Circular social innovation and local government:

Qualitatively assessing governance of circular citizen initiatives in Rotterdam.

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Executive summary

Global resource consumption has surged in recent decades, leading to increased environmental degradation and pollution. In response, initiatives such as the Dutch and Paris Climate Agreements have been established. These agreements commit the Dutch government to reducing greenhouse gas emissions by 49% before 2030 and 95% before 2050. One key strategy to achieve these goals is the adoption of a circular economy (CE) in the Netherlands, aiming to significantly reduce the demand for new resources.

Despite significant academic attention on the role of government in transitioning to a CE, the impact of social innovations (SIs) remains relatively understudied. Moreover, while there is evidence suggesting that local governments can positively influence the success of SIs, there is a lack of detailed studies on how they do so. This study addresses this gap by examining the relationship between the municipality of Rotterdam and circular citizen initiatives (CCIs), aiming to answer the following research question: *In what ways does the municipality of Rotterdam respond to the emergence of social innovation in the circular economy, specifically with regard to CCIs?*

To formulate an answer to the research question, this study has posed five sub-questions. These questions aim to gain and understanding of the operations and goals CCIs in Rotterdam, explore the policies and instruments employed by the municipality vis-à-vis CCIs, assess how the interaction between the municipality and CCIs impacts the transformative capacity of the latter, identify any bottlenecks or tensions in their relationship, and propose solutions to address these issues according to both CCIs and the municipality.

To contextualize the relationship between CCIs and the municipality of Rotterdam, existing literature on SI, transformative social innovation (TSI), and the Local Climate Policy and Action (LCPA) framework was utilized. SI and TSI theories, in conjunction with CE theory, were employed to conceptualize CCIs, while the LCPA framework provided a framework to evaluate policies and actions related to CCIs involved in the CE in Rotterdam. The study employed a relational approach to TSI, combined with the LCPA framework, to understand how the municipality influences the transformative capacity of CCIs.

This study took a qualitative approach in which empirical data were primarily collected through semi-structured interviews and supplemented with document analysis of academic publications and policy briefs. Interviews were conducted with six participants from various CCIs in Rotterdam, two civil servants from the municipality of Rotterdam, and two academic experts. Data analysis of the semi-structured interview was done through abductive coding.

Analysis of the data revealed that CCIs in Rotterdam exhibit diverse forms but share a focus on delivering value to lower socio-economic groups who cannot afford to waste and reducing 'the size of

the garbage pile'. The municipality governs CCIs through the provision of subsidies, materials, and access to its network. Additionally, the municipality positively influences the transformative capacity of CCIs, albeit to a limited extent through subsidies and more significantly through collective learning.

Despite these positive aspects, several bottlenecks and tensions were identified in the relationship between the municipality and CCIs, including clashing institutional logics, tensions between civil servants and CCI participants, regulatory conflicts, differing ideas of value creation, and accommodation provision issues. Most of these bottlenecks could be explained by historic and accepted practises in the municipality that ensue from historic institutional logics, namely Traditional Public Administration and New Public Management. These logics clash with a newer logic, New Public Governance, and thus create barriers in the relationship between the municipality of Rotterdam and CCIs.

Interviewed CCI participants proposed several solutions to address these bottlenecks and tensions, including assigning a single contact person or team per CCI with decision-making authority across departments, involving CCIs in decision-making processes earlier and more substantively, and aligning collaboration and support agreements with the municipality's long-term CE goals.

In conclusion, while the municipality of Rotterdam demonstrates some commitment to the emergence of CCIs, their role in the circular economy transition appears somewhat limited. The study recommends that the municipality map and review regulations hindering the circular economy and CCIs, take a more proactive role in providing spaces for CCIs, establish long-term agreements with CCIs, develop a digital central contact point for CCIs, and collaborate with CCIs using innovative frameworks such as the Circular Value Flower to explore new value creation methods beyond the purely economic.

Content

Abbreviations

CCI – Circular Citizen Initiative

CE – Circular Economy

LCPA – Local Climate Policy and Action

MLP – Multi Level Perspective

NPG – New Public Governance

NPM – New Public Management

SI – Social Innovation

TPA – Traditional Public Administration

TSI – Transformative Social Innovation

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1. Introduction

"Circular citizen initiatives, such as Precious Plastic, Repair Cafes, Herenboeren and deBlauweWijkEconomie, can be boosters for the transition towards circular economy. At least, if given the opportunity, because citizen initiatives experience a number of (system)barriers that hinder them in their activities." (Quist et al., 2022, p. 6)

In the past decades, the global use of raw natural resources has increased three-fold, from 37 billion tonnes in 1990 to 101,4 billion tonnes in 2021 (Edie, 2022; Plank et al., 2018). Resource use will keep increasing at an alarming rate, and predictions are that the global resource use will be double again by 2050 (IPCC, 2014). Despite this enormous increase in resource consumption, the global rate of reuse and recycling has stagnated at around 8.6% (Edie, 2022). The ever increasing demand for resources puts pressure on the environment, and causes environmental issues such as water, air and soil pollution, biodiversity loss, resource depletion and excessive land use (Geissdoerfer et al., 2017).

To reduce environmental pressure, the Dutch government has signed two agreements: the Dutch Climate Agreement and the Paris Climate Agreement. In these agreements, the Dutch government has agreed to respectively reduce Dutch greenhouse gas emissions, compared to 1990, by 49% before 2030, and by 95% before 2050. To make sure these goals are reached, several measures were agreed upon. One of these measures is to transform the Netherlands into a circular economy by 2050 (Waterstaat, 2022).

Circular economy is a concept that has started to gain momentum in the 1970's (EMF, 2013). One of the first uses of the concept can be attributed to Pearce and Kelly (Pearce & Turner, 1989). They first introduced the concept by describing the influence of natural resources on the economy as input as well as output for production and consumption. In doing so they investigated the linear and open-ended characteristics of economic systems. One of the first uses of the concept of loop economy, an important central concept of circular economy, was introduced by Ready-Mulvey and Stahel (1977). Circular economy is inherently connected to the concept of closed loops and includes the principles of the 3R's (reduce, reuse, and recycle), and the six R's (re-use, recycle, redesign, remanufacture, reduce, and recover) (Geissdoerfer et al., 2017; Winans et al., 2017).

A widely acknowledged definition of circular economy is given by the Ellen MacArthur Foundation and is introduced as follows: *"an industrial economy that is restorative or regenerative by intention and design"* (2013, p. 14). Building upon this definition, and several others, the seminal work by Geissdoerfer et al. arrive at the following definition: circular economy is *"a regenerative system in which resource input and waste, emission, and energy leakage are minimised by slowing, closing, and narrowing material and energy loops. This can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling."* (2017, p. 759). This definition is employed in this study as it is deemed to be a comprehensive description of circular economy (CE).

CEs help keep resources in the 'loop' for longer and, in an ideal situation, aim to reduce resource input to near zero. Therefore, they aim to enable economies to keep on reusing its resources over and over again and eliminate leakages from the system. In addition, CEs are considered an absolute necessity for maintaining sustainable economic growth (Geissdoerfer et al., 2017). Reusing resources is a major advantage because it reduces the need for new resources to be put into the system, which in turn reduces environmental impacts associated with the production and transport of new resources. In addition, reusing and recycling resources reduces waste production, resulting in less waste ending up in the environment. This mitigates air, water, and soil pollution. A well-known example of this is the Ocean Cleanup initiative, which captures plastics and other waste from the oceans for recycling, reducing ocean pollution (The Ocean Cleanup, n.d.).

The concept of CE, strictly speaking, focusses on economic systems and emphasises economic benefits over environmental benefits. Moreover, the responsibility of implementing CE is meant to reside with governments, NGO's and companies (Webster et al., 2017). This is a huge responsibility and, as has become evident during the last decades, these actors are often not able to tackle major challenges like this on their own (Murray et al., 2010).

During the past decades, many governments, NGOs, and corporations have increasingly implemented CE into their policy. This increase has seen a similar exponential rise in attention in academic studies about CE. But while the topic of CE is abundantly discussed, the mainstream CE discourses seem to focus on achieving circularity through the promotion of technological innovations and new sustainable business models, such as refurbishing, recycling, leasing, servicing, urban mining and energy recovery (Calisto Friant et al., 2021, 2023; Repo et al., 2018). This road to a "circular tomorrow" has, therefore, been criticized for being too techno-focused and growth-centric, neglecting the satisfaction of social needs and improving social value (Moreau et al., 2017; Rask, 2022).

Calist Friant et al. (2023) found evidence for the above mentioned criticisms in their study on CE discourses employed by the cities of Amsterdam, Glasgow, and Copenhagen. They found that CE policies in all three cities are focussed on technological innovation that foster economic growth and reduce environmental impacts while neglecting social aspects and the involvement of social actors. Another study on CE policy in the City of Gothenburg finds a similar result, but adds that neglecting the consumer perspective as well as social and systemic issues reduce the transformative potential of government CE programmes (Rask, 2022). In addition, another study finds a lack of congruence between CE policy priority and European citizen perspectives on desirable CE futures (Repo et al., 2018). Again, EU policy focusses on achieving economic targets such as waste management, bioeconomy and resource efficient eco-design while lacking attention for social needs. The lack of attention for social needs was identified as one of the major discrepancies between EU policy priority and European citizen perspectives (Repo et al., 2018).

As public governments and private actors fail to enact effective changes to create a more sustainable society, dissatisfaction grows amongst citizens as their social needs are not met. Sometimes, when dissatisfaction has reached a certain threshold, citizens from local communities take matters into their own hand and place themselves at the centre of sustainable innovation action to fundamentally change social relations. The satisfaction of social needs and goals through the transformation of social relations is referred to as 'social innovation' (Haxeltine et al., 2016; Moulaert, 2009; Mulgan et al., 2007; Phills et al., 2008). Social innovations (SIs) are a bottom-up approach to solve, or help solve, societal problems and focus on creating value for society as a whole (Brandsen et al., 2016; Moulaert, 2009; Murray et al., 2010; Phills et al., 2008; Voorberg et al., 2015). In the CE domain, SI is exemplified well in the 'Repair Café', a citizen initiative that started its operations in 2009 in Amsterdam. In Repair Cafés, citizens can meet up with tradesmen who possess expert knowledge and the skills to repair specific (household) items. This saves the lives of many repairable items that would otherwise end up as waste, resulting in potentially valuable resources being lost. This initiative started as a local initiative in Amsterdam and today there are over 2000 Repair Café's in over 35 countries, each year giving thousands of products a new life (Quist et al., 2022).

Beside the intrinsic motivation of citizens to make their community more sustainable, they are increasingly encouraged to do so by state actors. Examples of citizen initiative range from climate mitigation and energy transition to reducing food waste (Hoppe & De Vries, 2019; Mees et al., 2019). But encouragement is not all that is needed. SIs often also require public governments to facilitate and/or empower them. In addition, governments may offer support for acquiring essential permits or they may provide subsidies. However, it is currently unknown whether or not (local) governments are actually enabling and facilitating SIs (Hegger et al., 2017; Mees et al., 2019).

1.1 Relevance of this study

This section will demonstrate why exactly conducting a study regarding the relationship between local government and CCIs is relevant. It will illustrate both the academic and societal relevance by pinpointing the gaps in academic literature, and societal challenges that are related to this subject.

The main goal of citizen initiatives is to create public value, e.g. community energy initiatives that aim to create and/or improve sustainable energy systems and thus reducing energy costs and environmental impacts. In addition, community energy pursue the goal of 'energy-democracy' where local communities have the ability to directly participate in energy decision-making (Quist et al., 2022). They usually arise where there is a dire need for improvement of the situation. To make sure that citizen initiatives are effective at creating value, favourable conditions need to be created. Several studies have indicated that it is currently unknown what conditions are preferable to stimulate citizen initiatives. This is especially the case with regard to the relationship between the initiative and the government, institutions, and policy concerning citizen initiatives (Brandsen et al., 2017; Geldermans et al., 2020;

Sanders & Timmeren, 2018). A better understanding of the role of local governments vis-à-vis CCIs will help create favourable conditions for said initiatives to play a role in the transition of the Dutch society towards CE.

In their systemic review study, João-Roland and Granados (2020) found that support from policymakers is a crucial factor for the likelihood of a SI succeeding. In addition, they emphasise that building strategic relationship with policymakers is fundamental. Also, in their explorative study on the drivers and barriers towards the implementation of bottom-up CE initiatives in Amsterdam and Rotterdam, Russell et al. (2020) found that policy and regulation are important factors that contribute to the probability of success of CE initiatives. More studies establish that the (local) government can positively impact the success of bottom-up initiatives (Hoppe et al., 2015). However, in-depth studies on the relationship between local government and citizen initiatives are all but affluent (Edelenbos et al., 2018; Mees et al., 2019).

When citizens contribute to establishing CEs, responsibility shifts from governments to citizens. According Mees et al. (2019), governments may subsequently shift towards different roles that are 'enabling' and 'facilitating'. Their research contributes to this gap in the context of climate adaptation. The conceptual understanding of these roles in the context of the CE, however, remains unexplored. In addition, it remains unclear to what extent, if at all, governments are moving towards enabling or facilitating roles (Hegger et al., 2017).

Civil servants are often unsure about how to approach citizen initiatives, and how far their support should go (Verhoef et al., 2018). Should they be interacted with as if they were entrepreneurs, or a citizen initiative? In reality, citizen initiatives often take on a hybrid form (Karré & Meerkerk, 2019). Governments, however, do not yet have an adequate answer on how to deal with this. This stresses the need to gain an improved understanding of how local governments interact and/or support with citizen initiatives. In addition, the need is illustrated in the fact that sound conceptual understanding of local government support ensures that governments actually cultivate citizen initiatives, and not only frustrate them (Nederhand et al., 2014).

While this study is academically relevant, it is also relevant from a societal point of view. CCIs are important because they aim to increase reuse and conservation of resources. This is in line with the climate goals of the Dutch government, which is to reduce the use of primary resource in the Netherlands by 50% before 2030, and be fully circular before 2050 (Planbureau voor de Leefomgeving, 2019; Waterstaat, 2021). Establishing CEs is crucial instrument to reduce resource demand, energy use, and GHG emissions (Planbureau voor de Leefomgeving, 2019). Conducting a study on how to help make CCIs more effective is, therefore, relevant for Dutch society as they will contribute towards reaching Dutch climate goals. In addition, it will help citizens to provide added value for their community and improve their sustainability.

Finally, this research is relevant from the Industrial Ecology perspective. Industrial Ecology can be defined as a field of study that focuses on the stages of production processes of goods and services from a nature perspective by trying to mimic a natural system and conserving and reusing resources (Chertow, 2008). This can be directly related to the contents of this research, which focusses on the governance of citizen initiatives that aim to contribute towards circular economies in communities. The studied initiatives directly affect production stages of goods and services with the guiding principle to conserve and re-use resources.

1.2 Research objectives and questions

The previous section has established the gaps in contemporary literature and has illustrated the need and relevance for further study of the relationship between municipalities and CCIs. Taking the forementioned into account, this study has set the following research objectives:

1. To map what CCIs entail in the City of Rotterdam.
2. To discover what the governance of CCIs looks like in the municipality of Rotterdam, and which policies and policy instruments are put in place by the municipality vis-a-vis CCIs.
3. To discover how and to what extent the interaction between the municipality of Rotterdam and CCIs affects the transformative capacity of CCIs.
4. To explore what bottlenecks and/or tensions are experienced by CCIs while interacting with the municipality of Rotterdam.
5. To gain insight into how the bottlenecks can be resolved according to the involved actors.

The main research objective of this research is to examine the relationship between municipalities and CCIs. This objective is translated into the main research question: *In what ways does the municipality of Rotterdam respond to the emergence of social innovation in circular economy, more specifically to CCIs?* The main research question is divided into five sub-questions:

1. What kinds of CCIs are present in Rotterdam, and how to they intend to change social relations?
2. What does the governance arrangement vis-à-vis CCIs look like in the municipality of Rotterdam, and which policy instrumentations does the municipality employ vis-vis CCIs?
3. How does the interaction between the municipality of Rotterdam and CCIs affect the transformative capacity of the latter?
4. What bottlenecks and/or tensions are experienced with regards to the relationship between the municipality and CCIs?
5. How can these bottlenecks be resolved according to the involved stakeholders?

1.3 Readers' guide

The following chapters will answer the research questions of this study. Chapter 2 will review relevant studies and theoretical concepts regarding SI and TSI and local government organization. Chapter 3 will

discuss the research design and methodology employed to systematically answer the research questions posed in this study. In addition, the limitations of this study are discussed. Chapter 4 will present the results of the analysis of the municipality of Rotterdam and the interviews with CCIs, civil servants, and academic experts. Chapter 5 will discuss the results from the analysis and put them in the context of theoretical perspectives. In addition, it will discuss the generalizability of the results in light of the limitations of this study. Chapter 6 contains the conclusions of this study and answers the research questions posed in this study. Also, it will present recommendations for future research.

Chapter summary

This chapter highlights the surge in global natural resource consumption and the Dutch government's commitment to reducing greenhouse gas emissions and transitioning to a circular economy by 2050. CE aim to minimize resource input and waste through practices like reduce, reuse, and recycle. However, mainstream discourse on CE often prioritizes technological innovations over social aspects. The study focuses on the relationship between the municipality of Rotterdam and CCIs, aiming to understand how the municipality interact with CCIs to foster favourable conditions for their success.

Its relevance lies in academic contributions and societal impacts, particularly in advancing Dutch climate goals and promoting sustainability. Moreover, it aligns with Industrial Ecology principles, emphasizing resource conservation and reuse.

Research objectives include mapping CCIs, assessing governance arrangements, evaluating transformative capacity, identifying tensions, and suggesting solutions. Research questions explore the types of CCIs in Rotterdam, governance structures, the influence of municipal interaction on transformative potential, encountered challenges, and potential remedies. The main research query revolves around understanding the municipality of Rotterdam's response to social innovation in the circular economy, specifically towards CCIs.

Overall, the study aims to provide insights into the dynamics between municipalities and grassroots initiatives, offering implications for policy, practice, and future research, aiming to bridge the gap between academic understanding and practical implementation to achieve sustainable objectives.

2. Theoretical framework

This section moves on to introduce the core concepts of this study. First, the concept of social innovation will be discussed. The concept of SI provides handles to analyse co-creation or co-production between public institutions and its end-users, citizens. In addition, SI helps to understand what factors drive social changes. This chapter will, therefore, discuss and define the concept of SI as well as the framework of TSI and the Local Climate Action and Policy (LCPA) framework.

2.1 Literature research method

To identify important theoretical concepts, key literature, and academic gaps this study bases itself on a literature review. This section will provide transparency concerning the literature review method by describing the sourcing of literature as is prescribed by van Wee and Bannister (2016). An initial literature review was conducted via Web of Science by searching for "social innovation" in the 'Topic' field. This query was further refined by selecting the Web of Science subjects 'Environmental Studies,' 'Environmental Sciences', 'Green Sustainable Science Technology', 'Regional Urban Planning', 'Sociology', 'Urban Studies', 'Social Sciences Interdisciplinary', and 'Public Administration'. This search yielded 1,147 hits. Highly cited publications were used as a starting point. Through the method of 'snowballing' additional key literature was found. Additional publications employed in this study were recommended by supervisors. Besides Web of Science, Google scholar was used to find useful publications. By searching for "social innovation" there, additional highly cited publications were found and consulted to complete the literature review.

