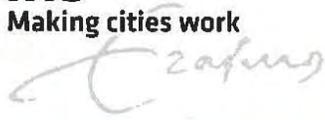


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of Erasmus University Rotterdam

MSc Programme in Urban Management and Development

Rotterdam, The Netherlands

September 2017

Thesis

Title: The influence of Network Governance on transition to circular economy in neighbourhood: The Case of EVA Lanxmeer and GWL Terrein in Netherlands

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Specialization: Urban Environmental Management and Climate Change

UMD 13

**MASTER'S PROGRAMME IN URBAN MANAGEMENT AND
DEVELOPMENT**

(October 2016 – September 2017)

**The influence of Network Governance on
transition to Circular Economy in
neighbourhoods: The Case of EVA Lanxmeer
and GWL Terrein in Netherlands**

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UMD 13 Report number: 1030
Rotterdam, September 2017

Summary

This thesis tries to understand and analyse the influence of network governance factors for transitioning to circular economy. The research is based in the Netherlands and adopts two case study neighbourhoods- EVA Lanxmeer in Culemborg and GWL Terrein in Amsterdam. The main objective of the research is to understand the prevalence of four main network governance factors which were selected after extensive literature review. These factors are studied from the perspective of their potential role for achieving the desired shift to circular economy. There is only one appropriate framework to measure Circular economy at the urban level, it is known as the ReSOLVE framework which was developed by the Ellen Mac Arthur Foundation. The research questions for this thesis are: What role does communication and cooperation play? What role can each stakeholder play in accelerating the transition? What kind of partnerships are being built between various stakeholders? What are the accelerators and barriers to transition? What role does trust play in a network? The research strategy was a multiple holistic case study approach and the data collection methods employed were semi structured interviews through snowball sampling technique. This technique was necessary since 'circular economy' is still a new area of expertise and the sample of respondents were selected as per the advice from the experts working in this area. In addition, secondary qualitative data was also sourced from basic document analysis (policy documents, regulatory frameworks, previous research and case studies). For analysis, Atlas Ti was used.

Analysis revealed that among the network governance factors, Actors and Resources and Collaborations played an important role in shaping both the development of neighbourhoods as well as in influencing the transition to circular economy. This is because the resident associations emerged as quite powerful in terms of resources and their influence on other actors. It was found that the factor 'Cooperation' was closely connected to the factor of Actors and Resources. This can be said because the resident groups were highly organised in terms of maintaining strong communication channels with informal internal networks of residents as well as external networks of other actors. Future circular and sustainable projects that are being planned in these neighbourhoods are being organised through these networks and groups with communication, partnership and trust emerging as other key factors. The study also revealed that the factor of social cohesion also plays an important role in these neighbourhoods. Social cohesion has an impact on building both cooperation as well as trust. This will continue to play a role for any future circular initiatives that maybe introduced in the neighbourhoods. The same can also be said for collaboration. Collaboration or partnership was foreseen as an important agent by each of the stakeholder reiterating the premise that: The multi-disciplinary nature of circular economy requiring action at multiple levels by all kinds of stakeholders. Lastly, the study also gained insights from various stakeholders on the perceived accelerators and barriers to transition to CE. The accelerators were listed as: Positive and innovative labelling, Consumer awareness, an ambitious government, cooperation between different actors, policy push, market. The barriers were listed as: Market not reflecting the true costs, Lock in periods of old legislations, Borders between various actors, Lack of funding for experimentation and innovation, Behavioral change and the fact that the tax burden needs to move away from labour on to resources.

Keywords

Circular economy, network governance, neighbourhood, sustainable, transition

Acknowledgements

When I started the journey for my thesis, the topic was exciting, yet an unfamiliar territory for me to explore. In this journey, there are so many people that I would like to extend my gratitude to. Beginning with my dear family and friends who were my pillars of strength and biggest motivators. Thank you to my mother and my sister for bearing with me and understanding the lost time that I could not spend with them while writing this thesis. I would like to next extend my gratitude and heartfelt thanks to my supervisor Dr. Alberto Gianoli who has offered me tremendous support and guidance throughout this journey. I am inspired by his patience and mentorship style. I would also like to thank the specialisation department of IHS- 'Urban Environmental Management and Climate Change'. During one of the several lectures we had, I got the eureka moment for my current thesis topic. Thank you for the inspiration.

Last but not the least, all my interviewees and reviewers who not only gave me their valuable time but also shared inspiring thoughts and experiences on the topic of Circular Economy, I am grateful to you all.

To the very unique batch of UMD 13, we made it!

Abbreviations

| | |
|-----|--|
| BEL | Bewonersvereniging EVA Lanxmeer |
| CE | Circular Economy |
| EU | European Union |
| EVA | Ecologisch Centrum voor Educatie, Voorlichting en Advies |
| GWL | Gemeente Waterleidingbedrijf |
| PVs | Photovoltaics |
| RE | Renewable Energy |

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Chapter 1: Introduction

1.1 Background

The concept of circular economy was first raised in 1989 by D.W. Pearce and R.K. Turner in their book 'Economics of natural resources and the environment'. It clearly depicted the biological cycle and a technological cycle. In the biological cycle, biochemical feedstocks are extracted from renewable resources and used and restored in a system mimicking the earth's biosphere. In the technological cycle, industrial products and materials are circulated in the system by maximising their productive use and reuse (VITO, 2017). The attention for circular concepts gained momentum with the introduction of cradle to cradle philosophy in the year 2002. In today's time, globally speaking, 'circular economy' (CE) principles are being adopted by businesses and governments as a route to resource efficiency, in response to rising prices of materials and also as a response to better preparedness in the face of climate change (Prendeville, Cherim, et al., 2017a). In 2010, the Ellen Mac Arthur Foundation created a fresh push for circular economy. Although, the origin of Circular Economy lies in industrial ecology, it is now being applied to cities through the lens of urban metabolism studies (Caputo, Pasetti, et al., 2016, Mostafavi, Farzinmoghadam, et al., 2014, Pinho, Oliveira, et al., 2013, Kalmykova and Rosado, 2015).

When looking at the building blocks of cities, i.e. at the neighbourhood level, many of today's sustainable neighbourhood development frameworks reflect principles of reducing greenhouse gas emissions and improving resilience to climate change threats. While the sustainable city initiatives generally aim to improve the environmental, economic and social conditions of the city and those living in it, they are variously framed according to a diverse and growing list of categories, including for example "eco cities", "liveable cities", "green cities", and "smart cities" (Holden, Li, et al., 2015). The concept of 'sustainable cities' is also closely proposed in response to the environmental degradation and climate change pressures (Hall, 1988, Haughton and Hunter, 2004, Coaffee, 2008). One of the key principles of both sustainable and resilient cities is resource efficiency, which is considered an important principle of circular economy (Murray, Skene, et al., 2015). There is increasing recognition that "*Delay in transition to more sustainable and resilient cities and regions will be reflected in future cost: to the environment, the economy and social well being*" (Pearson, Newton, et al., 2014). In this context, scholars propose a shift from linear economy to circular economy. There is also an important realisation that achieving urban sustainability and principles of circular economy is a multi-governance challenge that would require support from various actors/stakeholders and multiple agencies. Conversely, the capacity to engage a multitude of stakeholders is also seen as an opportunity and in line with the sustainability targets of several cities. This calls for an understanding on the role of multiple stakeholders and raises the question: To what extent is the shift towards circular economy is being observed in our neighbourhoods and cities? What factors will govern this transition? The study of network governance holds promise in answering these questions by allowing us to understand the dynamics of the networks that operate within this context. The overall framework and theoretical context of Network Governance field of studies can help in understanding the factors that are hindering or accelerating this transition. Simultaneously it provides an opportunity to gain understanding of what a potential future circular city constitutes.

1.2 Problem Statement

Globally, ‘circular economy’ (CE) principles are being adopted by businesses and governments as a route to resource efficiency, in response to rising prices of materials and also as a response to better preparedness in the face of climate change (Prendeville, et al., 2017a). In Europe, the European Union (EU) Commission published a circular economy package for taking forward EU initiatives that support the transition to a circular economy, engaging a range of stakeholders across sectors, value chains and countries both within the EU and internationally. Meanwhile in the Netherlands, the government has set ambitious climate goals, local authorities are working on sustainable neighbourhoods and principles of circular economy are being actively developed in several cities. For instance, the mission of the Metropole region of Amsterdam is to achieve an “international outstanding position as a circular resources hub of Europe by 2020” (Cramer, 2015).

Despite this momentum, though, the shift towards circular economy seems to be at a nascent stage. Despite policy support and an overall regional framework provided by EU and at the global level, the shift being demanded and driven through agencies like the Ellen Mac Arthur Foundation, bottom up planning approaches seem to be missing. The Dutch Working Group on Sustainable Urban Development has proposed a new approach to incorporate eco-effectiveness in sustainable urban design and to extend this as a natural approach to spatial planning at all levels (Meijer, Adriaens, et al., 2011). The proposed research aims to understand the factors that are currently operating and will have a role to play to achieve the desired shift to circular economy. The unit of analysis is at the neighbourhood level.

This research is pertinent in terms of defining how transition to circularity can be operationalized from the bottoms-up perspective. The proposed study will provide insights to the proponents of circular economy- including the policy makers on which area to focus their interventions on and which networks / actors to utilise for achieving their goals, treating neighbourhoods as the functional units.

1.3 Research Objectives

The main objective of the research is to identify the network governance factors that are currently operating and will have a role to play to achieve the desired shift to circular economy.

Additionally, the study seeks to examine the following:

- 1 What type of network operates
- 2 What role each stakeholder plays
- 3 What is the relation between them
- 4 What kind of partnerships are being built
- 5 How effective are these networks

The research goal is to understand how networks operate or are successful in neighbourhoods the area of circular economy in terms of:

- Mobilizing action from decision makers/city mayors

- Attracting finance for developing projects
- Peer to peer learning or exchange
- Increasing civic participation/ increasing awareness of stakeholders

1.4 Provisional Research Question(s)

What are the factors governing the transition or acceleration to circular cities/circularity by analysing the case of EVA Lanxmeer neighbourhood in Culemborg and GWL Terrein neighbourhood in Amsterdam

Sub questions:

What role does communication and cooperation play?

What role can each stakeholder play in accelerating the transition?

What kind of partnerships are being built between various stakeholders?

What are the accelerators and barriers to transition?

What role does trust play in a network?

Box 1: Dependent and Independent variables of the study

Dependent variable: Transition to circular state

Independent variable: Network governance factors that shape the transition towards circular economy in neighbourhoods

1.5 Significance of the Study

This research is pertinent in terms of defining how transition to circularity can be operationalized from the bottoms-up perspective. The proposed study will provide insights to the proponents of circular economy- including the policy makers on which area to focus their interventions on and which networks / actors to utilise for achieving their goals, treating neighbourhoods as the functional units. It is envisioned that the study shall provide insights to proponents of circular economy on approaches for identifying which arenas the initiator of a decision making process needs to focus upon in order to accelerate the transition. The analysis through the lens of network governance will provide an overview of how multiple actors function in a neighbourhood space and nature of resources and interactions between them. The study is also relevant in the given scenario of the global commitments of nations towards the Sustainable Development Goal 12 on sustainable consumption and production and Goal 11 on making cities resilient and sustainable.

1.6 Scope and Limitations

The concept of circular economy has been applied at a sectoral level. There are few examples of neighbourhood or city level cases. The cases which are available like that of Buiksloterham neighbourhood in Amsterdam are still in transition phases and full implementation of circular economy has not been achieved. Existing neighbourhoods like EVA Lanxmeer in Culemborg do display these characteristics relevant for the study, however, they were originally not planned to follow circular economy principles since it's a relatively newer concept (they were termed sustainable back then). The study will therefore have to balance and take care of the context in which these neighbourhoods were developed and then carefully select case studies. Finding empirical data is foreseen as another limitation as these concepts are still in early development stages. The study will thus heavily rely on insights from the subject experts- practitioners and academia.

Chapter 2: Literature Review

The chapter provides a detailed literature review on the theory of network governance and the broad range of concepts within it. This discussion is important to provide the theoretical context for the study. Since, it is not possible to study all the concepts under network governance, the selected concepts for study have been presented at the end of the chapter in the conceptual framework for this study. Since the objective of the study is to study the influence of network governance on transition to circular economy in the urban context, the chapter also provides an overview of the concept of sustainable neighbourhoods. The origin of concept of circular economy has also been highlighted and the literature on ways of measuring circularity at the city level has been discussed. The discussion also includes the examples of policies adopted for circular economy transition.

2.1 Why the study of network governance?

Current governance practices in cities across the world are characterised by collaborative models of partnerships with civil society and business actors. Especially in the field of urban climate politics and environmental sustainability, this is true due to the increasing realisation of the limited control that the local governments have (Betsill and Bulkeley, 2007). In several instances, cities often act in the set-up of a multi-level governance climate where there is certain level of dependency of local decision makers on both higher political levels and other actors in society. “This dependency has translated into the paradigm of ‘Network governance’ which has emerged as a promising ‘new mode of governance’ where cities can increase both the legitimacy and implementation capacity of an ambitious climate agenda.” (Khan, 2013). “In network governance the municipality is a facilitator rather than commander and implementer” (Khan, 2013). It is recognised that in order to realise and maximise the benefits of a circular economy, the involvement of several actors from different sectors will be required, such as the private sector, citizens, academia and research agencies as well as government officials and policy makers. This cooperation, coordination between these network of actors is crucial to understand the acceleration towards a circular state. This collaborative approach is achieved through instruments like coordination, communication, shared decision making, negotiation, resource sharing.

There is a need to study this mix of complementary instruments and approaches which can be taken forward by actors at different levels from the private sector, to individuals and public. The network governance research allows the study of these interactions and is empirically oriented. The study of functioning and implications of interactive forms of network governance carries an explanatory ambition. “Studying the dynamics and structure of network governance thus enables understanding whether this mode is legitimate and effective and can be insightful in terms of understanding what governance configurations are needed to steer towards a particular goal” (Sørensen and Torfing, 2007c). “Governance involves the formulation and implementation of collectively binding decisions through the participation of state and non-state actors in public/private networks” (Börzel and Panke, 2007). Keeping this view as central, network governance can be viewed as ‘governance without government’ which scholars have referred to as ‘cooperative’ or simply ‘new’ (Börzel and Panke, 2007). Due to the multi-disciplinary nature of the current circular economy study and in order to understand the multi-actor set up, the lens of network governance is thus being applied. For instance, one way is to measure the actor and their

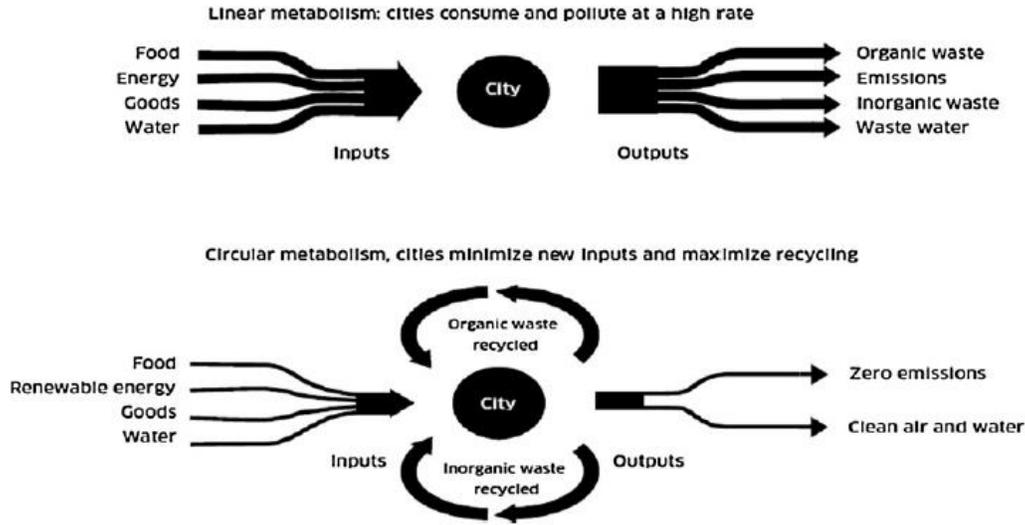
resources for transitioning to a circular economy. Most importantly it offers important opportunities for theoretical and methodological development, and for the generation of new knowledge with both academic and policy relevance which is very much needed in the area of circular economy.

2.2 The concept of sustainable neighbourhoods

When we define sustainable neighbourhoods, the principal and substitutable concepts that emerge are ‘sustainable’, ‘smart’, ‘resilient’ ‘liveable’ (Holden, Li, et al., 2015). These are often used interchangeably and are “informed by an overarching common understanding of urban development and regeneration which seeks to interrelate social, economic and environmental dimensions in a balanced and mutually beneficial way” (de Jong, Joss, et al., 2015). The concept of ‘liveable’ city on the other hand is defined as “bringing community together for healthy living, enhance their interaction among themselves and surrounding environment and promote their productivity and wellbeing in a sustainable way” (Maheshwari, Singh, et al., 2016) (Barton, 2000).

The literature on sustainable neighbourhoods outlines these features mentioned above as well as criteria that define ‘sustainability’ in these areas. These include aspects on size and densities, mobility, walkability as well as other transport planning aspects, location and accessibility of various infrastructure assets, social interactions and functional spaces for the same, safety aspects and existence of green spaces among others (Choguill, 2008). This overall understanding is useful to highlight and then looking at the study area in Netherlands, it is observed that the discourse on sustainable neighbourhoods emphasises on support for sustainable urban design and topics like liveability and clean energy attract considerable attention. The Dutch Government has in fact set ambitious climate goals and local authorities are working towards developing sustainable neighbourhoods. This reflects for instance in plans like: ‘Randstad in 2040’ and a ‘Second Delta Plan’ for climate proof water management (Meijer, et al., 2011). Additionally, the Metropole region of Amsterdam has adopted the mission to achieve an “international outstanding position as a circular resources hub of Europe by 2020” (Cramer, 2015). Circular economy is often applied to cities through the lens of urban metabolism studies (Caputo, et al., 2016, Mostafavi, et al., 2014, Pinho, et al., 2013, Kalmykova and Rosado, 2015). Figure 1 compares the linear vs circular metabolism approach translated to the city level.

Figure 1: Linear vs Circular metabolism in cities



Source: Sustainable Urban Design, The Next Step. After: Rogers et al., 1997, Cities For a Small Planet, Faber

2.3 The transition towards circularity and circular neighbourhoods

The transition to a circular economy is often recognised and cited as a multi-level governance challenge, which requires actions at various levels. For instance, in this case at the level of European Union (EU), Member State, local authority, private sector, citizens. Therefore, there is a need to understand and identify priority areas for action at different governance levels and hence the study of network governance becomes pertinent in this direction.

The European Commission has highlighted that in order to transition into a circular economy, there is a need for policies that function by way of: supporting existing initiatives (by revising existing policies, removing barriers); building on current efforts on waste management and recycling to support other loops in the circular economy (i.e. expanded reuse, remanufacturing and refurbishment); providing support for bottom-up initiatives; developing skills and providing incentives for innovation and developing closer collaboration between actors along the entire value chain (Bicket, Guilcher, et al., 2014). Furthermore in order to ensure the overall coherence of policy initiatives, there is a need to explore interactions, synergies and potential trade-offs between the circular economy and other related policy initiatives on areas like resource efficiency, bio-economy, green economy, dematerialisation etc. In this direction, the European Commission in 2015 had published a ‘circular economy package’ which includes a framework for taking forward EU initiatives that support the transition to a circular economy. The package focuses on engaging a range of stakeholders across sectors, value chains and countries both within the EU and internationally (Bicket, et al., 2014) .

