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A COMPARATIVE AND EXPLORATORY CASE-STUDY

The Role of Citizen Participation in the Implementation of a Circular Economy in Amsterdam, Melbourne, and New York City in Response to Climate Change

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Colophon

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This document was created using \LaTeX and \BibTeX and has been edited in the \TeX Maker editor. The text has been written in the Palatino font in size 11. *Zotero* has been used to categorize the referenced documents and to create the bibliography. *ATLAS.ti 9* has been used to conduct the analysis and the creation of Sankey diagrams in the results. *Adobe Illustrator* and *Adobe Photoshop* have been used to better visualize the Sankey diagrams and create the cases location overview map in figure 6. *Diagrams.net* has been used to create the flowcharts throughout this document. The circular economy logo located on the front page has been downloaded from *imgbin.com* and was created by user: asha_ju in 2017. A list containing the used packages and commands in \LaTeX can be received on request.

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Abstract

We live on a planet with a finite amount of resources and are already experiencing the impacts of climate change (CC). The transformation from a linear economy to a circular economy (CE) could be a solution for this issue. CE focuses on the reuse of products, cutting of environmental impacts, and recyclability of materials. This thesis researches the research question: How does citizen participation (CP) influence the implementation of CE in Amsterdam, Melbourne, and New York City in response to CC? To conduct this research, a comparative and exploratory case-study approach using deductive coding in a document analysis was chosen to investigate the cases: Amsterdam, Melbourne, and New York City. The results have then been visualized using Sankey diagrams to get an overview of the differences and similarities. The analysis states enabling factors as creating awareness and sharing information, while hindering factors are mainly found in financing and breaking old habits. The researcher concludes that the three cities see the role of CP in the implementation of CE in a beneficial way. The three cases do show differences where New York City is, currently, the front runner in the implementation of CE. This has mainly to do with the research conducted by New Lab on circular data (CD) which seems a good start for the implementation of a circular economy. Future research should conduct semi-structured interviews in each city with government and non-state stakeholders regarding the utilization of CD.

List of Abbreviations

CC	Climate Change
CD	Circular Data
CE	Circular Economy
CG	Collaborative Governance
CP	Citizen Participation
TA	Transformative Adaptation

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1 INTRODUCTION

Individuals often have no clue how they can contribute to mitigating the effects of climate change (CC) by themselves. These impacts can consist of food/energy insecurity, rising temperatures/sea levels, extreme weather conditions and will occur more often in the future. Besides, rising temperatures also have a causal influence on economic output. To be able to counter the impacts of CC, society needs to adapt its environmental strategies and policies by working together. (Castillo et al., 2021)

According to Fedele et al. (2019), conventional coping strategies and incremental adaptation are not effective enough to tackle the mentioned impacts of CC. Instead of these approaches, transformative adaptation (TA) could result in more effective policies in the fight against CC by trying to alter the entire system's ecological and social properties, and its functions. Besides society's fight against the consequences of CC, we live on a planet with a finite amount of resources. This means that we cannot produce materials and goods for an infinite amount of time due to resource depletion. Besides, we also generate a lot of waste by this continuous manufacturing. This is in line with the data according to Geyer et al. (2017), since the overall plastic waste generation in the world is approximately 6.200 MMT of which only 1.000 MMT has been recycled in 2015. Their predictions suggest, as can be seen in Figure 1, an increase in primary waste generation to 26.000 MMT of which around 8.750 MMT will be recycled.

According to Cuomo et al. (2020), urban areas will continue to depend on a linear economy of "take make dispose", based on a massive consumption of energy flows and the lack of waste recovery. The data of their literature review shows that urban areas produce 50 percent of the world's waste and 80 percent of the world's pollutant gases. On the other hand, Cuomo et al. state that cities have turned out to be creative hubs for integrating the circular economy (CE) which focuses on the reuse of products, the cutting of environmental impacts, and the recyclability of materials. CE could thus aid in the fight against waste production and increase waste recyclability which is the main implementation of CE being researched in this thesis.

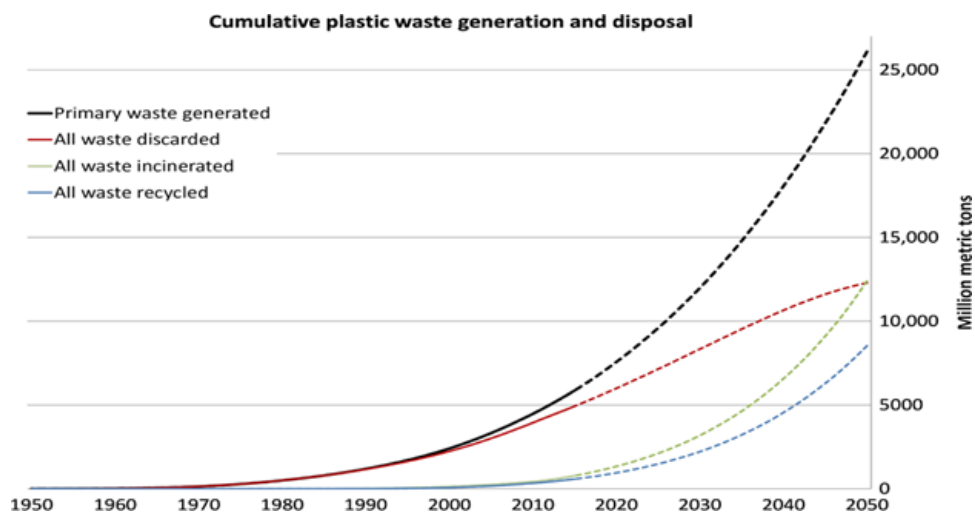


Figure 1: Global cumulative plastic waste generation and disposal (in million metric tons (MMT)). Solid lines show historical data from 1950 to 2015; dashed lines show projections of historical trends to 2050. (Geyer et al., 2017, p. 3)

1.1 Scientific and Societal Relevance

The transformative adaptation from a linear economy to CE cannot be established in a short amount of time with just a few stakeholders. This is in line with the second consideration by Fedele et al. (2019) of redirecting changes by assisting autonomous transformative adaptation. Therefore, an important aspect of successfully transforming to CE is citizen participation (CP) (Izdebska & Knieling, 2020), and, according to Cuomo et al. (2020), future research is needed on how to guarantee unconventionality, autonomy, and a systematic impact on policies to devise more consistent insights in the preservation of transformative potential for CE.

The thesis will perceive CP as a broader form and implementation of autonomy since autonomy itself is quite a narrow and vague concept. This study will try to partly fill the research gap by researching the benefit of CP for implementing CE in three different cities representing the Western world: Amsterdam, Melbourne, and New York City.

1.2 Research Problem

By executing a comparative analysis between the mentioned three cities, research has been conducted regarding the influence of CP on the implementation of CE. Looking at the government form, the three cities can be generally categorized as a democracy. This helps this study since it is harder to comparatively analyze CP in a democracy than, for instance, an oligarchy. Although, this does not rule out that the institutional context including policies and planning approaches could be rather different for each city.

To be able to research the research gap mentioned earlier, the following main research question will be used:

- How does citizen participation influence the implementation of a circular economy in Amsterdam, Melbourne and New York City in response to climate change?

To answer the main research question, the following sub questions will be used:

1. Which factors enable or hinder the implementation of a circular economy and how could the implementation be improved?
2. How and where can citizens be involved in the implementation of a circular economy?
3. What is the difference between the implementation of a circular economy between Amsterdam, Melbourne and New York City?
4. What is the difference in the role of citizen participation between Amsterdam, Melbourne and New York City?

2 THEORETICAL FRAMEWORK

2.1 Transformative Adaptation

Mentioned in Section 1, Fedele et al. (2019) state that conventional coping strategies and incremental adaptation are not effective enough to tackle the impacts by CC. A new different adaptation strategy was introduced by scholars: transformative adaptation (TA). The aim of TA is to reduce root causes of vulnerabilities and impacts of CC. Examples are social cultural, economic, environmental, and power relations being transformed into more just, sustainable, or resilient states. The biggest differences between these three adaptation strategies are that (1) the coping strategies and (2) incremental adaptation are applied on a smaller scale using a reactive approach, whilst (3) transformative adaptation is applied to a system using a proactive approach to reduce the root causes and impacts of CC. Figure 2 shows the implementation of different adaptation strategies regarding social-ecological systems. (Fedele et al., 2019)