In addition, Web of Science was used by searching "circular econom*". This query yielded 14,456 hits. The most cited publication, with 2,062 citations, is by Geissdoerfer et al. (2017). Also, Google Scholar was used by searching for "circular economy". Also, Web of Science was used by searching "circular economy" AND "social innovation" in the 'Topic' field. This yielded 47 hits with most publications concerning circular economy projects on a local scale. Most merely cite social innovation theory but do not combine if thoroughly with circular economy, nor do they study citizen initiatives. This query, therefore, yielded no helpful publications for this study.

2.2 Social innovation

To innovate is as old as mankind itself. The capacity to conceive new ideas and produce beneficial outcomes from them has been present throughout human history, constantly improving quality of life. According to Cajaiba-Santana (2014), economists were the first to study innovation, starting with the work of Schumpeter in 1934. Since then, the concept of innovation has been evolving separately in many different disciplines such as technology, psychology and management. The development of the social dimension of innovation seems to be a more recent one compared to the forementioned fields. However, Moulaert (2009) traces the first evocations of social innovation back to the nineteenth century

where Benjamin Franklin proposed minor modifications within the social organization of communities. Also, Max Weber demonstrated the power of rationalization in his work regarding the capitalist system at the start of the twentieth century. Notably, the origins of the approach employed in the first works of Schumpeter can be found in the works of Max Weber. It is safe to conclude, however, that the concept has been around for quite some time. Academic attention for the research area of social innovation has seen a significant increase since the late 1990's. This has been identified as the result of continued struggle by existing public institutions, and private institutions, to effectively tackle the biggest challenges of that time (Murray et al., 2010).

Now that some light has been shed on the history of the concept of social innovation this section moves on to define the two terms that make up the concept separately. In doing so, it will provide a more comprehensive understanding of the concept as a whole. First, when is something considered an innovation? Phills et al. (2008) divide innovation into two streams. One focusses on innovation as changes to processes that produce innovation, e.g. organizational structure, individual creativity and environmental context. The other focusses on innovation as an outcome, e.g. new products, product features and production methods. In addition, Phills et al. (2008) provide two criteria that a process or outcome must meet to be considered an innovation. The first criterion is novelty. Innovations must be new to the user, context or application. The second criterion is improvement. The process or outcome must be more effective or efficient than its pre-existing alternatives. In the context of this study, it is also important to add sustainable as an improvement, e.g. a solution that will continue to work for a long period of time. Mulgan et al. (2007, p. 6) move away from the criteria of novelty and improvement and simply define innovations as *"new ideas that work"*. They emphasise that the term of improvement ignores the importance of implementation and diffusion of the innovation. Mulgan et al. (2007) highlight implementation and diffusion because that will eventually transforms ideas to solutions that actually contribute to meeting goals. While the definition 'new ideas that work' is nice and simple, it does provide a means to differentiate between types of innovations, i.e. SI.

While innovation pertains to something new that works, the 'social' part in SI pertains to meeting social goals (Brandsen et al., 2016; Hoppe & De Vries, 2019; Moulaert, 2009; Mulgan et al., 2007; Phills et al., 2008; Voorberg et al., 2015). SIs differ from other types of innovations in the sense that they have different intended results, namely results that have social benefits (Cajaiba-Santana, 2014). SIs, therefore, have the goal to meet social needs and, in doing so, achieve a 'better' society. This is what differentiates SI from innovations in general, as they could also only meet the needs of a specific entity instead of the society as a whole. SI often has a countercultural nature and are formed self-consciously. They are formed to induce social change, and in response to a regime that is unsustainable (Hoppe & De Vries, 2019; Seyfang & Haxeltine, 2012).

With the increased academic attention for SI inherently comes continuous debate of defining, renegotiating, and redefining the term (Brandsen et al., 2016). Table 2.1 presents an overview of a few highly cited definitions found among academic literature. These definitions provide guidance for the general discussion on what SI means. As is shown in Table 2.1 there are many definitions and conceptualizations to be found in academic literature.

Table 2.1: Overview of the definitions of social innovation. Source: Author.

Authors	Definition
Brandsen et al. (2016, pp. 6–7)	*"social innovations are those that, created mainly by networks and joint action in social realms beyond business and government routines, at any given moment, raise the hope and expectations of progress towards something "better" (a more socially sustainable/democratic/effective society)."*
Haxeltine et al. (2016, p. 19)	*"Changes in social relations, involving new ways of doing, organising, framing and/or knowing."*
Moulaert (2009, p. 12)	*"It defines social innovation as the satisfaction of alienated human needs through the transformation of social relations: transformations which 'improve' the governance systems that guide and regulate the allocation of goods and services meant to satisfy those needs, and which establish new governance structures and organizations (discussion fora, political decision-making systems, firms, interfaces, allocation systems, and so on)."*
Mulgan et al. (2007, p. 8)	*"innovative activities and services that are motivated by the goal of meeting a social need, and are predominantly developed and diffused through organizations whose primary purposes are social"*
Phillis et al. (2008, p. 36)	*"A novel solution to a social problem that is more effective, efficient, sustainable, or just than existing solutions and for which the value created accrues primarily to society as a whole rather than private individuals."*
Voorberg et al. (2015, p. 1334)	*"social innovation as the creation of long-lasting outcomes that aim to address societal needs by fundamentally changing the relationships, positions and rules between the involved stakeholders, through an open process of participation, exchange and collaboration with relevant stakeholders, including end-users, thereby crossing organizational boundaries and jurisdictions."*
Wolsink (2012, p. 8)	*"New ideas that work in meeting social goals"*

By using the definitions as presented in Table 2.1, one can pinpoint the most important components of SI and create a working definition for this study. The first important component is that of the roots of SI. SIs are often a product of a bottom-up approach by social actors employing social means (Brandsen et al., 2016; Hoppe & De Vries, 2019). Second, a SI aims to address social needs that are not met by existing institutions (Brandsen et al., 2016; Cajaiba-Santana, 2014; Moulaert, 2009; Mulgan et al., 2007; Murray et al., 2010; Phills et al., 2008; Wolsink, 2012). Lastly, SIs are by definition social in their means and ends (Hoppe & De Vries, 2019; Murray et al., 2010). Taking example from the work by Hoppe and de Vries (2019), who define SI in the context of the energy transition, this study employs an adapted version of their definition and defines SI in the context of CE as follows: 'Innovations that are social in their means and contribute to circular economy transition, civic empowerment and social goals pertaining to the general wellbeing of communities'.

2.3 Transformative social innovation

The TSI framework is employed to study the process through which social innovations can challenge, alter and/or replace dominant institutions (Haxeltine et al., 2016). Social innovations contribute to transformative change, which entails an irreversible alteration to social structures and practises. For a social innovation to become transformative, it requires co-evolution with the other 'shades' of change and innovation. The four shades of change and innovation are defined by Avelino et al. (2019) as follows: (1) social innovation, (2) system innovation, (3) game-changers, and (4) narratives of change. A transition is brought to fruition through the interaction and co-evolution of the four shades. This involves new ways of knowing, organising, doing and framing.

TSI is similar to the Multi-Level-Perspective (MLP) in the way that both aim to theorise transition dynamics. MLP theorises transition dynamics through the interaction between three levels; (1) the socio-technical landscape (exogenous macro-trends), (2) socio-technical regimes (dominant institutions and practises), and (3) niche-innovations (Geels et al., 2017; Geels & Schot, 2007). Contrary to the MLP levels, the TSI shades do not attribute specific change and types of innovation to a specific level. In addition, the shades do not imply strong distinctions of exogenous or endogenous developments such as the level of MLP do (Avelino et al., 2019). This study will employ TSI over MLP due to its emphasis on interactive and co-evolutionary processes as well as its emphasis on the social dimension (social innovations).

Avelino et al. (2019) use the term shades to underline that they are not disconnected components but rather interacting, co-evolutionary, and partly overlapping processes. System innovation is conceptualised as a "process of structural change at the level of societal (sub)-systems" (Avelino et al., 2019, p. 197). Such an innovation is quite profound and creates changes in established patters of action and/or changes in structures. Said structures include dominant cultural assumptions and discourses,

legislation, physical and knowledge infrastructure, and the rules prevailing in economic chains (Grin et al., 2010).

Game changers can be conceptualised as 'macro-phenomena' that change the way that the 'game' of societal interactions is played. The macro-phenomena are certain events, trends or developments that change the rules and players within societal interactions. To name a few examples of game-changers: demographic developments (e.g., aging population), ecological phenomena (e.g., climate change and resulting phenomena such as biodiversity loss), socio-technological trends, social movements (e.g., circular economy movement), and socio-economic (e.g., an economic crises and subsequent pressures on the economy) and political challenges (e.g. the economic crisis, and subsequent un-employment and welfare state pressures) (Avelino et al., 2019).

The concept of 'narratives of change' is used to refer to *"sets of ideas, concepts, metaphors, discourses or story-lines about change and innovation"* (Wittmayer et al., 2015, p. 2). Avelino et al. (2019) distinguish between two types of narratives of change. First, there are narratives of change on the level of society, e.g. the narratives of change on the circular economy. On the societal level, the narratives of change can be used by actors to make sense of specific phenomena. Second, there are narratives of change that are a product of SI initiatives that counter existing framings and discourses. Social movements employ narratives of change to counter dominant discourses as well as to co-evolve with new paradigms that exist within the area they operate in. In addition, counter-narratives can be used to reshape existing belief symbols. The ideas that are the foundation of narratives of change often emerge at the local level, and can transform to the global level through self-communication (Avelino et al., 2019). Therefore, each of the shades of innovation affect a different dimension of dominant institutions (Avelino et al., 2019).

It is assumed that SIs can empower actors through the TSI process to better deal with major societal challenges. Empowerment refers to the ability to exercise self-determination. At the organisational level, this could be translated into enabling conditions including organizational forms that support autonomous motivation, and the definition of a common identity (Pel et al., 2020). On the individual level this entails that someone is able to act in accordance with their core interests and values (Ryan & Deci, 2000). Moreover, it entails that the actor has the belief that they can influence events and direct them towards desired ends (Elmes & Smith, 2001). Critical perspectives on empowerment argue that the empowerment of others may actually have the inverse effect of disempowering them (Hardy & Leiba-O'Sullivan, 1998; Toomey, 2011). This is based on the argument that when someone is empowered, a new dependency relation is created (Hardy & Leiba-O'Sullivan, 1998). The core elements of TSI are summarized in Figure 2.1.

Core element	Description
Social innovation agents	Agent engaged in social-innovation that focus particularly on SI-actors, SI-initiatives, and SI-networks.
A socio-material context	The contextual factors that include institutions, resources, practises, and processes of structuration that result in varying degrees of institutionalisation.
Transformative change	Change that challenges, alters and/or replaces incumbent institutions in the socio-material context.
Transformative social innovation	The process through which SI challenges, alters and/or replaces incumbent in the socio-material context.
Coevolution	A process occurring between several parts of situated novelty (e.g. SI) and (parts of) the socio-material context.
Institutional logics	Logics that both regulate behaviour and enable agency and change. May be multiple, overlap, and/or contested.
TSI-agency	The capacity of SI-agents to induce/contribute to transformative change.
Transformative impact, potential, and ambition	Different levels regarding the extent to which SI-agents contribute to transformative change.
(Dis)Empowerment	Process through which the empowered SI-actor gains a sense of autonomy, relatedness, competence, impact, and meaning
TSI strategies	The actions strategically performed by SI-agents to induce transformative change

Figure 2.1: Core elements of the TSI framework, adapted from Haxeltine et al. (2016).

Pel et al. (2020) expand on the TSI framework by developing a relational aspect to transformative innovation. They underline that social innovation agency is distributed across networks rather than attributed to certain actors, such as citizen initiatives or social entrepreneurs. This results in four key sets of relations in the TSI process; (1) relations within SI initiatives, (2) relations in network formation, (3) relations to institutional change, (4) relations to the socio-material context (Pel et al., 2020). Figure 2.1 presents the interactions between the sets of relationships within the TSI process. The present study takes a particular interest into the second set of relations. The achievements of SI are often attributed to creative social entrepreneurs, progressive social movements, grassroots actors, and empowering SI initiatives. However, contemporary theory also underlines a different perspective in which TSI relies on distributed, networked agency (Pel et al., 2020). SI initiatives are embedded in a broader constellation of actors. Through said constellation they are empowered.

Pel et al. (2020) describe three dimensions of SI networks, or ecosystems, in which the SI may be situated. First, the communities that the SI ecosystems tend to be embedded in. Examples of this are grassroots innovations, community-based initiatives, and government-civil society co-creation. SI initiatives rely on their networks for resources: local governments, NGOs, civil society organisations, unions, and universities can provide resources such as subsidies, accommodation, legitimacy, and critical mass of membership (Dorland et al., 2019). Second, SI initiatives have a 'translocal' dimension. Translocal refers to the combination of local embeddedness and the connection to a transnational network or social movement. Here, the SI initiative can derive empowerment from the development of a collective political voice, shared identities, and shared narratives of change (Wittmayer et al., 2019). Third, beyond immediate supportive networks, there is a more extensive network of societal discourses. The extensive network allows for the "broader circulation and resonance of ideas" (Pel et al., 2020, p. 4).
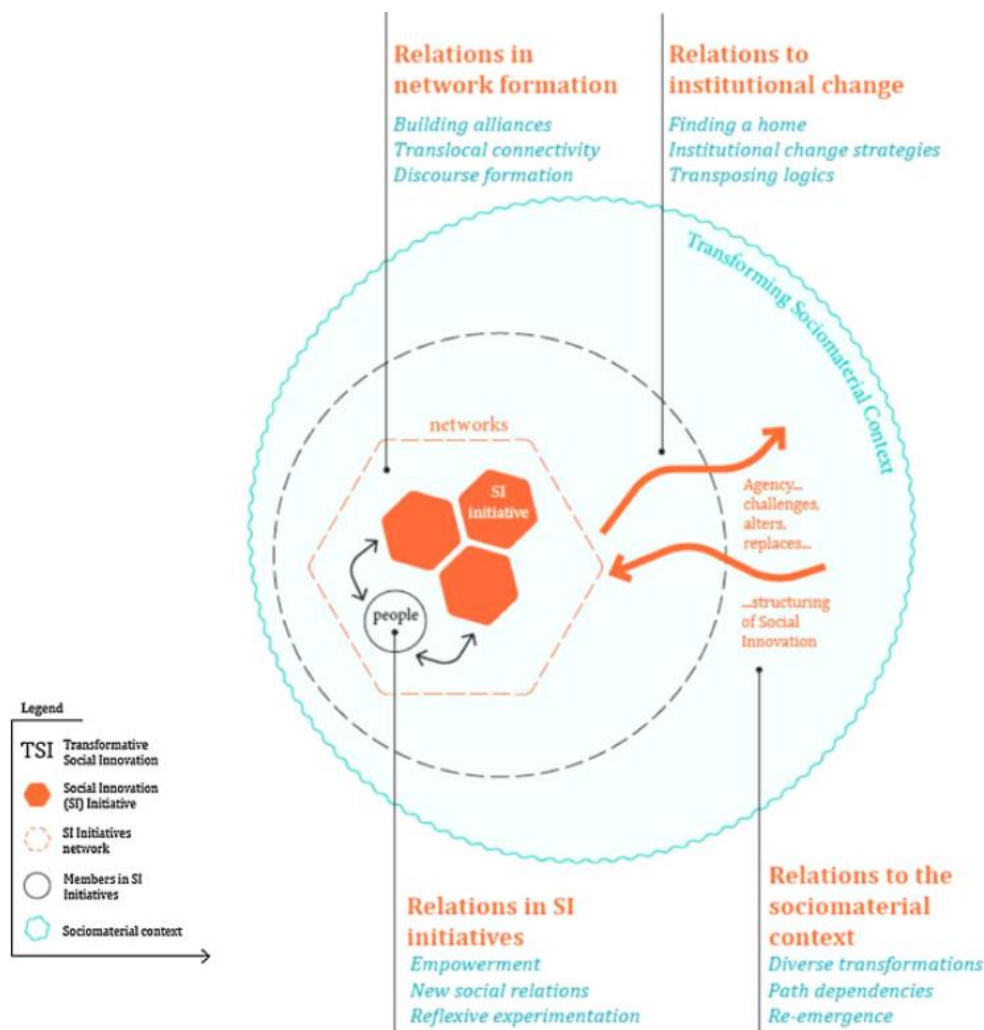

Figure 2.2: Four sets of relations in TSI processes. Source: (Pel et al., 2020).

2.4 Conceptualising circular citizen initiatives

Now, this section moves on to conceptualize the CCI by employing the nine Rs (De Jong et al., 2016). The nine Rs categorize CE actions and thus offer guidance to pinpoint CCIs based on their actions. If social innovation is put in the context of circular economy, one can think of citizen initiatives such as the Repair Café and Precious Plastic (Quist et al., 2022). Said initiatives take a bottom-up approach to address social needs or problems, and in doing so, promote circularity in the community. They are initiated by social groups (e.g. local entrepreneurs, technicians and civilians) to increase the reuse of broken products and recycling of plastics. In addition, by engaging with the initiatives, citizens are actively taking part in the circular economy, instead of being a passive 'green consumer' (Quist et al., 2022). CCIs are defined as: citizen initiatives, local sustainability initiatives and/or social movements that promote local repair, re-use, remanufacturing, refurbishing, and recycling with the goal of satisfying social needs.

In practise, CCIs could manifest in the form of local material recycling, repair movements. In the urban context, there is a plethora of opportunities and needs for the application of CE. The four main urban systems that offer opportunities for CE are: building, mobility, products and food (Marchesi & Tweed, 2021). Using the nine Rs, this study can categorize the CE actions of the CCIs. The levels of priority in the nine Rs indicate that one circular action should be preferred above others based on two factors: 'function before the material' which simply means that the product is used for its intended purpose as long as possible, and minimise energy use which entails that the product should treated with the minimal amount of energy after the life-cycle of the product has ended (Fogarassy et al., 2017). Table 2.2 presents the levels of priority and the nine corresponding Rs. Level 1 indicates the highest level of priority, level 9 the lowest level.

Table 2.2: The levels of priority of the nine Rs, adapted from De Jong et al. (2016).

Level	R	Description
1. *(High)*	Refuse	Prevent the use of resources
2.	Reduce	Decrease the use of resources
3.	Re-use	Find new use for the product (i.e. second-hand)
4.	Repair	Maintain and repair
5.	Refurbish	Improve product
6.	Remanufacture	Create a new product from second-hand
7.	Re-purpose	Re-use product for a different purpose
8.	Recycle	Re-use raw material of the product
9. *(Low)*	Recover	Recover energy from waste

2.5 Analytical framework for local government organization

Hoppe et al. (2016) developed an analytical framework to analyse the local governmental organization with regards to climate adaptation and mitigation policy and action. They conducted a literature review in which they followed the process heuristic regarding organizational policy implementation and its effects. This method yielded four categories of process characteristics; input, throughput, output, and outcome (Hoppe et al., 2016). The following sections will elaborate on the four categories.