Network governance analytical approaches allow the study of these dynamics in order to draw inferences for potential policy actions and incentives required for steering in the direction of achieving circular economy. Some of the policy actions as outlined by EU include regulatory measures, economic incentives, targeted and increased funding, efforts to engage and link actors along the value chain and initiatives to raise awareness of the benefits of the circular economy and available solutions (Bicket, et al., 2014). Box 2 depicts some of the instruments being adopted by the EU circular economy package.

Box 2 : Types of instruments that can be employed: Analysis of the recently published EU circular economy package

- New regulations: Strengthened or new targets (e.g. new targets on food waste), restrictions or bans (e.g. on landfilling of plastics or recyclable materials, on the use of certain toxic chemicals, coupled with strong legislation on energy recovery to avoid incineration).
- Mandatory requirements: Examples include mandatory phosphorous recovery from sewage sludge, development of action programmes to tackle food waste, mandatory requirements for the separation of waste.
- There is also a need to develop adequate indicators that show progress towards a resource-efficient economy, thus providing insights, raising public awareness and support for relevant measures.
- Fiscal reform to change incentives at different points in the value chain – i.e. upstream for materials inputs (e.g. resource pricing, cost recovery), product charging (e.g. deposit-refund schemes), waste charging (e.g. greater use of PAYT for household waste)

Source: (Bicket, Guilcher, et al., 2014)

2.4 The network governance analytical approaches

The theoretical context for this research is provided by the Network Governance Theory. Usually, in network analytical approaches, the main objective is either to: “describe, explain, or compare relational configurations or to use these configurations to explain certain outcomes; whether or not the way an actor is embedded in a network has an effect on the outcomes of the actor (such as level of innovation, performance, and learning)” (Provan and Kenis, 2008).

The concept of network governance enables to understand the needs for communication and interaction across formal organizational boundaries of political parties, administrative agencies, interest organisations, private enterprises, local governments and citizen movements. “These interactions may be seen as responses to demands for in-depth information, needs for personal contacts between decision makers, calls for citizen involvement in cases of local importance, and demands for uses of the third sector to make room for alternative solutions to those of the public sector, various other public-private partnerships and so on” (Bogason and Zølner, 2006).

The networks are a set of actors, also known as nodes, with relationships between these nodes as being either present or absent. Thus, networks are considered to vary with regard to their structural patterns of relations. “Network effectiveness is defined as the attainment of positive network level outcomes that could not normally be achieved by individual organizational participants acting independently” (Provan and Kenis, 2008). There are various ways of measuring the successful adoption of a particular form of governance. One approach suggests four key structural and relational contingencies: trust, size (number of participants), goal consensus, and the nature of the task (specifically, the need for network-level competencies) (Provan and Kenis, 2008).

Government and Governance

Government is defined as the formal state institutions that are often divided into legislative, executive and judicial branches and unified by their joint monopoly of legitimate, coercive power. Conversely, the term governance is defined as “deliberate attempts to govern particular policy areas through negotiated interaction between a multiplicity of actors, processes and institutions” (Marcussen and Torfing, 2007).

Governance networks are central to studies of policy making, participatory governance and institutional reform. The actual functioning of governance networks helps to explain policy outcome and helps in understanding the relation between effective and democratic governance. However, governance networks are not always featured as the independent variable. Literature

suggests that sometimes they also feature as the dependent variable, particularly in studies covering the impact of wider societal changes, or of deliberate attempts to regulate the self-regulating network processes through different forms of meta-governance. In other studies, governance networks are simply seen as the medium of power struggles, exchange of resources or the exercise of leadership (Marcussen and Torfing, 2007).

Origins in theory

There are two separate traditions in the area of Network Analysis. First, the Social Network Analysis, which is primarily practiced by American social scientists while applying quantitative research methods. It emphasises the network attributes of actors and/or their structural position in larger networks (Dryzek, 2007). The second tradition is called 'Policy Network Studies', which is primarily a European phenomenon which emphasises upon the economic and political resources that actors bring to networks, interdependence between these network actors, as well as the larger institutional context in which the network negotiation takes place.

In the field of policy network studies, governance networks have been defined as: "relatively stable horizontal articulations of interdependent but operationally autonomous actors interacting through negotiations taking place within a relatively institutionalized framework, which is self-regulating within the limits set by external agencies and which contribute to the production of public purpose" (Esmark, 2007). In Social Network Analysis, networks are defined as "lasting patterns of relations among actors, or simply as the relational structure of social life." Thus the analytical focus is on the nature of the relationships between actors and their relative position within the larger structure of information and resource flows (Esmark, 2007).

Governance networks engage private players, public and civil society actors at national, regional and local scales in shaping the future of our societies. Governance networks may fail, but network management can more often than not help in mitigating the risk of failure, enabling governance networks to achieve desired outcomes in terms of more effective and democratic governance and more innovation policy making. The current research follows the Policy Network stream of studies since it primarily engages with the process of networking by studying the many kinds of resources that network actors carry with them into governance networks and upon which others may be more or less dependent. They also attempt to trace and decipher the negotiations among network actors and how the institutional context simultaneously enables and constrains this interaction. This is relevant in the current case for understanding the factors leading to achievement of circularity in the neighbourhoods.

2.6 The elements for study in Network Governance

The shift towards network governance is described by the increasing policy dependency of governments on other actors which is derived from the complexities of modern societal problems and the notion that states have ceded power to other levels and actors (Koppenjan, 2007).

Network governance includes a broad range of organizational forms from public-private partnerships and stakeholder participation to informal and personal interactions between various individuals. As per the literature, actors have various motives for joining the network and differing opinions on the preferred outcomes. Interdependency between actors does not exclude

asymmetrical power relations. Infact, the interdependency between actors implies that it is difficult for policy makers to use networks as an implementation mechanism. Instead policy implementation is carried out as a process of deliberation and bargaining where actors “implement measures only to the extent that they perceive that it is beneficial to their own goals.” (Koppenjan, 2007). By raising the question of who were involved in the decision making process that produced a particular outcome, one can identify a network of social and political actors (Sørensen and Torfing, 2007a). Infact, network governance studies allows us to explore beyond this, including what role does each stakeholder play in a network and other factors that this study chooses to focus on, as explained in the following sections.

Complexity and decision making in network

The increasing pressure to search integrated solutions to complex societal problems has the consequence that governance networks attract actors from different backgrounds and in some cases different networks (Börzel and Panke, 2007). This leads to challenges since developing and implementing solutions to complex problems requires both that actors are brought together and that institutionally separate policy arenas become interconnected. In this context, it is important to study how are the current operating networks hindering or aiding the transition towards a circular economy. The study of the shortcomings or the opportunities can help the policy makers and decision makers in steering the policy path ahead.

Study of interactions

The complexity of the decision making process is primarily due to the fact that there are a large number of actors involved, with differing strategies and unpredictable interactions which is known as strategic uncertainty. This is further intensified by other factors such as actors having differing perceptions and thus different views of the nature of the problem and the solutions (i.e. uncertainty about content) (Börzel and Panke, 2007). The complexity of the process can therefore be analysed by focusing on the actors, the arenas where the decisions are made, and the networks in which the arenas are positioned. This perspective enables decision making to be perceived of as a game being played in an arena where several actors bring their strategies. Policy outcomes are therefore the consequences of interactions between different actors and their strategies. The insight this inference provides for this study is that it makes it possible to identify which arenas the initiator of a decision making process needs to focus upon. It is possible to identify the connections the initiator needs to make in order to ensure a valuable process that can produce worthwhile results for the actors involved. Since studying the arenas and games of various actors could not be included as part of the scope of this study, the study will instead focus on actors, resources and the interactions (Described in Section 2.9)

Mechanisms of Governance Network Formation

The basic premise is that “governance networks are products of interactions among more or less rational actors that invest in institutional arrangements to improve their capacity to implement various policy ideas” (Hertting, 2007). As per literature, the specific arguments around network formation mechanisms are organised around three related questions:

What are the contextual incentives for network formation?

What strategic calculations and choices should we expect of the single interdependent policy action?

And finally, what interactions or games should we expect to support or constrain the formation and institutionalisation of governance networks?

It is argued that the network formation is easier when the actors share a mutual understanding and shared perception of a policy problem. However, it is observed that a completely shared understanding of the cause and effect relations is not necessary to the emergence of governance networks. For instance, the actors may recognize and agree about the existence of interdependencies without sharing specific beliefs about the issue itself. Literature cites this as one of the characteristics of issue networks as opposed to policy communities (Hertting, 2007).

Co-operation and trust

The policy network approach has its own, distinct theoretical framework and has its basis around the idea that “policy is made in complex interaction processes between a large number of actors which takes place within networks of interdependent actors” (Koppenjan, 2007)). A key feature of networks is that actors are interdependent and they do not execute their decisions alone. Co-operation and trust are thus essential traits of network governance. Literature suggests that ‘Rules’ develop which govern the behaviour of actors and resource distribution in the network which also influences interactions within networks. Whats important to note is that these actors are mutually dependent and so policy can only be realised on the basis of co-operation. This cooperation, however, is neither simple nor spontaneous, and it requires types of game management and network constitution. In these games, each actor has its own perceptions of the other actors in the network, nature of the problem as well as the desired solutions. On the basis of these perceptions, the actors select strategies. The outcomes of the game are a result of interactions of strategies of different players in the game. These strategies are influenced by the perceptions of the actors, the power and resource divisions in the network and the rules of the network. (Koppenjan, 2007))

Network Management

Actors need to co-operate for achieving satisfying outcomes which are dependent on distribution of resources that are quantified in terms of costs and benefits of a solution. “Policy is made and policy processes take place in the tension between dependency and diversity of goals and interests. And while this tension can be to a large extent regulated by the rules and resource distribution in the network, the tension will still exist and needs to be solved in any policy game” (Koppenjan, 2007).

This then brings focus on steering of complex games in networks in order to achieve co-operation and collaboration of goals and interests. These steering strategies are what is known as ‘network management’, and is mainly focused on the improvement of co-operation between various actors (O’Toole, 1988). The assumption is that without network management, satisfying outcomes for actors are not possible to achieve. “Network management is thus an independent variable in the development of policy processes” (Klijn and Koppenjan, 2006).

The literature on the network approach explicitly mentions that network management is not an easy task but requires numerous skills including negotiation skills since network management

strategies are organised in a situation of mutual dependency. Thus “a network manager is not a central actor or director, but rather a mediator and stimulator” (Forester, 1989). This role is sometimes not necessarily intended for only one actor. Even though public actors often assume the role of network manager, other actors can also do so. The strategic positions of actors and the (behavioural) rules in use in the network determines which actor fulfils the role of a network manager (Ostrom, 1986, Burns and Flam, 1987 cited in Koppenjan, 2007).

The literature on network management makes distinction between two types of network management strategies: process management and network constitution. In Process management, the objective is to improve the interaction between actors in policy games. This may include steering strategies like:

- The improvement of mutual perception about an issue or solution; in a situation where the actors have different perceptions on the problems and solution. Network management is aimed at creating a minimum convergence of perceptions and at creating goals acceptable to all actors;
- The creation of temporary organisational arrangements between organisations; because coordination between different actors is not secured, organisational arrangements have to be created to sustain interactions and co-ordinate strategies

Contingent consent

Literature for network approaches also focuses on: how concerted action is established around a concrete issue (Hertting, 2007) . This ‘contingent consent’ is made possible through interdependencies. This implies that if interdependent actors believe that they will need efficient channels for resources and control exchanges in the future they can make their cooperative strategies contingent on cooperative responses. Consequently, governance networks and generalised trust are seen as the outcomes of such a contingent cooperation. Literature suggests that governance networks are preferred over more formal institutional arrangements because they make cheap exit strategy possible. In informal institutions actors can easily withdraw their institutional consent in cases where others do not ‘deliver’ (Hertting, 2007). Given the dependency of actors on each other’s resources, policy can only be established once the actors make their resources available (Sørensen and Torfing, 2007a)

Network constitution

The concept of Network constitution focuses on realising changes in the institutional characteristics of the network. These strategies are time consuming since they seek institutional change. As a result, they are usually not suitable for influencing policy games that are already underway. Literature lists out following Network constitution strategies:

- Changing the position of actors or the introduction of new actors; introduction of new actors in the network can bring new perceptions but can also change current positions of power and regularities in interaction;
- Changing the rules (for instance those that regulate access to a process) (Ostrom, 1986); This change can lead to different patterns of interactions of frames. For instance, changing conflict regulating mechanism can lead to other strategies and interaction patterns since actors want to avoid binding conflict resolution
- Reframing (i.e. fundamentally altering ideas about the functioning and the substantive problems of the network) (Rein and Schön, 1992); this is observed as starting radical

changes in perceptions on sectoral problems or ways of doing. Mostly central government tries to achieve this by radical system changes, but sometimes actors within networks themselves try to achieve this.

Actors and Resources

Two characteristics as being constitutive of networks, the first relates to the equal involvement of public and private actors (structure), and second refers to the mode of non-hierarchical coordination (process). In networks, public and private actors enjoy equal status despite the distribution of financial, material, or ideational resources being unequal. Public actors may have the power to levy decisions on private actors and private actors may offer information, expertise, financial resources or political support to public actors. In exchange, private actors receive substantive policy influence since public actors do not usually adopt and implement policies against the interest of the private actors involved (Börzel and Panke, 2007).

One of the stages of network governance studies involves identifying: Who are the most important actors in the policy game and what subsets can be recognized? This step is related to the identification of the central players in the game (Laumann and Knoke, 1987; Bryson and Crosby, 1992 cited in (Koppenjan, 2007). Actors might have interests or power positions, but are not always actively involved in the game. Literature points to various approaches that can be adopted in network analytical studies:

- What decisions are made at which locations? By analysing the decisions central to the issue, one gets an idea as to whether these decisions are made in the same places or in different places. This step also determines whether different subsets of actors are involved in certain decisions. These subsets may refer to possible arenas.
- Where are actors coming from and which issues concern them? This analysis contributes to identifying the background of actors, their interests, substantive interests, etc. The result will also point out towards what clusters of actors have the same background, and provides the opportunity to observe whether these actors are part of the same arena.
- What organizational arrangements exist to structure the interaction of these actors? Are these linked to each other (for instance, through formalized decision-making procedures or by overlapping memberships of actors)? This concerns the concrete arrangements that are important to the game or even specially designed for the game and are, thus, temporary in nature. (Koppenjan, 2007)

Assessing network based collaboration

Co-operation is the most common and widespread feature of networks, and can usually be found where the work is task-focused, short-term, where participation is voluntary and participants maintain their organizational identities and they are not forced to merge their independent goals and objectives. Co-operative activities, if successful, can give participants an appetite for more ambitious projects. More complex projects may require co-ordination among network participants, with some form of joint planning and a medium-term work programme depending on the previous history of working relationships. There may be a higher level of stability and formality among the membership, and agreement on a central co-ordinating function, often supplied by government. In contrast, collaboration is restricted to describing robust longer-term multi-stakeholder commitments. These usually occur when the members become more closely linked and connected;

“where the members recognize they must extend themselves beyond their familiar home-base roles and functions, and begin to create new roles and functions that are specific to the collaboration. There is a genuine inter-dependence, and there is a genuine sharing of power, risk and reward”(Wondolleck and Yaffee 2000; Mandell 2001; Brown and Keast 2003; Keast et al. 2004; Huxham and Vangen 2005 cited in Head, 2008).

In collaborative networks, patterns of stakeholder interaction may vary extensively. Such networks sometimes develop in a ‘bottom–up’ manner, with participants agreeing to work together in a more intensive manner over time. In practice, some collaborations are exclusively composed of non-government members, for example, various firms intensively linking within the business sector (Ebers 1997 cited in Head, 2008), or social innovation ventures that encompass business, community, research and not-for-profit sectors (Austin 2000 cited in Head, 2008). The performance of such a ‘bottom–up’ network will be measured by its members through a range of perspectives: for example, has the network helped the organization accomplish its own goals? Has it helped in facing problems or undertaking bold initiatives that could not have tackled alone? The expectations and aspirations of network members may change over time, along with fluctuating perceptions of success, and membership may expand or contract diminish in accordance with the changing aspirations.

Trust in networks

Many scholars argue that trust has a beneficial impact on cooperation in network alliances and that actors in alliances cannot rely merely on contracts. On the basis of the available literature, trust can be defined as a “stable positive expectation that actor A has (or predicts he has) of the intentions and motives of actor B in refraining from opportunistic behavior, even if the opportunity arises” (Edelenbos & Klijn, 2007 cited in Klijn et al, 2010). This primarily means that trust is based on the expectation that actor A will take the interests of actor B into account.

Thus trust, enables making risky choices. A conscious choice is made by one or several parties to take a risk, because of the belief that the other party can be trusted. The assumption as cited in most of the literature on trust is that actors will refrain from action (and cooperation) if trust is absent (Klijn et al, 2010). Another argument is that trust increases the probability that actors will invest their resources, such as money, knowledge, finance etc. in cooperation, thus creating stability in the networks and in the resulting relationships that provide a stronger basis for cooperation. Therefore, the study of the factor cooperation should also be supplemented by the study of the factor trust.

However, it is extremely difficult to measure trusts especially while capturing subjective qualitative data. The closest that literature comes to measuring trust in networks is by way of analysing and then categorising the captured information into various types of trust, as follows (Klijn et al, 2010):

1. Agreement trust: The parties in this project generally live up to the agreements made with each other which might be contractual or formal
2. Benefit of the doubt: The parties in this project give one another the benefit of the doubt
3. Reliability: The parties in this project keep in mind the intentions of the other parties
4. Absence of opportunistic behaviour: Parties do not use the contributions of other actors for their own advantage

5. Goodwill trust: Parties in this project can assume that the intentions of the other parties are good in principle

What role should government play

In many other cases, however, government agencies play significant roles in collaborative networks. For example, a public agency may initiate or fund a network. The role of government members when playing a funding and steering role, can significantly influence the dynamics of the network. Indeed, some scholars suggest that the role of ‘network manager’ is appropriately undertaken by a public agency, given the democratic legitimacy and resources of the state, whereas others urge on a larger role for community actors for power-sharing and democratic participation (Sørensen and Torfing, 2007a).

While confronted with network like situation, governments may choose among the following options (Sørensen and Torfing, 2007a) :

Table 1: Options of roles for government

| Roles | Implications |
|--|---|
| Not joining the network games instead imposing their ideas and goals on other social actors | This role requires huge investments in decision and implementation activities given the existing dependencies and the need for breaking the hindrance power of opponents. The risks are high which raises questions like: is there sufficient and stable political support for such a strategy? How sure can one be that the goal attainment means effectiveness and efficiency, given the imperfect information base of the policy and the strategical behaviour of target groups? What does this mean for the relations with parties on which governments rely dependent on in parallel and future arenas? |
| Perform their tasks in co-operation with other public, semi-public and private actors. | In this case it may happen that not every form of co-operation is acceptable or tolerable. For instance, hierarchical supervisory relations between public actors may limit the possibilities of horizontal co-operation. |
| Taking up the role of process manager- facilitating interaction processes aimed at the resolution of certain problems or the realisation of projects | There are trade offs in being a process manager and it might become hard to protect public interest, safeguard democratic values while performing the role of an unpartisan process manager. |
| Taking up the role of network builder | The strategies aimed towards changing network features have to be realised in the games themselves and need to be negotiated with other parties involved in order to achieve stable network changes. These changes cannot be accomplished instantly. This implies that network constitution is not instrumental to the realisation of substantive government goals in concrete games that are going on |

Collaboration

The potential membership of a collaborative network might be quite vast. Literature suggests that network dynamics are greatly impacted by the range and diversity of interests represented, their skills and knowledge as well as the resources they can mobilize (for their own organization and for the collective), and their previous histories of interaction and relationships (Head, 2008). Collaborative governance is a formal activity that “involves joint activities, joint structures and shared resources” (Ansell and Gash, 2008). Collaborative engagement in planning, policy and programme development requires attention to skills, capacities and trust-building processes.