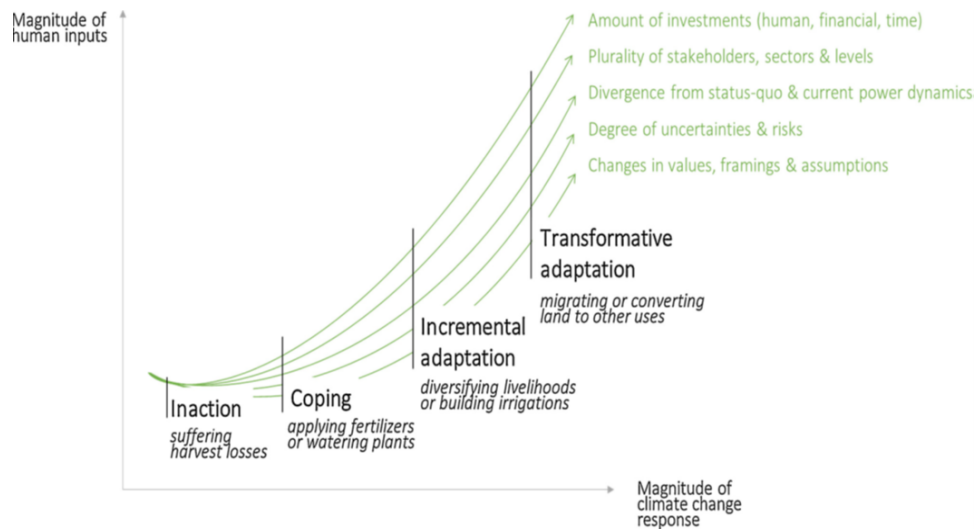


Figure 2: Types of strategies for reducing the impact of climate change on social-ecological systems, with examples from agriculture, along a gradient of increasing magnitude of responses. (Fedele et al., 2019, p. 117)

To be able to implement TA in a beneficial way, policy makers and practitioners should better acknowledge and carefully plan its transformation. Fedele et al. came up with three potential uses of TA for policy makers and practitioners in projects or plans. Firstly, TA could anticipate changes. Secondly, it could redirect changes by assisting autonomy. Lastly, TA could recover from changes created by CC. According to Fedele et al., TA usually has six different characteristics which can be found in Table 1.

Table 1: The six characteristics of Transformative Adaptation with definitions. (Created using Fedele et al. (2019))

Characteristics of TA	Definition
<i>Restructuring</i>	TA involves major shifts in fundamental properties, functions or interactions within the social, ecological, or social-ecological system.
<i>Path Shifting</i>	TA alters the systems' current trajectory by changing it into an alternative direction. An example for this is the change from single landscape-dominated species to one with mixed trees species.
<i>Innovative</i>	TA changes systems to new states that have not existed before in that area thanks to new knowledge, policies or technologies.
<i>Multi-scale</i>	TA has impact across multiple scales (e.g. trophic (energy/food chain), spatial, jurisdictional, or sectoral scales).
<i>System-wide</i>	TA occurs at large-scale and leads to systemic changes across complete regions, ecosystems, landscapes, or communities.
<i>Persistent</i>	TA entails a shift with long-term impacts which are not necessarily reversible (e.g. if the landscape consists of mixed tree species, it is harder to go back to one dominant tree species).

Although TA sounds as a good strategy in the fight against CC, several barriers are mentioned by Fedele et al. (2019). First of all, TA could receive less social and/or political support due to the high investments needed in humans, finance and time. It could particularly be time intensive before the benefits of TA will manifest themselves. Secondly, power imbalances and inequalities could also hinder TA, due to dominant actors who could be in the position to block such changes, by benefitting from the status-quo. Thirdly, TA could be discouraged by the need to involve multiple sectors, governance levels, and stakeholder since they could have potential differences in interests. (Fedele et al., 2019)

Fedele et al. (2019) mention that the characteristics of TA highlight the need to strategically consider and plan for this type of adaptation. The reasons given by Fedele et al. for what TA could be used for by policy makers, is in line with the research problem stated for this research, since TA could redirect changes by assisting autonomy and this research article tries to analyze the role of CP in implementing a CE. The researcher proclaims that the implementation of CE can be seen as an example of TA. This will be further addressed at the end of Subsection 2.2.

2.2 Circular Economy

As seen in Figure 1 in Section 1, cities are generating more and more waste and environmental pollution. This can be categorized under environmental issues but it can also be categorized under business issues. The global economy depends on businesses that can cope with global pressures using new forms of innovation and value creation. This is defined as the linear economy. Hence, according to Lacy et al. (2021), a transformation should occur from the linear economy to a circular economy (CE). Lacy et al. define the linear in the following way:

A linear economy refers to the traditional industrial model that follows a “take, make, waste” process in which raw materials are extracted, turned into products, and after being used or consumed, the products are typically thrown away as non-recyclable waste (or at most, they are recycled or downcycled). This is our mainstream economy model today. (p. 5)

Definitions for CE are hard to get by. According to Kirchherr et al. (2017) , when asking 114 different people about the definition of CE, you get 95 different answers. They defined CE within their iteratively developed coding framework in the following way:

An economic system that replaces the ‘end-of-life’ concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption process. It operates at the micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond), with the aim to accomplish sustainable development, thus simultaneously creating

environmental quality, economic prosperity and social equity, to the benefit of current and future generations. It is enabled by novel business models and responsible consumers. (p. 229)

Kirchherr et al., hope that this definition will contribute to the scholarly CE community as a conceptual foundation for future work on this topic. Therefore, this definition for CE will be used in this thesis. Geissdoerfer et al. (2020), conducted a review regarding circular business models. They also used the definition of CE stated by Kirchherr et al., to visualize it in a model which can be found in Figure 3.

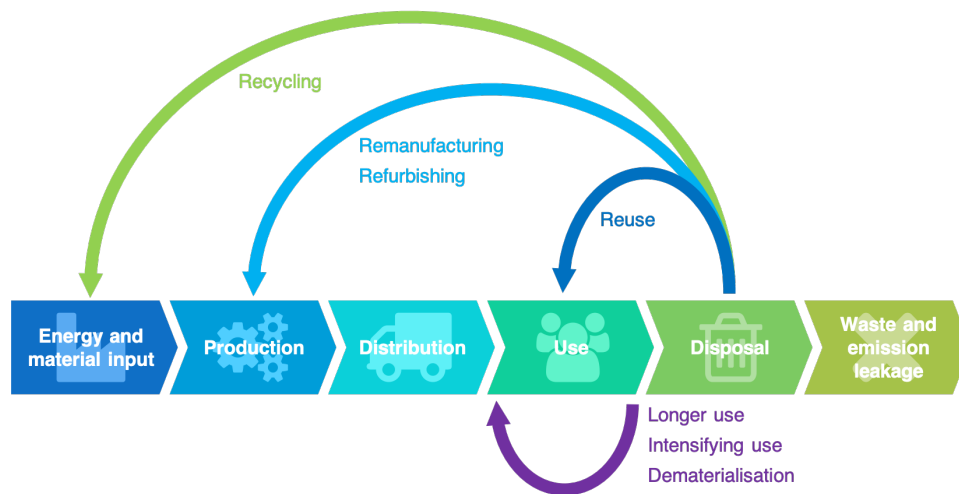


Figure 3: The Circular Economy Concept. (Geissdoerfer et al., 2020, p. 4)

This model is explained by Geissdoerfer et al. (2020), as resource input and waste, emission, and leakages being minimized by cycling, extending, intensifying, and dematerializing material and energy loops. This can be achieved, according to them, through digitalisation, servitisation, sharing solutions, long-lasting product design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling. Digitalisation and sharing solutions are measures that can be linked to CP as well, which will be further explored in Subsubsection 2.3.3.

As stated at the end of Subsection 2.1, CE can be seen as an example of TA. When looking at the six characteristics of TA, CE includes most of

them. CE is restructuring since it calls for major shifts in the fundamental properties of our economy. It is also path-shifting since CE will alter the systems' current trajectory of a linear economy by changing it to a circular one. It is innovative since CE will need new knowledge, policies and technologies to be implemented successfully. It is multi-scale since it will have an impact on different sectors like the government and entrepreneurs themselves, although this impact may vary for different scales and different implementation methods. It is system-wide because CE occurs only at large-scale and it will lead to systemic changes across whole cities or regions. Lastly, CE is mainly persistent when implemented on a macro level, where high investments are needed for the implementation, after which it will be difficult the shift back to a linear economy.

2.2.1 Circular City Data

The Circular City can be defined as the application to urban systems, urban tech in particular, of principles of the CE school of thought. The concept of circular data (CD) perceives data and knowledge as the energy, flow and medium of collaboration. It refers to the collection, production and exchange of data, and business insights in an arrangement between collaborators in a shared set of inquiries. ((N.3) New Lab, 2020)

CD is the main topic being explored in the first iteration of New Lab's The Circular City Program ('**the program**' from now on) regarding New York City. New Lab, a multi-disciplinary technology center, conducted a case-study regarding three start-ups providing real-time, high-definition maps for autonomous vehicles, empowering cities with data to become more responsive and equitable, and to make data accessible at the local level for neighborhood stakeholders. ((N.3) New Lab, 2020)

The New York Economic Development Organization initially requested New Lab to tackle issues related to moving New York City towards a zero-waste circular economy. Unfortunately, the topic of CE was mutually decided to be too vast and abstract to tackle in the first year of the program since no problem set could be articulated nor technology could be tested.

Despite this issue, the term 'circular' has persisted. It is seen as a metaphor for the set of relationships where the program sought to create collaborations, that could eventually help the transition towards CE. ((N.3) New Lab, 2020)

GS1 (2020), agrees with this by stating that a sustainable CE change at a large scale, won't happen, unless data is structured and shared through global and open standards. EMF & WEF (2016), go even a step further by stating that collaboration and data sharing enable the creation of a smart and circular city. Although, they mention that, this can only be achieved if barriers regarding data security and trust, like the crucial concern of how innovators, companies and government agencies use, share and protect personal data, are addressed.