2.5.1 Input

The input category constitutes resources such as personnel, materials, budget, and time. Hoppe et al. (2016) find that financial resources and fiscal health are two key resources that local government require to build capacity and develop local climate policy (Bulkeley & Betsill, 2003; Lubell et al., 2009; Moser & Ekstrom, 2010). Sufficient financial and fiscal resources allow for the hiring and training of staff, and/or it allows current members of staff to spend more time on managing climate policy projects. Furthermore, having sufficient budget would also allow for the hiring of external capacities such as advisors, and engineers that work on scenarios, planning, or other technicalities. Another important input is the political mandate of the local government, without political mandate the local government may lack the legal authority to develop and implement climate policy (Hoppe et al., 2016).

In addition, the size of the municipality is found to be an important input factor. This factor is related to the municipal staff volume. Several studies indicate a positive statistical relationship between the size of a municipality and its output of climate policy or climate actions by local government. Product and service delivery of climate policy instruments and climate action requires a great deal of preceding work. To deliver high quality instruments and action it is not only important to have a high number of staff members. It is also important that the staff and their managers possess experience, expertise, and motivational involvement (Hoppe et al., 2016; Krause, 2011a; Moser & Ekstrom, 2010). Finally, the use of technology can be a useful input. Technology can be used to monitor policy implementation processes, performance of climate policy instruments, and climate actions (Hoppe et al., 2016; Moser & Ekstrom, 2010). This input may seem straightforward, however in practice it is found that this if often outsourced to consultancy and engineering companies.

2.5.2 Throughput

Throughput indicators are activities and work processes that are used to actually produce services and products (Hoppe et al., 2016). A sound throughput starts with having a sound policy plan. This entails that the plan is ambitious while its goals are also realistic with a clear goals-means action plan (Hoppe et al., 2016). Sound plans still need political support and approval to become policy. Without the support of the town council no plans will be executed.

In addition, a complex but important throughput factor is sound and stable knowledge management, e.g., the use of knowledge management infrastructure and ICT support. Complex subject matter such as climate mitigation or circular economy may be difficult to grasp for a civil servant that it is dealing with time restrictions or for a local political representative, as they often do not have an education in (environmental) engineering. Furthermore, there is the issue of continuation of knowledge. When knowledgeable officers retire, their expertise is lost. Those who replace the knowledgeable officers may not possess the particular knowledge required for sound data management (Hoppe et al., 2016).

Related to the matter of staff, a so-called 'committed individual' (Bulkeley & Betsill, 2003), 'local firebrand' or 'local catalyst' can greatly contribute to a more effective and efficient throughput of climate policy and action. The person in question can be defined as a civil servant or public official who has certain power, authority, experience, and personal skills that enables them to intervene and influence decision-making at a given moment (Bulkeley & Betsill, 2003; Hoppe et al., 2016). Also, the committed individual is able to protect and/or maintain the interest of climate change and make sure it remains on local political and policy agenda's (Hoppe et al., 2016; Kern et al., 2004). Hoppe et al. (2016) argue that the committed individual needs to possess above average skill in networking, process managing, niche managing, and rise to the occasion as 'policy entrepreneur' to get the issues of climate and/or circular economy on the political and policy agenda. The policy entrepreneur will therefore set the stage and create right conditions to, in the long term, allow for a window of opportunity to arise. However, said official does need to have the political will and position to act (Bulkeley & Betsill, 2003). The official will likely face stakeholders and interest groups that oppose the proposed ideas and actions. A certain position, (political) motivation, and self-belief is needed to see essential ideas and actions through and get them on the agenda, even in the face of opposition.

Three important factors that were found to be closely related to each other are leadership, control over processes, and power over related domains/inter-departmental coordination (Hoppe et al., 2016). Usually, it is the civil servants of the environmental department who tend to be willing to design and implement progressive climate policy. However, they have to compete for budget with other, possibly more traditional, departments who will advocate competing policy issues. Without sound leadership and proper inter-departmental coordination, the competition for allocation of budget could become problematic (Krause, 2011a).

2.5.3 Output

Output indicators represent products and services that can be viewed as actions or performances delivered by the government. The output of local governance manifests in the form of instruments, incentives and projects. Local governments use said outputs to attain their policy goals (Borrás & Edler, 2014). There are many different forms of policy instruments such as levies, regulations, subsidies, awareness campaigns and multilateral agreements with other local actors (Hoppe et al., 2016).

The governing style of the local government is an important factor to determine the way outputs are shaped. Using the work by Kern & Bulkeley (2006), four governing modes are distinguished: (1) governing by authority, this constitutes the use of traditional forms of authority such as regulation, incentives to control other local actors; (2) self-governing, the capacity of local government to enact climate actions themselves (e.g., improving circularity from town hall waste); (3) governing by provision, shaping through the delivery of service and resource (e.g., providing low carbon services to the local citizenry); and (4) governing by enabling, which refers to actions by local government to empower local citizens and other actors to take action themselves or to help them build capacities to do so. Important to both the policy instrument and the governing style is municipal staff commitment to implement policy instruments and actions properly (Hoppe et al., 2016). Without a motivated and capable staff, ambitious climate policy or action risks becoming 'symbolic policy' (Krause, 2011b).

2.5.4 Outcome

Outcome represents the intended as well as unintended effects of the delivered products and services. The outcome of the process can be translated to the effects and impact of the implemented policy and climate actions. Besides the policies and actions that are a deliberate product of local government action, there is also climate action that results from the efforts of independently operating local actors (e.g., citizen-led low carbon initiatives). Said actions also belong to this cluster. Hoppe et al. (2016) identify three different types of outcome: mitigation, adaptation, and climate co-benefits. In the context of climate change, adaptation aims to address infrastructural action to create increased resilience to climate change. Mitigation, on the other hand, refers to installing energy efficient equipment or increasing the use of renewable energy systems. Climate co-benefits are added benefits in other societal domains that result from climate actions, for example in terms of health, more jobs, a more secure energy supply, and building a stronger economy (Hoppe et al., 2016).

However, the outcome factors need to be adapted to fit the context of CE, SI, and TSI. Therefore, two different outcome factors are proposed: citizen empowerment, and transformative capacity enhancement. The first outcome, citizen empowerment, aims to capture how the municipality of Rotterdam attempts to empower citizens to pursue their CE goals. Citizen empowerment, therefore, refers to giving (participants in) CCIs notion they have the psychological means to pursue goals that are important to them (Avelino et al., 2019; Pel et al., 2020). Feeling empowered pertains to the satisfaction of basic psychological needs such as autonomy, competence, and relatedness (Baumeister & Leary, 1995; Grouzet et al., 2005; Pel et al., 2020; Ryan & Deci, 2000). The relational approach to TSI argues that empowerment is not only created within the CCI, the CCI is also empowered through actors within their network (Pel et al., 2020). As an actor in the network, the municipality can (dis)empower CCIs by providing accommodation, subsidies, legitimacy, and critical mass of membership (Dorland et al., 2019; Pel et al., 2020). Citizen empowerment measures the extent to which the municipality empowers CCIs through the forementioned provisions.

The second outcome, transformative capacity enhancement, refers to how the municipality contributes to the capacity of CCIs to enact transformative change. The avenues through which the municipality can contribute to transformative capacity are: provision of resources (i.e. subsidies, accommodation, and access to networks) and collective learning (Haxeltine et al., 2016; Pel et al., 2020; Strasser et al., 2019). Resources, and the absence thereof, directly impact the capacity of a CCI to enact transformative change (Pel et al., 2020). Learning pertains to collective reflection and experimentation through which CCIs reach new understandings (Haxeltine et al., 2017), and it happens through three mechanisms: practicing and experimenting, exchanges, and monitoring and evaluation (Strasser et al., 2019). First, learning by practising and experimenting is done by trying new social relations, ways of doing, organising, framing and knowing. The CCI and municipality can reflect on their experiences of successes and failures. Through said experiences they will gain a new understanding of how to better challenge, alter, replace or provide alternatives to dominant institutions (Strasser et al., 2019). Second, learning through exchanges simply pertains to exchanging experiences, ideas and challenges among peers. Through this process, one can learn from successes and failures of others (Strasser et al., 2019). Third, learning through monitoring and evaluation entails that one learns through collective reflection and data collection about, for example, performance, resources, and strategies. This mechanism of learning is a time and resource consuming process, which is why SI actors often struggle to reserve ample resources and time for it. In addition, this mechanism calls for self-reflection. Not only on one's own experiences and strategies but also on implicit beliefs, assumption, and attitudes that underline said strategies and dominant institutions (Mierlo et al., 2010).

2.5.5 Additional clusters

Furthermore, Hoppe et al. (2016) include several additional clusters of factors into their framework that are related to characteristics of the local environment, the local action arena, external issue networks, influence exercised by higher levels of government, major external events, and intended climate action (CE action for the purpose of this study). These factors are relevant because they are found to have an impact on the development of local policy and actions and provide meaningful context to the policy process. These factors are presented in the Figure 2.3.

2.6 Presenting a framework to analyse local circular economy policy and action

Figure 2.3 presents items derived from the framework developed by Hoppe et al. (2016). Several items are adjusted to fit the aim and context of this study. Several items are dropped because they are not relevant to the research goals of this study. All original outcomes are removed, and the two outcomes introduced in 2.5.4 are added to the framework instead.

Item	Indicator
Cluster I: Municipal organisation	
Input	
Financial resources	Degree to which the local government has budget available that can be allocated to circular economy policy capacity.
Fiscal health	Information provided financial debts the municipality has on its annual budget, including information on municipalities being subjected to financial supervision by central government.
Size	No. of inhabitants (with local government staff mirroring size in terms of inhabitants).
Throughput	
Political support	Support among Aldermen for circular economy policy (with or without amendments).
Public leadership/ "political will" to act/ local catalyst	The presence of a catalyst.
Inter-department coordination/ policy integration	Degree of inter-department coordination on circular economy policy and actions.
Policy plan circular economy and social innovation (goals)	Clearly defined, ambitious goals.
Policy plan circular economy and social innovation (means/action plan)	Sound, feasible action plan which clearly links goals, means and circular economy actions.
Commitment of staff implementing policy instruments	Degree and type of personal commitment of the staff members to circular economy projects and actions.
Monitoring and evaluation	Municipality monitors circular economy policy and performance thereof frequently and anticipates with feedback loop to policy.
Output	
Policy instruments	Total of instruments.
Municipal governing by authority	Interpretation of appliance characteristics governing mode to local governments' governing style (using regulatory instruments, economic incentives and contracting parties to govern by hierarchy).

Municipal self-governing	Interpretation of appliance characteristics governing mode to local governments' governing style.
Municipal governing by provision	Interpretation of appliance characteristics governing mode to local governments' governing style.
Municipal governing through enabling	Interpretation of appliance characteristics governing mode to local governments' governing style.
Outcome	
Citizen empowerment	The municipality empowers citizens to pursue their goals related to CE through provision of accommodation, subsidies, legitimacy, and critical mass of membership.
Transformative capacity enhancement	The municipality enhances the transformative capacity of CCIs through the provision of resources and collective learning.
Cluster II: Characteristics of the local environment	
Demographic characteristics	Income per capita, and percentage highly educated population.
Cluster III: the local action arena	
Support by local leader/civic capacity	Presence of local leader and organized citizenry who support circular economy actions.
Partnerships with private organisations	Collaborative ties with local industry and local business firms to run local circular economy actions
Cluster IV: external issue networks	
Collaborative ties with other local governments	Degree of activity in inter-municipal/regional circular economy network(s)
Involvement in/membership of circular economy issue network(s)	The municipality is involved in national or international circular economy networks
Cluster V: influence exercised by higher government levels	
Alignment with agendas of higher-level governments	Sharing vision, goals, and strategic plans by central and regional governments

Cluster VII: intended CE action (output/projects)	
Actual CE policies and actions as implemented by the municipality of Rotterdam	

Figure 2.3: Items and indicators of the policy and action framework, adapted from Hoppe et al. (2016).

2.7 Comparing LCPA and TSI

The LCPA framework and relational approach TSI theory are compared to each other in this section. This study aims discover if and how the two theoretical frameworks interact and if they can complement one another. The comparison of the LCPA framework and TSI theory is useful for the analysis of this study's data because it allows this study to determine the impact of the municipality on the transformative capacity. The adapted LCPA framework of Hoppe et al. (2016) is compared to the relational approach to TSI by Pel et al. (2020) to see if there are interacting components.

The relational approach to TSI by Pel et al. (2020) relies on four sets of relations (see section 2.3). This study argues that several components of the LCPA framework interact with two out of the four sets of relations: relations in network formation, and the relations to institutional change. First, in the set of relations in network formation, the emphasis is put on how SI initiatives, in the case of the present study CCIs, organize their network to form a empowering collective that is able to sustain them through the provision of resources (Pel et al., 2020). The municipality and other (semi) governmental organisations are a good example of resource providing partners that CCIs could add to their network. Once part of the network, the municipality may (dis)empower CCIs through subsidies, accommodation, legitimacy, and critical mass of membership (Dorland et al., 2019; Pel et al., 2020). This study finds that there are interactions here between the LCPA framework and TSI theory. The forementioned illustrates that the municipality may perform certain actions to (dis)empower a CCI, and this study argues that said actions translate to the output of policy instruments and the governing modes.

Second, the relations to institutional change. Institutions have a stabilizing effect on *'the social relations, ways of doing, organizing, framing and knowing'* (Pel et al., 2020, p. 5). To induce transformative change, CCIs have to challenge and change both formal and informal institutions, which entails challenging institutional arrangements, organisational forms, and associated social norms and discourses (Pel et al., 2020). This study finds that certain components of the LCPA framework and TSI theory may interact with each other through this set of relations. In their struggle to induce transformative change, CCIs may challenge the way the municipality interacts with them. This study expects that CCIs produce feedback as they learn from past interactions with the municipality and may use the feedback to challenge or alter municipal policies, its role vis-à-vis CCIs, its bureaucratic organization, and social norms and discourses in the socio-material context. This expectation is in line with the 'embeddedness paradox' which entails that SI initiatives, such as CCIs, aim to transform the institutions that

simultaneously shape them (Seo & Creed, 2002). This study argues that the relations to institutional change and the challenging and altering of them via feedback can be translated to interaction between the CCI and throughput factors of the LCPA framework: political support, public leadership/local catalyst, inter-departmental coordination/policy integration, policy plans, commitment of staff, monitoring and evaluation. Both interactions are visualized in Figure 3.1 below.
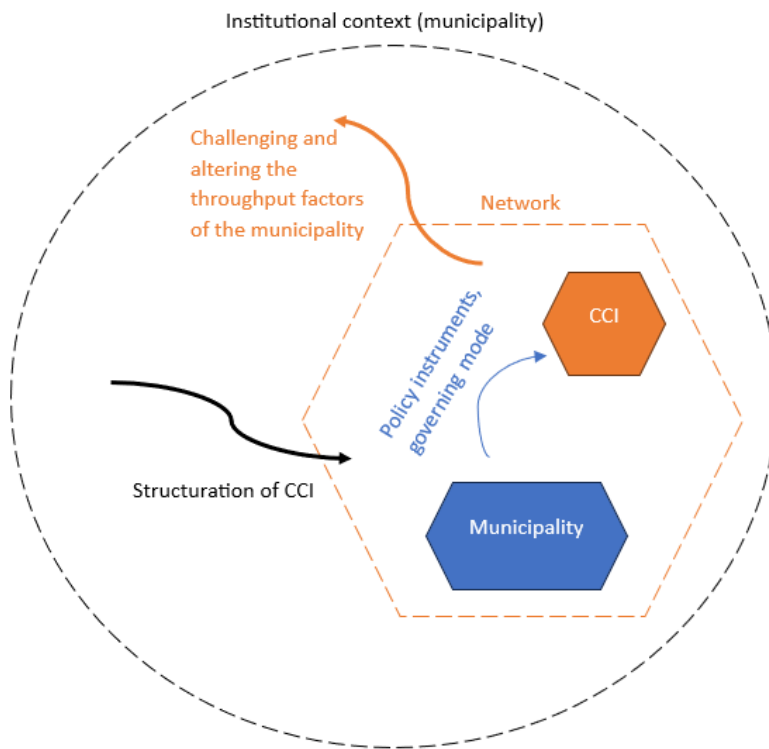
Figure 2.4: Visualisation of the interactions between LCPA and TSI. Source: Author.

Chapter summary

To summarize, this section constructed a theoretical framework that included SI, TSI, and CE theory. By building on the theory of SI and putting it in the context of CE theory, this study conceptualized CCIs as: "Innovations that were social in their means and contributed to circular economy transition, civic empowerment, and social goals pertaining to the general well-being of communities." This study, therefore, emphasized the social means and goals of SIs in CE. Furthermore, the relational approach to TSI was introduced because it was instrumental in assessing the interactions between CCIs and the municipality as a network partner as well as CCIs and the municipality as its institutional context. In addition, the LCPA framework was introduced and adapted to fit the context of CE. Important adaptations of the framework pertained to the outcome indicators, which were changed to measure citizen empowerment and transformative capacity enhancement as a result of municipal policy output. Finally, this study compared the LCPA framework and TSI theory to understand their interaction and potential complementarity in analysing transformative capacity within municipalities. It identified interactions between the frameworks, particularly in network formation and relations to institutional

change. The municipality's actions could empower or disempower CCIs, impacting policy instruments and governing modes. Additionally, CCIs challenged institutional norms and discourses, influencing municipal policies and organizational structures. These interactions highlighted the embeddedness paradox, where CCIs aimed to transform institutions that shaped them.

3. Research design and methodology

This chapter presents the 'blueprint' of the logical steps taken in this study. It will illuminate why certain choices were made for the research design and approach. In addition, it will present how the analytical steps will lead to answering the research questions set by this study: *In what ways does the municipality of Rotterdam respond to the emergence of social innovation in circular economy, more specifically to CCIs?* The goal of this study is to explore how the municipality of Rotterdam interacts with CCIs. One can, therefore, characterize this research as an explorative study. The goal of this study is to investigate a phenomenon in depth in its real-life context (Yin, 2009). Therefore, a fitting approach to serve this goal is the case study approach as this will allow this study to observe the central phenomenon accurately. The central phenomenon can be defined as the relationship between CCIs and the municipality of Rotterdam in its real-life context. The phenomenon is spatially bounded in the municipality of Rotterdam and is observed between November 20th, 2023 and January 30th, 2024. This study has a qualitative approach and is descriptive and exploratory by nature through the usage of 'rich' in-depth empirical data. To be able to answer the main research question four analytical steps have to be taken. They are formulated as follows:

(i) Take inventory on what kind of CCIs are present in Rotterdam, and what it entails to be one.

(ii) Examine what governing of CCIs looks like in Rotterdam and map the policy instruments employed by the municipality to interact with CCIs.

(iii) Examine the interaction between the municipality of Rotterdam and CCIs, and study how said interaction contributes to the transformative capacity of the latter.

(iv) Mapping the bottlenecks and/or tensions for CCIs vis-à-vis the municipality of Rotterdam.