Hence, it is argued that capacity-building and confidence-building are necessary for all the sectors – governmental, business, community and research – if network collaborations are to be well grounded and more successful (Ansell and Gash, 2008).

2.7 Circular economy

“The Circular Economy is an economic model wherein planning, resourcing, procurement, production and reprocessing are designed and managed, as both process and output, to maximize ecosystem functioning and human well-being” (Murray, Skene, et al., 2017) .

As our resource consumption and dependence continues to rise and our growth threatens to affect our production efficiency efforts, governments and companies have started looking at the circular model not only as a measure against resource scarcity but as an engine for innovation and growth (EMF, 2013). The idea of the “circular economy” derives its root from industrial ecology. It is derived from various schools of thoughts including the cradle-to-cradle approach mostly used with respect to the waste management and recycling sector. Only recently the term has also gained recognition in the business industry, policy advocates and also governments , especially China and Europe.

The circular economy builds on Industrial Ecology's concepts for the analysis of industrial systems operation or industrial metabolism and “optimization scaling them up to an economy wide system to establish a new model of economic development, production, distribution and recovery of products” (Ghisellini, Cialani, et al., 2016).

Translated to the city scale, circular economy development explores the integration and the redesign of four systems: the industrial system (e.g. changing the size of companies from small to large or the phase-out of the heavy polluting enterprises in favour of light economic activities as related to high-tech industries, tourism or culture) the infrastructure system delivering services (transportation and communication systems, water-recycling systems, clean energy and electrical power lines, etc.), the cultural framework and the social system (Ghisellini, et al., 2016).

Origins

“The concept of a circular economy has its conceptual roots in industrial ecology, which envisions a form of material symbiosis between otherwise very different companies and production processes” (Andersen, 2007). This includes efforts like recycling residual waste materials and by-products, resource minimisation and the adoption of cleaner technologies.

Box 3: Circular economy model

The circular economy model promotes the resiliency of resources. It aims to replace the traditional linear economy model of fast and cheap production, disposal with the production of long lasting goods that can be repaired and easily dismantled and recycled. A model of production based on a circular economy thus in principle seeks to extend the useful life of the product, i.e., delay its end-of-use. It favours the possibility of repair, refurbishment and reuse of products before their actual end-of-life (when it will be recycled into materials that become raw resources for newer goods). The circular economy model aims to match processes similar to those that occur in our natural environments, where little is wasted and most is recuperated by other species. Competition and cooperation among species occurs in nature, there by maintaining the efficiency of natural ecosystems and certainly providing flexibility and adaptability. Applying this metaphor to economic systems helps to ensure healthy competition and maximum efficiency of usage of available resources (Geng andDoberstein,2008).
(Sauvé, Bernard, et al., 2016) pg53

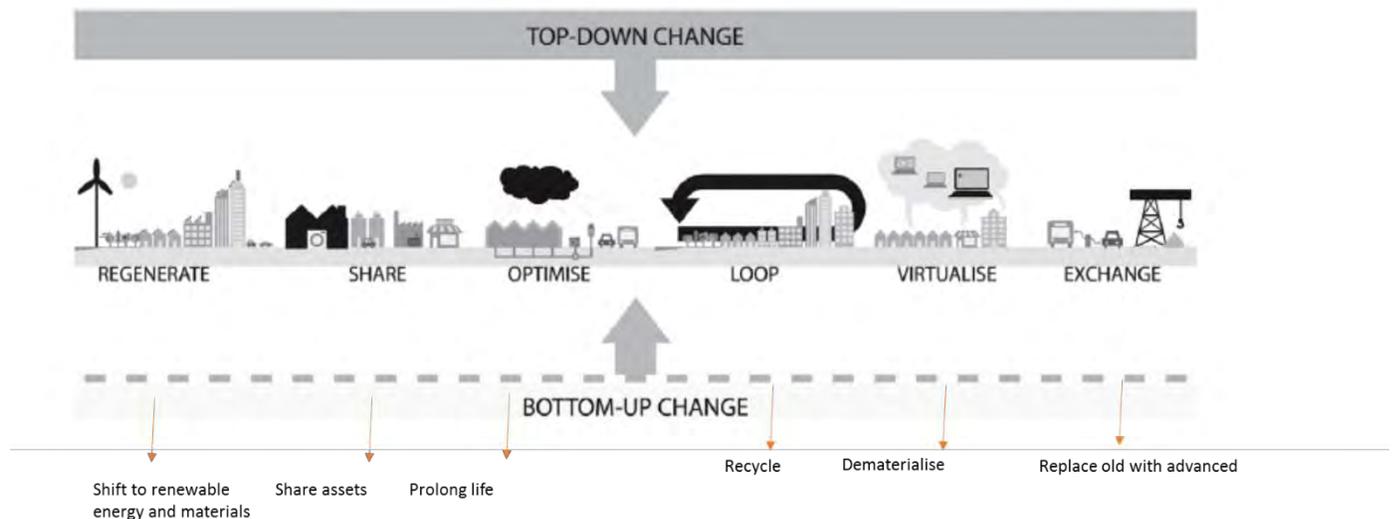
Globally, ‘circular economy’ (CE) principles are being adopted by businesses and governments, as a route to resource efficiency in the face of rising material prices and climate change. CE is interesting at the city-level for a number of reasons. For instance, technical and biological ‘nutrients’ become aggregated within city boundaries in quantities worth harnessing through urban mining. In addition, stakeholders are geographically close and this in itself can aid collaboration to close resource loops (Prendeville, et al., 2017a).

In order to accelerate the development of circularity, research points out towards important factors like political leadership, building adaptable future visions, using experimental approaches (such as living labs), developing contextual knowledge about resource use, and engaging with diverse stakeholders. However, there is a lack of consensus on what a circular city constitutes and a need to further untangle the how and why of the circular city concept (Prendeville, Cherim, et al., 2017b) which brings us to measuring the circularity.

2.7.1 Measuring circularity

The ReSOLVE framework is a descriptive yet practical framework proposed by Ellen Mac Arthur Foundation. It focuses on CE activity on a macro-level (national/regional/city-level). It outlines 6 measurable principles: Regenerate, Share, Optimize, Loop, Virtualize and Exchange (See Figure 2). The framework also defines the manifestations of circular economy at the city level (can be adopted to suitably apply to neighbourhood level) through top down and bottom up examples (Table 2).

Figure 2: ReSOLVE Framework



Source: EMF, 2015. Delivering the Circular Economy: A Toolkit for Policymakers) Cited in: (Prendeville, Cherim, et al., 2017)

Table 2: Measuring circular economy at neighbourhood and city level

| Circular city Principle | Top-down examples | Bottom-up examples |
|-------------------------|---|---|
| Regenerate | Utilizing rooftops as solar fields , developing green space for biodiversity and to improve air quality. | Personal acquisition of renewable energy; solar panels, urban farming, electric or biogas fuelled mobility. |
| Share | Policy innovation to support the collaborative economy, regulate sharing, tax and fiscal measures incentivizing sharing . | Car sharing, appliance sharing (washing machines, tools), repair (repair cafes), reuse (clothing, furniture, vehicles, appliances). |
| Optimise | By using gathered data on traffic flows, the efficiency of cities' major transportation can be optimized, decreasing congestion. Installing smart LED lighting throughout the city to save energy. Retrofitting old buildings to increase their energy efficiency. | Smart citizen labs, Fab Labs, smart grids, smart communities. |
| Loop | Waste separation and recycling , district heating, bio-based economy, reverse logistics. | Community recycling initiatives, upcycling initiatives, community bio-digesters. |
| Virtualize | Virtual city hall counters. Autonomous public transportation and semi-private transportation like taxis. Virtualization of public libraries, archives, legal information. A paperless municipality. | Community-led digital platforms, citizen-science climate monitoring. |
| Exchange | Circular construction/demolition materials and processes, electric powered public transportation, procurement of circular office furniture. | Electric mobility, organic and locally-sourced (super)markets, eco-fashion, e-readers. |

2.7.2 Role of Networks in Circular Economy

As mentioned before, it is a recognised fact that maximising the benefits of a circular economy will be challenging and the process will involve several players from different sectors. In many EU cities and regions, the lack of this cooperation and absence of awareness among these players can result in cases where, for example, the waste of private companies is constantly thrown away (resulting in economic and environmental impacts), instead of providing valuable raw resources for other private companies in other sectors (Bačová et al, 2016). Likewise, food produced in the outskirts of a city or within a region has very limited potential for local consumption without systematic local distribution, communication and promotion. This cooperation, coordination between these network of actors is crucial to understand the acceleration towards a circular state. CE not only requires innovative concepts but also innovative actors. These actors contribute

towards implementation in terms of providing support and resources like innovation designers and intermediaries who provide services and designs towards radical changes in both practices, policies and decision making tools (Ghisellini, et al., 2016). Thus, it is perceived that various networks operate (local, regional, global scale) and interactions in these networks either accelerate or hinder the process of transition.

2.8 Mainstreaming in policy

It is being recognised that cities and regions should display their commitment to a circular economy by way of integrating into relevant strategic documents, setting out local priorities, planned measures and by outlining forms of support. This sends a clear message to the local and regional stakeholders, enabling them to plan their activities in the long term. The documents may include EU regional operational programmes, long-term development plans, environmental strategies, as well as other thematic or sectoral strategies (e.g. waste management or industrial development plans) (Ghisellini, et al., 2016).

The progress achieved through policy instruments can be measured by introducing specific indicators focusing on the circular economy. A circular economy can also be included as a priority in steering regional research and innovation efforts.

CE is mainly recognized as a strategy for waste management or for implementation of environmental policies at the maturity stage of economic development (Ren, 2007). In EU the political importance of a CE development has been increasing in the past few years, as it can be determined from the ‘Manifesto of resource efficiency’ (EC, 2012c), the ‘European Resource Efficiency Platform’ (EREP) (2012) and the ‘EU Circular Economy Package’. Presenting the global scenario, it may be noted that in Japan the transition towards CE started way earlier with two important laws passed in 1991 and 2000. In USA at the moment a relevant federal policy law towards CE seems to be still lacking. Countries like Australia and New Zealand are on the verge of defining its CE transition while Korea and Vietnam have included relevant 3R (Reduce, Reuse, Recycle) policies in their political agenda. The Basque Government has integrated the circular economy in several of its strategic documents, including the Basque Country Energy Strategy 2030 and the Environmental Framework Programme 2020 (Ghisellini, et al., 2016).

2.9 Conceptual Framework

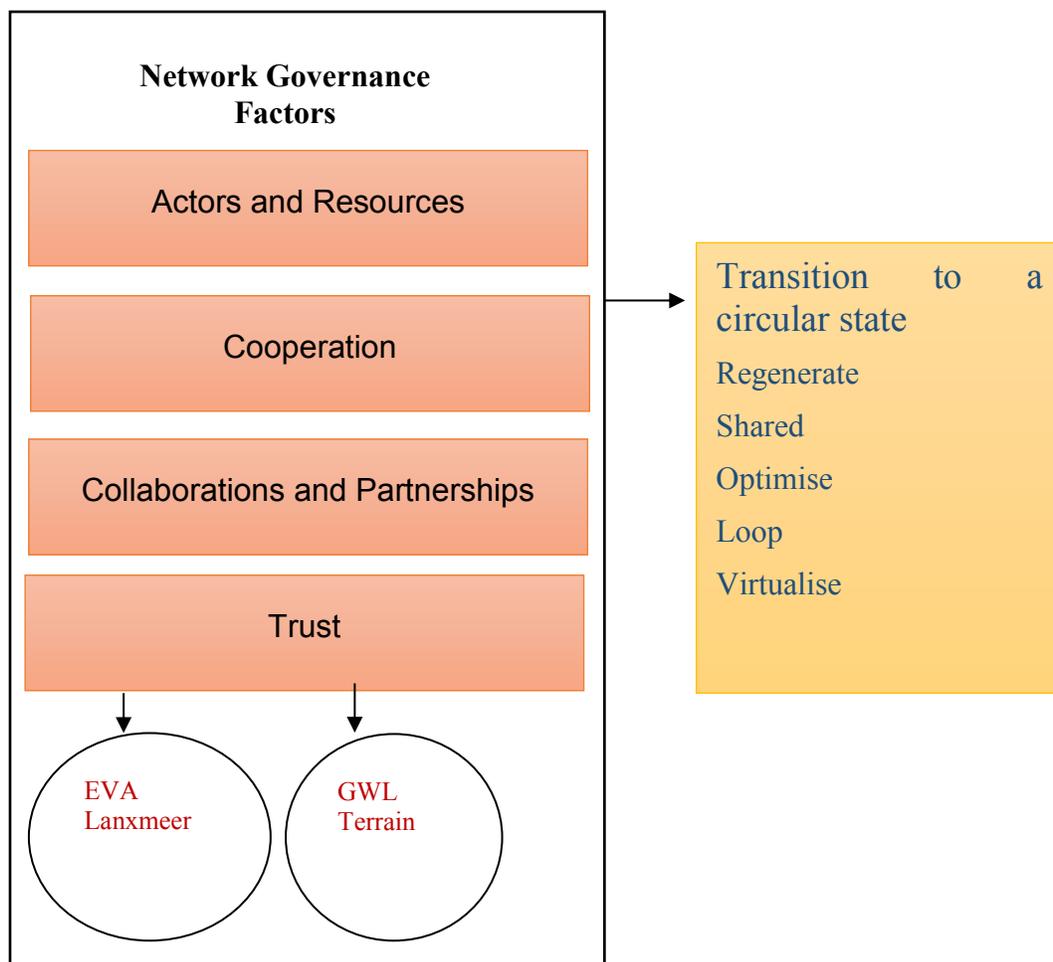
The objective of this study is to analyse the governance factors that influences the transition to circular economy with a discussion on each level in Netherlands but specifically presented through two case study neighbourhoods. Transitioning to circularity in the urban space is recognised as a multi-actor process and a collaborative approach is achieved through coordination, communication, shared decision making, negotiation, resource sharing. The dependent variable is ‘Transition to circular state’ and the independent variables are the network governance factors that shape the transition.

The network governance factors in the conceptual framework are based on academic literature presented in this chapter and this study has picked up the following few key variables: actors and resources, trust, level of cooperation (measured through the variable communication) and collaborations also referred to as partnerships in the analysis section. These factors appeared in the literature on network governance significantly and were studied in relation to transitioning to circular economy.

The transition to circularity is measured in terms of presence of circularity principles and projects as envisioned by the ReSOLVE framework in the case study areas. See Chapter 3, Table 3 for operationalisation of these variables.

The study applies network governance analytical perspective of governance to understand the status of transitioning to a circular economy. The objective is also to understand the accelerators and the barriers to transition by means of first decoding which actor holds what resources and which key partnerships are required to be built. Thus the aspects of partnerships and resources hold central importance in this study.

Figure 3: Conceptual framework



Chapter 3: Research Design and Methods

3.1 Revised Research Question(s)

3.1.1 Main Question

How does network governance influence the transition to circular neighbourhoods in two neighbourhoods in Netherlands: EVA Lanxmeer and GWL Terrein

3.1.2 Sub-questions

- I. What role does communication and cooperation play?
- II. What role can each stakeholder play in accelerating the transition?
- III. What kind of partnerships are being built between various stakeholders?
- IV. What are the accelerators and barriers to transition?
- V. What role does trust play in a network?

3.2 Operationalization: Variables and Indicators

Various concepts have been adopted as part of the framework for this research as shown in the conceptual framework in Chapter 2. All the terms have been defined in the literature review from different perspectives of various scholars. In order to operationalize these concepts, the research relies on these definitions from literature and contextualizes them. Different variables and their respective indicators have also been developed based on the definitions. Table 3 below shows the independent and dependent variables and the definitions for key concepts adopted for this study.

Network Governance:

A relatively stable horizontal articulation of interdependent, but operationally autonomous actors who interact through negotiations which take place within a regulative, normative, cognitive and imaginary framework that is self-regulating within limits set by external agencies; and which contributes to the production of public purpose (Sørensen and Torfing, 2007b)

Circular neighbourhoods:

Circularity in the neighbourhoods were measured based on presence of certain initiatives that follow the circular economy principles. These were measured in line with the six parameters of the ReSOLVE Framework (discussed in Chapter 2).

Table 3: Operationalisation of variables

| Concept & Literature context | Variable | Indicators | Method of Data collection | Source |
|---|------------------------------------|---|--------------------------------|--------|
| Independent variable- Network governance factors | | | | |
| <p>Actors and Resources</p> <p>Two characteristics as being constitutive of networks, the first relates to the equal involvement of public and private actors (structure), and second refers to the mode of non-hierarchical coordination (process). In networks, public and private actors enjoy equal status (although the distribution of financial, material, or ideational resources can be unequal). Public actors may have the power to impose decisions on private actors. Private actors offer public actors information, expertise, financial means, or political support, which the latter need to make and enforce collectively binding norms and rules. In exchange, private actors receive substantive policy influence since public actors do not adopt and implement policies against the interest of the private actors</p> | <p>Actors and Resources</p> | <p>Number of actors involved</p> <p>The strategy being adopted by each actor</p> <p>Decision making authorities in the area</p> <p>Community leaders in the area</p> <p>Resources owned by each actor</p> | <p>Qualitative (Interview)</p> | |

| | | | | |
|--|-----------------------------|---|--|--|
| <p>involved (Börzel and Panke, 2007).</p> <p>Rules develop which regulate the behaviour of actors and resource distribution in the network, and this also influence interactions within networks.</p> | | | | |
| <p>Cooperation</p> <p>Actors need to co-operate in order to achieve satisfying outcomes which are in turn dependent on distribution of resources that can be quantified in terms of costs and benefits of a solution. Co-operation can be improved and achieved through the component of communication. It is important to understand the needs for communication and interaction across the formal organizational boundaries of parliaments, political parties, administrative agencies, interest organisations, private enterprises, local governments, third sector organisations and citizen movements (Bogason and Zølner, 2006)</p> | <p>Communication</p> | <p>Existing Channels of communication</p> <p>Frequency of meetings within each stakeholder group</p> <p>Frequency of cross-sectoral meetings (common meetings)</p> <p>Satisfactory time devoted to the communication between the different parties</p> <p>The number of attendees in events and meetings</p> <p>The instances of different objectives (trade-offs) and instances of same objectives on the same initiative or program (complementarity)</p> <p>Satisfactory attention on the exchange between different standpoints</p> | | |

| | | | | |
|--|----------------------------|--|--|--|
| <p>Collaborations</p> <p>Collaboration is here restricted to describing robust longer-term multi-stakeholder commitments. These typically occur where the members become more closely linked and connected; where the members recognize they must extend themselves beyond their familiar home-base roles and functions, and begin to create new roles and functions that are specific to the collaboration. There is a genuine inter-dependence, and there is a genuine sharing of power, risk and reward</p> | <p>Partnerships</p> | <p>Number and type of action groups involved via the organized forms of negotiation and discussion platforms</p> <p>Number of members in each type of group.</p> <p>Range and scope of diversity of interests represented</p> <p>Skills and knowledge, the resources they can mobilize (for their own organization and for the collective), and their previous histories of interaction and relationships.</p> <p>Number of shared decisions and consensus between actors in a group</p> <p>Common initiatives using common budgets (shared finance)</p> <p>Achievements or milestones of collaboration- in the form of partnerships</p> | | |
|--|----------------------------|--|--|--|

| <p>Trust</p> <p>Based on the available literature, trust can be defined as: a stable positive expectation that actor A has (or predicts he has) of the intentions and motives of actor B in refraining from opportunistic behavior, even if the opportunity arises (Edelenbos and Klijn, 2007).</p> <p>Thus, the actor believes and expects that the other actor will take both actors' interests into account in the interaction (Rousseau et al., 1998; Nootboom, 2002).</p> | <p>Trust</p> | <p>a) Agreement trust b) Benefit of the doubt c) Reliability d) Absence of opportunistic behaviour e) Goodwill trust</p> | | |
|---|--------------------------|---|----------------------------------|---------------|
| Concept & Literature context | Variable | Indicators | Method of Data collection | Source |
| <p>Dependent variable- Transition to Circularity at neighbourhood level</p> | | | | |
| <p>Circularity</p> | <p>Regenerate</p> | <p>Presence of Solar rooftop initiatives</p> <p>Presence of green spaces for biodiversity and for improving air quality.</p> <p>Facilities or initiatives on: Car sharing, appliance sharing (washing machines, tools), repair (repair cafes), reuse (clothing, furniture, vehicles, appliances).</p> | | |

| | | | | |
|--|---|--|--|--|
| | <p>Share</p> <p>Optimize</p> <p>Loop</p> <p>Virtualize</p> <p>Exchange</p> | <p>Policy innovation that support the collaborative economy, regulate sharing, tax and fiscal measures incentivizing sharing.</p> <p>Initiatives on energy efficiency in buildings (retrofitting)</p> <p>Initiatives in the area of: Waste separation and recycling, district heating, bio-based economy, reverse logistics. community recycling initiatives, upcycling initiatives, community bio-digesters.</p> <p>Presence of virtual city hall counters, virtual public libraries, archives, paperless initiatives</p> <p>Presence of circular construction/demolition materials and processes, electric powered public transportation, procurement of circular office furniture. Electric mobility, organic and locally-sourced (super)markets.</p> | | |
|--|---|--|--|--|

3.3 Research strategy

This research adopts a case study strategy. A case study is defined as “an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident (Yin, 2009).” This is the most suitable method since it offers depth and produces extensive descriptions of the phenomenon under study (Van Thiel, 2014). In this case, depth of information is required for analyzing the role and influence of network governance in steering the neighbourhoods towards the goal of circular economy. It can also be a case where certain factors might be leading to a hindrance in achieving these goals. The case study strategy allows understanding the depth of the subject through a variety of evidence- documents, artifacts, interviews and observations (Yin, 2009). As per Yin (2009, pg.9) “How and Why questions are more explanatory and likely to lead to the use of case studies, histories, and experiments as the preferred research methods. This is because such questions deal with operational links needing to be traced over time, rather than more frequencies or incidence.” Furthermore, the case study approach is justified as an appropriate strategy because the study of network governance is not a single unit but consists of sub-units: communication, collaboration, trust, actors and resources.