New Lab published a research journal in 2020 called *The Circular City* containing three journal articles explaining the findings in the first year of the program. New Lab's research journal concludes that if the presented model proves successful, it could be applied to other commercial and residential districts in New York City. The development of the analytics and systems mentioned in the journal have the potential to mark the early beginnings of a transformation in the quality of life, resiliency, and sustainability of streets ((N.3) New Lab, 2020). In conclusion, CD seems to be a good starting point for the long-term implementation of CE in cities. Although, this can even be better enabled by collaboration, global and open standards, and the addressing of barriers for CD regarding data security and trust.

2.3 Citizen Participation

Citizen Participation (CP) can be compared to eating spinach: no one is against it since it is good for you. Participation by the governed in their government is the cornerstone of democracy. According to Arnstein (2019), CP is a categorical term for citizen power. It can be seen as the redistribution of power to citizens, who are currently excluded from the political and economic process, to be deliberately included in the future. Arnstein pro-

duced a ladder pattern with each rung corresponding to the extent of citizens' power in determining the plan and/or program. The different rungs on the ladder of citizen participation are divided into three degrees: 1 – 2 are seen as non-participation, 3 – 5 are seen as degrees of tokenism and 6 – 8 are seen as degrees of citizen power. The ladder of citizen participation with the corresponding definitions per rung can be seen in Figure 4.

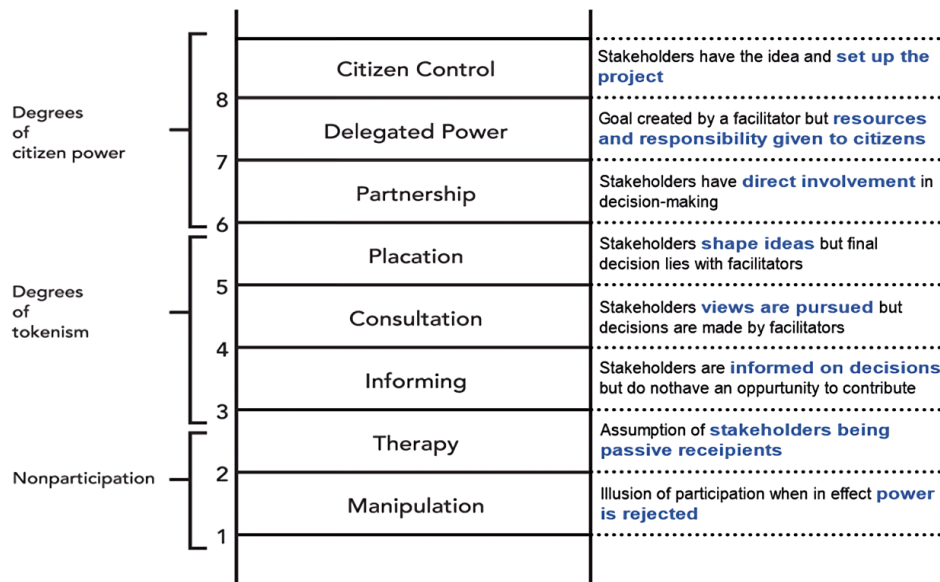


Figure 4: Eight rungs on a ladder of citizen participation with definitions. (Adapted from (Arnstein, 2019, p. 26))

Stated by Kirchherr et al. (2017), the lack of consumer interest and awareness is one of the main barriers in making the CE a reality. In this aspect, CP can be seen as an important aspect of CE. According to Izdebska & Knieling (2020), citizens can be seen as major actors within the waste management of cities and related CE. The connection between these lies in their roles as consumers and waste producers. Individual awareness while citizens perform these two roles could lead to more responsible consumption and compliance waste separation and collection schemes resulting in increased reuse and recycling.

2.3.1 Collaborative Governance

Mentioned by Newman et al. (2004), policy documents suggest that an important shift is taking place towards a more collaborative style of governance globally. Policy reforms for the local government and other sectors are oriented towards encouraging active citizenship and promoting public participation in decision making. These policy reforms also suggest a new form of collaborative agreement between state and citizen based on concepts of responsible and active citizenship. This new form of collaborative agreement has been characterized as the concept of collaborative governance (CG) which could hollow out the nation state and cause multi-level governance to emerge. The concept could improve CP by encouraging engagement by stakeholders in policy and decision-making. (Newman et al., 2004)

Ansell & Gash (2008), define CG as a “governing arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative, and which aims to make or implement public policy or manage public programs or assets” (p. 544). Izdebska & Knieling (2020) state that interventions and policies are meant to regulate and serve civil society. The inclusion of people’s perceptions and ideas in its design and implementation can be seen as an asset to produce efficient regulations. They link CG to waste management and CE in the following manner:

Collaborative governance explains the significance of involving citizens for achieving (in an effective manner) the objectives of waste management and circular economy in cities. The concept also suggests that authorities in charge of waste management have a higher chance of reaching their objectives if they share their motivations, if they have clearly defined objectives, well developed structures for citizen involvement, and resources available in order to reach the citizens and promote pro-environmental behavior in the area of waste management and circular economy. (p. 117)

2.3.2 Collaborative Planning

According to Healey (1998), the process of collaborative planning tries to maintain and transform mindsets about the meaning of places and the priorities for action. It is useful for implementing a CE, since it is more efficient by reducing regulatory transaction costs, building shared knowledge and understanding, generating opportunities for creative synergy, and developing capacity among stakeholders to solve local problems. (Healey, 1998)

2.3.3 Planning Support Systems

Managing time is seen as criticism for traditional collaborative planning since it could be a lengthy process. Digital tools could benefit the collaborative process by mainly managing time. Planning Support Systems (PSS) attempt to integrate such digital tools. It is defined as an information framework that is able to integrate the full range of current and future information technologies which are useful for planning. Recent studies have given attention to the use of mobile apps for CP. These apps are an example for the use of PSS in planning. It is expected that these can reach a wide range of participants due to citizens being able to give real-time feedback by using their mobile phones anywhere. Lin and Benneker identified three key criteria of PSS linked to the three conditions of stakeholder management which can be found in Table 2. (Lin & Benneker, 2021)

Table 2: Linkages between conditions determining Stakeholder Management and key criteria of Planning Support Tools. (Created using (Lin & Benneker, 2021)

Conditions determining Stakeholder Management	Key criteria of Planning Support Tools	
Gaining support from various stakeholders for the project.	↔	User-friendliness refers to the ease of use of a functionality for the intended end-user and its connectivity meaning the accessibility to users.
Gaining input , i.e. local knowledge gathering from residents and other stakeholders.	↔	Usefulness refers to whether the system being used is able to achieve the desired goals. It could give more informed outcomes and increased efficiency.
Managing time , i.e. some stakeholders might not have the time to participate in physical meetings.	↔	Efficiency refers to the time and effort of different users in relation to the accuracy and completeness.

2.4 Conceptual Model

The diagram in Figure 5 represents the conceptual model in support of Section 2. As made clear in the sections of the theoretical framework, CE will have a positive influence on the reduction of CC. CE will be able to be implemented by changing from conventional coping strategies and incremental adaptation to TA. CE is benefitted by a prior implementation of CD. The implementation of CE will be influenced by CP which is benefitted by CG, collaborative planning, and PSS.

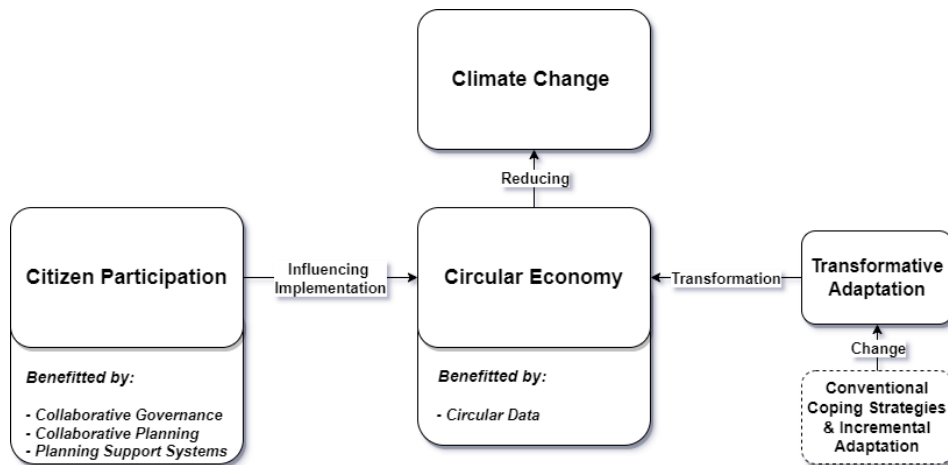


Figure 5: Conceptual model in support of the theoretical framework.

2.5 Hypothesis

The central hypothesis for this research is that 'The bigger the role of CP in implementing CE, the better the implementation of CE. It is expected that the role of CP will have a bigger beneficial effect in Amsterdam than in Melbourne and New York City since Amsterdam has a lower population. Differences between cases are expected to be small since they are all front runners in the implementation of CE. Cities already using CD will have a better chance of implementing CE successfully since CE is now seen as too vast and abstract.