3.1 Case-study selection

To conduct a solid case study, one must adequately define what exactly their unit of analysis is. As defined by Yin (2009), the unit of analysis is the entity, e.g. an individual or a groups of persons, being studied. The entities being studied here are the CCIs in Rotterdam, they are the unit of analysis of this study. The cases that have been selected are based in Rotterdam, in The Netherlands. Rotterdam boasts a wide variety of citizen initiatives with circular economy goals. Said wide variety makes the municipality of Rotterdam and its CCIs a fitting case with sufficient units of analysis to study the relationship between CCIs and the municipality.

Rotterdam was selected over other three major cities in The Netherlands (Amsterdam, The Hague, and Utrecht) due to three meaningful differences. First of all, Rotterdam has the largest industry size relative to its economy size (Centraal Bureau voor de Statistiek, 2022b). The other cities' industry sizes are smaller, and their economies consist of larger shares of commercial services, governmental services, and healthcare. Second, Rotterdam scores lowest of the four cities, and among the lowest of The

Netherlands, on the 'socio-economic score' indicator. This is an aggregated score of overall welfare, education level, and participation on the labour market (Centraal Bureau voor de Statistiek, 2022a). Third, compared to the other cities Rotterdam is known for its potential and vision of realising a 'manufacturing-economy' in the Metropolitan Region Rotterdam The Hague (IABR, 2016). The forementioned differences give reason to believe that Rotterdam is the most interesting case for this explorative study. The relatively large industry size indicates that citizens of Rotterdam are industrious which is assumed to provide civic capacity for CCIs. The low socio-economic score indicates that citizens of Rotterdam may have a relatively larger benefit more from reducing the need to waste by being frugal with their resources, which implies increased motivation for creating and participating in CCIs. The potential and vision of realising a manufacturing-economy indicates that Rotterdam has the right ingredients to host CCIs. Furthermore, the municipality of Rotterdam has set goals and targets for 2030. They are therefore making a clear effort to transition towards a circular economy, and aim to involve citizen initiative in that transition (Gemeente Rotterdam, 2019; Rotterdam Circulair, 2023).

Also, this study argues that there is promising evidence of a rich 'soil' in Rotterdam for CCIs to grow. Evidence for said soil can be found in current neighbourhood programmes such as 'Resilient BoTu', which is a neighbourhood development program designed to make Bospolder-Tussendijken more resilient and sustainable (Doff, 2021). Another example of rich soil for CE is found in Roteb, Rotterdam's municipal waste company which also ran thrift stores. It stopped its operations in 2019. However, when it was still active in the 1990's, it was a early adopter of recycling and explorer of reuse and remanufacturing (Krikke et al., 1999). Finally, the municipality of Rotterdam has a dedicated department for the implementation of CE, Rotterdam Circulair. The goal of Rotterdam Circulair is to employ CE to reach the climate goals of 2030 and 2050. An important aspect of their approach is to implement the transition to CE together with many different stakeholders such as: schools, citizens, and companies (Rotterdam Circulair, n.d.).

To select case studies, an initial sample is created by searching for CCIs based in Rotterdam on the internet, searching the website of 'Rotterdam Circulair', and via supervisor contacts that are experts and/or authorities in the field of citizen initiatives. In addition, new respondents may be found and approached through snowball sampling. This leads to the creation of a list of sixty initiatives. This list is subjected to four selection criteria.

Table 3.1: Case selection criteria. Source: Author.

	Criterium
1.	Employs a CE action.
2.	Primarily serving social needs.
3.	Employs social actors to achieve social goals.

4.	Sufficient contact information available.

First, to be selected the CCI has to employ one or more of the CE actions as illustrated in the nine Rs. The nine Rs are: Refuse, Reduce. Re-use, Repair, Refurbish, Remanufacture, Re-purpose, Recycle, and Recover. Second, initiatives were removed if they did not primarily serve social needs (i.e., for local communities) but rather pursued economic or technological objectives. This is essential because the aim of this study is not to research sustainable business models but rather the addressing of social needs by local actors with the goal to provide value for the community. Third, initiatives were not selected if they did not employ social actors to achieve their goals. Fourth, only initiatives were selected about whom ample information was available on their initiators, partners and goals.

3.2 Data collection

The research questions posed in this study require focused and qualitative data that is insightful. Conducting interviews among people involved in the studied relationship will provide the main source of data. To supplement this, secondary data will be collected from document analysis, section 3.3 will elaborate on this. The subsections below will elaborate on both data collection methods and how this study means to approach the collection.

Empirical data is collected throughout the four analytical steps. The data collection methods are semi-structured interviews and document analysis. Furthermore, it is important to determine where and from whom to collect the data. Table 3.1 presents an overview of the analytical steps and the corresponding methods and approaches.

Table 3.2: Overview of the analytical steps and corresponding methods and approaches. Source: Author.

Step	**Method**	**Data sources**
(i)	Document analysis	Policy briefs, municipal websites, initiative websites
	Semi-structured interviews	Municipal actors, initiative participants
(ii)	Document analysis	Policy briefs, municipal websites
	Semi-structured interviews	Municipal actors and initiative participants
(iii)	Document analysis	Policy briefs
	Semi-structured interviews	Municipal actors and initiative participants
(iv)	Semi-structured interviews	Municipal actors, initiative participants, and academic experts

3.2.1 Semi-structured interviews

The primary data source of this study will be semi-structured in-depth interviews. The benefit of conducting interviews is that they allow for the collection of qualitative as well as quantitative data. This study opts for semi-structured interviews held in an open format because that method leaves room for the interviewees to answer the questions in their own way (Kallio et al., 2016). In addition, by offering a focused structure of discussion instead of a rigid process to follow, the method allows for more flexibility and exploration of the research area by providing guidance on what to discuss (Gill et al., 2008). Semi-structured interviews will be conducted among local government civil servants who are involved with the citizen initiative, participants of the citizen initiatives themselves, academic experts, and other potentially relevant partners of the citizen initiatives. The interview questions are formulated using the LCPA indicators and the TSI framework. The interview questions and a list of interviewees can be found in Appendix C.

To safeguard the privacy of the respondents the interview transcripts are anonymised and are not publicly available. However, they are available upon request via the author of this study. In light of transparency, this study will refer to the transcripts document name when a quote from said transcript is used.

3.3 Data analysis

Documents analysis is employed in this study as a supplementary information source to interview data and as a means to triangulate data (Yin, 2009). The aim of the document analysis is to collect additional information on (1) policy of the municipality vis-à-vis citizen initiatives, (2) documentation of collaborations between the municipality and CCIs, (3) policy instruments that were employed by the municipality of Rotterdam.

To analyse the collected data, this study employs a hybrid approach. A codebook is developed through a hybrid approach of deductive and inductive coding. The codes in the codebook are partly based upon the theoretical propositions and concepts defined in Chapter 2, as well as the research questions of this study. In addition, codes are generated inductively during the coding process. This hybrid method is referred to as 'abductive' coding (Vila-Henninger et al., 2022). This is done to make sure that regularly occurring themes and anomalies that were not coded based upon theoretical propositions and research questions are still taken into consideration for the analysis. The data analysis software Atlas.ti is employed for the coding process. The codebook can be found in Appendix C.

In order to judge how the municipality of Rotterdam approaches local circularity policy, the LCPA developed by Hoppe et al. (2016), was adapted to fit the context of CE policy. Their framework employs a series of indicators that allow for the measurement of CE policy and action. Each indicator is assigned a score using a five-point scale ranging from '--', indicating the factor is absent, to '++', indicating the

factor is present. All indicators are divided into groups related to input, throughput, output, and outcome. A table with further information, such as operationalizations, can be found in Appendix A.

3.4 Validity and reliability

Collecting data through interviews inherently causes threats to the validity and reliability of this study. Through its design, this study aims to mitigate those threats. In addition, being aware of possible threats allows this study to anticipate them and take appropriate measures. This section discusses the measures undertaken to safeguard of validity and reliability of this study. Section 3.4.1 will discuss possible threats and limitations of this study.

Through its qualitative design, this study is able to collect comprehensive data on the relationship between the municipality and CCIs. The interview questions are formulated based on relevant literature and expert judgement to ensure measurement validity. In addition. this study aims to establish data-source triangulation. Data-source triangulation involves the collection of data from multiple sources to confirm a comprehensive understanding of the phenomenon that is studied (Carter et al., 2014). Through data source triangulation, the researcher collects data from different types of people, i.e. certain individuals, groups, and communities, to collect multiple perspectives and validate the data. Multiple perspectives were collected from CCIs respondents, civil servants, and academic experts about one phenomenon: the relationship between the municipality of Rotterdam and CCIs. Data triangulation enhances both the validity and reliability of this study (Leung, 2015). The external validity is safeguarded by comparing the results of this study to other similar studies. This is done to check the consistency and generalizability of the results derived in this study.

Reliability is ensured by following a standardized procedure during the collection of interview data. The procedure entails standardized communication with potential respondents and a standardized list of interview questions for each category of respondents. Moreover, the coding process is standardized to make sure that the gathering of data is consistent, and biases are minimized. In addition, this study provides transparency on the forementioned procedures and interviewed respondents.

3.4.1 Threats

Threats to the internal validity may arise from the studied sample of CCIs and civil servants. Through snowball sampling respondents are not randomly selected, resulting in sampling bias and a limited generalizability. Another threat to the internal validity is self-selection bias. Because participation in the interview is voluntary, certain individuals may be more or less likely to respond, i.e. individuals with a strong opinion regarding the research topic, which may lead to over- or underrepresentation of certain subgroups.

Threats to the external validity pertain mainly to the population and setting of this study. The population which is targeted with this study may not be generalizable well to populations of other cities in The

Netherlands. Each CCI has different goals and ways of operating depending on the community they are embedded in. Furthermore, the reliability is threatened by the semi-structured interview approach. The interviewer bias may arise due to the flexible nature of semi-structured interviews. This bias is related to the personal qualifications and (subconscious) expectations of the interviewer (Salazar, 1990), which may result in inconsistency in questioning and probing across respondents. Another threat arises from the selection bias of selection Rotterdam as the case of this study. Rotterdam is a major city that was found to have a 'rich soil' for CE. This is where Rotterdam differs from many other cities, but this study does not control for these differences. Therefore, the results from studying Rotterdam may be readily generalized. his study will mitigate the forementioned threats through transparent reporting, standardized procedures, and it will account for the possible limitations and threats in the discussion of the results as well as its subsequent recommendations.

3.5 Ethical clearance

The method of this study, including the process of contacting respondents and processing their information, was cleared by the Human Research Ethics Committee of the TU Delft. All respondents were informed on the goals of the study, the data processing, and possible risks of participation in this study. In addition, all participant signed an informed consent form prior to the interview. The invitation to participate in this study and the informed consent form can be found in Appendix D.

Chapter summary

This chapter outlines the methodology for investigating how the municipality of Rotterdam responds to SI in CE, particularly focusing on CCIs. It adopts an exploratory, qualitative approach through case studies, aiming to answer the research question: "In what ways does the municipality of Rotterdam respond to the emergence of social innovation in the circular economy, specifically to CCIs?" Four analytical steps are outlined: inventory-taking of CCIs, examination of governance, analysis of interactions, and mapping of bottlenecks.

Rotterdam is chosen due to its diverse range of CCIs and significant industrial size, socio-economic challenges, and vision for a manufacturing economy. Case selection prioritizes CCIs serving social needs, employing social actors, and having sufficient information available. Data collection involves semi-structured interviews and document analysis. Data analysis employs a hybrid approach of deductive and inductive coding. Measures are taken to ensure validity and reliability, considering potential biases such as sampling and self-selection. Overall, the methodology aims to provide a comprehensive understanding of the relationship between Rotterdam's municipality and CCIs within the circular economy context.

4. Results

The results from the data analysis are presented in this chapter. First, the analytical results of the LCPA framework are presented. Subsequently, findings derived from the interview data are presented and an overview of CCI respondents is provided. The interview data results are structured to be in line with the research questions of this study and therefore consists of five sections. The first section presents what it entails to be a CCI in Rotterdam. Second, it will provide the results regarding the governance situation vis-à-vis CCIs in Rotterdam. In addition, an overview of the policy instruments used by the municipality of Rotterdam to support CCIs is given. Third, this section will illustrate how the municipality's actions affect the transformative capacity of CCIs. Fourth, the bottlenecks and tensions in the relationship between the municipality and CCIs are summed up. Finally, this study presents how the bottlenecks and tensions can be resolved according to the various respondents.

4.1 Results of the LCPA analysis

This study found that RC can be viewed as the department that is responsible for the agenda, policies, and actions concerning CE in Rotterdam. Also, they have a specific agenda concerning the engagement and facilitation of citizens in realizing the CE transition. Therefore, this analysis will pay extra attention to RC as the department enacting policies and actions for Rotterdam.

The results show that overall, the municipality performs well, with most items scoring at least a '+'. Financial resources were found to be low. RC has received funds from the municipality to finance structural expenses but no financial coverage to keep CE projects running from 2024 to 2026. Supporting citizen initiatives and local projects was not on the lists of CE projects that do receive financial coverage, and therefore, it is assumed little to no budget is available for CCIs (Rotterdam Circulair, 2023). This is interpreted as a sign of low commitment to supporting CCIs from the municipality. Furthermore, political support among aldermen was found to be low. Sustainability, and specifically CE, ranks low on the list of priorities in the coalition agreement. Although the coalition partners have agreed to continue the RC program, it will not be expanded. The inter-department coordination/policy integration regarding CCIs was found to be low. Despite this, several catalysts were found among civil servants. They are often enthusiastic and motivated, sometimes going beyond their task description to support CCIs. These catalysts are found in RC but also in other departments such as City Management and Rijnmond Central Environmental Management Service.

Civil servants reported that, in general, CE policies are sometimes coordinated and integrated. CCI respondents, however, did not experience said coordination to be present regarding their initiatives. In terms of the policy plan CE and SIs, this study found that the goals were rather vague and somewhat ambitious. The corresponding means/action plan was relatively sound and clearly linked to the goals. Despite the somewhat lacking goals and means, the commitment of staff was very high. All respondents indicated that civil servants from RC are highly motivated, proactive, and think out-of-the-box to assist

them. Analysis revealed that the set of policy instruments at the disposal of RC is rather limited, see Table 4.3 for an overview of instruments. Furthermore, the analysis revealed that RC exhibits all governing modes, except governing by provision, to an extent. For 'self-governing', RC provides some financial incentives, governs through enacting some CE actions themselves (influences plans, designs, and management of public spaces as owner and client), is somewhat involved in CE projects as a provider, and works to enable citizens to enact CE actions mostly through civil servant support and to a limited extent via resources.

The analysis also reveals that the municipality empowers citizens to a limited extent to pursue their CE goals. RC launches civic engagement programmes, facilitates pop-up item exchange shops, and collaborates with neighbourhood councils, thus providing critical mass of membership, accommodation (for CE actions, not for CCIs), and legitimacy through affiliation with citizen organizations concerned with CE. Furthermore, the municipality enhances the transformative capacity of CCIs to a limited extent. Resource provision is deemed to be low due to limited subsidy and accommodation provision. However, RC does provide CCIs with access to an extensive network. The municipality engages in collective learning to a limited extent. It does so via experiments with CCIs, some exchanges of experiences with other departments of the municipality, and via regular reflections with CCIs. No evidence was found for learning through monitoring. The municipality participates in many partnerships and collaborations with private organizations (i.e., BlueCity), with municipalities situated in the province of South-Holland, and via yearly meetings with all municipalities in The Netherlands. Also, the municipality is involved in a national CE issue and lobby network named CircuLaw. Finally, the 'Kwartiermakers' program entails mapping neighbourhoods to gain an understanding of ongoing CE actions and initiatives. This program is used to assess the opportunities in neighbourhoods for more circular actions. Also, neighbours are encouraged to contribute to CE projects and initiatives.

Table 4.1: Results of the LCPA analysis of the municipality of Rotterdam. Source: Author.

Item	Score
Municipal organisation input	
Financial resources	+/-
Fiscal health	++
Size	++
Municipal organisation throughput	
Political support	+/-
Public leadership/" political will" to act/ local catalyst	++
Inter-department coordination/ policy integration	+/-
Policy plan circular economy and social innovations (goals)	+/-
Policy plan circular economy and social innovations (means/action plan)	+/-

Commitment of staff implementing policy instruments regarding circular economy and social innovations	++
Monitoring and evaluation	+
Municipal organisation output	
Policy instruments	+/-
Municipal governing by authority	+
Municipal self-governing	+
Municipal governing by provision	+/-
Municipal governing through enabling	+
Outcome	
Citizen empowerment	+
Transformative capacity enhancement	+
Cluster II: Characteristics of the local environment	
Demographic characteristics	+
Cluster III: the local action arena	
Support by local leaders/civic capacity	+
Partnerships with private organisations	++
Cluster IV: external issue networks	
Collaborative ties with other local governments	++
Involvement in/membership of circular economy issue network(s)	+
Cluster V: influence exercised by higher government levels	
Alignment with agendas of higher-level governments	+
Cluster VII: intended CE action (output/projects)	
Mapping and preparing neighbourhoods for CE through the 'Kwartiermakers' program	+

4.2 CCIs in Rotterdam

The first respondent participates in a CCI that focuses on repairing and/or repurposing household appliances. Their format is that of the 'Repair Café', where people from the neighbourhood can come to the 'Café' with broken appliances to see if they can be fixed by a certified expert. In addition, neighbours need only pay for the costs of materials. The repair experts work on a voluntary basis, and the Repair Café primarily serves people from the neighbourhood who cannot afford new appliances when their old ones stop working or break. Their goal is to help those people and give their household appliances a second life while reducing the number of appliances that would otherwise end up as waste. In doing so, they aim to teach people a new way of handling household appliances at the end of their lifetime.

The second respondent takes part in a CCI that focuses on reusing and repurposing decommissioned products. The textiles are provided by the client and are often decommissioned or last edition work clothes. The CCI repurposes the delivered textiles into new products for the client. The providers of the materials are usually large companies or organizations. The societal value of this initiative is found in its social means. Said initiative employs people who are on welfare or status holders for whom it is difficult to reach the labour market. However, these people possess the skill to craft textiles, a skill that has seen ever decreasing demand in the Netherlands but could prove valuable in the circular economy. Their goal is to employ 100 people who would otherwise rely on welfare and to reduce "the size of the garbage pile." Also, they hope to bring back textile craft to The Netherlands and subsequently change the way people and companies handle used textiles.

The third respondent is a participant in a CCI that aims to establish a bike-sharing system that is easily accessible to people of lower socio-economic status who have low access to regular means of mobility. According to this initiative, people of lower socio-economic status are having trouble accessing regular means of mobility (i.e., being able to afford commuting with public transit), with only half of them having access to a bike. Their goal is to combat 'mobility poverty', provide sustainable and affordable bike-sharing mobility, and promote social cohesion through bike depots combined with social hubs. Their bikes are for everyone, but the emphasis is on those who need it most, i.e., lower socio-economic groups in Rotterdam-Zuid. Through their inclusive bike-sharing initiative, this CCI intends to change the way lower socio-economic groups use mobility.