In a co-variational approach, causal inferences are drawn on the basis of observed co-variation between causal factors (independent variables) and causal effects (dependent variables). Such an approach has an affinity to focus on the effects of specific causes and not on the causes of specific effects – like quantitative research (Blatter and Blume, 2008). In this case, we wanted to study the effect of network governance on achieving circularity in neighbourhoods. Multiple holistic case study approach was adopted since the two urban neighbourhoods- EVA Lanxmeer and GWL Terrein were roughly built around the same time. Both these neighbourhoods were selected because they featured in literature as popular eco-neighbourhood examples from the Netherlands. This was measured by observing the number of times that EVA Lanxmeer and GWL Terrein appeared together in several reports and publications on thematic areas of sustainable and eco neighbourhoods (for eg. Meijer, Adriaens, et al., 2011). These neighbourhoods were also recommended by most of the academic experts who were contacted during the pre-data collection phase to review the research questions and recommend appropriate case study neighbourhoods. Some of these experts were also the key interviewees for this research (See Annexure 1).

Since for multiple case studies, replication logic has to be used instead of sampling logic, therefore literature suggested that each case must be carefully selected so that it (a) predicts similar (a literal replication) or (b) predicts contrasting results but for anticipatable reasons (a theoretical replication) (Yin, 2009). Additionally, the framework needs to specify the conditions under which a particular phenomenon is likely to be found (a literal replication) as well as the conditions when it is not likely to be found (a theoretical replication). The theoretical framework later becomes the agent for generalizing to new cases. In this case, the research analyses the two case study neighbourhoods to draw comparisons on similarities and differences.

3.4 Data Collection Methods

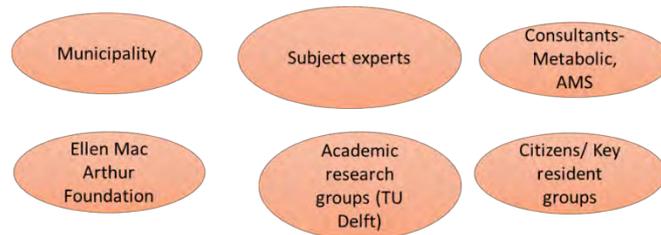
This research largely relies upon primary qualitative data collected through semi-structured interviews and secondary qualitative data based on document analysis (policy documents, regulatory frameworks, previous research and case studies). In-depth interview involves “asking key respondents about the facts of a matter as well as opinions about events.” It includes recording

interviewee's own insights into certain occurrences and may use such propositions as the basis for further inquiry (Yin, 2009). It is essential that one first interviews the subject experts and academia to gain insights on main parameters and then interview citizen groups, municipality and other important network actors (Figure 4). The non-probability sampling technique was adopted which entailed purposive sampling and snowball sampling techniques. These techniques are helpful since 'circular economy' is still a new area of expertise and the sample of respondents will be selected as per the advice from the experts working in this area.

In-depth structured interviews offered insights on the various actors in the network and eventually the sample size was also dependent on the 'saturation' principle. The concept of data saturation is "referred to the point in data collection when no new additional data are found that develop aspects of a conceptual category" (Francis, Johnston, et al., 2010). The idea of data saturation is a very useful guide for such research, in which the appropriate sample size is a function of the purpose of the study and the complexity, range and distribution of experiences or views of interest, rather than of the statistical parameters used in quantitative research. While following the saturation principle, data is collected till a point where one has a confirmatory evidence (evidence from two or more different sources) for most of the main topics.

The key stakeholder groups were first mapped after extensive desk literature review. From these groups, individuals for possible interviewees were identified, narrowed down and contacted.

Figure 4: Cluster of stakeholder groups



Primary qualitative data was collected through semi-structured interviews. Secondary qualitative data was sourced from basic document analysis (policy documents, regulatory frameworks, previous research and case studies including documents provided by key informants in the neighbourhoods). The approach was to first interview the subject experts and academia to gain insights on main parameters followed by interviews with citizen groups, municipality and other important network actors (Figure 1).

For each section of the operationalisation variables (Table 4) the interview questions were formulated in order to capture responses that measure the same. Variables like 'Actors and resources', 'trust' were relevant for all stakeholders, while specific questions on 'communication' networks in neighbourhoods were directed to residents and municipality. Since during the course of the interviews knowledge was shared on each factor of the study, the follow up questions were accordingly drawn asking the respondents to elaborate on this knowledge and therefore a semi-structured interview questionnaire was prepared. In line with the theory, different types or levels of questions were prepared (Annexure 1). As per Yin, the potentially relevant questions can occur at any of five levels: Level 1: questions asked for specific interviewees (in this case mostly directed towards the academic expert); Level 2: questions asked of the individual case (For instance, Decision making structure in the neighbourhoods); Level 3: questions asked of the patterns of finding across multiple cases (in this case questions on accelerators and barriers to transition); Level 4: questions asked of an entire study – for example, calling on information beyond the case study evidence and

including other literature or published data that may have been reviewed (these documents were shared by key informants of the neighbourhoods and mostly focused on history of formation of decision making structures). Level 5: normative questions about policy recommendations and conclusions, going beyond the narrow scope of the study (for instance questions on replication and future of circular initiatives were directed to the residents and municipality officials).

3.4.1 Reliability and Validity

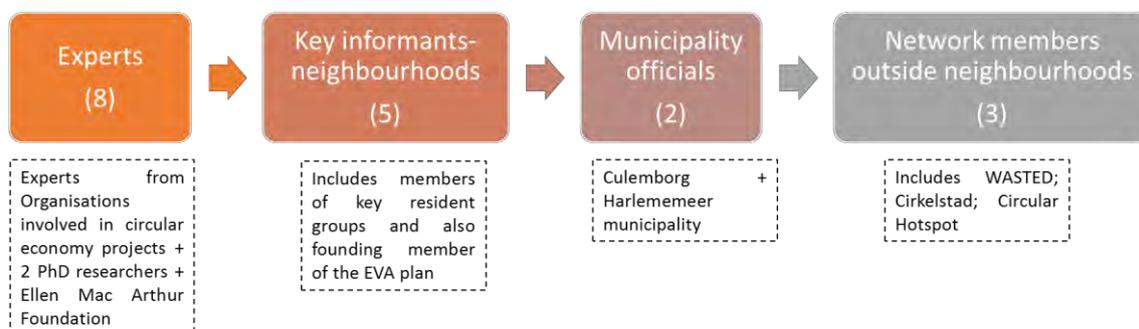
In order to address the challenge of “subjective judgements” during data collection, (Yin, 2009) the qualitative data was collected under specific concepts (related to original objective of study) and operational measures were identified that matched the concepts (citing similar match publications or studies). In case study research, triangulation is a highly suitable means of countering problems that might arise with respect to reliability and validity. This means usually a mixed method design is chosen, in which methods such as observation, content analysis of documents and other materials and the interview are combined. (Van Thiel, 2014). Therefore, documentation method i.e. analysis of other relevant documents was employed as a tool. For this study, a key method for triangulation was also achieved by capturing the perceptions and responses on same questions by different types of respondents, namely, municipality officials, residents, academic and subject experts. As per theory, the case study approach may follow four types of triangulation techniques:

- Data sources (data triangulation);
- Among different evaluators (investigator triangulation);
- Perspectives to the same data (theory triangulation);
- Methods (methodological triangulation)

The current research study makes use of data and theory triangulation by involving three types of stakeholders (Academics and subject experts, residents, local government or municipality officials).

Figure 5: Profile of final interviewees

Respondents



3.5 Study Limitations

First of all, there have hardly been any studies that measure circular economy at a micro scale of urban neighbourhoods. Most of the discourse is focused on macro scale often at the industry level. The contact of Ellen Mac Arthur Foundation was therefore very relevant and was interviewed twice (once at the beginning and once with all other interviews). This was done so as to seek relevant contacts and information on the work being undertaken in cities on this subject. Many of the academic and subject experts in this area were also contacted at the inception stage of the study in order to identify appropriate case study neighbourhoods and in order to employ snowball sampling technique to identify other interviewees. The next limitation is that this study measures the network governance factor of cooperation only through the variable of communication as this was the most relevant variable in a network context in both the neighbourhoods. It was not within the scope of the study to analyse and include variables like 'arenas' and 'games' which do feature prominently in network governance literature. It was also very challenging to measure the variable of 'trust' in networks and only subjective perceptions were captured from the interviewees and this issue was also discussed with the experts during the interview (while posing this question). Thankfully, only one article during the literature review process mentioned some categories for measuring trust and this was useful during the analysis stage. It is important to mention that the timing of the data collection coincided with the summer holidays in Netherlands, it could have been a major hindrance. However, early contact with the interviewees (as early as February, March) did address this problem to some extent. Unfortunately, even after repeated attempts to contact the Westerpark Municipality in Amsterdam, an interview could not be scheduled with the relevant official during the desired time period. In order to cover up for this missing link, municipality of Haarlemmermeer was contacted and interviewed so as to roughly represent the Amsterdam region where one of the case study- GWL Terrein is located.

3.6 Data Analysis Methods

For analysis of qualitative data obtained through interviews, Atlas Ti application was used to facilitate different analysis techniques including content analysis, direct interpretation and explanation building. The analysis was thematic in nature and coding under various themes was undertaken as per the key variables of the conceptual framework under study. Additional codes were also developed based on the new knowledge received during the interviews (See Figure 6 and Table 4). In line with literature on analysis in case study methods, the 'Pattern matching' analytical technique was employed. It is used for strengthening internal validity and used when case study is an explanatory one. It may be noted that the patterns may be related to the dependent or the independent variables of the study (or both) (Yin, 2009).

Figure 6: Word cloud of code labels



Table 4: Code list

| Code | Code group | Definition |
|--------------------|--------------------|--|
| Actors | Network Governance | Key stakeholders involved in the process of transitioning to circular economy |
| Cooperation | | Cooperation between residents |
| Resources | | The power and resources that each stakeholder holds for influencing transition |
| Trust | | Wherever trust in networks is discussed |
| Communication | | Methods of communication in neighbourhoods; how is Circular economy communicated |
| Partnerships | | Partnerships developed or missing between each stakeholders |
| Accelerators | | - |
| Barriers | | Response on Barriers to transition |
| Transition | | Any mention of transition |
| Networks | | Any mention of networks |
| Top down/Bottom up | | Discussion on the question pertaining to this |

| | | |
|------------------------------|--------------------|--|
| Policy | | Comments on policy environment |
| Finance | | Any mention of finance as an enabling tool |
| Innovation | | Any mention on innovations as recommendations |
| Stage | | Responses to specific question on stages of transition |
| Replication | | Responses to specific question on replication |
| Circular economy | | Whenever circular economy is mentioned as a descriptive or envisioning manner |
| Neighbourhoods | | Any information or mention of neighbourhood level scale. |
| Circular initiatives | Neighbourhood info | Any information on circular initiatives as per examples outlined under ReSOLVE Framework |
| Tensions/Disagreements | | Any historical information on instances of conflicts and disagreements over any issue in the neighbourhood |
| Neighbourhood timeline | | Any information on development stages and time-periods of neighbourhood formation. |
| Mediation | | Any information on actors who played a mediating role in the conflict situations |
| Decision makers | | Key authorities in the neighbourhood |
| Other neighbourhood features | | Any other information |

Chapter 4: Research Findings

4.1 Introduction

Networks are everything, they let you leapfrog, get into circles, surpass hurdles and utilize the joint, shared pool of resources, knowledge and with this combined strength, there emerges a power to transform, transition, move onto the next level or make progress on a pending agenda/action. These networks can be basic, informal but also highly specialized and powerful, hosting an almost parallel governance structure. The concept of network governance is an interesting ideal which proposes an idea that policy is made in complex interaction processes between a large number of actors which takes place within networks of interdependent actors. Therefore, network analytical approaches enable decoding these complex interactions. When it comes to the area of environment sustainability often there is a thought that it is an area which involves multi stakeholder groups who are not from any one stream but instead involved in a multi-disciplinary action. More than a decade back, a new discourse was started on cradle to cradle philosophy and therein the term circular economy was coined and gained momentum.

As discussed before, despite this momentum, though, the shift towards circular economy seems to be at a nascent stage. The proposed research aims to explore the ‘frontrunner’ position of the Netherlands and understand what role can network governance play as a factor that could contribute to transition. It aims to study the current transition phase and see the application of network governance principles in real case studies treating neighbourhoods as the units of analysis. Is network governance contributing and if yes, in what way is it contributing to achieve the desired shift to circular economy. The chosen case study neighbourhoods are already popular examples often cited in eco-neighbourhood case studies. Its time to enter into these neighbourhoods and analyse from a network point of view, the presence of networks, the interaction and coordination mechanisms which give an indication on the status of how circularity is viewed and operates currently. This will provide insights on the accelerators and barriers and also an opportunity of a zoomed in perspective for policy makers, practitioners and supporters of circular economy who often operate at the national and regional scales. This research also brings in crucial insights from leading experts in the area, each of them commenting on the scale and stage of transition and their deep perspectives from their years of rich knowledge and practical expertise in this area. After a decade, since cradle to cradle was first introduced and talked about in the Netherlands, where is the country heading? What are the pathways it requires to embark on ? And most importantly who are the main actors and their key resources that can accelerate the transition to CE. An answer that is best obtained by applying network governance frameworks of study. This chapter presents the key findings of the study.

4.2 Neighbourhood profile

4.2.1 EVA Lanxmeer, Culemborg



Photograph 1: EVA Lanxmeer

In 1995, a cooperation was established between the foundation of EVA and the municipality of Culemborg to realize a sustainable residential area which came to be known as EVA Lanxmeer. It was built on a waterfield area and was divided into four zones. It was based on principles of permaculture and organic design. It is roughly spread over a total area of 30 ha with living spaces comprising of 6 ha; working space roughly 4.5 ha; combination of living and working around 1.5 ha; schools around 4 ha; Roads and Green zones roughly 10 ha and lastly city farm around 4 ha.

| | | |
|--------|--|---|
| Zone 1 | Private property right to own home | Rest, shelter, natural materials |
| Zone 2 | Joint Garden overlapping private gardens | Grown-up neighborhoods play and lounge areas, fruit trees |
| Zone 3 | Public space openness, security, ecological unit | Edible landscape, parky, water, bio-diversity |
| Zone 4 | Agriculture and horticulture Ecological, accessible | Beds and fields, biotuin, experiments permaculture |

The neighbourhood has around 320 houses and contains a conventional mix of housing, from social rented and subsidized owner-occupied properties to more expensive private sector homes. In response to residents' wishes, the design is more varied and unconventional than normal. To create an integrated residential and employment environment, the neighbourhood also contains business accommodation, offices and workshops. No more than fifty new homes were completed each year. A unique aspect of the plan is that, part of the neighbourhood lies in the 25-year zone of the Culemborg water abstraction zone in the Lanxmeer polder, where in principle no building is allowed. This makes Lanxmeer very unique since it was the first time that permission was granted to build in such an area, conditional upon a radical package of environmental measures. The location of the neighbourhood is also special since it is situated in a floodplain landscape near the historic centre of the old town of Culemborg next to the railway station. This station connects it to Utrecht and the rest of the Randstad (the west part of the Netherlands). This neighbourhood although urban is at the same time often said to have a rural environment.

4.2.2 GWL Terrein



Photograph 2: GWL Terrein

Key Features

- Residents, architects, corporations and municipality came together to build this area with 600 homes
- Urban density of 100 dwellings per hectare, environmental ideals as a binding factor
- Car-free area with only 100 parking permits for 600 households
- High social cohesion

GWL-terrein, Gemeente Waterleidingbedrijf (GWL), was the former grounds of the Municipal Waterworks in Amsterdam. In 1989, when the Municipal Water Company announced relocation plans, the residents took the initiative of establishing neighborhood *milieuvriendelijke* Foundation called Ecoplan. In 1990 the Westerpark municipality took over its jurisdiction and in 1993 started a co-development urban plan for the neighbourhood along with the residents. The neighbourhood was completed in 1998 and is built on an area of 6.6 ha (residential area: 5.8 ha) and is comprised of 17 blocks with 600 dwellings and 1200 m² of office-space, including also restaurants and shops. It includes all kinds of housing: privately owned, social rent, disabled people (Miva) homes, studio houses, old age homes etc. It was developed as a car free zone with only 100 parking permits available to 600 houses.