3 METHODOLOGY

This study used a qualitative research method to determine the role of CP in the implementation of CE. Qualitative research is seen as an unstructured, exploratory research method that studies highly complex phenomena that are impossible to explain with quantitative research and tries to develop initial understanding (Ahmad et al., 2019). The role of CP in the implementation of CE can be seen as a highly complex phenomena. It cannot be researched quantitatively due to numerical data not being available since the implementation has not been fully completed yet anywhere. Therefore, this research will be conducted *ex ante*. Qualitative research is also holistic in nature which is in line with the author's research objective. A comparative case-study approach will be conducted to explore the influence of CP for implementing CE in Amsterdam, Melbourne, and New York City.

3.1 Case Selection

To be able to answer the research question and sub questions mentioned in Subsection 1.2, some boundaries have been set while choosing the research area. Amsterdam, Melbourne, and New York City have been chosen as cases due to the following reasons:

- The three cities each are located in different parts of the Occident which for this research supports the comparability of the cities. (*See Figure 6*)
- The three cities perceive a high GDP percentage compared to the national GDP making them important for the national economy. (*See Table 3*)
- The three cities are front-runners in sustainability and have a publicly available CE strategy report used to conduct this research. (*See Table 4*)

The general characteristics of the cases can be found in Table 3. The table also shows the Global Waste Index per country which concludes that all three cities are located in countries which score relatively low on this index meaning that measures to better manage waste are needed. A map indicating the location of the researched cases can be found in Figure 6.

Table 3: Overview of characteristics of Amsterdam, Melbourne and New York City. (Created using ABS (2021), CBS (2021), Eurostat (2020), New York Fed (2021), Sensoneo (2019), SGSEP (2019), and USCB (2020))

	Amsterdam	Melbourne	New York City
Continent	Europe	Oceania	North America
Country	The Netherlands (NL)	Australia (AU)	United States of America (US)
Government	Parliamentary Constitutional Monarchy	Parliamentary Constitutional Monarchy	Constitutional Federal Republic
Population	873.338 (2021)	5.159.211 (2021)	8.804.190 (2020)
Size	219,32 km ²	9.933 km ²	1.223,59 km ²
GDP	EUR 182 billion (2018)	EUR 235 billion (2018)	EUR 920 billion (2018)
City GDP % of national GDP	23%	20%	5%
Global Waste Index (0-100, higher is better)	NL: 32 (2019)	AU: 24 (2019)	US: 12 (2019)

3.2 Research Methods

A comparative case-study will be conducted and can be defined as an empirical examination of a specific phenomenon within its real-world context while identifying the best strategies for presenting evidence in a linear format. The comparative case-study will be conducted using a policy document analysis since this will produce a large amount of qualitative data. This approach fits exploratory studies since these types of studies are mostly oriented towards a lack of prior knowledge of the phenomenon. This is also the case for the role of CP for implementing CE since the policy documents used are all geared towards the future. This comparative case-study method enables the author to explore practical life events, behavioral process, and organizational procedures regarding CP in CE. (Yin, 2009)

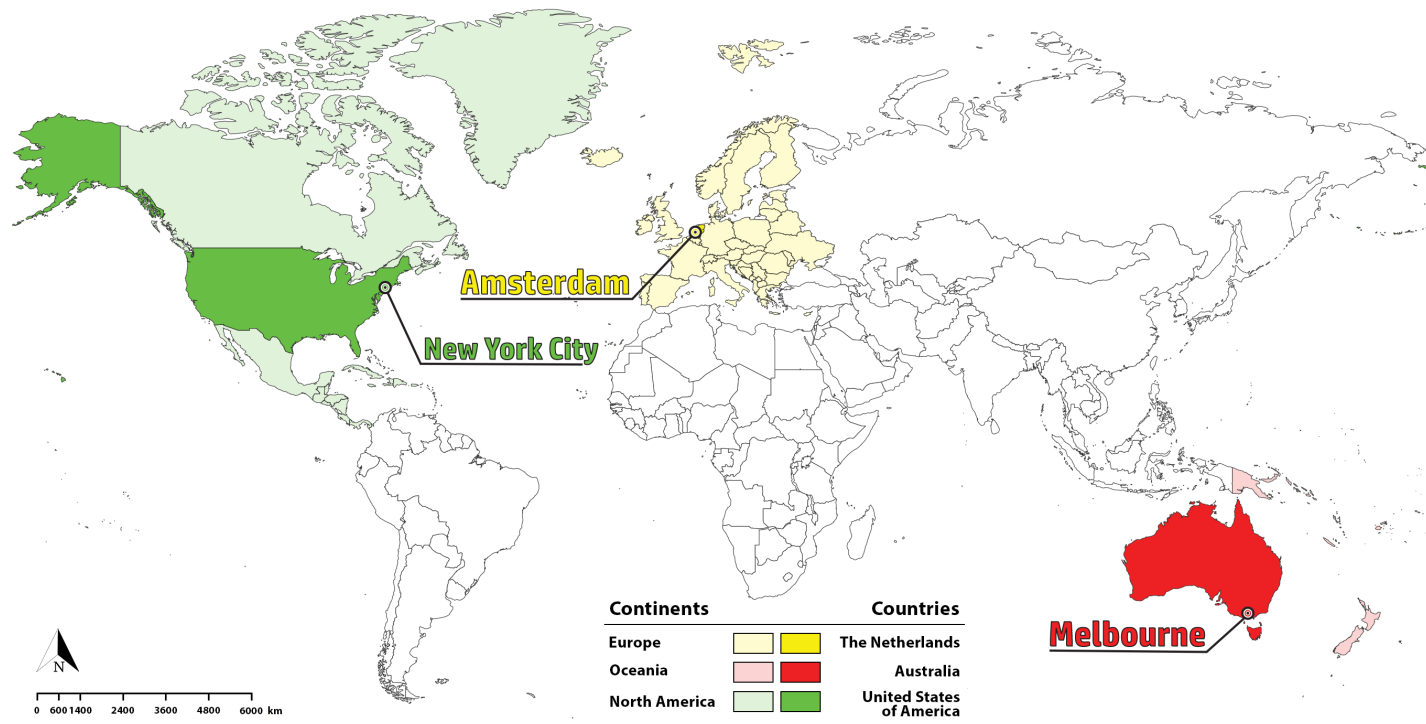


Figure 6: Map indicating the location of studied cases. (Created using FreeVectorMaps.com (2017))

The comparative case-study document analysis will use qualitative data gathered from strategy reports, policy documents, and scientific papers to determine the role of citizen participation in the implementation of CE. Table 4 gives an overview of the characteristics of the analyzed documents for each case. The data collection scheme can be found in Figure 7.

The data will be analyzed by deductive coding, since it helps to explore or describe a phenomenon, using computer assisted qualitative analysis software (CAQDAS) (Kawulich, 2017). The researcher will be using ATLAS.ti 9 to analyze predetermined codes in two coding themes: 'Circular Economy' and 'Citizen Participation' which are visualized in Section 4 using the colors 'Grey' and 'Blue' respectively. This coding scheme can be found in Appendix A in Figure A.1. These 17 codes can be seen as the variables analyzed in this research project and have been linked to 1000 quotations in the researched documents.