The fourth respondent is part of a CCI similar to the Repair Café, which also helps neighbours repair broken household appliances such as furniture. Additionally, this initiative hosts a circular workshop in the neighbourhood of Carnisse, where people can repair and pick up furniture. Said furniture consists of items put on the street to be collected by City Management or harvested from houses scheduled for demolition. They gain access to these houses through a contact at Rijnmond Central Environmental Management Service who is enthusiastic about their initiative. The furniture is then placed in their 'furniture bank' for neighbours to pick up. If the furniture is beyond repair, its materials are used to create new furniture or for other projects. Neighbours are invited to work on their own furniture and projects at the workshop using these materials. Moreover, the initiative hosts special workshops to stimulate sustainable thinking among neighbours. Their goal is to accelerate the transition to a circular economy from the grassroots level, aiming to change social relations within the neighbourhood by inspiring and educating neighbours on circularity, as well as helping those unable to afford to discard materials or furniture.

The fifth respondent participates in a CCI with numerous goals and ideas to improve sustainability in their neighbourhood, Noordereiland. In terms of CE, they host a monthly shop where neighbours can exchange, bring, pick up, repair, and recycle various appliances and furniture. Their CE goal is to further

stimulate reuse, repair, and recycling of appliances and furniture among neighbours, achieved through their monthly shop and educational engagement with neighbours. They aim to change social relations by introducing new ways of handling household items and furniture.

The sixth respondent is a project manager for CE in the neighbourhood of Bospolder-Tussendijken. They support local citizen initiatives and encourage local citizens and entrepreneurs to participate in local sustainability initiatives. Furthermore, they map current sustainability initiatives in the neighbourhood to gain insight into existing efforts. They also identify areas where neighbours, entrepreneurs, and the municipality can further engage. Thus, they gather insight into the needs of CCIs and who they need to connect with to empower and be empowered. Their goal is to map practices, skills, locations, and needs that could enhance CE and self-sustainability in the neighbourhood. Additionally, they aim to increase awareness among neighbours to improve their enthusiasm, knowledge, and skills with CE. This CCI aims to completely transform social relations to enhance CE in the neighbourhood.

Table 4.2: Overview of CCIs and their CE activities and goals. Source: Author.

CCI	CE activities	Goals
Respondent 1	Repair	Reduce the garbage pile and help people who cannot afford to waste appliances through CE.
Respondent 2	Re-purpose	Reduce the textile garbage pile, employs people who would otherwise be on welfare, and bring back textile craft to The Netherlands.
Respondent 4	Re-use (sharing bikes entails more users of one product and therefore a kind of second-hand use)	Offer inclusive and affordable mobility to lower socio-economic groups to reduce mobility poverty.
Respondent 5	Re-use, Repair, Recycle.	Speed up the CE transition, stimulate CE among neighbours, and help those who cannot afford to waste through CE.
Respondent 7	Re-use, Repair, Recycle.	Stimulate CE among neighbours. Host a monthly shop to exchange and repair household appliances.
Respondent 8	All Rs.	Mapping opportunities for improving CE practises in Bospolder-Tussendijken as well as stimulating CE activity among neighbours and local entrepreneurs.

4.3 The governance of CCIs

The municipality of Rotterdam has set the goal of becoming a circular city by 2050, in accordance with the Dutch national climate goals. They acknowledge that CE is not a goal on its own, but rather a means to restore balance between people, the environment, and the economy (Rotterdam Circulair, 2023). Through CE, the municipality aims to achieve three goals: a greener and more sustainable Rotterdam, an economy that is resilient, and a healthier and cleaner environment to live in (Rotterdam Circulair, 2023). To achieve the forementioned goals the municipality will take on a many-faced role in which they aim to serve the many differing requirements of a CE. Four roles are distinguished as follows: the municipality will standardize as owner and principal, the municipality will investigate and facilitate the right preconditions, the municipality becomes a partner to standardize in the city and the region, the municipality becomes a partner to stimulate and cooperate in the city and region to scale-up innovations (Rotterdam Circulair, 2023). The municipality has chosen to broaden its focus, from just reducing CO2 emissions, to also focus on changing the way the people of Rotterdam live and work as well as encourage them to take ownership in the circular economy. According to an interviewed civil servant, their approach does account for the social aspect of the CE transition and the role citizens and neighbourhoods plays in said transition.

This study has found that CCIs interact with many different departments of the municipality, sometimes with just one but more often with several at a time. It needs to be noted that some CCIs had ongoing interactions with more departments than is reported in this chapter. However, in line with the research aims of this study, just the interactions that concern CE are reported. Among said departments Rotterdam Circular was found to be involved most. Rotterdam Circular (RC) actively involves themselves with CCIs and attempt to support them when their goals align. This study finds that they are the municipality's main contact and CE supporter for CCIs. RC assumes several different roles in the network of CCIs: financial supporter, networking/connecting partner, client, and strategic partner. In other words, RC provides subsidies, connects actors in their network with CCIs, hires a CCI to map and stimulate CE practises, and advises CCI. RC takes a reflexive approach to cooperation with CCIs. This simply means that they do not follow a certain protocol or checklist, rather they discuss possibilities and try them out. This is illustrated below in a statement from a civil servant.

"Yeah, you see, that's not the way I approach an initiative, you know, it's mainly, um, there's an initiative, they're working on something, there's something going on in that neighbourhood, and we look at it, is it circular? Does it fit with our vision? And then we get involved. It's not like we have a checklist and tick off whether we need to use certain tools. There's of course policy, and within the framework of policy, um, we have the freedom to, as I just said, try things out with them." (Respondent 3).

In four cases, RC acts as a network partner to CCIs. In one case, RC is a client to a CCI. In two cases, the CCI and RC have no ongoing interactions with each other. As a network partner, RC and the CCI

organise regular meetings to discuss finance and budget, cooperation, opportunities, progress, and difficulties that the CCI experience in achieving their goals. In one case, RC supports the CCI through subsidies for certain expenses, i.e. tools to repair products. In two cases, RC provides subsidies to cover a number of workhours of volunteer participants in the CCIs. In one case, RC provided a CCI with materials from their storage. The materials in question were chewing gum wrappers used by the CCI to make thankyou gifts for participants. Aside from assuming a role, the departments of the municipality employ a number of policy instruments to support CCIs. The policy instruments often do not fit classical theoretical definitions. Rather, the instruments are a mix of subsidies, materials and service provisions. RC does not provide any subsidies for accommodation expenses such as rent. Generally, interviewees were satisfied with the personal motivation and dedication of civil servants to be of assistance to the CCI. They are described as being *"benevolent"*, *"highly motivated"*, and *"circular minded"*. In one case, a CCI applied for a 'bewonersinitiatief' to finance the purchase of tools and materials. A bewonersinitiatief is a subsidy that citizens or citizens initiatives can apply for to finance plans or projects that have a positive impact on the neighbourhood (Gemeente Rotterdam, n.d.).

Table 4.3: Summary of municipal policy instruments applied to CCIs. Source: Author.

Instrument	Department	Description
Subsidies	RC	- Financing the purchase of tools and/or materials
	RC	- Providing compensation for a number of workhours of volunteers within CCIs
Materials	RC	- Supplying materials (i.e. chewing gum wrappers)
Service	RC	- Network provision, connecting CCIs with municipal departments, external partners, and other CCIs
	CM	- Waste collection trucks and personnel

City Management is another department that is found to cooperate with CCIs. Their assignment is to keep the city clean and tidy. Among their responsibilities are the tasks of collecting waste and household items that citizen put out on the street as well as running recycling centres. This is where CCIs see opportunities to cooperate with City Management. This study found that cooperating with CCIs and stimulating CE practises is not necessarily a part of the assignment of City Management. However, cooperations do occur from time to time. In one case, a CCI and City Management organised a 'cleanup day'. During this cleanup day, participants of the CCI would ask neighbours to put appliances and furniture they no longer need out on the street and City Management would then facilitate a collection truck and personnel to collect the appliances and furniture. Along the same lines, City Management has engaged in an ongoing cooperation with a CCI in Noordereiland in which they bring the CCI all sorts of household items that can be re-used.

Table 4.4: Overview of CCIs and corresponding governance. Source: Author.

CCI	Governance
Respondent 1	- Bewonersinitiatief subsidy
Respondent 2	- Connecting CCI with unemployed status holders - Connecting CCI with external partners
Respondent 4	- Coordination with Department of Mobility for launching their bike-sharing initiative.
Respondent 5	- In talks with RC for long term financial support for materials and working hours - Contact with a civil servant at Rijnmond Central Environmental Management Service for harvesting empty buildings. - Cooperation with City Management for clean-up days.
Respondent 7	- Financial support for working hours of volunteer participants - Provision of materials - Cooperation with City Management for collection of household items
Respondent 8	- Hired by RC

4.4 Affecting transformative capacity of CCIs

In general, respondents indicated that the municipality could do more to improve transformative capacity of CCIs. As is explained in section 2.5.1, affecting transformative capacity can be done via the provision of subsidies, accommodation, network, and collective learning. The municipality was found to provide limited subsidies to CCIs, they do so via subsidies for tools and materials and for workhours. CCI interviewees acknowledge that the municipality does provide some accommodations, such as community centres. Moreover, two interviewed CCIs representatives use these public spaces made available by the municipality. However, these spaces are very limited, not always suitable for CCI operations, and not made especially available to CCIs but to all citizens. In addition, the municipality refuses to play an active role in providing accommodation for CCIs. Most CCI respondents, however, reported that the network provided by RC civil servants is very helpful to their operations. This study found that RC possesses an extensive network consisting of several CCIs, NGOs, commercial partners, academic partners, and civil servants of other municipal departments. Several CCI interviewees report that RC expertly provides access to their network and helps them establish connections with useful contact within said network. This exemplified in the following statement from a CCI respondent:

"Yes, they are very much into connecting people and linking other initiatives, or when we encounter something like, 'Hey, we want to organize this or that, but we're not sure where to go within the

municipality,' they always help out too. You can really turn to them with any question; sometimes they don't know the answer either, but..." (Respondent 5).

Interviewed civil servants from RC underline this. They indicate they that put in a lot of effort in connecting people for CCIs. In doing so, they try to provide the best service possible and think out-of-the-box, e.g. connecting interieur design students with a CCI who wanted to redesign their workspace to be more space efficient. In addition, the interviewed civil servants feel that their network can be solution for many issues they cannot resolve for CCIs. By employing their network creatively and effectively they can provide a lot of value for CCIs. This is exemplified in a statement from an interviewed civil servant from RC:

"What we can do is connect them with colleagues who might be able to support them in that, so linking someone from the Department of Work and Income to them (..) bridging the gap to colleagues from another domain or cluster who deal with, for example, Rotterdammers who don't have a job yet, and then going from there to see if we can recruit repairers or something for a repair café, yeah, I don't want to say recruit, but recruit, so that someone can eventually get a paid job out of it. " (Respondent 3).

Civil servants also noted that they are constantly learning from interactions with CCIs. They indicate to do so externally with CCIs as well as internally with colleges from other departments that also collaborate with citizen initiatives. Furthermore, they state that they are continuously 'learning by doing' through what is called 'doing and thinking' sessions. Although it has to be noted that is has been a few years since these sessions took place within RC. Several stakeholders, such as BlueCity and representatives from citizen initiatives, were invited to participate in these sessions. The goal of the sessions was to reflect on the previous program of RC, and to discuss what should be covered in their new program. In addition, RC conducted an evaluation with four circular neighbourhood projects in 2022. They used this evaluation to reflect on their circular neighbourhood approach and improve it. Furthermore, a civil servant interviewee stated that they would like to improve internal evaluation to also evaluate more together with civil servants that work on other sustainability themes such as energy transition and climate adaptation.

4.5 Bottlenecks and tensions

Several bottlenecks and tensions were found in the relationship between the municipality and CCIs. The bottlenecks and tension can be distinguished into five major categories, some with a few sub-elements. The first main category concerns tensions that arise due to the clashing institutional logics of the municipality and CCIs. The second main category is related to tensions between civil servants and CCI participants. Elements of this category are low trust, active and passive impediment of CCIs, and political climate. The third main category covers municipal and national regulations that impede the operations of the CCIs. The fourth category is concerned with the municipality's economic ideas of

value-creation on the one hand and the social value-creation ideas of the CCIs on the other. The final category concerns the provision of accommodation for CCIs.

4.5.1 Clashing institutional logics

All interviewed CCIs were found to be integral by design, meaning that they attempt to cover many different issues and goals in one initiative. The municipality is heavily compartmentalized and has organised a separate department for most domains of public life. This study has found that this difference in organisation logic causes bottlenecks in two ways: when a CCI approaches the municipality, and when the municipality attempts to govern CCIs and the space they operate in. First, when a CCI approaches the municipality, it is often unclear to them who to approach in which department. In addition, their plans regularly cover multiple jurisdictions divided among multiple municipal departments. The following quote from an interview with an academic expert illustrates this:

"To navigate yourself through all those different departments, another project, well, so that's a recent thing from last week that I was involved in. It's also a circular initiative, focusing on green matters. We asked: Can you provide us with the contacts you've interacted with at the municipality in the past three years? It's a four-page list of names. It's often quite unclear who exactly you need to reach out to, and who is responsible for what." (Respondent 6).

Almost all interviewed CCI participants indicated that the compartmentalization of the municipality has been an issue for them. It is difficult for them to make sense of who is responsible for what. In addition, CCIs regularly got referred to another department because a part of their proposal does not belong under the jurisdiction of the first department. This sometimes results in CCIs having to draft multiple proposals tailored to comply with the requirements of different departments. Besides the fact that this endeavour may be incredibly difficult for citizens who have no experience with navigating the municipality, it is also a very demanding on their time, resources, and motivation to continue their work. On top of that, it is not uncommon for one department to approve the proposal and the second department to decline it, thus sending the CCI back to the drawing board. Interviewees indicate that RC has been a somewhat mediating factor in this bottleneck. They offer a clear contact point for CCIs and offer directions on who to contact in which department. Also, they connect CCIs with civil servants in other departments.

Second, when the municipality attempts to govern CCIs or the space they operate in, their approach is often rather compartmentalized. Respondents indicate that there is a lack of integral governance and departmental coordination within the municipality. This is exemplified in the following statement from a CCI respondent:

"And the moment we demonstrate that we're making enough impact for the city, I don't think that's much of a problem in itself, then we'll also be included in the final redevelopment. (..) and the circular economy program manager for the 2030-2050 circular economy program was there, and to my surprise,

all those plans they have with crafts and bringing crafts closer to the people, and those sorts of things, and the role of the circular economy are not linked to the urban planner of this area." (Respondent 2).

Respondents feel that the certain topics that are important to the cultivation of CCIs, such as urban planning, sustainability, and city management, are not combined and coordinated during policy development.

4.5.2 Tensions between civil servants and CCI participants

Most respondents indicated that they feel that overall trust in the municipality is low. In most CCIs there were no major trust issues towards the municipality, however some did note that they felt that citizens from the community they served did not harbour a lot of trust towards the municipality. In one case, an interviewed CCI had completely lost its trust in the municipality due to a past incident in which an alderman had agreed to come visit the CCI, but never showed. Respondents from all categories note similar experiences regarding low trust. They find that current low trust in the national government has resonated to local governments. In addition, CCI respondents sometimes feel they are mistrusted by civil servants. Several CCI respondents experienced mistrust based on the fact that they are citizens. Moreover, CCI respondents indicate that they sometimes feel that they need to prove themselves as being capable or that they are underestimated by civil servants and aldermen based on the neighbourhood they live in. In addition, they feel that civil servants at times do not trust them to take over responsibilities from the municipality.

Besides mistrust a few CCI respondents felt that they were at times impeded in their operations by civil servants. Said impediment entails that civil servant either actively or passively try to stop the operations of a CCI. Only one case experienced active impediment when a civil servant started calling potential financial partners of the CCI to advise them to not support the CCI. In addition, a few cases experienced passive impediments in which civil servants and aldermen refused to play an active role in making the success of the CCI possible. In most of these cases the municipality did not see the need of the operations and added value of the CCI. This is exemplified in a statement from a CCI:

"Impede, well, if you ask me, not directly. If you were to ask the founder, they would say: yes, definitely. They would tell you that they went to the alderman, and he said: yeah, but everyone already has a bike. That's just not true. I don't know to what extent that story is entirely true, by the way, but we have heard that kind of response, and how quickly it gets shot down based on superficial characteristics." (Respondent 4).

Finally, CCI respondents indicated that the changing of the political climate has changed to willingness of civil servants and aldermen to be of assistance or cooperate with CCIs. Some of the interviewed CCIs experienced that civil servants themselves were receptive to their proposals, but that they could not agree to them due the political direction of the municipality. Several CCIs underline the shift from the previous

coalition that included two more sustainability minded parties (GroenLinks and D66) compared to the current coalition with two parties who give less priority to sustainability (Leefbaar Rotterdam and VVD). Therefore, some services that CCIs aim to provide are left to be carried out by the market because political officeholders see no need for the municipality to get involved in the provision of the service. This is exemplified in a statement from a CCI:

"We've spoken to some people in the policy team, or at least in the mobility team, and they often point to politics. Like, the political winds are blowing differently now, so there's much more emphasis on looking to the market for solutions (..) Well, you see, Leefbaar is quite dominant in Rotterdam, of course. (..) And their thinking and approach to these challenges are quite, let's say, right-wing conservative." (Respondent 4).

4.5.3 Municipal and national regulations

Multiple CCIs have stated that their operations have been impeded due to regulations. Said regulations are both municipal and national. Respondents from all categories agreed that current regulations and civil servant task description limit the ability of CCIs to operate but also the extent to which civil servants can be supportive of CCIs. One such impeding regulation is the prohibition to pick-up household items that are put on the street by citizens to be collected by City Management as waste. This regulation denies CCIs the chance to obtain household items and materials that are potentially still repair- or re-useable. Civil servants are supposed to fine CCI participants if they collect the 'waste' anyway. Some CCI respondents tried to raise this issue and attempted to point out the discrepancy between the municipality's transition goals and these, in their perspective, transition limiting regulations. Civil servants would, however, reply that they simply cannot legally allow it because it would need a change in task description or a law change, which is not up to them to do. Along the same lines, CCI respondents have stated to encounter impeding regulations regarding recycling centres. A CCI approached recycling centres to request special access to pick out materials and devices for repair from the waste containers. However, they were told that regulations would not allow employees of the recycling centres to make this possible.

On the national level, VAT was found to be a very limiting regulation. Both CCIs and the municipality have stated to struggle with this issue. Due to national regulations, VAT has to be added to a new product when it is sold, it does not matter if products are made from brand new materials or re-used or repurposed materials. This entails that VAT, at a rate of 21%, is paid on a product when it enters its first life cycle, as well as when it is processed by a CCI to start its second life cycle. Interviewees state that this makes it more difficult for products made of re-used or repurposed to compete with products made with 'virgin' materials, as they are often cheaper. Both CCIs and civil servant interviewees believe that some limiting regulations are simply out of date and do not regard sustainability concerns. However, they find it

difficult to lobby for change of limiting regulations and corresponding laws and look to higher levels of government to take action.

4.5.4 Clashing ideas of value-creation

Further tensions arise due to clashing ideas of value creation. The municipality was found to reason in market and economical terms, this entails that issues are often left to be resolved by the market and that value is regularly expressed in the amount of money it directly delivers to the municipality and its citizens. CCIs, on the other hand, often employ different definitions of value-creation. As a result of this, their value-creation potential may often appear to be low as it expressed the terms that do not match municipality's terms. This causes a tension in which the municipality and CCIs do not 'speak the same language'. The following real-life example provided in an interview with an academic expert illustrates how terms of value-creation may differ:

"You see that also with the sale of community real estate, so that was in Bospolder-Tussendijken where a building used by several neighbourhood organizations was located. And then, that was owned by the municipality, and the municipality sold it to a dental practice, but with, yes, now it's also beneficial for the community, and we have the most financial return." (Respondent 6).