4.2 Analysis of key variables

This section presents key viewpoints and takeaways of various stakeholders on the key variables of the research. The sub section headings reflect the code names used in Atlas Ti. At

several points throughout this section, quotes from interviews have been presented to substantiate the points and key messages delivered in the analysis. At the end of presenting the findings for each variable a short conclusion is provided to comment on and answer the research questions and objectives of this study. Care is taken to present points of view of residents, municipality as well as practitioners. This helps in triangulating the data and also understanding the network actors point of views. The ‘practitioners’ group comprises of the following organisations and initiatives:

WASTED

It is a project by Cities Foundation in Amsterdam. The idea first came into existence in 2015 after research on plastic recycling which was only introduced in Netherlands in 2013. This initiative is currently running in the neighbourhood of Amsterdam Noord which incentivizes residents by giving them a reward for disposing their plastic waste in designated bins. Once the residents separate their waste, not only plastic but also paper, they bring the waste to designated containers which has a QR code on it, the residents need to scan it and then upload a picture of the bag (which is transparent) to the website. Upon validation, the residents receive a digital coin which they can collect and use to receive discounts at around 14 local shops for goods and services. Value of the coin on an average is 1.5-2 euro. The initiative has around 800 subscribers and has managed to collect around 1844kg of plastic waste till date. The WASTED laboratory plans to reprocess and upcycle the locally collected plastic into modular plastic blocks that can be used for community-enhancing projects such as planters, stages and park benches.

Circular Valley

The Circular Valley project is and was intended to be a circularity hub, a physical location where all kinds of stakeholders work on the system based relationship, in inter-disciplinary teams to start building new business models and new products and new collaborative ways of designing to basically speed up the transition from the linear to the circular economy. This hub has expanded as a regional implementation organization that looks at all the different initiatives that are taking place in the larger metropolitan area of Amsterdam for example, Schiphol at the harbour, at the city referring to new housing, referring to expansion of Schiphol but also use of the landscape etc. and try to be a connecting factor to all those separate ideas. It also tries to connect all the separate layers of governance that are involved so it looks at the province of north Holland, looks at the municipality of Amsterdam, Almere and Haarlemmermeer.

Cirkelstad

Cirkelstad is a community of practice for a region with representation from all kinds of stakeholders that engage in knowledge sharing practices. It includes municipalities and private sector like the construction industry and even knowledge institutes. The network is membership based with a contribution of 5000 euros per year and engages in sharing knowledge, giving tips through innovative projects.

In addition to this, municipality of Haarlemmermeer which is one of the front runners in the 100 Circular Economy Network of Ellen Mac Arthur Foundation (EMF) was also interviewed. The key contact was received through the snowball sampling technique by one of the interviewees from EMF.

4.2.1 Actor and Resources

The respondents were asked which stakeholders can have a greater influence and what kind of resources does each type of actor hold for shaping the transition. The results were interesting and varied. This section first presents the findings from the interviews conducted with networks outside the neighbourhoods, i.e. the academic experts and then with the overlapping network actors- municipality officials. Later in Section 4.2.1.1, the analysis focuses on the micro level scale, i.e. the case study neighbourhoods.

Resources were viewed as power to legislate; infrastructure service provision; land; finance; knowledge among others. Besides these individual powers, there is also a possibility of using combination of these resources due to the interdependency between various stakeholders. This nexus is explained by one of the municipality stakeholders:

One of the actors is the private sector, which has the most resources in terms of waste and that have also the most opportunities to take more value but you see that they will not take steps if some other actors dont take steps as well, [...] so financial sector have a key role to actually open the doors for private sector that can develop that and the government has a big role and in terms of legislation.

Policies and human resources were also viewed as resources. For instance, the Amsterdam municipality has a separate departments for CE which gives an indication of their seriousness. On the national level, the fact that the ministry of infrastructure and environment has outlined an ambition and mission on the circular economy, are also some examples.

The other resources and potential power of each stakeholder is presented in the following sections. Table 5 at the end of this section summarises the same.

Municipality

The municipality's power was viewed in the form of providing the conditions for new constructions for instance or new planning. They can also provide the rules and regulations and adjust them with regards to separating waste at the source at household for instance. An expert cited that sometimes people are very willing to do their best and do their share in recycling waste products to the highest utility possible but they need to be facilitated.

[...] they need to be facilitated and to do that at the household level and if in Amsterdam theres quite a lot of difficulties because of the sheer profile of many of the apartments and apartment blocks and high densities and lack of space in order to have the right containers in your house or close to the house but this is a limitation that needs to be dealt with and I think that the municipality is the first to deal with that and that's only one example theres many of those examples so the municipalities has a great role very important but its only a part of the whole picture

Municipalities are big players because they are also the owners of the land on which the houses should be built and they are also the biggest player in the business model for the new housing because they own the land and they have to sell it. Hence they can be key players for introducing circularity in the building sector. It was noted that some municipalities have a very green council who have a drive to reserve some areas for these kinds of building concepts. The next important player then becomes the financial sector, since one needs banks who are willing to invest or give mortgages for these kinds of houses.

And after that you need banks who are willing to invest or give mortgages for these kinds of houses so if theres a good partnership between a bank for financing a municipality then you have a good basis because the builders themselves, the construction companies they always follow the demand so there are some construction companies who are most advanced in these kind of techniques then others but if theres a demand if there are customers for something that will always be a building

company that will be able to provide these kinds of things, the building companies, the market for those kind of things is not so much the factor that's present these kind of things happening...

It was felt that municipalities and local governments have a very unique role in creating change because local governments invest in infrastructure, they run waste collection schemes so they have their foot on the ground and quite practical tools to use to create change. For instance it was suggested that if they start procuring goods and services in different ways it's a huge market driver in itself with a huge potential to engage in collaborative initiatives. For local govts this can become a strength since they know the people in their area closely which then translates to a bigger level of trust.

The role of ambitious governments could not be undermined and the example of the CE package at the European level was quoted as the best example. The role of funding support in accelerating the transition was also highlighted.

The whole building material in Netherlands is 25% of govt so they can really make the difference if they really use their market power not in the govts but the market power, I think nowadays, to really get a turning point so not only it has to be bottom up but they are a party that can make the difference from now. They just have to choose for it, this is important thing because the market always listens to the person who pay for the project so really I think money rules in this way, it's the important thing, what you see in a traditional way now the govt is building a task force to get the Netherlands by 2050 in a circular way.

This ambition was demonstrated by the official from Haarlemmermeer municipality:

I am working now with different public leaders in the region that will I hope so make a statement at the end of this year by saying from now on everything that is built new in this area it will be circular and it will energy neutral and we are not going to for example use natural gas anymore in homes so I think that's very important because you create actually a level playing field in this area so the rules and the legislation in Haarlemmermeer has to be the same as in Amsterdam or in Almere so the private sector have certainties and they can develop their businesses

The Municipality itself stressed on the importance of all actors for achieving the goals.

We need all those three actors to help us in achieving the goals because its not our goals not from the municipality its from all of us because the effects of CC hits everyone. Every stakeholder if you call them like that has to deliver their part their responsibility, looking at households its energy savings, installing sun panels. Factories trying to energy saving as well. Everyone has to meet to deliver part of the targets mobility as well we all drive cars

Producers

There was also a discussion that the consumer owns a lot of the resources that is dispersed over a lot of some small units and thus in the end if the producer is willing to retain ownership, it can become really powerful and big resource owner. However in the current economic system they own what they are currently producing and then they sell to the consumer. So the level of influence was thought to be in between these two and there is a potential to actually shift that ownership and this is also currently the discourse on circular economy.

I don't know the answer yet but it could even be that ownership trickles down further up that value chain , perhaps in the end a mine a copper mine allows what no longer sells that copper to the industry but just leases that out and well you can use the copper and well make uhmm benefit from its conductive qualities for example but we will always remain the owner of the copper and am curious whether it will move in that direction.

Large corporations and market factors

The role of large corporations was cited as important because they are quite often multinational which means they have a lot of leverage in order to bring certain innovations to scale and power to change systems. This interest of big corporates and hence the market was reiterated since politicians too listen to the market. However, the big corporates also need the

small innovators who come up with new solutions to drive change and they often invest in these solutions. This is often seen when start up initiatives are funded by private corporate money.

One of the residents from the neighbourhoods felt that companies had an important influence since they are the creative organisations, they have the creative ideas, they want to challenge the government, have the ability to organize networks. The market is also asking for it because there is a certain demand from the public but the public is not capable of organizing it themselves so they need others, enterprises, companies who organize it for them. They don't need traditional enterprises, but they need the innovative enterprises which are not restricted to multinationals but include local companies, who are sometimes regionally based.

Citizens

Next comes the role of the citizens, their support, creativity and ambition is needed to create a circular living area. This was observed in the two case study neighbourhoods where the first inhabitants were a group of like minded and highly driven individuals who took active part initially in the planning process and later as also observed today in managing these spaces.

Entrepreneurs

The role of entrepreneurs and bottom up initiatives was also highlighted. The government was quoted as the enabling actor for driving this. It was felt that the municipality plays less of a role financially and more of a role in ensuring that there are structures there to allow entrepreneurs to develop it as well.

It was suggested that the government creates room for these entrepreneurs and the bottom up initiatives and support them more for instance in the procurement policy and other areas so that they have more income and can have more success. It was recommended that the governmental parties could be more front running to support the other front runners from the bottom up and take more short term steps towards phasing out linear practices. It was also highlighted that it was important to connect the people that still work at companies or organisations that are very linear in their approach to more bottom up initiatives working towards circularity. This would lead to creation of space where they could share information without being too competitive about protecting can provide grounds for innovation.

The municipalities could support the bottom up initiatives by creating an experimental space and easing the rules and regulations. Example of Rotterdam was quoted where the municipality has launched a website where individuals and innovators can share their innovations and experiments. It was recommended that instead of setting these long term goals, they could try to start projects collaborating with front running actors from all the different layers so not only the initiatives and the policy makers but also the larger companies so as to cross the silos.

[...] now also the ministry but also in municipalities CE most of the time is within sustainability department and then they talk to the packaging industry or they talk to the textile industry and that is not how CE works which these different industries separately so look at an experiment where you can connect multiple sectors at one place in your city [...] because everything is designed for the linear economy and by starting experiments which cross silos thinking within the municipality and with the so that's more on the strategic level and then for the management of the municipality department, but also on the ground with different businesses and inhabitants and working together and from both these experiences I think that is what needs to be done now.

Table 5: Actors and Resources

| Stakeholder | Power or Resources | Comments on Category |
|---------------------------------------|--|---|
| Municipality | <ul style="list-style-type: none"> • Owners of land • Power to legislate • Infrastructure provision with private sector | Strong legislators as they own the land and thus key decisions on its future development rests on them; authority for key infrastructure services |
| EU | <ul style="list-style-type: none"> • Policy push (EU circular economy package, Horizon 2020 research programme) • Finance | Their policies and programme has an impact at the regional level |
| Citizens | <ul style="list-style-type: none"> • Consumers of products | Imbibe Change, Success of any movement or agenda depends on their adoption, receptibility |
| Private sector, Business industry | <ul style="list-style-type: none"> • Influence on market • Producers of good and services | Change agents, steps taken by them can have a mass impact on production and consumption |
| Entrepreneurs, Academic organisations | <ul style="list-style-type: none"> • Knowledge capital • Power to innovate and trigger change | System thinkers, innovators |
| Financial organisations | <ul style="list-style-type: none"> • Financial resources | Their power is that other actors are dependent on them for resources |

4.2.1.1 Decision making structures in neighbourhoods

The previous section provides the overall context to the study of actors and resources in the networks outside and those overlapping (municipality) within the neighbourhoods. Building upon that, this section analyses the actors and resources inside the case study neighbourhoods.

EVA Lanxmeer

The EVA Foundation provided the development concept for the neighbourhood and partnered with the local municipal council to develop the project. In this direction, in 1996, the local authority and the EVA Foundation established the EVA-Lanxmeer Project Group. In 1998, following a revision of the local land use plan to change the designated land use from agriculture to residential, the EVA-Lanxmeer residents' association (BEL) was established. Earlier, the BEL played an administrative role by facilitating new inhabitants to join and after the district was completed, this role diminished. The foundation ended operating around 10 years ago and passed on all responsibilities to BEL which now functions as an active resident association. It comprises of a board, a chairman, treasurer and a secretary and two other members and they are responsible for organizing the general assembly. They function through contributions which amounts to 25 euro per year per household. Besides the BEL, there are 10-15 different working groups (roughly size of 5 persons) focusing on various issues. As explained by the resident who is also Director of a local energy cooperative in the neighbourhood, these working groups emerge whenever there is a 'problem' or a 'passion' for an issue.

Every group like this groups they emerge because there is a problem or passion. So these groups they define themselves they define their boundaries what they want to do and they simply do it by themselves nobody giving them the right to do sometimes these groups when they need money from the joint contribution they are asked for a mandate at the general assembly. [...] And the groups they can exist for sometime so theres no need that they exist when the problem is not there theres also no need when there is no passion for it anymore so they kind of come and go, the groups that are kind of always more or less formalized [...] All these working groups are there because people feel that its needed that they are there.

The general assembly disburses money to the working groups from the board as and when they require it. An amount of upto 500 euro does not require any special permission, only when its higher they need to ask the board. There are three vertical forms that have ownership in themselves like a foundation, limited company and the cooperative. So within those structures, in a foundation the board is always the incharge, in a limited company which in the case of this neighbourhood is owned by the cooperative, so the co-operative is incharge of what happens within the company and the limited company is itself directly by a director.

GWL Terrein

The neighbourhood is comprised of 17 building blocks and usually in the Netherlands, when a building block is built, there is an organization with all the owners or housing corporations owning a certain block, so it could fall under 17 different units. Since this neighbourhood was a special ecological area, a single umbrella organization was made with a chairman and a board. It operates through contributions of 6 euro per month per household.

Every block has a representative and then there are some representatives from the community garden group and from among the tenants in every building. This means that the bigger occupied buildings have the most votes. However, it was observed that the voting process is very non-formal and mostly based on trust and mutual agreement.

The umbrella organization rents an office in the neighbourhood which also has a caretaker who is supported through contributions. The residents observe merit in communicating to the municipality through this body because they feel that the officials prefer speaking to the neighbourhood as “one voice” which they also view as something powerful.

[...] so we talk to the local municipality in one voice which is very powerful for us we have a very good lobby to the local city and local city is very happy because they don't have to figure out is it individual thing or is it group with a real backing.

Every 6 weeks, the city also conducts a liveability meeting in the neighbourhood which offers an opportunity for everyone to raise complaints or questions. This meeting has in attendance, a representative from the umbrella body, the local city and the police authority. These meetings discuss a range of liveability topics including safety, green initiatives and grievances among other issues.

4.2.1.2 Conclusion on influence of actors and resources on transition

The analysis revealed that resources were viewed as power to legislate; infrastructure service provision; land; finance; knowledge among others. It was also observed that besides these individual powers, there was also a possibility of using combination of these resources due to the interdependencies established between various stakeholders. In the case study

neighbourhoods it was observed especially that the power of the citizens as a collective formal association, i.e. BEL and umbrella body emerged as the most powerful actors. Interestingly the residents themselves saw these associations as internal networks which were established to communicate in a unified voice with external actors and networks. However, the interaction with other actors like municipality officials as well as historical instances of conflict, mediation and resolution revealed that these resident bodies were quite vital for the functioning of the neighbourhoods. When it comes to their role in shaping the transition to a circular economy, it was observed that they were indeed of paramount importance as they were gateways for any initiative to enter into the neighbourhood. For instance, the current energy cooperative is managed by the residents and is already formulating several circular plans related to the energy sector. This directly refers to the Regenerate principle of CE. The residents also actively take up energy efficiency targets which directly refers to the Optimise principle of CE.

4.2.2 Cooperation

As mentioned in the operationalisation Table in Chapter 3, the concept of Cooperation was measured through the variable Communication. The frequency of meetings and the information received on the communication networks in the neighbourhoods were analysed. Communication was captured in two ways, one in terms of how it is communicated to the end user, the experts commented on this aspect. Secondly, what role does it play in the neighbourhood for building cooperation, for instance the communication platforms and the frequency of communication.

4.2.2.1 Communication

The communication variable came across in two ways, one wherein the experts mentioned it as the way to pitch or communicate the concept and term of ‘circular economy’ and the other wherein the residents and key informants mentioned the significance and structure of communication within their neighbourhoods. The latter is relevant for the research question while the former gives additional information on the overall understanding of this concept in the Netherlands.

“[...] there are several ways to pitch CE and usually you should not label it as such, you should probably it as an alternative that is more healthy cheaper more fun or you name it. so you have to look what are the labels that we can use in order to speak to those people [...] if you try to make mobilise people through talking to them about sustainability what does it mean to them you know what does it mean to the quality of life so you have to reach them with the right type of language [...] and all those aspects that improve the quality of life of the people concerned that might be that might incentivize them to make a move”

The residents seem to agree with this as mentioned by one of the residents:

“Well I think it must be understandable, don’t make it too complicated, it must be advantageous, make clear what advantages are, it must be reliable and honest so make sure that what you tell is true, can be made true [...]”

The residents of the case study neighbourhoods explained the communication structure in their neighbourhoods. It is to be noted that both the neighbourhoods have dedicated websites and regular newsletter circulation and also organize meetings from time to time.

The municipality appreciated these organized networks and agreed that it facilitated ease of communication. For instance, the culemborg municipality official recognized that having an organized group at the residential level like BEL in EVA Lanxmeer makes it easier for them to communicate with the neighbourhood as a whole.

“in case of BEL it's an organized group which can speak for all the inhabitants of Eva Lanxmeer so it's easy for us to speak to the BEL”

It was cited as an important medium for maintaining relationship with the municipality

“Without BEL strange uncertain relationship with municipality there still needs to be contact with municipality for some issues so now we are looking can we not make a new board out of representatives from all working parties in autumn we will discuss it further and for me also very important, people want to renew website.”

A new factor of ‘Social cohesion’ also emerged in the discussions.

because this how the design of the plan is made it's very easy to meet each other so you know when as a neighbor when there is a problem so you can easily help and where I lived in those houses before you already knew the people on your stairs but that was it [Resident from GWL Terrein]

I think the average the larger self-employed people are well represented. Interaction is happening at this court level, there is lot of interaction because it was slowly developed so group of people e you knew grew slowly everyone knows 100 people, there is lot of interaction. [Resident from EVA]

This can be explained because the governance structures in these neighbourhoods is completely self-organized and highly reliant on trust and social cohesion. The municipality also interacts with the residents using these self-organized networks. For instance, in EVA Lanxmeer, twice a year there is a more strategic level meeting between municipality and one or two board members of the BEL.

[...] with the one of the yeah how do you call them the council man of the board of the municipality. Yeah so you have the mayor and the board and so there's two members of the board are also responsible for the management of this area and they discuss issues together with the board member

Even the municipality supports and recognizes this organized structure and their role in building cooperation. The residents feel positive about the involvement of their local government and this overall cooperation with the municipality has been established through the resident associations.

The last two years they are very active on that and when they start taking a role in developing this area they were also very ambitious but in between they were not, now they have an alderman who is from green left party so he is very ambitious and he contributes also to a lot of new green ideas and he is very positive about sustainable devt

4.2.2.2 Relation between municipality and neighbourhood

The involvement and cooperation between the community and the municipality also has historical relevance. Both the neighbourhoods were formed with support from the partnership developed between the first inhabitants and the local municipality. Communication was always facilitated and sometimes actively steered by the members of the resident bodies. For instance, in EVA Lanxmeer, the cooperation between the municipality and BEL intensified in 2004 when they became partners to discuss various issues. BEL is also responsible for issuing a newsletter to keep the community connected and updated.

The representatives of all working parties have their meetings together for decision making. The board general meeting is twice a year, the role of the board is rather small and more interaction occur between these working groups. Thus, BEL plays a strong role in maintaining relations of these internal networks with networks outside as quoted by one of the oldest residents : “Without BEL, there will be strange uncertain relationship with municipality”.