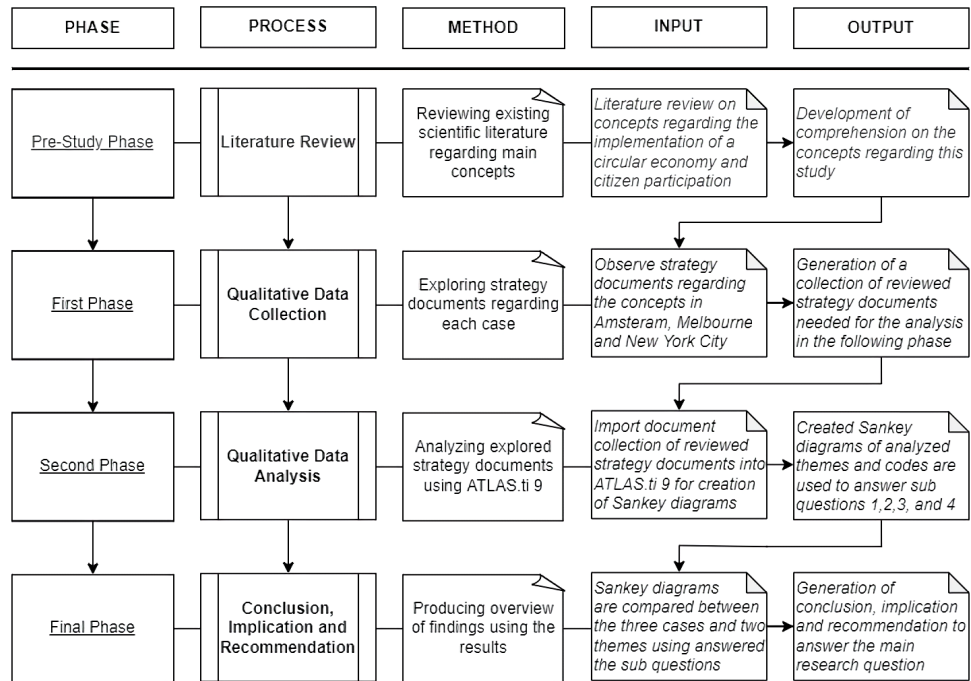


Figure 7: Data Collection Scheme

Table 4: Overview of analyzed documents for each case

CASE	AMSTERDAM		
Document Abbreviation	A.1		A.2
Document Type	Main Strategy Document		Complementing Document
Document Title	<i>Amsterdam Circular 2020-2025 Strategy</i>		<i>Building Blocks for the New Strategy</i>
Author	Municipality of Amsterdam		City of Amsterdam Circle Economy Kate Raworth
Pages	88		65
Publisher	Municipality of Amsterdam		City of Amsterdam
Year	2020		2019
CASE	MELBOURNE		
Document Abbreviation	M.1		M.2
Document Type	Main Strategy Document		Regional Strategy Document
Document Title	<i>Waste and Resource Recovery Strategy 2030</i>		<i>Recycling Victoria: A new economy</i>
Author	City of Melbourne		Victoria State Government
Pages	56		46
Publisher	City of Melbourne		Victoria State Government
Year	2019		2020
CASE	NEW YORK CITY		
Document Abbreviation	N.1	N.2	N.3
Document Type	Main Strategy Document	Scientific paper	Research Journal
Document Title	<i>Complex Challenges. Circular Solutions.</i>	<i>Circular Economy Meets the Fashion Industry</i>	<i>The Circular City</i>
Author	New York Circular City Initiative (NYCCI)	Kim Younghyun & Savannah Wu	New Lab
Pages	46	20	156
Publisher	New York Circular City Initiative	Springer	New Lab
Year	2020	2021	2019

3.3 Ethical Considerations

When it comes to overall ethical considerations, they are not explicitly relevant since interviews or surveys will not be conducted. Confidentiality regarding gathered data does not show any ethical problems since the policy documents used are publicly available. The environmental, social and spatial justice are of importance for this research due to the implementation of CE altering the economy in general. This could have positive and negative social and environmental implications.

4 RESULTS

This section will elaborate on the results of the document analysis conducted in ATLAS.ti 9, visualized using Sankey diagrams. First, the results will be visualized for the cases in conjunction in Figure 8. Table 5 gives an overview of major case study results in a comparative perspective. Second, the analysis of the three cities individually will be explained and visualized. Third, the code co-occurrence between the two coding themes will be explained and visualized using examples from the document analysis.

4.1 Comparison between the three cities

In general, the results between the three cities have been compared in Table 5 using the two subthemes 'Circular Economy' and 'Citizen Participation', explained in Subsection A.1 using Figure A.1. Further elaboration, using quotations from the document analysis, regarding these subthemes for the three cities, will be conducted in the individual subsections per city. The differences in the code-occurrence for the analyzed documents in conjunction have been visualized in Figure 8 using Table 6.

The perception of CP shows similarities between the three cases regarding partnership. They all encourage more collaboration between non-state stakeholders and the government. Amsterdam and New York City do perceive CP in the form of citizen control and delegated power, although these are both quite rare. The document analysis of Melbourne does not mention these two forms of CP at all.

The usage of CP can be perceived between the three cities as the utilization of co-creation, co-governance and PSS. All three utilization methods are used in Amsterdam and Melbourne in small amounts which can also be seen in Figure 8. New York City does not mention PSS specifically. In Amsterdam these utilization methods are used for the improvement of construction. Melbourne uses co-creation more for submitting creative ideas to solve common problems. New York City is more focused on collaboration and information sharing.

Table 5: Overview of major case study results in comparative perspective vis-à-vis the document analysis.

	Amsterdam, NL	Melbourne, AU	New York City, US
Perception of Citizen Participation	Perceived by partnership with non-state stakeholders and the central government. Citizen control and delegated power are rare.	Collaboration with Victorian Government, developers and entrepreneurs. Citizen control and delegated power are non-existent.	Multi-sector collaboration to implement CE. Data-driven partnership for CD. Citizen control and delegated power are rare.
Usage of Citizen Participation	Small usage of co-governance, co-creation and PSS improving construction, opportunities for external stakeholders, and information sharing.	Close collaboration with local governments to ensure improved policy settings. Non-state stakeholders can submit creative ideas to solve common problems. PSS are non-existent.	Non-state stakeholders collaborate to manage environmental and resource issues. PSS are used to share information, connect stakeholders and closure of supply chain loops. Co-governance is non-existent.
Effects of Citizen Participation	Benefitted by citizen initiatives, engagement in participatory meetings and new technologies. Raises awareness and brings citizens together. Drawback effects are not mentioned.	Benefitted by fair payment systems for businesses and more convenient recycling services for non-state stakeholders. Damaged by businesses not bearing the costs of waste.	Benefitted by worker's craftsmanship being complemented by digital technologies, centered intentions, access, and ethics and a focus on value adding for stakeholders.
Differences in Citizen Participation	Creating awareness and binding policy choices for and among non-state stakeholders through information sharing. Developing resilient neighborhoods decreasing conflicts.	Engaging, educating and collaborating with the community through campaigns and workshops. Citizens can give feedback and support services. Conflicts are not mentioned.	Partnership with start-ups. Developing a city-wide communications campaign to inform, inspire and engage non-state stakeholders. Conflicts are not mentioned.
Implementation of a Circular Economy	Creating awareness, cooperation and increasing demand for clean technologies are the main enablers. Biggest hinder is breaking old habits. Requiring a tiered approach based on acceptable risks.	Encouraging innovation, jobs, and social enterprise, building trust and awareness, and informing people are enablers. Hindered by having little influence over the waste system and rapid city growth. Protecting communities and environment from high-risk wastes.	Creating jobs, economic benefits, collaboration and efficient use of resources are enablers. Hindering financial institutions through different business models. Managing future risks, needs and opportunities through prediction using CD.
Examples of a Circular Economy	Making different choices regarding investment and policy, and establishing seventeen development directions, are government initiatives. Citizen initiatives exist in abundance and are encouraged by the municipality to collaborate.	Advocating for resilient and sustainable waste and resource recovery network and demonstrating leadership are government initiatives. Participating in trials supporting organic services are citizen initiatives.	Identifying actions the city and non-state stakeholders could take to generate positive impacts across a range of sectors are government initiative. Citizen initiatives exist in abundance encouraged by the municipality.

The biggest difference in *the effects of CP* between the three cities are that Amsterdam focuses on citizen initiatives, Melbourne focuses on the creation of a fair payment system, whilst New York City focuses on the higher usage of digital technologies.

Differences in CP between the three cities are not very big. Something that does stand out is New York City specifically mentioning collaborating with start-ups where Amsterdam and Melbourne focus more on the broader community and businesses.

The three cities do show differences in *the implementation of CE*. Amsterdam’s enablers are the creation of awareness and cooperation, while their biggest hinder is breaking old habits. Melbourne’s enablers are encouraging innovations and jobs, while being hindered by having little influence on the waste system. New York City’s enablers are the creation of jobs as well, being hindered by different business models. Risks are managed in a tiered approach, by protection from high-risk waste and prediction using CD respectively.

Lastly, *examples of CE*, are quite different between the cities as well. The governments of Amsterdam, Melbourne and New York City want to initiate different choices regarding investment and policy, resilient and sustainable waste and resource recovery networks, and identification of the generation of positive impacts respectively. Citizens initiatives are encouraged by the governments and exist in abundance in all three cities.

The Sankey diagram in Figure 8 can be understood using key Table 6. The thickness of the lines between the codes and cities shows the code appearance quantity in the document analysis for a city. The exact occurrence of codes can be seen on the left side of the diagram and have been simplified by giving three different colors to the three cities: **Amsterdam**, **Melbourne** and **New York City**. This explanation is applicable to all further diagrams for the individual cities and code co-occurrence.

Table 6: Key for Figure 8: Cases in Conjunction Code Occurrence.