Also, the municipality was found to sometimes leave service provision to the market, as they thought it should be. CCIs experienced that they were sometimes forced to compete with commercial organizations on the market to deliver their service. In contrast to commercial parties, the CCIs do not aim to make profit of their service, but rather aim to create as much value as possible for neighbours. In the case of a bike-sharing CCI this meant that they had to compete with the mobility market to deliver a service that is not designed to serve 'the usual suspects' but rather those who cannot afford to partake in regular means of mobility due to their lower socio-economic status. This is illustrated below in a statement from the interview with said CCI:

"This initiative, it's been running for quite some time before we got involved, honestly, for years. And so far, the municipality hasn't really seen any value in it. (..) They've said: it's something the market offers, if you want to position yourself as a provider, that's fine, but we're not going to get involved beyond that." (Respondent 4).

According to interviewed CCIs and academic experts, this is both unfair and undesirable. CCIs will have a difficult time competing with market parties for tenders because their value-creation does not match the municipality's idea of value-creation, resulting in an unfair competition. Due to this unfairness, it may be undesirable to make CCIs compete with commercial organizations because they will be more likely to be unsuccessful in creating much needed societal value. The following statement from a CCI provides an example of societal value-creation that is not directly economic:

"And yes, when you start looking at things differently, so that you might get less per square meter, but you've solved a huge problem. Because I think, when we've achieved that ambition of having 100 people employed, who would otherwise be on welfare, then you're actually talking about millions in profit for the city of Rotterdam." (Respondent 2).

Also, interviewed academic experts experienced that the municipality does not see the need and the added value of giving a role to citizen initiatives as whole in creating public value. However, they argue that public value should be created together, by civil servant and citizen, in a network. Despite of this, CCIs and academic experts feel that the municipality's idea of value-creation does not yet include citizens and citizen initiatives as equal partners. However, interviewed civil servants from RC do see that there is a lot of value in getting citizens involved into the CE transition. Furthermore, they intend to create equal partnerships in which they join an ongoing initiative as a supporter, and do not tell them what to do. This is explained in the following statement from a civil servant from RC:

"We really do it mainly with residents and resident initiatives. So, it's really not that we, wearing the municipality's hat, go into the neighbourhoods and tell them what to do. We really engage with existing initiatives or energy in the neighbourhood where they're already active, and we see how we can help them take it a step further. So, it's really up to them, the residents, the initiatives; it's not that we're going to take over or execute it ourselves." (Respondent 3).

4.5.5 Provision of accommodation

Finally, CCI respondents are found to experience great difficulty to find suitable accommodation due to the fact that renting suitable property is expensive. It becomes extra tricky when a CCI has no means of steady income due to their free or low-price services. Moreover, participants in CCIs are mostly volunteers who cannot afford additional rents on top of their own living expenses. Companies that rent out properties generally prove inflexible in their rents for CCIs. Therefore, the CCIs look to the municipality for either an accommodation to manifest in or financial support for the rent. However, the municipality does not provide financial support for an accommodation. A civil servant interviewee acknowledges this issue in the following statement:

"Another bottleneck is that, and this applies not only to our neighbourhood approach but broadly in Rotterdam, when it comes to circular initiatives, there is a discussion about a shortage of space—space for initiatives sometimes, also very practically, for example, a dedicated storage space or a fixed place where they can be every day. This is related to, on one hand, the availability of suitable buildings, but sometimes also that initiatives cannot afford it because they are often small-scale initiatives. Or the municipality has certain plans in the neighbourhood, and that doesn't align well with the community. So, I think there are different causes, space is a problem." (Respondent 3)

4.6 Solutions for an improved relationship

This study has found that there is a plethora of changes that interviewees would like to be made in order to improve the relationship between the municipality and CCIs.

The first solution concerns changing municipal operations to better match the integral approach of the CCIs. All CCIs and academic expert respondents agree that the municipality should aim to better match the integral approach of CCIs. Regarding this solution, interviewed CCIs and academic experts came up with several proposals. First, they argue that cooperations with the municipality could be streamlined if each CCI is assigned to one contact that can represent multiple departments from the municipality. The contact should then be able to discuss and provide financial support on behalf of all departments it represents as well as process integral proposals of the CCI. According to CCI respondents, not having to interact with multiple departments for financial support and approval of proposal would be a major improvement.

Second, CCIs are typically endeavours that require a lot of patience and a long-term vision. Currently, most studied CCIs are provided with short-term financial support, oftentimes on a one-year basis. Besides that, the financial support is provided on a short-term, agreements on extension of the support are often quite late in the support term. CCI interviewees report that short-term financial support combined with late extensions cause a lot of uncertainty about whether their initiative will still be able to operate next year, as they are quite reliant on the subsidies. They prefer longer term support with a timely decision regarding the extension of the support.

Third, almost all interviewed CCIs indicate that an accommodation to manifest their initiative in is very important. Without it, they fear that is will be extremely difficult to get a foothold. Also, a few CCIs stated that they experienced extra difficulty to establish partnerships and gain support due to the fact that they had not yet secured an accommodation. For them, this resulted in a reinforcing loop in which the CCI could not get support to secure an accommodation and experienced extra difficulty to establish partnerships because they did not have an accommodation. While many of the questioned initiatives did find accommodation eventually, they state that finding one proved to be a huge drain on their time and resources. Therefore, CCIs would like the municipality to assume a facilitative role in securing accommodation for them. They indicated that they needed the municipality to either provide more public facilitations in which they can manifest in, such as community centres, or provide financial support for the CCI to secure accommodation themselves. Moreover, several CCIs believe that the municipality should reserve (more) spaces for citizen initiatives in neighbourhoods and urban zoning plans.

Another common remark among CCI interviewees was the request to be involved in decision-making early and to be viewed as a serious stakeholder, not as a participating resident. The major difference between the two, according to the CCIs, is that a serious stakeholder is viewed as an equal partner in the decision-making process while the participating resident is a box to be ticked off as part of the protocol.

However, CCI respondents do remark that they are getting involved earlier in the decision-making process than before. Despite this, they still feel that they are not viewed as an equal partner and stakeholder when decisions are made. In addition, CCI and academic expert interviewees feel that a bottom-up approach should be taken more often. According to them, civil servants should explore ongoing initiatives and wishes in the neighbourhood more and start working from there together with residents. However, both municipal and academic expert interviewees note that the inverse applies as well, meaning that organised residents should tune their initiative to ongoing plans of the municipality as that increases the likelihood of (financial) resources being available for them.

Chapter summary

This chapter provides an in-depth analysis of CCIs in Rotterdam and the municipality's role in facilitating the transition to a CE. It highlights the interaction between CCIs and various municipal departments, focusing on RC as the primary contact and supporter for CCIs. The municipality's approach to CE is outlined, emphasizing its goal of becoming a circular city by 2050 and its recognition of CE as a means to balance environmental, social, and economic factors.

Overall, the municipality's performance in supporting CCIs is evaluated positively, with most initiatives scoring at least adequately. However, financial resources for CE projects are found to be low, with little to no budget available for supporting CCIs beyond covering structural expenses. Political support for sustainability initiatives, including CE, is also lacking, as evidenced by sustainability ranking low on the list of coalition priorities. Despite these challenges, there are enthusiastic civil servants within RC and other departments who actively support CCIs, sometimes going beyond their assigned tasks to assist them. The municipality employs various policy instruments to support CCIs, including subsidies for tools and materials, and networking opportunities facilitated by RC. However, provision of subsidies and accommodation is limited, and CCIs often face challenges navigating the municipality's compartmentalized structure.

The study identifies several tensions and bottlenecks in the relationship between the municipality and CCIs, including clashes in institutional logics, regulatory barriers, and differing economic and social value systems. Despite these challenges, CCIs remain integral to Rotterdam's CE goals, aiming to address multiple issues and goals within their initiatives. CCIs often face low trust from citizens towards the municipality. Civil servants may impede CCI operations, either actively or passively, while regulations at both municipal and national levels limit their ability to operate effectively. Clashing perspectives on value creation further strain the relationship, as CCIs prioritize societal value over profit, leading to unfair competition with market-based solutions. Accommodation for CCIs is also a major hurdle, with renting proving expensive. Proposed solutions include streamlining cooperation with the municipality, providing long-term financial support, facilitating access to accommodation, and involving CCIs in decision-making processes as equal stakeholders.

5. Discussion

This study has analysed how the municipality of Rotterdam responds to the emergence of social innovation in circular economy. This chapter discusses the results of this study and puts them into the context of theoretical perspectives. Finally, it discusses the limitations and generalizability of its results.

With regards to CE policies and actions produced by the municipality of Rotterdam, the analysis revealed a relatively good performance. Using the LCPA framework overall scores were mostly '+' or higher. However, the municipality scored relatively low regarding financial resources for CE, political support, and policy plan for CE and SIs. This is reason to assume that the CE transition and stimulating CCIs is not (yet) a priority. A possible explanation for this may the current political climate in Rotterdam. The current coalition consist of Leefbaar Rotterdam (10 seats out of 45), VVD (6 seats), D66 (5 seats), and DENK (4 seats) (Gemeente Rotterdam, 2022b). The product of this coalition is an agreement that is not very ambitious in terms of sustainability overall with relatively low priority in CE. In addition, it gives low priority to enabling citizens to partake in the CE transition. In the coalition agreement, citizens are not mentioned at all in the context of sustainability or CE (Gemeente Rotterdam, 2022a). Despite the low priority, the potential for CE is certainly there. Several catalysts for CE were found among different departments. Moreover, RC staff are deemed committed to its policies. In addition, a broad constellation of partnerships and collaborations is present for the municipality to exchange experiences, learn from the networks, and advocate for necessary changes to current regulations from higher governments.

This section now moves to discuss the status of CCIs in Rotterdam. This study found that there is a rich environment of CCIs present in Rotterdam, ranging from small local groups to large collectives, from repairing to sharing, and from citizen initiative to social entrepreneurship. From the six interviewed CCIs, half focussed on re-use and repair. These three CCIs employ the Repair Café 'formula' (with one being an actual Repair Café), meaning they create a location for neighbours to bring household appliances for repair or to exchange them with other neighbours. A remarkable find is that virtually all interviewed CCIs, intentionally or not, create the most value for citizens of lower socio-economic status, such as citizens from poorer neighbourhoods and status holder on welfare. A possible explanation is given by several different respondents who state that 'some people simply cannot afford to waste'. It is reasonable to assume that those who cannot afford to replace household appliances and furniture will, relatively, benefit the most from repair and re-use at the neighbourhood level. This study, however, cannot draw any conclusions pertaining to the main 'clientele' of CCIs. This may be an interesting subject for future studies.

In terms of the governance vis-à-vis CCIs in Rotterdam, analysis revealed that RC is the department of the municipality that is involved the most. They act as a central contact point for CCIs and a regular partner in their networks. As regular partner, RC was found to assume several different roles: financial

supporter, networking/connecting partner, client, and strategic partner. Interviewed civil servants explained that they take a reflexive approach to cooperation with CCIs. This means that RC have relative freedom to assume different roles based on the needs of their CCI partner. In addition to their network and strategic expertise RC employs two policy instruments: subsidies and materials. Both these instruments, however, are provided in a limited extent. Financial support is only given to cover a limited number of workhours for the CCIs. Materials were provided once from the storage of the municipality. This limited capacity for financial and material support corresponds with the previous finding that financial coverage to support CE projects is low. In addition, the limited financial coverage may explain why RC primary supports CCI through its civil servant capacity, despite many CCIs expressing a need for more financial and accommodation support.

The municipality of Rotterdam was found to affect the transformative capacity of CCIs in a few ways. Through RC, subsidies are provided by the municipality to improve transformative capacity. However, this study argues that these subsidies have only a minor impact on transformative capacity due to the limited extent in which they are provided. The subsidies helped volunteers in the CCIs by compensating them for workhours they put into the CCI. Also, it helped CCIs to buy materials and tools to run their operations. And while this is certainly helpful for CCIs, this study argues that is mostly helps CCIs who already have a better sense of the activities they aim to conduct and the means they need for it. CCIs who are still developing their common goal and means to said goals will have no need for tools and workhour compensation. This study argues that they would benefit more from subsidies that improve their sense of competence or relatedness. For example, it may be more beneficial for them to provide subsidies that facilitate education regarding CE and managing an initiative. Furthermore, the analysis revealed the provision of accommodation to be very limited. According to Haxeltine et al. (2016) infrastructural resources such as accommodation may be used as a resource to help (transformative) goals. By not providing CCIs with suitable accommodation the municipality does not improve transformative capacity of CCIs. However, the municipality does improve the transformative capacity of CCI by providing them with access to their extensive network. It can be used by CCIs to establish many different partnerships. In addition, RC helps CCIs in navigating the different departments of the municipality. Besides this, RC and CCIs engage in collective learning to improve transformative capacity. Both CCIs and the municipality gain new understandings by experimenting together and evaluating the results. Also, RC reflects internally on its successes and failures. They do so inside their own department as well as with other departments of the municipality who also collaborate with citizen initiatives, i.e. community energy initiatives. Through these learning mechanisms RC is able to improve the transformative capacity of CCIs. Summarizing the above, this study argues that, overall, the municipality has a positive impact on the transformative capacity of CCIs. However, there is potential to improve further. This study and interviewed CCIs underline the importance of an accommodation for

CCIs to run their operations. Keeping more suitable spaces CCIs in mind in (future) urban planning may be a wise course of action.

This study has identified four major bottlenecks/tensions in the relationship between the municipality of Rotterdam and CCIs. These four bottlenecks can be summarized as follows: (1) clashing institutional logics, (2) tensions between civil servants and CCI participants, (3) municipal and national regulations, and (4) clashing ideas of value-creation. This study found that the institutional logics of the municipality of Rotterdam are often difficult to align with CCI logics. This corresponds with the findings of a study conducted by Nederhand et al. (2019), who studied the interplay between institutional logics and boundary spanners in the municipality of Rotterdam. Their research is deemed instrumental in explaining the results of this study. They argue that historic institutional logics, namely Traditional Public Administration (TPA) and New Public Management (NPM), dictate current behaviours of civil servant through historically grown and accepted rule-based practices. These historic logics and their corresponding practises cause frictions with a newer institutional logic, New Public Governance (NPG) (Nederhand et al., 2019). NPG advocates a pluralist state in which multiple (non) governmental actors contribute to the delivery of effective public services (Osborne, 2006). Enabling citizens, in the form of CCIs, to contribute to public service provision is a part of this logic. Nederhand et al. (2019) argue that, in pursuit of this new logic, both citizens and civil servants meet barriers from historic logics. They identify four barriers regarding standardisation (coercing civil servants to adhere to existing regulations and authorised policy programmes instead of creating tailor-made solutions for citizens), internal-orientation (looking to political decisions of political officeholder to guide decisions instead of external actors such as citizens), functional specification (breaking down policy ambitions into large sets of smaller tasks among departments instead of integrally approaching local needs), and result-orientation (holding civil servant accountable via key performance indicators instead of leaving room to take on extra tasks that come up during interactions with citizens). From these barriers CCIs seems to experience the most difficulty from the result-orientation and functional specification barrier, although one could argue that all barriers are experienced among interviewees to a certain extent. By using the misalignment of institutional logics between the municipality of Rotterdam and CCIs as a starting point this study can make sense of other bottlenecks and tensions.

The research by Nederhand et al. (2019) yields explanatory power in terms of the tensions between civil servant and CCI participants. Here, the analysis revealed low trust between civil servants and citizens as well as active and passive impediment of CCIs by civil servants. The historic logics TPA and NPM do not focus on the network or relation-building (Osborne, 2006). Moreover, political officeholders dictate policy and civil servants dictate actions. Citizen do not need to be included in decision-making and public service delivery. Keeping the logics of TPA and NPM in mind, historic practises coming from these logics could cause political officeholders and civil servants to view participating citizens as overstepping boundaries. This resonates with the results of this study where several CCI respondents

felt that were not taken seriously by political officeholders and civil servant or that they did not entrust the execution of 'their' public services to them. As a result, political officeholders and civil servants may actively or passively impede CCIs in their operations. CCIs in Rotterdam are no exception in facing these issues. A study into the role of governmental organisations vis-à-vis citizen initiatives conducted by the National Ombudsman found similar results. They conducted a survey among more than 100 citizen initiatives and found that initiatives are not always taken seriously by governmental organisations and that they often do not listen to needs and preferences of citizens (Verhoef et al., 2018). This is also underlined by the interviewed academic experts.

Besides impediment from civil servants, this study found that several municipal and national regulations impede the operations of CCIs. These consist of a municipal regulation that forbids CCIs to pick-up household items and furniture from the street or recycling centres, and a national regulation that obliges the application of VAT on re-used and repurposed items. What is interesting here is that these regulations appear to directly contradict policy agendas and goals of the municipality of Rotterdam namely, achieving a CE by 2050 (Rotterdam Circulair, 2023). Assuming that both contribute to this goal, it seems that regulations are not yet directed to reaching said goal. It is remarkable that 'only' two impeding regulations were found considering that a systematic review of academic and grey literature conducted by de Jesus & Mendonça (2018) determined that regulations are not only a driver of CE but also one of the most important barriers. A possible explanation for a relatively low number of impeding regulations might be that most interviewed CCIs are small scale organizations with a relatively low range of (nearly) free services provided mostly on neighbourhood scale. The issue of VAT was found to be impeding by a CCI that can also be considered a social entrepreneur that actually sells its repurposed products to companies.

Furthermore, this study argues that the municipality of Rotterdam and CCIs have mismatching ideas what it means to create public value. Grounding this statement in terms of institutional logics leads this study to believe that the municipality holds onto the historic institutional logic of NPM. In NPM, value is created mostly through classical contracts and the market. Value is measured in efficiency and effectiveness of public service and achieving managerial targets while staying within budget (Nederhand et al., 2019; Osborne, 2006). Evidence for this was found in the sale of community real estate as well as forcing CCIs to compete with the market for mobility provision. Interviewed academic experts underlined the presence of these NPM characteristics in the municipality of Rotterdam. Furthermore, they indicated that these characteristics are not limited to Rotterdam but are common among Dutch municipalities. However, CCIs do not share the same ideas of value-creation. They want to contribute to public value creation as equal partners and demand a say in decision-making processes. Moreover, they do not want to be treated as another market party. This study finds that CCIs are often dismissed or referred to the market based on superficial measures of value-creation. To combat this, Leclercq and Smit (2023) have developed a 'circular value-flower' to help both local governments and citizen

initiatives broaden their perspective from just economic value to also include other values, namely: ecological, social, cultural, and aesthetic value.