The relation of BEL with the municipality also underwent through some tensions. Till 2003, the municipality used to work with the association of inhabitants for coordinating the development of new plans. From 2003 onwards, BEL was not a part of this process anymore. Later, between 2003-2008 some projects were developed when the inhabitants could only see the plans when they were about to be realized and one such plan created a conflict. This plan was for an apartment complex which was “glued to a road and just next to houses in agriculture green houses”. This was perceived to have a huge impact and the residents wanted adjustments in the plan to situate it away from the road and in slightly different orientation. The residents wanted that on the parcel the houses should be accompanied with a private garden and 55 sq meters of collective gardens in line with their historical plan for the neighbourhood. The new developments were not following this rule which created unrest. In order to get this plan altered, the residents filed a case in a higher court and fought against the municipality. In 2011, the proposed apartment complex was finalized and the municipality changed the plan so as to make it more acceptable to the residents. This led to the creation of a working group within BEL called TOPLA which now works with the municipality to develop and negotiate the building criteria that the municipality gives to the developers of a parcel. This partnership emerged out of a conflict situation and was made possible through the network management and steering strategies of BEL.

In GWL Terrein, the cases of conflict and tension were within the residents of the neighbourhood. This was observed only one time when four of the blocks wanted to build an extra floor on top which faced opposition from the neighbouring blocks. In this case, the permission was granted by official agencies but due to the unrest between the resident groups, the umbrella association had to step in to intervene and mediate the conflict.

4.2.2.3 Conclusion on the influence of cooperation on transition

Analysis reveals that cooperation will have a fairly important role to play in shaping transition. This can be commented by observing the strong communication networks and consistency of resident interaction. However, a new factor of ‘social cohesion’ was observed which can be said to be a result of these strong communication pathways. This is also observed from the fact that the residents valued the car free nature of their neighbourhoods and the community gardens that they shared with each other which could not have been possible without greater levels of cooperation and cohesion. This is directly related to the ‘Share’ feature of circularity as per the ReSOLVE framework.

4.2.3 Collaborations and Partnerships

The factor of collaboration was measured by studying the partnerships. The experts and municipality officials were asked to cite key partnerships that they thought were working well between certain kinds of stakeholders and also mention about partnerships that were absent and need to be built. This section is divided into presenting the responses for both existing and proposed partnerships.

4.2.3.1 Existing Partnerships

Municipality and residents

Partnership between the municipality and residents was highly organised in both the cases through the organised associations. In case of Lanxmeer, for instance, the parcels in the area were developed on a parcel to parcel basis without an overall detailed plan. In 2010, the resident group worked together with the municipality on a 41:20 *bestemming* plan (destination plan). The group TOPLA was established to make sure that if a developer wishing to develop a parcel would visit the municipality, then the developer would also need to contact TOPLA. This ensured that they would have the same information as the municipality. They also were there in the plan approval stage. In GWL terrain the residents partnered with the municipality for improving the landscape architecture in their area. This required working on plans with the landscape architect which the city provided them. The residents held community consultations where several plans were discussed elaborately and decision was taken mutually. The residents then took the responsibility for maintaining the new garden spaces.

The experts also cited energy corporations as important agents and good examples of collaborative models which took care of their energy supplies and develop RE within their neighbourhoods. Later, on field, this was seen in the neighbourhood of Lanxmeer where the citizens have established an energy cooperative and their next project seems to be lighting the parking lots with renewable energy (RE) for which they plan to partner with municipality etc. Now there is a group busy with collective solar panels on the public parking place that's not a ball game because that's on the roof we need to make a construction then we have to place the panels on public space so then we need to cooperate with municipality because municipality decides what's happening on the land so then we need to make a plan then municipality needs to give a permission for it and maybe they want money for it to some extent then because project is so big like 650 solar panels we also need to do an agreement with the grid company which in Netherlands is privatized, [...] so then we have to discuss with them what the cost will be of to the project to the grids and then we have to contract the company who wants to buy the energy or if you want to sell it to ourselves we have to organize it ourselves [...]

We are this year we will have one of the parking places filled with solar panels and I am just starting a project, it's a feasibility study we do this from starting august till November. It's a feasibility study on three business cases, one is linked to electric transportation so if we have this solar panels production of solar energy if we have that how are we going to use it in the area? so that's the main question we want to address because we can store it in electric vehicles, we can store it in boilers because almost every house has a boiler of at least 450 l and or we can store it or we can do something with the most response.

Leadership for undertaking partnerships was not restricted only to residents. These were also actively developed by the municipalities themselves. For instance, the Culemborg municipality shared its intent of working together with nine other municipalities on Sustainability as one of the key agenda items. Haarlemmermeer municipality was observed to be a step ahead and even accepted their seriousness towards citizen engagement as according to them the citizens seem to be demanding circularity in vision planning exercise for the city.

In this municipality participation of citizens is very important and I self have organised some workshops about development of new neighbourhoods in this municipality and I invited both private sector as citizens to discuss how that neighbourhood has to look in future and what satisfies us is that everyone is saying it has to be circular, it has to be future proof and do you want to do that in every neighbourhood here that we develop in future? We also have a force, the existing neighbourhoods there has to be done a lot of too but our vision is that everything that we build new it has to be future proof already so you cant make the same mistakes again and again so that has to be good.

Adding to it, the official shared that there were different types of networks, so their relations with the citizens was not only government and citizens but also as a partner in development to a circular economy. In the area of waste management transition, the municipality is working on a pilot experiment where they have selected three areas that are differing from each other and asking the people what do you think is the best system for you? How can you take the waste to a lower level and take in the most of the valuable resources out of it like plastics and metals or garden waste and make something valuable from it? The municipality

official cited this as a huge success drawing a key learning that listening to citizens and what they think that fits them at the best, is actually giving them good solutions.

Municipalities like Haarlemmermeer are also engaging with citizens about development of new neighbourhoods. They are increasingly being told by various stakeholders that the future has to be circular.

I invited both private sector as citizens to discuss how that neighbourhood has to look in future and what satisfies us is that everyone is saying it has to be circular, it has to be future proof and do you want to do that in every neighbourhood here that we develop in

future? We also have a force, the existing neighbourhoods there has to be done a lot of too but our vision is that everything that we build new it has to be future proof already so you cant make the same mistakes again and again so that has to be good

Green deals

The example of Green deals was cited as a great example of collaborative governance. This new governance scheme is also being promoted by the European Commission. The idea is that the government chooses few products to work with collaboratively and understand the barriers. For instance, looking at financial barriers like funding , regulatory barriers etc. For instance, is there a lack of regulation or a change is required in existing ones. So this offers opportunities where the government is actually willing to change regulation based on these collaborative efforts. This displays innovation in terms of how they are willing to iterate, learn, collaborate and listen.

Knowledge partnerships

The Horizon 2020 EU research project was cited as a key research partnership which was implementing circular economy related projects in Netherlands. Other than that, there were several positive and fruitful collaborations listed between knowledge institutes, both universities and research centres and the municipalities which sometimes also involved smaller and bigger companies. The example of Buiksloterham where the consultancy agency Metabolic acted as a leader and brought together several stakeholders was cited.

We had a Circular Buiksloterham manifesto was signed in 2015 signed by different parties basically having a vision of different parties that developed the area. from that we got lot of attention from diff municipalities not only Netherlands but also across the world. All had interest in seeing how we done that, I think bottom up approach appeals to other people and also how its conceptual and basically executed in a structured way so that ways its been quite successful.

[...] I think there is really group of citizens that want to achieve something combined with the knowledge of Metabolic, waterboard that wants to experiment, municipality that wants to give them space, I think that's a good job of getting something from the ground and developing it, so I think that could be a best practice in building this networks around circular devt. And be a good example, if in practice, still have to see.

Local and National governments

Netherlands has a national plan for circular economy which focuses on inter-departmental development of circular economy and it includes a resources agreement which is aligned to the Paris agreement on climate change. Municipalities like Haarlemmermeer has signed that agreement and are often quoted as one of the front runners. They are also working on establishing a circular resources program for the Amsterdam metropolitan area with a focus on nine resources like biomass, built environment, plastics, electronical waste, mattresses, metals etc.

4.2.3.2 Proposed partnerships

Regarding the point on the missing partnerships, it was felt that the coalition that needs to be stronger should be between developers and municipality and also within the municipality. Since the municipality is comprised of several departments for instance, the land office, who might be economically driven with profitability ambitions rather than looking at sustainability parameters. Other categories are presented as follows:

Municipalities and entrepreneurs

This partnership is required wherein different municipalities give support to the local entrepreneurs by financing different meetups, by financing different expositions where they showcase their space, by perhaps subsidizing some of them and just by legitimising them, by giving them the permits that they require, being quiet lenient in the requirements that they need.

Private companies and small innovators

It was suggested that the partnerships between the private sector and small innovators needs to be strengthened further. To some extent, it is being observed already when entrepreneurs and their innovations are financially supported by bigger companies.

Municipality and infrastructure and service providers

The infrastructure providers were recognised as important stakeholders for building circularity. And herein an important partnership was recommended, the partnership with local governments. It is recommended that the government makes strong legislations and legal requirements for circularity so that housing corporations inbuilt the same in their projects. It was suggested that the municipality should take it forward in terms of urban development projects but also in terms of giving creative entrepreneurs and other people who want to take initiatives, the space and room for penetration. The case of setting up living laboratories was cited as an example through which the municipality could directly give permission and also legitimization to entrepreneurs. They also need to get water authority boards and energy suppliers on board with circular thinking because essentially these are the people that you need for infrastructure to be linked. An example of the regional water authority board of Amsterdam was cited wherein recently they started taking steps towards building more circular water systems in neighbourhoods in response to the rising demand from the residents. They actively supported a lot of the decentralised sanitation and water projects while maintaining some control over it due to the safety regulations on drinking water for the general public. This highlight the challenges that authorities might face sometimes when it comes to doing a balance act between supporting initiatives but also acting within the legislation structures.

[...] its quite difficult because you are dealing with infrastructure that's its really difficult to do so without basically breaking it apart. And that is really difficult because all a lot of these buildings are protected nationally so its very difficult to even do restoration work on them but definitely to change the infrastructure so I think the most important stakeholder for that is again the municipality because they are the ones determining what you can and cannot do to this building and where they have a lot more freedom in industrial area they barely have freedom in older areas so I think that's definitely one.

4.2.3.3 Conclusion on influence of collaborations and partnerships

An important learning from these interactions was that transitioning to Circular Economy requires partnerships between all kinds of actors. So while businesses are innovating and

implementing new solutions, it is obvious that without having policy makers actively engaged, it will be difficult to create the right enabling conditions for implementation. Depending on the governance levels of the specific governments they have different methods to use to help the transition to a Circular economy. It is also clear that at some point partnerships between residents and municipalities, residents and private sector and entrepreneurs will also be required for the larger uptake of principles and services covered under the circular economy regime.

Another learning was that not all loops can be closed at the neighbourhood level. For instance, the resident in Lanxmeer said that for household waste, they never intended to manage it in the area itself but instead the municipality of Culemborg was tackling it in collaboration with nine other municipalities. So circularity is being organized at a much bigger scale. Similarly, at some stage, there was a proposal for a biogas plant in the neighbourhood (directly related to Loop feature of CE) however, it was concluded not to be economically feasible.

[...] the energy gained will cover only 15% of the production cost so not feasible at all. Not at all. The only thing if we could also save money with the sewage company so if the public sewage company would give us back the money that we spent on cleaning the water, that would then add 30% so then we are at 45% in total, still 55% to go, so we will always lack money to do that so at this scale. Even at the level of the Netherlands [...] they have developed a system for using the energy from the sewerage water, which you call energy fabric to using that energy for the process and they only get it feasible when there are more than 100,000 households are linked to the sewage system. Here for Culemborg its only 11,000 that are linked to the grid so its far too small and then for this area only its even smaller so there is no economic sense to do this at this scale.

4.2.4 Trust in networks

One of the components of this network governance study was on understanding: How trust is viewed in networks? Without an exception everybody stressed on the paramount role of the trust. However, it was viewed differently by different stakeholders. Some experts mentioned it in the connection between data availability and raw materials supply and demand. This was stated in context of what can data do for aligning the supply and demand of certain raw materials that is currently questioned when it comes to construction demolition flows or other commodities or maybe critical metals. This is where trust plays a role because opening up certain types of information to other people needs to be built on trust or very clear agreements and these clear agreements also are built on trust.

In context to the creation of the early communities in the neighbourhood, the level of trust was high because the ambition was the same- to build an eco neighbourhood. But for transitioning to Circular Economy, it was felt that one will require more than trust, for instance, better business models that make more economic sense and innovation and creativity that makes it appealing. One of the stakeholders cited the example of Almere since it has been observed that it is typically attracting the kind of people that have a bit of a more entrepreneurial spirit and are also willing to explore what's possible in making the neighbourhoods completely circular. There is a level of self organization as well as innovation since they are not relying on sewerage services or electricity supply or gas supply from elsewhere.

Almere is building on east side of Almere – Oosterwold, municipality is clearing areas for residential development without putting any infrastructure in terms of electricity, sewage, whatever or gas infrastructure which are traditional things that we always put in the ground first, they just clear the area and say well you do the thing, you probably as a home owner you know best how to make this circular. You might not need us to or might not need electricity connection and I think that's these are very promising initiatives and also innovation really takes the concept further.

In EVA Lanxmeer, all tenants and buyers are required to join the residents' association and sign an agreement in which they endorse the aims of the neighbourhood. The main points in this agreement are the decentralized parking arrangements, the ban on the use of bleach in

kitchens and bathrooms, which is harmful to the helophyte filters used for the biological water purification in wetlands located around the edges of the neighbourhood. This underlines the fact that the residents have obligations to the neighbourhood. They must make a clear commitment to the environment and be prepared to participate in the preparation of plans and the maintenance of the communal gardens in the neighbourhood. In GWL Terrein the residents are obliged by the Association of Owners, corporation and occupation committee to be a member of the GWL Terrain Dome Association, and thereby responsible for the management of the neighborhood. However, there is no formal agreement of the residents to engage in environment sustainability and cooperation is currently exercised mostly through goodwill trust.

It was also highlighted that gaining trust from people differs at various stages. This was observed in the two neighbourhoods where in the initial phase, a lot of people that think alike came together and in that phase it was easy to give trust and gain trust. But while scaling up things (in this case building circularity) it gets important to make trust less important and instead rely on good business models and then talking in terms of money works because that then becomes the universal language between all kinds of different stakeholders. It was also opined that its necessary to clarify that a circular concept is not only profitable for one party but can be profitable for all parties and in that case which inturn requires new business models. Closely related to trust comes the role of ownership as cited by a resident from Lanxmeer who cited example of the communal garden and said:

Why is this communal garden so nice? It wont be nice if municipality will develop it and have the public officers to maintain it .never. Its because the people around here take ownership of this garden why do they do that? Basically because all the people that live around this communal garden have been able to take responsibility for the design of the area so all our wishes our dreams are in this garden we have produced it ourselves and that's why we are we also take the time to put the effort in it to keep it nice its our garden and so it means that the ownership or sometimes not even the hard ownership this case its also the hard ownership if its only the sense of ownership is distributed you get out of this control and if sense of ownership. If the people in here have working in an organization they lose sense of ownership what they are doing cause you just yeah become a robot . so building trust is about in my words its about creating a sense of ownership

It was also highlighted that for any circular project to be a success, it needs to be supported from top down and execution needs to come from bottom up and for that to really be a success, then people need to trust each other. In this direction, the municipality needs to give a freedom to residents to execute the projects and in the same way the residents need to give them a certain respect and trust back to ensure that the project is actually executed. This is infact being observed in Lanxmeer for certain solar projects. Interestingly, the top-down, bottom-up approach was highlighted time and again in response to questions that were un related to it. These discussions have been summarized in section 4.3.8.1.

The role of clear communication was also linked back to the aspect of trust indicating its importance.

[...] matters that are discussed in BEL are also discussed in gardens, problems in gardens are also discussed in the BEL so there are open communication channels also to hear what is experienced on a local individual level and its discussed on in the BEL which is a neighbourhood organization, so these lines are quite fluid and quite open

From a practitioner's view point, the team leader of the Wasted initiative commented that in order to build trust, you need a lot of interaction to show the people that you actually know what you are doing and talking about and you have to be open minded. He stressed on continuous engagement and communication with the stakeholders. This approach of WASTED is observed in the special focus that they give to capacity building programmes for the residents, which they feel is the key for achieving the goals of waste related circularity projects.

4.2.4.1 Conclusion on the influence of trust for transition

Going back to the definition of trust presented in Chapter 2 (stable positive expectation that actor A has (or predicts he has) of the intentions and motives of actor B.....), it is observed that the social cohesion has an influence on trust. The self-organization nature observed in the neighbourhoods in the form of organized resident networks support the built up of this trust. It was observed that both types of trust: Goodwill as well as Agreement Trust was present in the neighbourhoods. Since not all circular economy features are present currently in the neighbourhood, it is tough to comment on the presence of 'Reliability' and 'Absence of opportunistic behaviour' types of trust since these can be studied in detail only in context of certain circular projects. Since some of these projects are being planned in the future, this was not possible to study in entirety through this study.

4.2.5 Circular initiatives in the neighbourhood

4.2.5.1 EVA Lanxmeer, Culemborg

EVA Lanxmeer was built on a waterfield area and was divided into four zones. It was based on principles of permaculture and organic design.

[...] that was a part of the aims of the EVA Foundation we had it officially in our aim to create sustainable durable circumstances for people to live their lives more sustainable and to be involved in create your own environment yourself and I think that is important when your aim is ultimately even circular economy but CE to me is a sound that is that also needs a basis and more sustainable or durable the basis is how easier it is to get to CE that's my conviction. (Founder, EVA Foundation)

The fundament of houses was a form of a concrete and the rule was that layer of clay that is removed to make fundament has the same weight as fundament and house itself. Therefore the houses adopt a light construction model which means that the underground is not pressed which preserves the whole water system.

With respect to water management, the key activities are as follows:

- i) Water retention: The rain water is separated from the sewage system and is captured in retention ponds
- ii) Water purification: The grey water is purified in reet bed filters

A biogas plant was initially planned as part of an EVA centre. The biogas plant was never set up because the plan for the EVA centre failed due to funding constraints. Later, a feasibility study by group of residents concluded that it was economically not feasible to set up a biogas plant. Initially the black water stream was to be directed towards the biogas plant but currently it is going into the public sewage system. Hence this loop could not be closed in this neighbourhood. Eva lanxmeer has a community heating system. For managing the household waste, the city municipality is partnering with 9 other neighbouring municipalities, so circularity loop for waste is organized at a much larger scale. Therefore, the neighbourhood does exactly the same as anybody else in Culemborg, they sort their waste into an organic bin, a paper bin and they also have a plastic waste container which is collected every two weeks. Other bigger waste bigger household waste like stones or furniture are brought to a recycle point.

One of the initiatives by the citizens was the introduction of communal gardens next to their private gardens. For example, the residents share one big piece of land of around 800 sq meter with 18 neighbours which means that at the time of purchasing the house, they have their own parcel with private lands but they also have 1/18th part of the whole as co-ownership.

For the energy sector, the neighbourhood had a target to reduce their fossil energy load by 50% compared to an average household elsewhere. The average fossil energy consumption in average household in Netherlands in the year 2000 was 85 Giga joules so the target was to reach 40 Gj and this was achieved by the residents (See Figure 7). Several residents have individual solar panels which they either own individually but also sometimes collectively, which also makes it cheaper for a group of houses. There are some upcoming initiatives to cover their public parking places with Solar PVs so the target is to become self-sufficient in future. In this direction, there is a local energy co-operative comprised of the residents which has been established as a limited company and the shares of the limited company are owned by the cooperative. They have to present a budget and status of accounts every year and their investment and growth plans.