Letter	Corresponding Code	Letter	Corresponding Code	Letter	Corresponding Code
A	Drawback Effects	G	Hindering Factors	M	Risk Management
B	Co-governance	H	Citizen Roles	N	Effects of Citizen Roles
C	Benefitting Effects	I	Co-creation	O	Citizen Control
D	Conflict Management	J	Information Sharing	P	Planning Support Systems
E	Partnership	K	Enabling Factors	Q	Delegated Power
F	Citizen Initiatives	L	Government Initiatives		

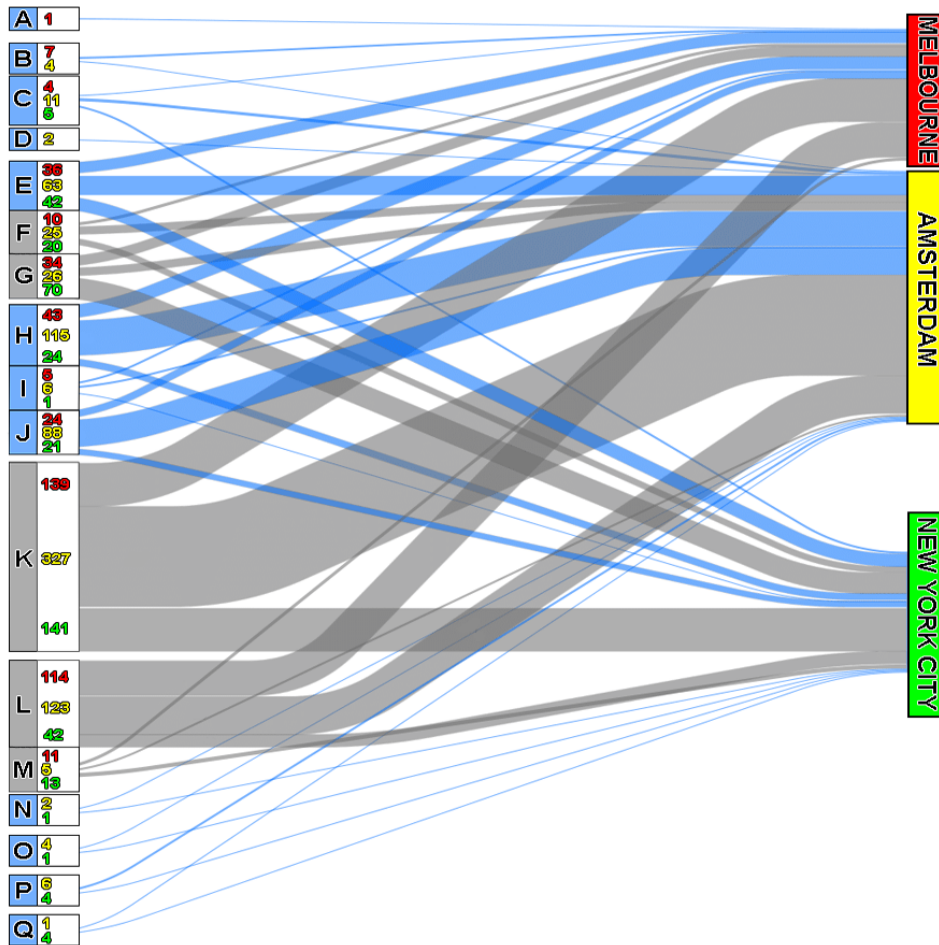


Figure 8: Cases in Conjunction Code Occurrence

Amsterdam

This subsection will elaborate on the results for Amsterdam. The Sankey diagram shown in Figure 9, using Table 7, illustrates the amount of times the deductive codes appeared in the document analysis of Amsterdam.

What immediately stands out in the diagram is the high occurrence of *Code K: Enabling Factors* and *Code L: Government Initiatives* in the document analysis. Table 5 mentioned Amsterdam seeing the creation of awareness,

Table 7: Key for Figure 9: Amsterdam Code Occurrence.

Letter	Corresponding Code	Letter	Corresponding Code	Letter	Corresponding Code
B	Co-governance	H	Citizen Roles	M	Risk Management
C	Benefitting Effects	I	Co-creation	N	Effects of Citizen Roles
D	Conflict Management	J	Information Sharing	O	Citizen Control
E	Partnership	K	Enabling Factors	P	Planning Support Systems
F	Citizen Initiatives	L	Government Initiatives	Q	Delegated Power
G	Hindering Factors				

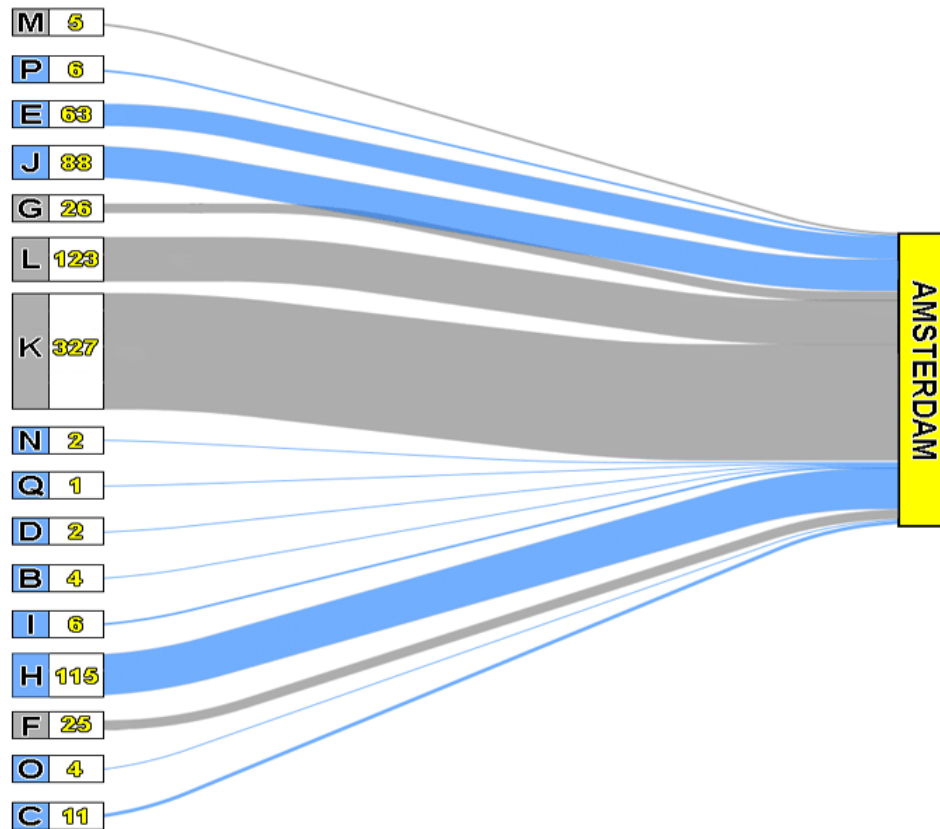


Figure 9: Amsterdam Code Occurrence.

cooperation and demand for clean technologies as the main enablers for the implementation of CE. Amsterdam wants to "stimulate cooperation in the production chains so that we get the most out of raw materials" ((A.1) Municipality of Amsterdam, 2020, p. 10). Government initiatives and enabling factors by the city of Amsterdam are mentioned by the city of Amsterdam using the following quote:

We established seventeen development directions (desired developments such as circular construction, repairing more and reducing food waste) with suggestions for actions taken for each of these directions (such as making adaptable buildings, setting up repair centers or stimulating awareness. ((A.1) Municipality of Amsterdam, 2020, p. 25)

Code I: Co-creation has been linked to *Code J: Information Sharing* and *Code E: Partnership* in the context of construction using the following quote:

Share knowledge to adopt circular principles in construction through collaboration and co-creation. Best practices and knowledge in fields of biophilic design and biomimicry can expand knowledge of architecture and construction firms. ((A.2) City of Amsterdam, 2019, p. 15)

Code G: Hindering Factors for the implementation of CE in Amsterdam has been mentioned as breaking old habits. This can be linked to *Code M: Risk Management* in the following quote:

The transition to a circular economy will not always be easy. We have to break old habits and we have to change to way we think and act. This may cause friction. ((A.1) Municipality of Amsterdam, 2020, p. 20)

Code F: Citizen Initiatives exist in abundance in the city of Amsterdam. The following quote gives two examples of citizen initiatives in Amsterdam:

Powerful initiatives are also emerging from the bottom up, such as Ma.ak020, a 'social agreement' by and for Amsterdam residents that strives to create a circular city with about twenty 'doughnut-deal initiatives'. And there is the Repair Café where more and more residents are able to have household appliances repaired close to home, so that the valuable raw materials can be preserved. ((A.1) Municipality of Amsterdam, 2020, p. 22)

Melbourne

Table 8: Key for Figure 10: Melbourne Code Occurrence.

Letter	Corresponding Code	Letter	Corresponding Code	Letter	Corresponding Code
A	Drawback Effects	F	Citizen Initiatives	J	Information Sharing
B	Co-governance	G	Hindering Factors	K	Enabling Factors
C	Benefitting Effects	H	Citizen Roles	L	Government Initiatives
E	Partnership	I	Co-creation	M	Risk Management

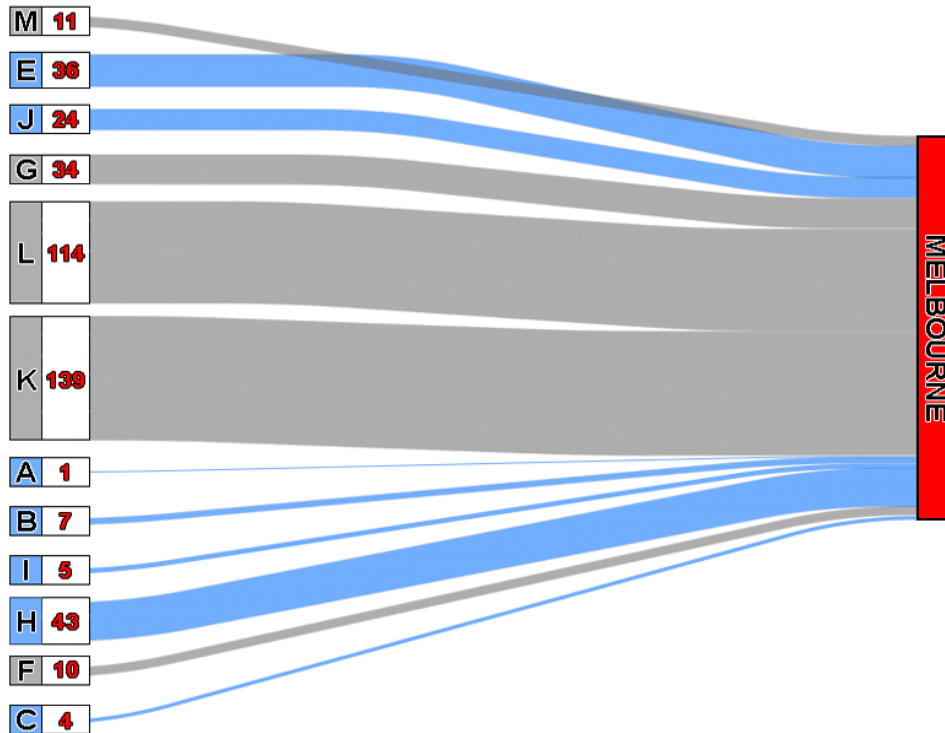


Figure 10: Melbourne Code Occurrence.