The next bottleneck pertains to the accommodation of CCIs. Both civil servant and CCI respondents agree that having accommodation to store material or run operations from is crucial to the success of CCIs. The municipality does not offer support to cover rents, instead interviewed CCIs found support through semi-governmental organisations, sustainability funds, and/or NGOs. Moreover, CCIs expressed the wish that the municipality would do more to help them find or finance accommodation. Interestingly, this wish resonated with more citizen initiatives among The Netherlands (Verhoef et al., 2018). The explanation for this wish is quite simple. First of all, there is currently a national shortage of spaces to rent (van Gurp, 2023) making it even more difficult for CCIs to find suitable and affordable accommodation. Second, among the interviewed CCIs most performed their duties on a voluntary basis. For all of them, it is impossible to cover additional rents from their own pocket, therefore they are reliant on external financial support to rent an accommodation for their initiative. Some CCIs find accommodation in community centres, however, they also deal with shortages of space and if space is available, it may not be suitable. The LCPA analysis revealed that CE actions regarding social innovations were a low priority with very limited financial resources available. This may explain why the municipality simply does not reserve enough budget to be of assistance, despite being aware of the importance of accommodation for CCIs.

Finally, the analysis revealed solutions suggested by respondents to potentially resolve bottlenecks and tension in the relationship between the municipality of Rotterdam and CCIs. First, and perhaps the most challenging: change municipal operations to better match the needs of CCIs. This section has attempted to theoretically explain how the logics of CCIs clash with institutional logics of the municipality of Rotterdam but finding a practical solution to it is more easily said than done. However, building upon the clashing logics line of reasoning and combining it with the solutions suggested by interviewees, this study argues that two barriers need breaking down the most: the internal-orientation and functional specification barriers. These barriers entail that political officeholders dictate decision-making, and that the municipality's operations and responsibilities are strictly split between departments. The first barrier causes CCIs to struggle with the fact that they are regularly involved in a late stage of the decision-making process. CCI respondents believe that decision-making in Rotterdam is done primarily top-down instead of bottom-up. They feel that the municipality should attune their policy and action more to the wishes and needs of CCIs. Rotterdam is no exception here because more citizen initiatives across The Netherlands experience similar barriers (Verhoef et al., 2018). This solution in which citizens are viewed as a serious actor and partner corresponds with the NPG logic. The second barrier causes all studied CCI to struggle with the fragmented structure of the municipality. Their primary solution to this barrier would be to appoint one contact to every CCI. Said contact should have the authority to act on behalf of all involved departments. Again, this solution is underlined by more citizen initiatives in The Netherlands

(Verhoef et al., 2018). Although it is not a permanent solution, this issue can be partly mitigated by a 'boundary-spanner'. Simply put, boundary spanners are 'connectors of people and processes' (Nederhand et al., 2019). They act as facilitators from within the governmental organization that arrange contacts between internal aspects of government and external parties, such as citizen initiatives. Based on the results of this study, one could argue that RC acts as a boundary spanner for CCIs. Both CCIs and civil servants from RC report that RC often acts as a facilitator of contacts within their network, both governmental and non-governmental.

Another solution proposed by interviewed CCIs pertains to long-term vision and support for CCIs. Typically, CCIs are long-term endeavours with goals that are achieved piecemeal over the years. And while both the municipality and CCIs work to contribute towards the same long-term goals, completing the transition to CE, CCIs experience no long-term commitment from the municipality to support them. This study found the municipality would not commit to long-term financial support, often offering one-year support contracts, and did assist in finding suitable accommodation for the CCIs. Despite the fact that almost all interviewed CCI underlined this to be a crucial factor to their operations. The fact that the municipality does not (yet) commit to long-term support could be explained by uncertainty regarding the division of budgets as a result of who holds political offices. In addition, both civil servants and CCIs note that the municipality is often bound to yearly budgets. However, this is a cause for dissatisfaction and incomprehension among CCIs. They see a discrepancy between the long-term commitment of the municipality to reaching climate goals of 2030 and 2050, and a short-term commitment to supporting CCIs.

This study offers several scientific contributions: (1) it contributes to the clear lack of academic attention towards SI in CE on the community level (see section 2.1) by exploring what it entails to be a CCI. Furthermore, (2) it helps bridge several gaps in academic knowledge pertaining to the ways civil servants/policymakers attempt to support CCIs (Edelenbos et al., 2018; Mees et al., 2019) as well as what role(s) the municipality assumes vis-à-vis CCIs (Hegger et al., 2017). Also, (3) this study adds novel items to the list of known bottlenecks and tensions that may occur in the relationship between CCIs and the municipality. It also (4) adds to empirical evidence supporting the proposition that bottlenecks and tensions occur due mismatching institutional logics (Nederhand et al., 2019) that shape the practises of the municipality and CCIs that cause bottlenecks and tensions in their relationship. Finally, (5) this study developed a novel approach to analysing interactions between SIs in CE and municipalities by combining TSI theory and the LCPA framework. This approach contributes to the academic toolkit for analysing interactions between that may bilaterally shape (specific components of) the structure of (local) government and the SI.

6. Conclusion, limitations, and recommendations

This study has looked into the emergence of CCIs in the municipality of Rotterdam and has explored what the relationship between the two looks like. It attempted to answer the following research question: '*How does the municipality of Rotterdam respond to the emergence of social innovation in circular economy, more specifically to CCIs?*' To come to an answer, a theoretical framework was constructed consisting of SI and TSI theory, as well as the LCPA framework. Subsequently, a qualitative approach was taken to gather empirical data via document analysis and semi-structured with participants in CCIs, civil servants involved with CCIs, and academic experts. Using the relational approach to TSI and the, to CE adapted, LCPA framework, this study has constructed a lens that is fit for analysing the relationship between the municipality of Rotterdam and CCIs. The analysis of empirical data from the semi-structured interviews was performed through abductive coding. Using the discussed results from the analysis this section will now move to answer the sub-questions before finally answering the central research question of this study.

First, '*What kinds of CCIs are present in Rotterdam, and how to they intend to change social relations?*' This study found that CCIs in Rotterdam are involved in all types of circular action (nine Rs), but most focussed on repair and re-use. It seems that most CCIs fashion themselves to the Repair Café format by facilitating the repair and exchange of primarily household items and furniture for neighbours who cannot afford to waste. CCIs intend to change social relations by changing ways of knowing pertaining to creating awareness of CE among neighbours and teaching them new ways of doing by changing how neighbours handle their products that have reached the end of their life cycle.

Second, '*What does the governance arrangement vis-à-vis CCIs look like in the municipality of Rotterdam, and which policy instrumentations does the municipality employ vis-vis CCIs?*' In terms of governance the municipality of Rotterdam is involved in most CCIs via the RC department. RC regularly acts as a partner in the network of CCIs. They attempt to support CCIs via bottom-up approach by mapping initiatives in the neighbourhoods and responding to their needs. One could therefore describe their governance as facilitating as they take on a role in which they provide aim to provide the right context in which CCIs are able to run their operations independently. Their set of policy instruments to do so, however, is rather limited. Their set of instruments includes the provision of materials and financial compensation for materials and workhours of CCI participants. In addition, they were found to serve as a boundary spanner by providing access to their network and establishing connections between CCIs and civil servant within other municipal departments.

Third, '*How does the interaction between the municipality of Rotterdam and CCIs affect the transformative capacity of the latter?*' Municipal support improves the transformative capacity of CCIs in Rotterdam. This study argues that the most positive impact on transformative capacity is made through collective learning and the provision of RCs extensive network. By experimenting with CCIs

the municipality facilitates the opportunity for CCIs to learn. In addition, RC has formed a extensive network of civil servants, entrepreneurs, and CCIs through which they facilitate the exchange of learning opportunities. Also, the offer their network to CCIs to help them acquire resources. However, it needs to be noted that the municipality has opportunities related to transformative capacity enhancement. It should consider increasing subsides as well as playing a more active role in arranging accommodation for CCIs. Both these means of support should improve the transformative capacity of CCIs even further.

Fourth, *'What bottlenecks and/or tensions are experienced with regards to the relationship between the municipality and CCIs?'* The analysis revealed five main bottlenecks and/or tensions: clashing institutional logics, tensions between civil servants and CCI participants, municipal and national regulations, Clashing ideas of value-creation, and accommodation. Most of these bottlenecks/tensions can be explained by historic and accepted practises ensuing from historic institutional logics (TPA and NPM) that clash with newer logics (NPG). The misalignment of institutional logics create two barriers from which CCIs experience a lot of difficulties: the result-orientation and functional specification barrier. These barriers entail that political officeholders dictate decision-making, and that the municipality's operations and responsibilities are strictly split between departments. This translates to a situation in which CCIs are often involved in a late stage of decision-making and experience major difficulties interacting with the municipality due to it compartmentalized structure.

Fifth, *'How can these bottlenecks be resolved according to the involved actors?'* Drastic changes are needed to completely resolve the bottlenecks found in this study. However, improvements could be made by changing how the municipality interacts with CCIs. First of all, the municipality should take citizens and CCIs more seriously as stakeholders and partners. This entails that citizens and CCIs are involved early in the decision-making process as an equal partner. Also, the municipality should provide CCIs with a single contact who acts on behalf of all involved departments. This would ease the burden of CCIs who would otherwise be forced to cooperate and coordinate with multiple departments from the municipality. Finally, the municipality should align collaborations and support with the long-term transition goals. Currently, collaboration and support agreements are rather short-term, mostly one year, but they should be longer term to better match CE goals set for 2030 and 2050.

Together, the sub-questions paint a comprehensive picture of the relationship between the municipality of Rotterdam and CCIs. They provide the means necessary to finally answer the main research question of this stud: '*In what ways does the municipality of Rotterdam respond to the emergence of social innovation in circular economy, more specifically to CCIs?'* This study finds that the municipality is taking a reflexive approach to the emergence of SI in CE in Rotterdam. It does so by facilitating CCIs to operate independently. However, the facilitation is still rather limited. Also, this study finds that the municipality does not yet see citizens play a large role in the CE transition. However, civil servants

seems to increasingly see the need and added benefits of involving citizens and their initiatives in the CE transition. However, much more can and should be done. There are still too many bottlenecks and tensions that arise within the relationship that impede the operations and transformative capacity of CCIs significantly. These bottlenecks are expected to be a result from historic logics and ensuring practises that cause barriers to arise in the relationship.

6.1 Limitations

To see the true value of the discussed results of this study, one needs to be aware of the limitations of them. First of all, a limited number of respondents were questioned regarding the subject of interest. And while this study has triangulated data to improve reliability and validity, the number of respondents, nine, remains quite small. This number will suffice due to the explorative nature of this study, but results of this study should, therefore, only be generalized to the larger population of CCIs in Rotterdam with caution. Along the same lines, a limited number of civil servants was interviewed. Thus, limiting the generalizability of results concerning their motivation and ways of interacting with CCIs. Also, this study acknowledges that its means of measuring the degree of citizen empowerment and collective learning were limited. The interviews only allowed this study to capture said phenomena to a limited extent. Therefore, more research is needed to fully map and understand the extent of citizen empowerment and collective learning.

While several similarities were found regarding the bottlenecks and tensions that CCIs in Rotterdam and citizen initiatives across The Netherlands experienced, one should be careful to generalize these results to other types of citizen initiatives, Dutch cities, and/or other countries. As was mentioned in section 3.4.1, Rotterdam possesses unique contextual factors in terms of geographical characteristics, demography, economy, and policy. Also, the operations that CCIs in Rotterdam perform are likely different to other types of citizen initiatives. In addition, every municipality has unique practises that ensued from historic logics. It therefore likely that civil servants and citizen initiatives will not run into the same barrier to the same extent as CCIs in Rotterdam do. Taking all of the forementioned into account, this study argues that the results it produced are not readily generalizable to other municipalities, types of citizen initiatives, or countries. However, they do provide valuable and informative insight into what the relationship between the municipality and CCI looks like and what the bottlenecks are. Also, because of triangulation it is safe to assume that the identified underlying causes for the bottlenecks are also present in the relationship between other Dutch municipalities and other types of citizen initiatives.

6.2 Recommendations for future research

This study has a few recommendations for future research. First, it would be interesting to further test the explanatory power of the LCPA framework in the context of CE and SI policy and action. To do so, future research should look into conducting a study after CE and SI using the LCPA framework and

employing a comparative analysis of several large or medium-sized municipalities with a rich population of CCIs.

Second, because regulations were pinpointed as both an important driver and barrier to CE, more empirical research is needed to map local impeding regulations for CCIs and social entrepreneurs.

Third, future research could concern itself with how to reorganize the way citizens and municipalities create value together and make decisions regarding CE for local communities. The circular value flower developed by Leclercq and Smit (2023) could be a starting point for this.

Fourth, a comparative analysis should be conducted towards different policies and actions aimed to empower citizens to participate in the CE transition. It would be interesting to see how different municipal "support tools" affect the feeling of empowerment in citizens. On top of this, said study should put an emphasis on how citizens actually experience empowerment from the municipality.

Fifth, the mechanisms of collective learning between the municipality of Rotterdam and CCIs should be studied further. In doing so, the academic community can gain a better understanding of best practices regarding learning in the context of CE and SI.

6.3 Policy recommendations

This study also offers several policy recommendations for the municipality of Rotterdam. First, the municipality should conduct inquiries among civil servants and CCIs to identify municipal regulations that hinder the operations of CCIs. Regulations that impede progress need to be identified and reviewed to ensure they align with current goals and values. Some regulations may be outdated and obstruct the advancement of sustainability and CE. Additionally, the municipality should address the issue of VAT at CricuLaw and aim to either remove or lower it for products made from recycled and re-used materials.

Second, the municipality should consider playing a more significant role in providing accommodation for CCIs. Collaboration with communities, CCIs, and housing cooperatives should be sought to facilitate accommodation for CCIs in each neighbourhood. This accessibility at the neighbourhood level is crucial for facilitating participation and utilization of CCI services.

Third, the municipality should reconsider its approach to the duration of agreements with CCIs. Establishing CE in Rotterdam is a long-term goal, yet current short-term agreements with CCIs do not align with this vision. Therefore, discussions with citizens and CCIs should be initiated to envision the relationship between them in 2050, with interim goals set for the period leading up to 2050.

Fourth, it should be made simpler for CCIs to collaborate with the municipality. This could be achieved by establishing a digital contact point through which CCIs can cooperate with a single central contact. This contact could either be an individual empowered to make decisions on behalf of all relevant departments or a team of representatives acting as one integral partner to the CCIs.

Fifth, the municipality should employ the Circular Value Flower developed by Leclercq and Smit (2023) to redesign its interactions, collaborations, and value creation with CCIs for local communities. Experimentation with this method will provide insights into various ways of generating public value beyond mere economic considerations.

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8. Appendices

Appendix A: LCPA framework

Table A1: Unchanged items and indicators of the policy and action framework by Hoppe et al. (2016).

Item	Indicator
Municipal organisation: Input	
Financial resources	degree to which the local government has budget available that can be allocated to climate policy capacity.
Fiscal health	information provided financial debts the municipality has on its annual budget, including information on municipalities being subjected to financial supervision by central government
Legal authority	legal authority municipalities in The Netherlands have.
Use of technology	Degree of knowledge, experience and expertise regarding climate policy and running of related projects.
Size	no. of inhabitants (with local government staff mirroring size in terms of inhabitants).
Council type	
Municipal organisation: Throughput	
Political support	Support among Aldermen for climate policy (with or without amendments)
Public leadership/" political will" to act/ local catalyst	
Inter-department coordination/ policy integration	Degree of inter-department coordination on climate policy and actions.
Knowledge management	Degree of knowledge management. Presence of knowledge management infrastructure.
Policy plan mitigation (goals)	clearly defined, ambitious goals
Policy plan mitigation (means/action plan)	sound, feasible action plan which clearly links goals, means and climate actions
Policy plan adaptation (goals)	clearly defined, ambitious goals

Policy plan (means/action plan)	sound, feasible action plan which clearly links goals, means and climate actions
Commitment of staff implementing policy instruments	
Monitoring and evaluation	Municipality monitors climate policy and performance thereof frequently, and anticipates with feedback loop to policy
Municipal organisation: Output	
Policy instruments	Total of instruments presented to be presented in Table
Municipal governing by authority	interpretation of appliance characteristics governing mode to local governments' governing style (using regulatory instruments, economic incentives and contracting parties to govern by hierarchy).
Municipal self-governing	interpretation of appliance characteristics governing mode to local governments' governing style.
Municipal governing by provision	interpretation of appliance characteristics governing mode to local governments' governing style.
Municipal governing through enabling	interpretation of appliance characteristics governing mode to local governments' governing style.
Outcome	
Greenhouse gas emission reduction	
Resilience	
Climate co-benefits	
Cluster II: Characteristics of the local environment	
Demographic characteristics	Income per capita, and percentage highly educated population.
Circular economy group activity	Presence of active citizen-led climate initiative.
Environmental stress	Pollution to the environment due to economic activities.
Cluster III: the local action arena	

Presence of process manager	Local government has agents available (either tasked or hired) to manage processes in local projects.
Support by local leaders	Presence of local leaders and organized citizenry who support climate actions and related projects.
Partnerships with private organisations	Collaborative ties with local industry and local business firms to run local climate actions
Cluster IV: external issue networks	
Collaborative ties with other local governments	Degree of activity in inter-municipal/regional climate network(s)
Involvement in/membership of climate issue network(s)	
Cluster V: influence exercised by higher government levels	
Alignment with agendas of higher-level governments	Sharing vision, goals, and strategic plans by central and regional governments
Presence of inter-governmental support schemes	Municipality uses intergovernmental support scheme to build climate capacity and/or fund local projects. Financial sum of subsidy
Cluster VI: major external events	
(Geo-)political events	
(Geo-)physical events/natural disasters	
Major economic events	
Cluster VII: intended climate action (output/projects)	
Installing EE and/or RES plants and infrastructure	Size and intensity of total set of mitigation projects.
Energy efficient behaviour (by local citizens and organizations)	Citizens reached by awareness raising campaign who indicate to lower fossil energy consumption.
Installing infrastructure to cope with extreme weather events	Size and intensity of total set of adaptation projects.

Appendix B: Interview questions, participants, and codebook

Table B1: Interview questions for municipal staff.

Item

General information	
Role	Who are you, and what is your role within the municipality?
Goal	What is/are the goals of your organization regarding the circular economy? How does your organization intend to achieve these goals?
Questions	
LCPA	What does the relationship between the municipality and circular citizen initiatives generally look like?
LCPA	Which policy instruments does the municipality employ to support circular citizen initiatives?
LCPA	How does municipal personnel evaluate the results of its policy regarding circular economy?
LCPA	To what extent is municipal personnel personally dedicated to mobilizing support for the implementation of circular economy policies and projects?
LCPA	Is there strong leadership from the municipality regarding circular economy policies and projects?
LCPA	To what extent is there coordination and integration of policies and actions between different departments within the municipality concerning circular economy?
LCPA	Does the municipality collaborate with other (semi) governments on circular economy projects?
LCPA	Does the municipality collaborate with (international) private entities on circular economy projects?
Bottlenecks	To what extent are there obstacles and/or tensions arising when the municipality collaborates with circular citizen initiatives? What are these obstacles and/or tensions, and how are they addressed?
Bottlenecks	What could circular citizen initiatives do to alleviate these obstacles and/or tensions?
End	Are there any additional sources of information or individuals I could consult for further insights in the context of this research?

Table B2: Interview questions for participants in CCIs.