Since these panels will be placed on public space, they need to cooperate with the municipality because municipality decides what's happening on their land. So a plan needs to be drawn and approved and since it is a big project of 650 solar panels, they also need an agreement with the grid company which is privatized or semi-privatized. There will be discussions on the cost of the project and mechanisms for buying and selling the energy.

The energy cooperative is also undertaking feasibility studies on business cases for using the energy produced for electric transportation, for storing the energy in boilers for heating purpose etc.

The neighbourhood also follows car-free principles. It is clearly outlined in the contracts of the residents, that they have to park their car at the central parking place.

An exception is provided for the category of houses that have private offices attached to them. This category of residents are allowed to give up a portion of their private front gardens to make a parking place for their visitors.

Figure 7: Sustainable and Circular initiatives in EVA Lanxmeer



4.2.5.2 GWL Terrein

GWL terrein in Amsterdam was nominated as a national demonstration project for energy efficient and sustainable building. The sustainable building measures for the buildings include: reduced energy use (through increased insulation, energy-efficient windows, passive solar gain and district heating with a heat and power generator); rainwater-flushed toilet systems (in the three-level blocks); green roofs (on high-rise buildings). At GWL–terrein, material choices are based on environmental preference lists provided by the city of Amsterdam. The houses are built with environmentally friendly materials, such as pine granulate concrete, wooden slabs and environmentally friendly woods and paint systems. On the high rise, sedum roofs are laid out (*translated from documents shared in Dutch by key informant).

The neighbourhood has 17 blocks and includes all kinds of housing: privately owned, social rent, disabled people (Miva) homes, studio houses, old age homes etc. It was developed as a car free zone with only 100 parking permits available to 600 houses. This means that one out of the six apartments can have a car which is lowest in Amsterdam and the official waiting list for owning a car is 19 years.

"It was a beautiful area, with beautiful old buildings, such as the beautiful warehouse building, almost industrial buildings. The ground was clean and without cars it looked very green. An ideal place to live environmentally friendly. A lot of people came up who were willing to leave their car to live there. "

The residents were involved in the planning process from the very beginning and worked closely to give their inputs to the principal architects. The residents also manage community gardens and the presence of these initiatives has created high social cohesion among the residents. Despite its location close to the city centre and high density dwellings, the green spaces have created natural buffer zones.

[...] you have little plots 4 by 4 where people can grow flowers and stuff you can rent it theres little organization doing it think about 80...so people are in the garden talking theres playground next to it children are playing, people are growing vegetables stuff like that we also have around 100 apple trees all high apple trees cutting them in spring in autumn pick apples everybodys in square in afternoon theres apple pie so all these little networks they overlap,

Like EVA Lanxmeer, this neighbourhood too had a target to reduce their energy consumption by 50% as compared to other households.

Solar panels were initially not part of the project so they had the city heating system which follows a co-generation process (electricity and hot water). Few blocks have solar panels now. For instance, one of the block has around 250 solar panels which provides energy for elevators. The sun's orientation has been taken into consideration and the houses are provided with hotfill facilities, and since early construction time, water-efficient 'Gustavsberg toilets' were built. The buildings also have grey water systems using rain water for the toilet flushing purposes and they also collect rain water which is not connected to the sewage system, so the rain water is goes either in the ground which has a lot of unpaved green spaces or goes into the ground. For the waste, in Amsterdam there are underground containers which the neighbourhood is dependent on so there is no special provision for waste management within the neighbourhood.

When the area was built the previous water cellars were torn down and the grinded concrete was used in the new concrete for the new buildings so all the construction waste was utilised. On a social level, there are sharing practices between the residents, for instance they have a separate platform for car sharing and some families also work together for the maintenance of the gardens which is also a place for social interactions.

[...] its also very nice because yeah and you have here certain trees they are fruit trees and the municipality doesn't want to do maintenance so we have to do it and that's also a way to meet people and same interests. When the fruit is ready to pick you can , we tell everybody we have a site and then you can read the children are allowed to come visit to pick up apples. And that connects also

4.2.5.3 Conclusion on the influence of trust for transition

Presence of circular initiatives in the neighbourhood:

| Circular city Principle/ Variables for measuring CE | EVA Lanxmeer | GWL Terrein |
|--|---|---|
| Regenerate | Solar panels, urban farms | Solar panels, urban farms |
| Share | Car sharing initiatives, community urban farm | Car sharing initiatives, community urban gardens |
| Optimise | No retrofitting however, upcoming smart grid initiative (being planned for future) | Few efforts for building energy efficiency in place |
| Loop | There was a proposal for a community bio-digester but it was eventually not built. | No special initiative for recycling in the neighbourhood, being done at city level scale. |
| Virtualize | None | None |
| Exchange | Circular construction material was used to build the foundations and some parts of the houses | Circular construction during the early stages of development, |

| | | |
|--|--|---|
| | | reused the concretes from buildings that were demolished. |
|--|--|---|

4.2.6 Accelerators for transition

Since one of the sub research questions focused on identifying accelerators and barriers with respect to transitioning to circular economy. Each stakeholder was asked to respond on the same. The responses were gathered and clubbed under various headers to deliver the key messages. For some barriers, few stakeholders also recommended measures, the same have been listed out wherever applicable.

4.2.6.1 Positive and innovative labelling

Effective communication by ways of careful labelling of ‘Circularity’ and ‘Circular economy’ emerged as an overarching theme in all the discussions. Experts emphasized on importance of simplifying the technical jargons and communicating it at ground level innovatively. Residents suggested that the agenda of circular economy should be linked to their dreams and their problems so that they create a sense of ownership of it, which will lead to larger uptake and impact. By doing so, then circular economy can be interpreted and adopted by different neighbourhoods differently based on their priorities (for instance, some may prioritise energy projects over waste). This will also have implications on scales and stages of transition.

4.2.6.2 Consumer awareness

Instead of proposing the generic ‘awareness’ measure, the recommendation was rather specific on the need for consumer awareness about their ‘resource footprint’. This action is envisioned as a stimulant and accelerator of transition to CE. The example of the consumer markets was cited as an example by one of the experts who observed:

that’s also the reason why CE is getting most traction in the consumer markets whether its textiles or mobile phone companies or telecom companies. Its really the consumer product industries that approaches them not so much the which I think the construction industry will probably follow and but the more further away from the consumer it is, sort of the more alien to environmental concerns they typically are

This highlights the opportunity and advantage provided by a particular type of industry which demands focus instead of assuming an all inclusive generic approach.

4.2.6.3 An ambitious government and a policy push

Political will and an ambitious government was cited as another important potential accelerator. Most experts and practitioners appreciated the CE package at European level and the efforts of really enabling funding through it. They cited few success stories of the change enabled through these projects. But there was a unanimous demand for more political will and courage in this direction at all levels of government.

The biggest drive forward for CE was envisioned through policy and regulations. As mentioned before, the outlining of 65% of recycled waste target was felt as a good incentive

for the Amsterdam municipality to start working on it themselves. It was suggested that with this policy in place they could start reorganizing their organization and start pushing neighbourhoods and businesses for action.

4.2.6.4 Cooperation between different actors

In support with the network governance theory, stakeholders agreed that cooperation between different actors was imperative for accelerating the transition. It was felt that each stakeholder had a distinct role but cooperation and partnerships between these various roles would help each of them overcome their individual barriers and this collaborative strength would then act as an accelerator.

4.2.7 Barriers to transition

4.2.7.1 Implementation difficulties

It was felt that often the difficulty sets in due to the voluntary nature of state of things. So the green deals initiative is voluntarily where businesses are asked to see how they can reduce energy, make things circular but in the end nothing much gets done because it is voluntarily and therefore also the lowest on people's agenda.

[...] makes it really difficult if there is no stick lets say to actually get things moving so and then you remain a bit in the ambitions but you never reach the implementation. So I think implementation is difficult part and that's probably done more at the local level.

4.2.7.2 Clash of interests

An important barrier for any type of change was pointed out as the interest of the big companies. For instance, an example quoted from the mitigation perspective was the opposition to substitution of enforced concrete with wood based construction materials. The traditional construction industry was fierce opposing it, including the cement producers and the iron bars producers. Thus the absence of factoring in at all the environmental consequences of the linear economy is proving out to be the biggest barrier.

4.2.7.3 Market not reflecting true costs

It was observed that there was a huge lock in, in the market and currently the market does not reflect true costs. This holds true especially when it comes to low value goods like plastics or textiles, where its very difficult to change practices because it is not profitable. Since we have an economy that is very much market driven so currently this poses as a barrier but a reverse shift in thinking and practices in the market can also become a big potential.

4.2.7.4 Old legislations

Old legislations and rules introduced pre- circular economy era were cited as major hindrances. Some examples were like the national monument rules, which restricted changes

in master plans and other legislations that created lock in scenarios typically for new developments which had to rely on getting energy and materials from certain suppliers only, for lock in periods of 10, 20 and even 30 years. This was observed as very difficult barrier to overcome despite situations where people were very ambitious and wanted to make changes but could not for another 10-15 years.

A stakeholder cited cases of businesses that really want to start becoming more circular for example a construction company that wanted to build a house made up of recycled plastic but there were so many safety regulations which obstructed the vision. On one hand the government wants to promote a Circular Economy but then they contradictory regulations in place which don't connect. It was suggested that there should be more connections between the national, regional and local governments so that the agenda of CE is imbibed throughout the entire govt and not just the ministry of infrastructure and environment

4.2.7.5 Borders between various actors

Lack of cooperation between different actors in different sectors was observed as an obstacle. Often it was felt that the opportunities for achieving circularity in fact was lying between the borders of various actors and their institutional arrangements or lack of it.

It is still very hard to look outside of your own box where you work and most of the opportunities on CE lies between the border, between your organisation and that of the other if you look at different supply chains for example or at financing, I can have a great idea to implement but if the bank doesn't finance me and doesn't see that opportunity, I have a problem so I think its between, its right on the border between different actors

4.2.7.6 Funding for experimentation and innovation

It was felt that there was a lack of financial resources or funding that inhibited the playing field for experimentation and innovation. There was a requirement for providing funding to innovators to start experimenting, a 'playground for experimentation on circularity'. Funding for multi-year projects was especially recommended since results take time to build up and one always need to first experiment what works, what doesn't work for careful replication which again requires funding.

4.2.7.7 Behavioral change

The general sentiment that resonated in the responses was that change of any kind was not easy, especially behavioral. It was comfortable and easy to maintain a status-quo then to initiate change. Often rethinking on materials and resources creates discomfort and resistance since we are used to a linear way of thinking.

[...] theres lot of money involved in measures against climate change , the temporarily natural gas , gasoline and benzene there are comfortable it works its affordable we are used to it so we have to change and every change is difficult and if you are used to for 20 years to live in a certain way and the govt says you have to change why?

Besides the discussions on barriers, some solutions were also proposed to address the same. Most of the suggestions were directed towards authorities and decision making agencies. For instance, it was suggested that the municipalities should just start working towards the transition while simultaneously recording all the lessons to guide future decisions.

These could include recording the hurdles and accordingly reviewing the legislations that need to be removed or altered; which processes have to be changed; which barriers do the

actors come across when they try adopting circularity. It was envisioned that at a strategic level starting these experiments will enable crossing silos thinking within the municipality but also outside on the ground, with different businesses and inhabitants working together. Another suggestion was tax reforms so that it moves the tax burden away from labour on to the resources. This when done on a large scale and consistently is expected to generate more circular economy opportunities. This will also enable the bigger corporations to step in. Additionally, it was suggested that the tax system should factor in environmental consequences of heavy resource use or on the other hand try to encourage what we want more of which is labour, discourage which we want less of which is resource extraction. These principles were suggested as key steps for removing barriers and accelerating the overall process.

An interesting insight was that the experts were looking at developing economies as more circular since they use more local and sustainable resources since sometimes the limitations of developed nations is its dependence on other markets and absence of a local market.

So China also is doing some great things locally building green cities and atleast on paper they look very good and I am not sure if they work, well they have to prove themselves in the coming years in practice...and everything fits very well they are much local, they are using local resources and are able to make very much more local circular systems.

4.2.7 Other discussion themes

As mentioned earlier, additional codes were developed during the analysis stage in atlas Ti. These were based on the new knowledge received during the interviews and these are derived from the most commonly recurring themes from the data, which do not necessarily fall under dependent or independent variables for this study. This section presents the same. It is still crucial to share these findings on them since it does overall contribute to the overall picture that emerged as a result of this study.

4.2.7.1 Top down and Bottom up initiatives

While discussing regarding the formulation of the neighbourhoods, the residents reported that a combination of these forces led to the realization of these neighbourhoods. They noted that at some point top forces dominated which was necessary for fulfilment of processes, but eventually partnerships were developed with the bottom forces who then controlled and steered various functions in the neighbourhoods. The role of a mediator or facilitator was taken by individuals like Marlein Kaptein of the EVA foundation and early group of residents in GWL Terrein. Some individuals led pioneering groups to organise themselves and at some stage partnerships between bottom up and top down actors was deemed necessary for the development of the neighbourhoods.

As pointed by an expert, the smaller initiatives (by bottom forces) often hit the boundaries of outer system (Controlled by top forces). The balance of these forces is necessary. Sometimes it is observed that there is traction from the bottom which doesn't really need support from the top. For instance, the initiatives with attractive financial models, the example of use of coffee ground to grow mushrooms was cited as one.

Mushrooms being a globally growing market for a very high quality protein and if you look at the sheer size of the amount of waste that comes out of our global coffee industry and the fact that we only use 0.2% of the material in our coffee . that has these amounts and these numbers already tell us the potential to tap into that waste source . so these are

things that will go on their own

In the context of the neighbourhoods, some levels of self organized governance does exist. Through BEL in Lanxmeer and umbrella association in GWL, residents are able to exercise control on ownership and management of their communal gardens and energy management.

Since the study explores how can network governance aid in transition, observations from field and analyzing the qualitative data leads to an inference that sometimes if you have a community that already has a strong network governance basis and then they look at circular concepts and then they say wow it fits us really well and then it gets easy to implement those circular concepts because its already something that fits within the way they are organised and the way they live. Sometimes they have a very local economy which makes things also a bit easier with local loops of resources and sometimes you have group of people which are just very ambitious concerning circular concepts and nature based concepts and then they have to struggle with the governance structure that they have to deal with and that's much more difficult

It was observed that eventually if you want any of these circular projects to be a success then it needs to be support from top down and execution from bottom up and for that to really be a success then people need to trust each other you need to the municipality needs to give a freedom to residents to execute the projects and on the same way the residents need to give them a certain respect and trust back to the municipality to ensure that the project is actually executed. As mentioned before the smaller initiatives may encounter boundaries that are set by those larger institutions like regulatory boundaries or they will find that the financial system is not yet cooperating, banking, banks may not be financing circular initiatives because they are not yet adjusted to this new way of thinking. This again reiterates the role of collaboration and partnerships between all actors driving the top and bottom forces becomes necessary so I think it really both are needed they both need to complement each other because the larger system should be prepared for this and maybe also give directions for change but experimentation is needed too.

4.2.7.2 Stage of transition

Besides commenting on the network governance factors, the respondents were also asked about their viewpoints on the stage of transition in the Netherlands. Each stakeholder brought insights on various scales – regional, national, local. Almost all of them agreed that Circular Economy gained ground really quickly in the Netherlands which gave it a headstart. The experts were divided on their comments, with some very confident on the front running position or advanced stage of transition and others of the opinion that we were still observing early stages of transition.

Commenting on the scale, experts pointed out that since the Netherlands does not really have a production economy so there are only couple of things that are really produced within Netherlands itself so on the production side, circularity is at a very much small scale. On the living environment side, in context to the case study areas in Amsterdam and Culemborg, there was some agreement that those were indeed created through network governance, very much bottom up in nature but relatively unique right now in the Netherlands.

There was an observation that the future lies in the housing sector, i.e. the buildings sector and it should be done in a way where it is integrated in the system. It was cited as an opportunity:

So I think that for the new areas there is a chance to give a boost to circular concepts for building and reusing materials from demolished buildings elsewhere in new buildings that need to be built right now and my hope is that using that new materials will also, or my expectation is that it will also be possible to create cheaper constructions

This opportunity was directed towards the architects and urban designers to cater to the citizens who were looking for affordable and cheaper ways to build their homes. Some suggested measures included usage of pre-fab lightweight circular housing materials.

Those who believed that we were still talking of early stages of transition cited the reasons for the same. Their observation was that while Netherlands is certainly beyond the pre development stage and already in experimental phases for some sectors but there seems to be some hindering factors. Legislation and dominance way of linear thinking about when it comes to aspects of the CE was cited as one of these factors.

there is no real room for creating enough momentum to switch to ..to really accelerate and that's because of legislation because of lobby and lot of parties who are talking about it maybe to just be involved to slow it down but that is not something that you can of course...but that's the feeling that uhhh the current side of transition and that is based on lot of research that its hanging now and that some of the linear economy things are maybe already broken ...phasing out you could phrase it like that but most of the current economy is based on the linear thinking

During the interviews with the respondents, a portion of discussion was infact focused on discussing the accelerators and barriers for transition to CE as summarized in the previous section.

The viewpoint of the practitioner group was that each stakeholder or level of governance was at a different pace. They did recognize the way the government was actively working on it through different national resource agreements and were also trying to incorporate large businesses as well. As pointed out especially for the city of Amsterdam which is really trying to promote CE and have outlined various targets like they want to have 65 % of all the waste to be recycled in 2020 (currently its at 27%). However, it was felt that it was on a high abstract policy level leaving lots of gaps at the local level in absence of community involvement for achievement of targets.

once you look at more and more down on the local level theres a big gap between people that went to university and studied something circular and people that have a daily job as working in a shop or and you don't have that much in common with these circular economy because its such an abstract concept

4.2.7.3 Envisioning circularity

Since each actor interprets and perceives circular economy and its manifestation at a neighbourhood level differently, the respondents were asked to envision and describe a circular neighbourhood as per their understanding. Many of them envisioned a circular neighbourhood as waste free, using less fossil energy and more renewable energy with water being cleaned relatively close by. For water cycle they specifically recognised that so much of it gets lost and hence reusing grey water for instance for toilets made more sense. They envisioned it as a green space which was water resilient since it used the rain water effectively and made use of green roofs. With respect to food systems being circular, they felt that it was difficult to design the neighbourhoods in such a manner since it was dependent on independent choices and behaviour.

Some stakeholders also felt that it would look different at different places, so geographical context was noted as a key criteria. The closest manifestation or similarity of these principles was observed in some examples of living labs where people usually share a lot of assets, so 'sharing' also emerged as one of the key characteristic of such a neighbourhood.

The point on zero waste and a zero input of energy and water was reiterated. Regarding being energy neutral, it was accepted that sometimes it was not possible to get all the energy required from PV panels and in this case, scaling up requires attention. It's also important to think about the concept of energy mix wherein energy is being produced in different ways like combining solar energy with energy from heat (heat and cold storage), surface water. This would then enable a neighbourhood to be completely independent of the grid. Other stakeholders preferred not to use the term 'neutral' but the term 'positive'. Some challenges were also cited like the difficulties with achieving very high-grade drinking water quality based on the water that is available from rain. Moreover, because ground water extraction destabilizes the surface, so using drinking water from that source cannot be promoted on a local scale. It can be done only if one looks at ground water resources that are replenished, so sustainable ground water resources outside of the urban areas.

The discussion also focused on 'scales' of circularity and the feasibility of closing the loops at a neighbourhood level. For instance, an expert mentioned that everything need not be circular at the neighbourhood itself but instead the scale has to be composite which would involve collaborating with neighbouring area to reach a goal.