This subsection will elaborate on the results for Melbourne. The Sankey diagram shown in Figure 10, using Table 8, illustrates the amount of times the deductive codes appeared in the document analysis of Melbourne.

The document analysis of Melbourne mentions *Code G: Hindering Factors* regarding the waste system in the following quote:

We have very little influence over the waste system or for commercial and industrial or construction and demolition waste – the vast majority of waste generated in the municipality. ((M.1) City of Melbourne, 2019, p. 30)

The following quote regarding *Code K: Enabling Factors* gives a solution for this low influence of the municipality over the waste system:

A fair payment system would encourage businesses to separate out waste streams to maximize cost savings and diversion from landfill. Waste collection partners may specialize in servicing specific waste streams across the network. Resources may also be separated after collection at a processing facility. ((M.1) City of Melbourne, 2019, p. 44)

Melbourne also wants to involve non-state stakeholders, regarding construction, using *Code B: Co-governance*, *Code E: Partnership* and *Code H: Citizen Roles* in the following quote:

Community groups will be involved in designed the innovation fund; they can also apply for grants which will provide support and resources for their innovative projects. Groups will also help implement organic trials, both in low and high-rise buildings. They will be able to support our advocacy efforts and campaigns on education, investment and product stewardship. ((M.1) City of Melbourne, 2019, p. 13)

Besides the mentioned steps taken by the City of Melbourne, *Code L: Government Initiatives* are proposed in the second analyzed document in the form of *Code J: Information Sharing* illustrated in the following quote:

The Victorian Government will encourage councils and their communities to identify and pursue local opportunities for improving material use and management. It will also provide information and tools to help consumers move towards low-waste, low-resource living. Over time, sharing, repairing, loaning and buying second-hand will become more common. ((M.2) Victoria State Government, 2020, p. 21)

An example of *Code F: Citizen Initiatives* is stated in the following quote:

Yume has created the world's leading business-to-business online marketplace, dedicated to sell quality surplus food that would otherwise be at risk of going to landfill. ((M.2) Victoria State Government, 2020, p. 19)

New York City

Table 9: Key for Figure 11: New York City Code Occurrence.

Letter	Corresponding Code	Letter	Corresponding Code	Letter	Corresponding Code
C	Benefitting Effects	I	Co-creation	N	Effects of Citizen Roles
E	Partnership	J	Information Sharing	O	Citizen Control
F	Citizen Initiatives	K	Enabling Factors	P	Planning Support Systems
G	Hindering Factors	L	Government Initiatives	Q	Delegated Power
H	Citizen Roles	M	Risk Management		

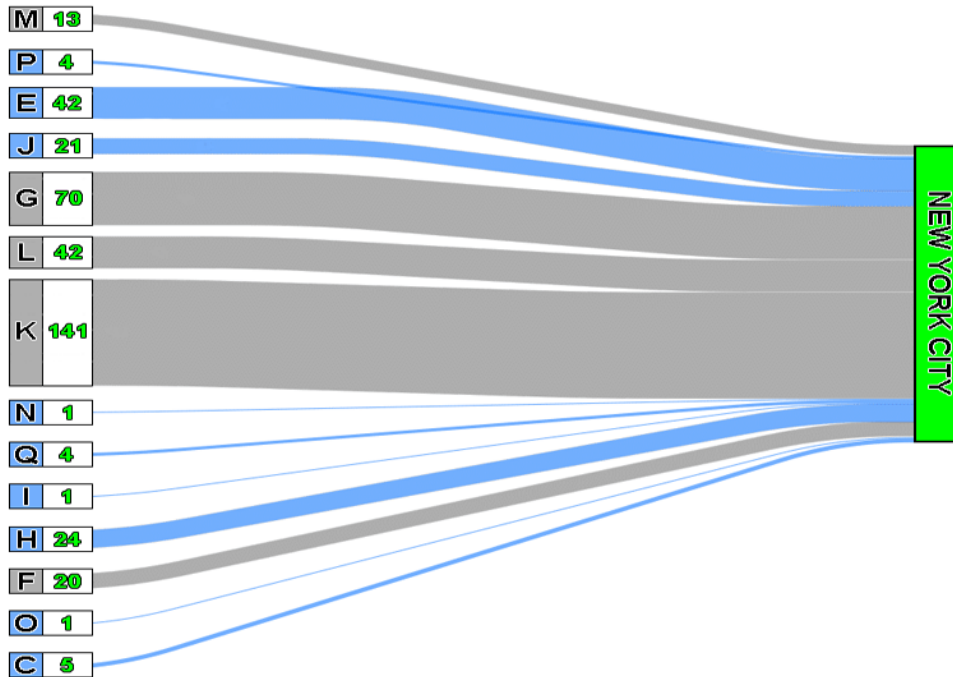


Figure 11: New York City Code Occurrence.

This subsection will elaborate on the results for New York City. The Sankey diagram shown in Figure 11, using Table 9, illustrates the amount of times the deductive codes appeared in the document analysis of New York City.

Code G: Hindering Factors, are mentioned in the document analysis, regarding value adding and financing, in the following two quotes:

Intention, access, and ethics need to be at the center of the program, but without a focus on value added for stakeholders, the model will fail to scale in a sustainable way. ((N.3) New Lab, 2020, p. 19)

It goes without saying that the transition to the circular economy will require finance. However, accessing this capital is not straightforward because banks may perceive circular economy business models as unconventional, hence of uncertain credit risk, and may therefore be reluctant to engage. ((N.1) NYCCI, 2020, p. 13)

Besides hindering factors, the document analysis also mentions *Code K: Enabling Factors* for the implementation of CE using *Code E: Partnership* in the following quote:

New Lab's The Circular City program is an infrastructure for collective learning: a virtuous cycle of public-private collaboration whereby new ideas, new challenges, and new partners are introduced to accelerate innovation and rapidly develop, test, evaluate, and scale new technology in order to address urban challenges, and push the smart-cities market forward and positively impact the quality of life in cities. ((N.3) New Lab, 2020, p. 12)

Another mention of *Code K: Enabling Factors* is the usage of *Code P: Planning Support Systems*, stated in the form of increasing transparency by implementing Internet of Things (IoT) data structures, in the following quote:

Innovation such as the IoT data infrastructure could increase transparency in the supply chain by, for instance, allowing for impact assessment of greenhouse gas emissions curbed and water saved throughout the product value chain. In this way, producers and consumers would be able to observe outcomes of their behavioral change toward circularity, which makes the transition process more predictable. ((N.2) Younghyun and Wu, 2021, p. 307)

Code F: Citizen Initiatives occurs in abundance as well and is exemplified in the following quote:

IKEA, the world's largest furniture retailer, is testing furniture renting models and has early success with students and short-term expatriate workers, according to CEO Jesper Brodin. ((N.1) NYCCI, 2020, p. 21)

4.2 Code Co-Occurrence

Table 10: Key for Figure 12: Code Co-Occurrence Analysis.

