1,5	0	8	1	1	1	1	1,5	3	8,5
Nevera Solidaria	1,5	2,5	0,5		1,5	0	3,5	1	1	1		1,5	3	6,5
Total Barcelona							57							61,5

Table H 6. *Difficulties in collaborations per small win initiative*

Small win initiatives	Difficulties in collaborations						
	Complexity	Time	Lack of information	Technical	Human resources	Lack of effort	Money
Café De Ceudel		Yes	Yes			Yes	
The Waste Transformers							
GROWx							
Myco Insulation Project				Yes			
I Can Change		Yes					
PeelPioneers		Yes					
Wormenhotels		Yes			Yes		
Too Good To Go NL							
BuurtBuik							
Taste Before You Waste							
Total Amsterdam		4	1	1	1	1	
Espigoladors		Yes					
Soy Comida Perfecta					Yes		
Pont Alimentari		Yes					
Menjador Ca La Rosa	Yes						
ColorSensing					Yes		
Revolta	Yes	Yes		Yes			
Nutrició Sense Fronteres	Yes	Yes			Yes		
La Fàbrica del Sol	Yes	Yes	Yes				Yes
Too Good To Go ES	Yes						
Nevera Solidaria							
Total Barcelona	5	5	1	1	2		1
Total	5	9	2	2	3	1	1

Table H 7. *The energizing mechanism per small win initiative*

Small win initiatives	Feelings or events related to the energizing mechanism				
	Enthusiastic	Convinced	Desire to inspire	Inspiring others	Inspired by
Café De Ceuvel	Yes		Yes	Yes	
The Waste Transformers	Yes	Yes	Yes	Yes	Yes
GROWx	Yes	Yes		Yes	
Myco Insulation Project	Yes	Yes	Yes		
I Can Change	Yes				Yes
PeelPioneers		Yes	Yes	Yes	
Wormenhôtels	Yes			Yes	Yes
Too Good To Go NL	Yes		Yes	Yes	
BuurtBuik					Yes
Taste Before You Waste		Yes	Yes	Yes	
Total Amsterdam	7	5	6	7	4
Espigoladors				Yes	Yes
Soy Comida Perfecta				Yes	Yes
Pont Alimentari		Yes			Yes
Menjador Ca La Rosa	Yes			Yes	Yes
ColorSensing					
Revolta					
Nutrició Sense Fronteres					
La Fàbrica del Sol		Yes			
Too Good To Go ES	Yes	Yes	Yes	Yes	
Nevera Solidaria					Yes
Total Barcelona	2	3	1	4	5
Total	9	8	7	11	9

Table H 8. *The learning by doing mechanism per small win initiative*

Small win initiatives	Ways of learning by doing		
	Solving problems	Experimenting	Adapting to needs
Café De Ceuvel	Yes	Yes	
The Waste Transformers	Yes	Yes	
GROWx	Yes	Yes	Yes
Myco Insulation Project	Yes	Yes	
I Can Change	Yes	Yes	
PeelPioneers	Yes	Yes	Yes
Wormenhôtels	Yes	Yes	
Too Good To Go NL	Yes	Yes	
BuurtBuik			
Taste Before You Waste			Yes
Total Amsterdam	8	8	3

Table H 8 Continued

Small win initiatives	Ways of learning by doing		
	Solving problems	Experimenting	Adapting to needs
Espigoladors	Yes		
Soy Comida Perfecta	Yes		
Pont Alimentari			Yes
Menjador Ca La Rosa	Yes	Yes	Yes
ColorSensing	Yes	Yes	Yes
Revolta	Yes	Yes	
Nutrició Sense Fronteres	Yes	Yes	Yes
La Fàbrica del Sol	Yes		
Too Good To Go ES	Yes		
Nevera Solidaria			
Total Barcelona	8	4	4
Total	16	12	7

Table H 9. *The logic of attraction mechanism per small win initiative*

Small win initiatives	Resources in the logic of attraction mechanism			
	More demand	More employees	More financial support	More partners
Café De Ceuvél				Yes
The Waste Transformers		Yes	Yes	Yes
GROWx		Yes	Yes	Yes
Myco Insulation Project				Yes
I Can Change	Yes	Yes	Yes	Yes
PeelPioneers	Yes	Yes	Yes	Yes
Wormenhotels	Yes	Yes	Yes	Yes
Too Good To Go NL	Yes	Yes	Yes	Yes
BuurtBuik	Yes	Yes	Yes	Yes
Taste Before You Waste	Yes	Yes		Yes
Total Amsterdam	6	8	7	10
Espigoladors	Yes	Yes	Yes	Yes
Soy Comida Perfecta				
Pont Alimentari				Yes
Menjador Ca La Rosa				Yes
ColorSensing		Yes	Yes	Yes
Revolta			Yes	Yes
Nutrició Sense Fronteres	Yes		Yes	Yes
La Fàbrica del Sol	Yes	Yes	Yes	
Too Good To Go ES	Yes	Yes	Yes	Yes
Nevera Solidaria	Yes			
Total Barcelona	5	4	6	7
Total	11	12	13	17



Table H 10. *The coupling mechanism per small win initiative*

Initiatives	Coupling	
	Working in other scales	Working in other societal problems
Café De Ceudel		Yes
The Waste Transformers	Yes	Yes
GROWx	Yes	
Myco Insulation Project		
I Can Change		
PeelPioneers	Yes	
Wormenhôtels	Yes	Yes
Too Good To Go NL	Yes	Yes
BuurtBuik		Yes
Taste Before You Waste	Yes	Yes
Total Amsterdam	6	6
Espigoladors	Yes	Yes
Soy Comida Perfecta		Yes
Pont Alimentari		Yes
Menjador Ca La Rosa		Yes
ColorSensing		
Revolta		Yes
Nutrició Sense Fronteres	Yes	Yes
La Fàbrica del Sol		Yes
Too Good To Go ES	Yes	Yes
Nevera Solidaria	Yes	Yes
Total Barcelona	4	9
Total	10	12