Item

General information	
Role	Who are you, and what is your role within the circular citizen initiative?
Goal	What is/are the goals of your organization regarding the circular economy? How does your organization intend to achieve these goals?
Questions	
LCPA	What does the relationship between the municipality and circular citizen initiatives generally look like?
LCPA	Which policy instruments does the municipality employ to support circular citizen initiatives?
LCPA	To what extent are municipal personnel personally dedicated to mobilizing support for the implementation of circular economy policies and projects?
LCPA/TSI	To what extent are municipal personnel personally dedicated to mobilizing support for the implementation of circular economy policies and projects?
TSI	How does the municipality's support assist you in achieving your goals related to the transition to a circular economy?
TSI	To what extent does the municipality pose obstacles to achieving those transition goals?
TSI	How capable are you of independently achieving your goals concerning the circular economy?
TSI	How does the municipality contribute to your autonomy and impact in achieving your goals?
Bottlenecks	Are there any obstacles and/or tensions that arise when you collaborate with the municipality? What are these obstacles and/or tensions?
Bottlenecks	What can the municipality do to address these obstacles and/or tensions and improve collaboration?
End	Are there any additional sources of information or individuals I could consult for further insights in the context of this research?

Table B3: Interview questions for other stakeholders.

Item

General information	
Role	Who are you, and what is your role within or in relation to circular citizen initiatives in Rotterdam?
Goal	What is/are the goals of your organization regarding the circular economy? How does your organization intend to achieve these goals?
Questions	
LCPA	What does the relationship between the municipality and circular citizen initiatives generally look like?
LCPA	Which policy instruments does the municipality employ to support circular citizen initiatives?
LCPA	How do you or your organization mobilize support for the implementation of circular economy policies and projects?
TSI	Do you or your organization collaborate with other (semi) governments and/or private entities in the field of the circular economy, besides the municipality of Rotterdam?
TSI	How does the support from your organization assist citizen initiatives in achieving their goals related to the transition to a circular economy?
TSI	To what extent does the municipality pose obstacles to achieving those transition goals?
TSI	To what extent are circular citizen initiatives capable of independently achieving their goals regarding the circular economy?
TSI	How does your organization contribute to the autonomy and impact of circular citizen initiatives in achieving their goals?
Bottlenecks	Are there any obstacles and/or tensions that arise when the municipality and citizen initiatives collaborate? What are these obstacles and/or tensions?
Bottlenecks	What can the municipality do to address these obstacles and/or tensions and improve collaboration?
Bottlenecks	What can the citizen initiative do to address these obstacles and/or tensions and improve collaboration?
End	Are there any additional sources of information or individuals I could consult for further insights in the context of this research?

Table C4: interview participants.

Interview number	Category	Description
Respondent 1	CCI	Is a Repair Café.
Respondent 2	CCI	Is a social entrepreneur that employs people who are on welfare to remake decommissioned textiles such as banner and work clothes into new products.
Respondent 3	Civil servant	In this interview two civil servant were questioned. They work under the department Rotterdam Circulair which is directly involved in CCIs and attempts to support them in reaching their CE goals.
Respondent 4	CCI	In this interview a participant in a sustainable and inclusive bike sharing CCI is questioned. This CCI aims to set up a bike sharing system that is low-priced for people from socio-economic groups that have low access to regular means of mobility.
Respondent 5	CCI	In this interview a participant in a CCI in Rotterdam Zuid was questioned. Their CCI focuses on gathering and harvesting used appliances, furniture, and materials and reusing them or giving them so people who need them. In addition, they host a workplace for repairs and workshops.
Respondent 6	Academic expert	In this interview an academic expert with a background in architecture was questioned. They worked as an academic at the TU Delft and is currently employed at a research firm.
Respondent 7	CCI	In this interview a participant in a CCI in Noordereiland was questioned. This CCI produces a plethora of sustainability activities, among those they organise a monthly shop in which neighbours can bring and pick-up furniture and appliances for/from other neighbours.
Respondent 8	CCI	In this interview a freelance project leader circular economy was questioned. They operate in the neighbourhood Bospolder-Tussendijken. In that neighbourhood they work to bring residents and entrepreneurs together to work in citizen initiatives that focus on circular economy.
Respondent 9	Academic expert	In this interview an academic expert from the Erasmus University was questioned. They have conducted several studies on the relationship between several municipalities and local social innovations.

Table C5: Code for analysis of interviews

Group	Analytical questions	Code
CCIs	What does it entail to be a CCI?	Operations
		CE goal
		Partners
Governance	How does the municipality govern CCI, and what instruments does it use?	Policy instrument
		Policy reflection
		Municipal policy
		Municipal organisation
Support	How does the municipality support CCIs?	Facilitation
		Financial support

		Accommodation
		Network/connections
Bottlenecks/tensions	What bottlenecks/tensions occur in the relationship between the municipality and CCI?	Accommodation
		Integral approach/compartmentalization
		Low trust
		Difficult to reach
		Regulation (municipal/national)
		Political climate
		Impediment
		Economic ideas of value-creation
Solutions	What solutions do interviewees propose?	Possible solutions
Relationship	How are ongoing cooperations going?	Dependencies
		Civil servant motivation
		Cooperations

Appendix C: Informed consent
Appendix D1: Invitation for participating in this study.

Beste meneer/mevrouw,

Hierbij nodig u graag uit om deel te nemen aan een onderzoek genaamd *'Circular social innovation and local government: Analysing governance, policy, and municipal support for circular citizen initiatives in the municipality of Rotterdam, how does it affect transformative capacity and what are the bottlenecks?'* Dit onderzoek wordt uitgevoerd als onderdeel van een afstudeeronderzoek (Master-scriptie) voor de studie Industrial Ecology van de TU Delft en de Universiteit Leiden door Kelvin Koop.

Het doel van dit onderzoek is het bestuderen van de relatie tussen de gemeente Rotterdam en circulaire burger initiatieven, daarbij doe ik specifiek onderzoek naar de beleidsinstrumenten, gemeentelijk ondersteuning voor de initiatieven en wat de knelpunten zijn in de relatie. Het interview zal ongeveer 30-60 minuten in beslag nemen. De gegevens zullen gebruikt worden voor het afstudeeronderzoek van Kelvin Koop en mogelijke wetenschappelijke publicaties die hier uit voortkomen. U wordt gevraagd om 12-15 vragen te beantwoorden die betrekking hebben tot de relatie tussen de gemeente Rotterdam en circulaire burgerinitiatieven, en/of interne beleidsvormingsprocessen met betrekking tot de circulaire economie.

Het interview vindt bij voorkeur via een videogesprek plaats, maar kan in overleg natuurlijk ook fysiek plaatsvinden. Graag hoor ik of u deel wilt nemen in dit onderzoek. Daarna maken we samen een afspraak voor een tijd en datum waarop het interview plaats kan vinden. Alvast dank voor uw reactie.

Met vriendelijke groet,
Kelvin Koop

Appendix D2: Informed consent form.

U wordt uitgenodigd om deel te nemen aan een onderzoek genaamd *'Circular social innovation and local government:*

Analysing governance, policy, and municipal support for circular citizen initiatives in municipality of Rotterdam, how does it affect transformative capacity and what are the bottlenecks?' Dit onderzoek wordt uitgevoerd als onderdeel van een afstudeeronderzoek (Master-scriptie) voor de studie Industrial Ecology van de TU Delft en de Universiteit Leiden door K.C. Koop.

Het doel van dit onderzoek is het bestuderen van de relatie tussen de gemeente Rotterdam en circulaire burger initiatieven, daarbij doe ik specifiek onderzoek naar de beleidsinstrumenten, gemeentelijk ondersteuning voor de initiatieven en wat de knelpunten zijn in de relatie. Het interview zal ongeveer 30-60 minuten in beslag nemen. De gegevens zullen gebruikt worden voor het afstudeeronderzoek van K.C. Koop en mogelijke wetenschappelijke publicaties die hier uit voortkomen. U wordt gevraagd om 12-15 vragen te beantwoorden die betrekking hebben tot de relatie tussen de gemeente Rotterdam en circulaire burgerinitiatieven, en/of interne beleidsvormingsprocessen met betrekking tot de circulaire economie.

Zoals bij elke online activiteit is het risico van een 'databreuk' aanwezig. De door u verstrekte gegevens (zoals interview) zullen vertrouwelijk worden behandeld. De risico's worden geminimaliseerd door persoonlijke gegevens zoals uw naam en email te anonimiseren in het onderzoek. Uw naam en email worden wel opgeslagen via dit informed consent formulier. Deze persoonlijke informatie wordt veilig bewaard op de universiteit op Surfdrive. Uw data en informatie wordt niet gedeeld zonder uw expliciete toestemming. Gegevens zoals interviewtranscripten worden tot twee jaar na het aflopen van het huidige afstudeeronderzoek bewaard. Mogelijke video- of geluidsopnames van interviews worden direct na afloop van het onderzoek verwijderd.

Uw deelname aan dit onderzoek is volledig vrijwillig, en u kunt zich elk moment terugtrekken zonder reden op te geven. U bent vrij om vragen niet te beantwoorden. U heeft het recht om toegang te krijgen tot uw persoonlijke data en antwoorden die u geeft tijdens het interview om deze te rectificeren of te verwijderen.

Voor contact kunt u terecht bij K.C. (Kelvin) Koop

VINK ALSTUBLIEFT HET HOKJE AAN DAT VAN TOEPASSING IS	Yes	No
A: ALGEMENE OVEREENKOMST – ONDERZOEKSDOELEN, DEELNEMERSTAKEN EN VRIJWILLIGE DEELNAME		
1. Ik heb de informatie over het onderzoek gedateerd [.…/.…/.……..] gelezen en begrepen, of deze is aan mij voorgelezen. Ik heb de mogelijkheid gehad om vragen te stellen over het onderzoek en mijn vragen zijn naar tevredenheid beantwoord.	☐	☐
2. Ik doe vrijwillig mee aan dit onderzoek, en ik begrijp dat ik kan weigeren vragen te beantwoorden en mij op elk moment kan terugtrekken uit de studie, zonder een reden op te hoeven geven.	☐	☐
3. Ik begrijp dat mijn deelname aan het onderzoek de volgende punten betekent:	☐	☐

VINK ALSTUBLIEFT HET HOKJE AAN DAT VAN TOEPASSING IS	Yes	No
- De data dat voortkomt uit dit interview wordt gebruikt te behoeve van de Master scriptie van K.C. Koop. - Dit interview wordt opgenomen doormiddel van een audio opname en wordt vervolgens getranscribeerd. De audio opnames worden daarna verwijderd.		
B: DEELNAME RISICO'S EN BESCHERMING VAN DATA		
4. Ik begrijp dat mijn deelname betekent dat er persoonlijke identificeerbare informatie en onderzoeksdata worden verzameld, met het risico dat ik hieruit geïdentificeerd kan worden door gemeente personeel en/of personen binnen en rondom het burgerinitiatief.	☐	☐
5. Ik begrijp dat mijn deelname het bovengenoemde risico met zich meebrengt. Ik begrijp dat dit risico wordt geminimaliseerd door het anonimiseren van persoonlijke data en uitspraken die gedaan worden tijdens het interview.	☐	☐
6. Ik begrijp dat de volgende stappen worden ondernomen om het risico van een databreuk te minimaliseren, en dat mijn identiteit op de volgende manieren wordt beschermd in het geval van een databreuk: - Uw persoonlijke data wordt beveiligd opgeslagen waar alleen de onderzoeker er toegang toe heeft. - De audio opnames worden beveiligd opgeslagen waar alleen de onderzoeker er toegang toe heeft.	☐	☐
7. Ik begrijp dat de persoonlijke informatie die over mij verzameld wordt en mij kan identificeren, zoals uw naam en email adres, niet gedeeld worden buiten het studieteam.	☐	☐
8. Ik begrijp dat de persoonlijke data die over mij verzameld wordt, vernietigd wordt wanneer u dit verzoekt of wanneer de begeleidend wetenschapper (Dr. T. Hoppe) dit verzoekt.	☐	☐
C: ONDERZOEKS PUBLICATIE, VERSPREIDING EN TOEPASSING		
9. Ik begrijp dat na het onderzoek de geanonimiseerde informatie gebruikt zal worden voor de Master scriptie van K.C. Koop	☐	☐
10.Ik geef toestemming om mijn antwoorden, ideeën of andere bijdrages anoniem te quoten in resulterende producten.	☐	☐
11. Ik geef toestemming om mijn naam te gebruiken voor quotes in resulterende producten	☐	☐
D: (LANGE TERMIJN) DATA OPSLAG, TOEGANG EN HERGEBRUIK		

VINK ALSTUBLIEFT HET HOKJE AAN DAT VAN TOEPASSING IS	Yes	No
12. Ik geef toestemming om de geanonimiseerde data resulterend uit het interview en toegepast in de Master scriptie wordt gearchiveerd in de TU Delft Repositories opdat deze gebruikt kunnen worden voor toekomstig onderzoek en onderwijs.	☐	☐

Handtekeningen

Ik, **de deelnemer**, verklaar dat de informatie en het instemmingsformulier correct zijn voorgelezen, en dat ik de kans heb gekregen om vragen te stellen. Ik verklaar dat ik mijn instemming vrijwillig heeft gegeven.

_____ _____ _____

Naam deelnemer   Handtekening   Datum

Ik, **de onderzoeker**, verklaar dat ik de informatie en het instemmingsformulier correct aan de potentiële deelnemer heb voorgelezen en, naar het beste van mijn vermogen, heb verzekerd dat de deelnemer begrijpt waar hij/zij vrijwillig mee instemt.

_____ _____ _____

Naam onderzoeker   Handtekening   Datum

Appendix D: Results of the analysis of the municipality of Rotterdam with background information

Appendix D1: Results of the LCPA analysis of the municipality of Rotterdam.

Item	Score
Municipal organisation input	
Financial resources	+/-
Indicator: Degree to which the local government has budget available that can be allocated to circular economy policy capacity for social innovations.	Limited capacity financed. No financial coverage yet for RC during 2024-2046. RC relies on grants from Rotterdam's general sustainability fund (Duurzaamheidstransitie-budget) for financial means to support social innovations. However, they did receive this grant in December 2023. In addition, the municipality makes €3 million available every year for citizens initiatives in general through CityLab 010.
Fiscal health	++
Indicator: Information provided financial debts the municipality has on its annual budget, including information on municipalities being subjected to financial supervision by central government.	Rotterdam consistently maintains good fiscal health.
Size	++
Indicator: No. of inhabitants (with local government staff mirroring size in terms of inhabitants).	664,311 (2023)/12,314 (2022)
Municipal organisation throughput	
Political support	+/-
Indicator: Support among Aldermen for circular economy policy (with or without amendments).	Circular economy is a relatively low priority in the new coalition agreement. Primarily focuses on waste and materials. RC is continued but its plans and program are reevaluated.
Public leadership/" political will" to act/ local catalyst	++
Indicator: The presence of a catalyst.	Several catalysts were identified by respondents across different departments.

Inter-department coordination/ policy integration	+/-
Indicator: Degree of inter-department coordination on circular economy policy and actions regarding social innovations.	Civil servants reported inter-department coordination on circular economy policy and actions, but CCI respondents did not report to experience said coordination regarding social innovations.
Policy plan circular economy and social innovations (goals)	+/-
Indicator: Clearly defined, ambitious goals.	Rather vague goals that are somewhat ambitious.
Policy plan circular economy and social innovations (means/action plan)	+/-
Indicator: Sound, feasible action plan which clearly links goals, means and circular economy actions regarding social innovations.	Relatively sound plans with feasible means and actions that are clearly linked to the goals.
Commitment of staff implementing policy instruments regarding circular economy and social innovations	++
Indicator: Degree and type of personal commitment of the staff members to circular economy projects and actions regarding social innovations.	All CCI respondents report the commitment of staff among RC to be high.
Monitoring and evaluation	+
Indicator: Municipality monitors circular economy policy and performance thereof frequently and anticipates with feedback loop to policy.	Goals and means of RC were thoroughly evaluated around five years ago to better fit the needs of citizens. New evaluations are coming up. Regular evaluations of cooperation between RC and CCIs.
Municipal organisation output	
Policy instruments	+/-
Total of instruments.	Rather limited set of instruments.
Municipal governing by authority	+

Indicator: Interpretation of appliance characteristics governing mode to local governments' governing style (using regulatory instruments, economic incentives and contracting parties to govern by hierarchy).	Some financial incentives are provided.
Municipal self-governing	+
Indicator: Interpretation of appliance characteristics governing mode to local governments' governing style.	The municipality enacts CE actions themselves by influencing plans, designs, management and use of public spaces as owner and client.
Municipal governing by provision	+/-
Indicator: Interpretation of appliance characteristics governing mode to local governments' governing style.	The municipality is somewhat involved CE projects as a provider.
Municipal governing through enabling	+
Indicator: Interpretation of appliance characteristics governing mode to local governments' governing style.	Extensive support via civil servants, limited support via resources.
Outcome	
Citizen empowerment	+
Indicator: The municipality empowers citizens to pursue their goals related to CE through provision of accommodation, subsidies, legitimacy, and critical mass of membership.	The municipality does aim to facilitate the 'clean-up' days and pop-up shops where citizens can exchange items. Through the RC program 'Wij'k voor Wij'k' citizens are actively taught how to get involved into the CE transition. Also, neighbourhood councils are involved and supported to help citizens organise circular activities. Finally, citizens are encouraged to share their stories of living circular by starting a dialog between citizens in special meeting locations.
Transformative capacity enhancement	+

Indicator: The municipality actively enhances the transformative capacity of CCIs through the provision of resources and collective learning.	Resource provision was found to be rather low. The municipality provides limited subsidies, limited accommodation, however they do provide an extensive network to connect CCIs with. Collective learning was found to be present to a limited extent. RC runs experiments with CCIs. The municipality does learn from exchanges with peers but to a limited extent. Partly because they primarily exchange with departments of the municipality and partly because, according to RC, there are not a lot of peers (other municipalities) who run similar programmes. Also, regular evaluations were done with CCIs, no evidence was found for monitoring.
Cluster II: Characteristics of the local environment	
Demographic characteristics	+
Indicator: Income per capita, and percentage highly educated population.	Income: €29.035 (2022) / highly educated: 33,2% (2021)
Cluster III: the local action arena	
Support by local leaders/civic capacity	+
Indicator: Presence of local leader and organized citizenry who support circular economy actions.	Presence substantial civic capacity to enact circular economy actions. (via 'BlueCity').
Partnerships with private organisations	++
Indicator: Collaborative ties with local industry and local business firms to run circular economy actions.	Multiple collaboration ties with private organisations to run circular economy actions.
Cluster IV: external issue networks	
Collaborative ties with other local governments	++
Indicator: Degree of activity in inter-municipal/regional circular economy network(s)	Heavily involved in regional and national circular economy networks.

Involvement in/membership of circular economy issue network(s)	+
Indicator: The municipality is involved in national or international circular economy networks	Involved in national circular economy issue and lobby network, 'CircuLaw'.
Cluster V: influence exercised by higher government levels	
Alignment with agendas of higher-level governments	+
Indicator: Sharing vision, goals, and strategic plans by central and regional governments	Aligns with goals and plans of higher governments.
Cluster VII: intended CE action (output/projects)	
Kwartiermakers program.	+