If we take water and you are in Netherlands and for instance in Culemborg I think they have a lot of water there available so that can be closed easily on this scale or maybe you need a bit larger scale so you take the other neighbourhoods that is there too and then you can generate more water than you use for this area in I say 2025 that's your goal you gonna work towards it and then you have energy and then you do the same process so on which scale can you be composite at which point in time and you gonna work towards that and you also gonna collaborate with the neighbouring areas or neighbourhoods or actors in order to reach this goals so I don't envision everything being circular in the neighbourhood itself and I think there are multiple pathways and there are lot of scenarios made which directions circular economy can go.

It was also observed that there is certain level of flexibility when it comes to the managerial scale of circularity. Sometimes, it can be more about sharing while in other cases it can be more about doing everything yourself individually. For instance, there is an option of an energy Cooperative but one can also opt for owning individual and private solar panels.

There can also be a scenario wherein it is a business as usual like approach where the companies solve everything which means that you just buy renewable energy from a company or buy a new phone in exchange to your old one, which does not explicitly change our ways. This means that we are using the same systems or models but for a different goal (in this case circularity). Stakeholders also highlighted that the applications of these scenarios will be dependent on the type of neighbourhood. For instance, the neighbourhood EVA Lanxmeer has a more rural environment and a strong community based thinking which enables more sharing approach. As seen in their initiative of an energy cooperative.

However, a city centre neighbourhood like GWL terrein do not have energy sharing measures with only few private individuals owning personal solar PVs. But when it comes to sharing for mobility, it is more natural since they are in the city centre and more access to public transport than EVA Lanxmeer. Private vehicle ownership in Lanxmeer is higher than GWL Terrein, also because there are limited parking permits (around 100 for 600 households).

For some resource flows it might be easier to close the loop internally than others, like retrofitting buildings for reducing energy consumption and installing PV panels to ensure that there is atleast a large share of renewables for energy provision. These are the low hanging fruits for a neighbourhood whereas for other elements, one might need to see neighbourhoods

as part of a city system and then close the loop at a larger scale. For example, the waste flows from each neighbourhoods are required to be closed at a municipal scale level through better treatment systems or different policies to make these circular principles work out. Similarly, retrofitting the water systems needs rethinking on a city scale level.

4.2.7.4 Replication

With EVA Lanxmeer and GWL being popular sustainable case studies, it was explored whether its replication was thought at some stage and if no then what will it take to replicate this model to other neighbourhoods. While this was something that was thought at several points in time, it was never materialized. Its important to understand the reasons for the same. Many stakeholders including the municipality official believed that these were exceptional cases and a key factor for their success was the drive and enthusiasm in the people who initiated the process. The municipality of Culemborg shared that they do look at implementing the sustainability angle in new and upcoming housing areas and the EVA Lanxmeer remains the key reference point.

It's a question we ask ourselves continuously how can we make success of EVA lanxmeer export to other neighborhoods it's a difficult matter uhhh because EVA lanxmeer starts with a group of very enthusiastic and people with vision etc almost once in a lifetime so that's not easy to copy the success to other neighbourhoods but we are trying to do that we have several parts of culemborg are is still growing new households are houses are built and uhhh the to deal with or to implement sustainability we try to look at EVA lanxmeer and try to get it to other projects

Regarding the uptake of energy initiatives which is a key aspect of circular systems, a resident leading the initiative shared that in order to make this transition, it will be important to link these initiatives to their dreams and create a sense of ownership around it. In doing so, the resident pointed out towards the strong role of trust, communication and building active partnerships or collaboration.

So people who don't have this mindset in the beginning they don't even have the will power in the energy transition at all because its not urgent theme so maybe you should connect this energy issue to a thing that's important to them so to figure that out listen and not imposing then if at some point [...]

In the case of GWL Terrein too, after they completed a decade, there was a symposium and a documentary capturing the process was made and disseminated. There was a lot of interest but nothing materialized with respect to replicating it to more neighbourhoods. Now a decade later, Amsterdam is making some progress with the municipality outlining several targets but there are gaps since it requires substantial investment and finance is always a roadblock. However, if this was to be replicated, the residents again pointed out on the importance of strong collaboration, one between the municipality and housing corporations and one with the residents themselves. The residents accepted that the municipality was indeed emulating their example in developing new and upcoming ones.

[...] lately lets say everything which is built now especially in west of Amsterdam but also old part of amsterdam they are all kind of 0 emissions things like that so in amsterdam its almost normal if you build a new area to make it sustainable

4.3 Discussion and Conclusion on Findings

Analysis revealed that among the network governance factors, Actors and Resources and Collaborations played an important role in shaping both the development of neighbourhoods as well as in influencing the transition to circular economy. This is because the resident associations emerged as quite powerful in terms of resources and their influence on other actors. It was found that the factor 'Cooperation' was closely connected to the factor of Actors and Resources. This can be said because the resident groups were highly organised in terms of maintaining strong communication channels with informal internal networks of residents as well as external networks of other actors. These groups helped in designing and maintaining the communal gardens, in co-producing the public green space, in developing the city farms, in developing local energy company, in developing roads and streets, in developing city parks, in developing landscape elements, just everything is being done with the participation of the inhabitants. Future circular and sustainable projects that are being planned in these neighbourhoods are being organised through these networks and groups with communication, partnership and trust emerging as other key factors. The study also revealed that the factor of social cohesion also plays an important role in these neighbourhoods. Social cohesion has an impact on building both cooperation as well as trust. This will continue to play a role for any future circular initiatives that maybe introduced in the neighbourhoods. The same can also be said for collaboration. Collaboration or partnership was foreseen as an important agent by each of the stakeholder reiterating the premise that we began with: The multi-disciplinary nature of circular economy requires action at multiple levels by all kinds of stakeholders. The study also supported the views from literature that: collaborative approach is achieved through coordination, communication, shared decision making, negotiation, resource sharing.

Lastly, the study also gained insights from various stakeholders on the perceived accelerators and barriers to transition to CE. The accelerators were listed as: Positive and innovative labelling, Consumer awareness, an ambitious government, cooperation between different actors, policy push, market. The barriers were listed as: Market not reflecting the true costs, Lock in periods of old legislations, Borders between various actors, Lack of funding for experimentation and innovation, Behavioral change and the fact that the tax burden needs to move away from labour on to resources.

Chapter 5: Conclusions and recommendations

The purpose of this research was to understand the influence of network governance factors on the transition to circular economy. The answer that emerged was positively yes, there was enough evidence to support this influence. However, there were also variables like social cohesion that could influence some of the network governance factors itself (like trust). It was also observed that not all the loops could be closed at the neighbourhood level which is usually the assumption while trying to see circular economy at a local scale. For instance, this was observed for the sectors of waste, where it was deemed more feasible to tackle it at a bigger scale with the municipality taking the lead. Similarly, at some stage, there was a proposal for a biogas plant in one of the neighbourhoods (directly related to Loop feature of CE) however, it was concluded not to be economically feasible at that scale. Under the main research questions, sub-questions were created to guide the research and the brief findings on the same have been presented.

What role does communication and cooperation play?

Both experts and residents mentioned on the need for labelling CE with care so as to simplify and make it for higher uptake and understanding. Strong communication channels were observed between residents, municipalities, private sector which also help in building stronger partnerships. Due to these strong communication networks and consistency of resident interaction it can be said that cooperation has a fairly important role to play in shaping transition. However, a new factor of ‘social cohesion’ was observed which can said to be a result of these strong communication pathways. This was also observed from the fact that the residents valued the car free nature of their neighbourhoods and the community gardens that they shared with each other which could not have been possible without greater levels of cooperation and cohesion.

What role can each stakeholder play in accelerating the transition?

The actors and resources were mapped based on the various responses received to this question. Resources were listed as power to legislate; infrastructure service provision; land and finance. Based on the roles that the actors play, the following categories emerged:

System thinkers- Academic, entrepreneurs: They trigger change, introduce concept, bring the knowledge

Municipality- Owners of land; Infrastructure provision in partnership with private sector developers

Role of citizens or residents – acceptance of change; imbibing the change; shifting lifestyle habits

It was also observed that the combination of these resources was also a power owing to the interdependencies. This nexus was recognised by several stakeholders. In the case study neighbourhoods it was observed especially that the power of the citizens as a collective formal association, i.e. BEL and umbrella body emerged as the most powerful actors. The interaction with other actors like municipality officials as well as historical instances of conflict, mediation and resolution revealed that these resident bodies were quite vital for the functioning of the neighbourhoods. When it comes to their role in shaping the transition to a circular economy, it was observed that they were indeed of paramount importance as they were connecting links and gateways for any initiative to enter into the neighbourhood.

What kind of partnerships are being built between various stakeholders?

Analysis revealed that the coalition that needs to be stronger should be between developers and municipality and also within the municipality. The huge potential for circularity in the buildings sector was recognised by various experts since several housing developments are expected in the near future. One example was seen in the form of the energy corporations that are emerging in one of the neighbourhoods which has ambitious plan to develop RE within their neighbourhoods. For this partnerships with municipality are also being explored.

The role of entrepreneurs and academic institutes was also highlighted and good practices of Green deals and Cirkelstad were also highlighted. The partnerships being developed by the Haarlemmermeer municipality was also an example of public-private-citizen partnership.

What role does trust play in a network?

Subjective perceptions were captured on this subject during the interviews. Analysis revealed that the self-organization nature observed in the neighbourhoods in the form of organized resident networks supported the built up of this trust. It was observed that both types of trust: Goodwill as well as Agreement Trust were prevalent in the neighbourhoods. Since not all circular economy features were present currently in the neighbourhood, it was tough to comment on the presence of other types of trust as identified in the literature. Also since some of these projects are being planned in the future, this was not possible to study in entirety through this study.

What are the accelerators and barriers to transition?

The accelerators were listed as: Positive and innovative labelling, Consumer awareness, an ambitious government, cooperation between different actors, policy push, market. The barriers were listed as: Market not reflecting the true costs, Lock in periods of old legislations, Borders between various actors, Lack of funding for experimentation and innovation, Behavioral change and the fact that the tax burden needs to move away from labour on to resources.

Other findings: Co-creation with residents

In both the neighbourhoods it was observed that the residents were involved in creation of the neighbourhoods since the early phases of development of the urban plan.

The municipality and residents worked together to kind of co-produce this area in close partnerships with the architects and developers. The vision of the early inhabitants was passed over to the future inhabitants through organised institutional structures. The resident groups were highly organised while maintaining strong communication channels with informal internal networks of residents. These groups helped in designing and maintaining the communal gardens, in co-producing the public green space, in developing the city farms, in developing local energy company, in developing roads and streets, in developing city parks, in developing landscape elements, just everything has been done in with participation of inhabitants. Future circular and sustainable projects that are being planned in these neighbourhoods are being organised through these networks and groups with communication, partnership and trust emerging as key factors.

Reflections and Recommendations for Future Research

When the neighbourhoods of EVA Lanxmeer (Culemborg) and GWL Terrein (Amsterdam) were developed in the late 90s, it was a partnership in a sense between the early or future inhabitants, municipality and developers. It was a co-created vision and later these were widely documented as eco-neighbourhoods or sustainable neighbourhoods by researchers from across the world.

While some observe that EVA Lanxmeer is more like countryside with spaced out development (30 ha; including working spaces) with some rural character. GWL Terrein on the other hand is a dense urban development (6 ha) right in the city centre yet buffered by their greenery and unique plan. Despite these difference, both these neighbourhoods seem to follow a car free principle, one more stricter than the other. While GWL Terrein has only 100 parking permits for roughly 600 households (A long waiting list of 19yrs to own a car if they have to park it there!). EVA Lanxmeer on the other hand has designated car spaces at the fringe of the neighbourhood, not allowing residents to park their cars in front of their homes. This has created a walkable green corridor since both have communal gardens and more safer and free playing spaces for children owing to non-interference by cars. What implication does this have? Well, not only the residents live in more harmony and direct contact with nature, the so called 'eco sustainable' principles are embedded in the planning of their spaces since the very beginning. This makes them more aware and receptive to further sustainable and circular transitions, say, introduction of biogas and solar interventions.

Besides this the removal of cars makes the inner spaces between the living areas more multi-functional and interactive. Residents agree that there are more opportunities for community interactions as they work in the garden together or simply walk in these spaces with their family at variable points of time during the day. Social cohesion, then emerges as another unforeseen factor in my research as it seems to have an overall effect on other factors. Its interesting to see how social cohesion, communication networks (both neighbourhoods have quarterly newsletters and dedicated websites) and self organised patterns of decision making impact the everyday functioning of the neighbourhoods. While this was not a community perception type of a study, but there would be merit to undertake future studies that explore the awareness and behavioral patterns of citizens staying here vis a vis other neighbourhoods on matters related to sustainability. Since some interviewees do agree and point out there is a relation, in their opinion. Bringing in this contact with nature and de-motorising our neighbourhoods can have interesting implications. One can imagine that with this natural baseline level of understanding about eco-sustainable principles, citizens can perhaps have higher levels of acceptability and open-ness or receptibility for larger local, regional and national level objectives and programmes launched by various agencies including the governments, some of whom are showing deep level of commitments to the Paris Agreement. After all the citizens have a big role to play in the implementation of SDGs.

One can also draw connections between various streams of thinking: 'Sustainable' 'Resilient' 'Low-carbon' 'Liveable' and 'Circular'. This study leaves us with some questions that might be interesting to explore in future: Are there more external factors that might have influence on network governance factors itself? Can Circularity be further decoded and simplified for widespread uptake? Are we communicating it in the right manner? By first building liveability, can it then become an important enabler for the rest to follow? Or Liveability is all where this leads to or should lead to?

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Annex 1: Research Instruments

Interview list

| S.No | Contact name | Designation | Organisation | Area of Expertise |
|------|---------------------|--|--|---|
| 1 | Mr Marco Hoogvliet | Manager of Deltares' strategic research program Sustainable Delta Cities | Deltares | Sustainable Cities (Expert in urban (ground)water and soil systems) |
| 2 | Mr Bob Geldermans | Programme Manager, Circular City | Amsterdam Institute for Advanced Metropolitan Studies (AMS) | Circular economy, Urban Living Labs |
| 3 | Mr Jelmer Hoogzard | Consultant | Shifting Paradigms | Urban Metabolism |
| 4 | Mr Giezen Mendel | Assistant Professor, Sustainable Urban Devt and Infrastructure | Amsterdam Institute for Social Science Research, University of Amsterdam | Circular economy |
| 5 | Ms Nadine Galle | Consultant | Metabolic | Urban Metabolism; Circular economy; specialist in Buiksloterham area, Amsterdam |
| 6 | Ms Ilse Voskamp | PhD student | Wageningen University | Circular economy, sustainable neighbourhoods |
| 7 | Ms Maja Johannessen | Gov. & Cities Programme Associate | Ellen Mac Arthur Foundation | Foundation representative; Circular Cities Network |
| 8 | Mr Diego Pos | Board member | GWL Terrein Umbrella Association | Key informant and resident from GWL Terrein |

| | | | | |
|----|---------------------|-----------------------|---|--|
| 9 | Ms Marleen Lodder | Research Advisor | Dutch Research Institute for Transitions (DRIFT) | Architect conducting PhD in the area of Cradle to cradle, circular economy |
| 10 | Mr Gerwin Verschuur | Director | Local Energy Cooperative (Thermobello) EVA Lanxmeer | Key informant and resident from EVA Lanxmeer |
| 11 | Ms Rosalie Begeer | Urban Design Designer | Municipality of Amsterdam | Resident from GWL Terrein |
| 12 | Ms Marleen Kaptein | Founder | EVA Foundation | The founder of the Foundation and pioneer of the proposal to develop Lanxmeer neighbourhood |
| 13 | Mr Mart Kamphuis | Project manager | WASTED | Running a local circular economy initiative in a neighbourhood in Amsterdam |
| 14 | Mr Jan de Rooij | Policy advisor | Culemborg Municipality | Policy advisor on the theme of environment and sustainability |
| 15 | Mr Gerdan Nurullah | Policy Advisor | Municipality of Haarlemmermeer | Policy Advisor Sustainability |
| 16 | Mr Thinneussen | Incoming president | BEL, Eva Lanxmeer | The incoming president of the resident body BEL in Eva Lanxmeer |
| 17 | Mr Rutger Buch | Manager | Cirkelstad | Leading program and change management |
| 18 | Mr Olaf | Founder | Olaf Blaauw Consultancy | Actively involved in the Circular valley project working with municipalities of Amsterdam, Almere and Haarlemmermeer |

Interview Questions for Experts

1. Can you tell me about your organisation's work
2. What kind of actors do you see in the area of circular economy
3. How do you see each actor's role with respect to enabling circular economy

4. What kind of collaborations or partnerships exists between various actors? Any knowledge exchange or partnerships already existing?
5. What has been the achievement or milestone so far of a collaboration, can you give an example? Alternately, has there been any roadblock?
6. What kind of partnerships are required to be built for enabling the transition? Who will be responsible for building these?
7. What kind of partnerships are developing between municipality and various actors? Between other actors minus the municipality
8. Which stakeholder has the most influence in terms of resources
9. How do you see the distribution of resources
10. In your opinion what is accelerating or hindering the transition
11. How do you see circular economy manifesting in the neighbourhood? (Or Tell them about the ReSOLVE framework and your understanding of manifestations?)
12. Your observations and comments on the current policy environment. What are the barriers and enablers?
13. Which actor can address the biggest barrier?
14. How is collaboration and trust built in a network

Interview Questions for Key informant in neighbourhoods

1. Tell me about this neighbourhood and the genesis....the sustainability initiatives in a timeline way
2. So were other neighbourhoods also planned on similar lines? More demonstration projects on agenda?
3. List all types of circular initiatives in the neighbourhood- rainwater; drainage infrastructure
4. Which sector is most active?
5. It was built in 90s, how has it changed since then?
6. Presence of residence working groups, associations- number of members; frequency of meeting
7. Connections or programmes where municipality connects with residents- how do they communicate
8. Frequency of communication;
9. What are the features of residents here vis a vis residents elsewhere?
10. What is the level of trust? What is the level of collaboration?
11. How can this be replicated? Any plans in future?
12. Official un official partnerships
13. Ease of introducing initiatives?
14. Reason for this ease? Is it because of active govt agency or resident attitudes
15. Barriers in introducing initiatives
16. How will you rate the citizens attitude regarding: a) understanding of circular initiatives

b) Acceptance of circular initiatives

Interview Questions for Municipality officials

1. What are the policies that the municipality follows as part of their mandate (from regional/national level) and directives in the area of sustainability and circular economy?
2. What are the specific targets and vision plan outlined by Amsterdam/Culemborg municipality for circular economy and sustainability (5 years/10years)? What are the planning measures for neighbourhoods specifically?
3. Does the municipality partner with other municipalities for any large scale sustainability program or policy? Specifically comment for waste, energy and water sectors.
4. Does the municipality partner with the private sector for the same? Are they active for instance in waste management or recycling sector?
5. How would you rate other neighbourhoods vis a vis GWI Terrein. Did the sustainability agenda and this example spread to other neighbourhoods? Why is it not replicated or are there plans for spreading it to other areas? Is it a unique case or you feel it can be replicated?
6. How does the municipality communicate with the residents? What platforms do you use? What is the frequency?
7. In GWL terrain who is the focal point or resident body that you communicate with? Is it different from other neighbourhoods? How will you rate it, is it more active and easier or opposite?
8. How is your association/communication with the umbrella association of residents in the neighbourhood?
9. Do these organised associations make it easier to communicate with the residents?
10. What kind of partnerships are required to be built for enabling the transition? Who will be responsible for building these?
11. What has been the achievement or milestone so far of a collaboration, can you give an example (best practice)? Alternately, has there been any roadblock?
12. In your opinion what is accelerating or hindering the transition to circular economy in Netherlands?
13. Which stakeholder has the most influence in terms of resources?

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