Letter	Corresponding Code	Letter	Corresponding Code	Letter	Corresponding Code
A	Drawback Effects	G	Hindering Factors	L	Government Initiatives
B	Co-governance	H	Citizen Roles	M	Risk Management
C	Benefitting Effects	I	Co-creation	O	Citizen Control
D	Conflict Management	J	Information Sharing	P	Planning Support Systems
E	Partnership	K	Enabling Factors	Q	Delegated Power
F	Citizen Initiatives				

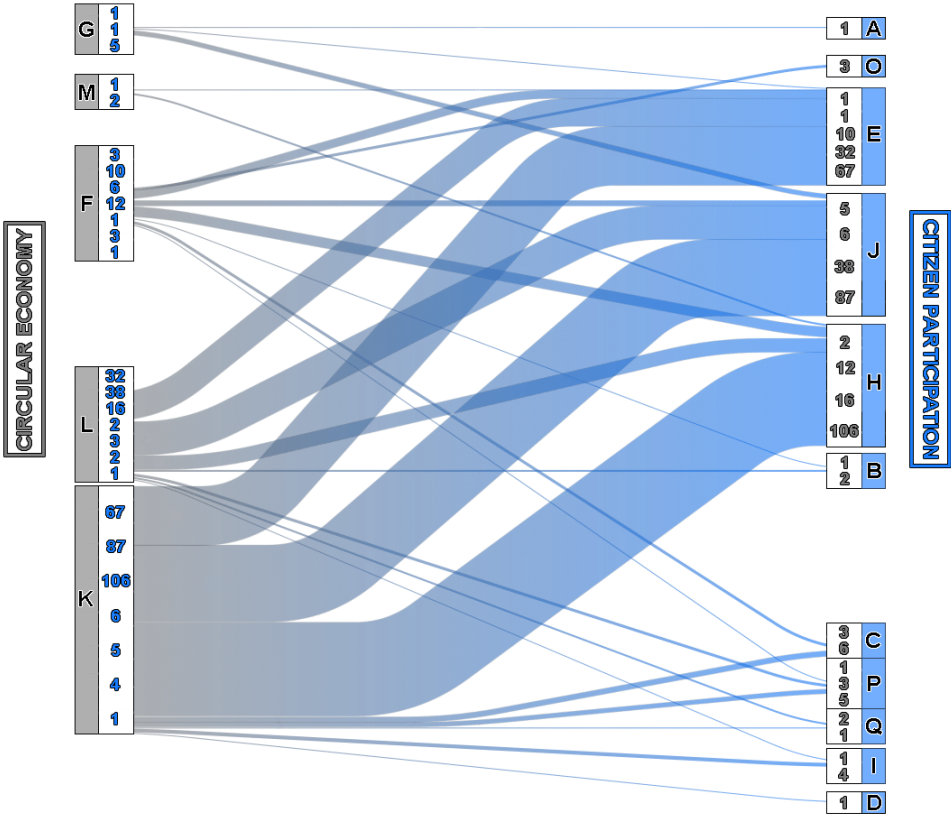


Figure 12: Code Co-Occurrence Analysis.

The Sankey diagram for the Code Co-Occurrence can be found in Figure 12 using Table 10. This diagram illustrates the amount of times certain codes were linked together to the same quote in the analyzed documents for all three cases. This linkage has again been done using the two main themes 'Circular Economy' and 'Citizen Participation'.

Looking at the Sankey diagram in Figure 12, it becomes apparent that code *K: Enabling Factors* occurs a lot in conjunction with code *E: Partnership*. An example for this is the need for collaboration for realizing the vision of circular New York City and is illustrated in the following quote:

Realizing vision of a circular New York City requires concerted effort and collaboration, and the leadership of policymakers, businesses and financial institutions. ((N.1) NYCCI, 2020, p. 4)

Code L: Government Initiatives occurs the most in conjunction with *Code J: Information Sharing* to be able to encourage and inform non-state stakeholders about waste management and CE, which is illustrated in the following quote:

The City and chain partners are working together to encourage Amsterdam's residents to eat healthier and more sustainably through awareness-raising campaigns and the Amsterdam Approach to Healthy Weight ('Amsterdamse Aanpak Gezond Gewicht'). ((A.1) Municipality of Amsterdam, 2020, p. 41)

Lastly, the document analysis of Amsterdam also mentioned *Code K: Enabling Factors* in conjunction with *Code L: Government Initiatives* and *Code J: Information Sharing* for the regional and national government of the Netherlands in the following quote:

Regional government: lead awareness-raising campaigns; provide platforms to foster collaboration between stakeholders in the food value chain. National government: adapt regulations that aim at balancing supply and demand; develop national and international advertisements for waste prevention; consider and adjust food safety regulations to allow for the reuse of food waste; increase taxation on (food) waste (for companies). ((A.2) City of Amsterdam, 2019, p. 33)

5 DISCUSSION

The transformation from a linear economy to CE requires more effort than the mentioned enabling factors propose. The most important enabling factors mentioned in the document analysis are the creation of awareness regarding waste management among non-state stakeholders by education campaigns (also mentioned by Kirchherr et al. (2017)). Hindering factors entail the financial uncertainties needed for innovation to make the transformation a reality. Transparency and trust are also factors mentioned which hinder the implementation of CE. Another interesting mention hindering the implementation of CE is breaking old habits in waste management which has only been mentioned in the document analysis for Amsterdam.

In Subsubsection 2.3.1 and Subsubsection 2.3.2, CG and collaborative planning are seen as a means of implementing more CP in the implementation of CE. Although, co-governance and co-creation are implemented inadequately in policies at the moment. Giving citizens, businesses and educational institutions more responsibility could result in a easier implementation of CE. The three cities do show a small occurrence of these concepts, although, PSS could be implemented more to improve the planning process and is now only seen in New York City to share information and connect stakeholders.

New York City is also the only city making use of CD since they state that the implementation of CE is currently too vast and abstract. The other cities could use CD as well since it is beneficial in managing risks, needs and opportunities through predictions with data.

This thesis tried to fill the research gap mentioned by Cuomo et al. (2020) on how to guarantee more unconventionality, autonomy, and a systematic impact in the transformation to a CE. Overall it seems that collaboration is mostly present in New York City. This difference could best be explained by New Lab's The Circular City Program which focuses specifically on collaboration between the government and non-state stakeholders. Other cities could initiate a similar program benefitting the implementation of CE in the long run.

5.1 Conclusion

To answer the research question stated in Subsection 1.2, the results do confirm that the three cases do see the role of CP in the implementation of CE in a beneficial way. *Subquestion 1* has been answered in Section 5 by the creation of awareness improving, and financing and breaking old habits as hindering, the implementation of CE. The implementation could further be improved by a higher usage of CG, collaborative planning and PSS which answers *subquestion 2*. *Subquestion 3* can be answered by the different implementation of CE at the moment. Amsterdam and Melbourne have a similar approach for the implementation of CE, while New York took a different approach by establishing a pilot program using CD since they state that the implementation of CE is currently too vast and broad. *Subquestion 4* raised the question of what kind of differences there are in the role of CP in the implementation of CE in the three cities. The answer to this question can be formulated as the role of CP being quite similar in the three cities. They all make small usage of CG and collaborative planning but Melbourne should utilize the utilization of PSS more. New York also stands out here in a positive way by mentioning that they work together with a lot of start-ups which has not been mentioned explicitly in the other two cities.

New Lab's implementation of CD in New York City can overall be seen as the most beneficial new course of action for policies regarding the implementation of CE. In general, this is relevant for spatial planning due to CE having a big and broad systemic impact on a city's whole region and spatial organization, since the space of the state, market, and community will change drastically. CE will require change in the integration of sectoral policies, involving stakeholders and promoting the development of pilots regarding the implementation of CE.

5.2 Reflection

Future research could create more insightful results on the course of action in the implementation of CE by making use of CD. This could overall improve the framework on CE and CP. The way this study was fulfilled with the use of deductive coding had a positive effect on the research approach. The use of deductive coding benefitted the comparability of the three cities due to inductive coding making use of undetermined codes which results in different codes for each analyzed document. Semi-structured interviews could have created more in-depth results. Unfortunately, this was unfeasible and impractical in the context of this bachelor thesis project. Future research could therefore create more insightful results using semi-structured interviews with government and non-state stakeholder representatives from the three cities with an emphasis on the utilization of CD.

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A APPENDIX

A.1 Deductive Coding Scheme

Theme	Subtheme	Letter	Code	Explanation
Citizen Participation (CP)	Perception of Citizen Participation	O Q E	Citizen Control Delegated Power Partnership	Codes O, Q and E are used to perceive the perception of CP in the researched cases. <i>Citizen control, delegated power and partnership</i> are taken from Arnstein's ladder of CP (Figure 4) and resemble the three highest rungs of CP on the ladder. The three codes are jointly seen as degrees of citizen power and resemble the highest form of CP.
	Usage of Citizen Participation	I B P	Co-creation Co-governance Planning Support Systems	Codes I, B and P are used to perceive the usage of CP in the researched cases. <i>Co-creation</i> ¹ and <i>Co-governance</i> ² are seen as similar terms to collaborative planning and CS respectively, but are used more throughout research in general. PSS is used to determine examples of digital information sharing in the researched cases.
	Effects of Citizen Participation	A C N	Drawback Effects Benefitting Effects Effects of Citizen Roles	Codes A, C and N are used to perceive the effects of CP in the researched cases. <i>Drawback and benefitting effects</i> are used to determine the beneficiality of CP in the implementation of CE. Other <i>effects of citizen roles</i> are determined to perceive the effects of CP in the implementation of CE in general.
	Differences in Citizen Participation	H J D	Citizen Roles Information Sharing Conflict Management	Codes H, J and D are used to perceive the differences in CP in the researched cases. <i>Citizen roles</i> are seen as roles in the implementation of CE by non-state stakeholders. <i>Information sharing and conflict management</i> are also perceived in the researched cases and are used jointly with citizen roles to find differences and similarities between the researched cases.
Circular Economy (CE)	Implementation of a Circular Economy	K G M	Enabling Factors Hindering Factors Risk Management	Codes K, G and M are used to perceive the implementation of CE in the researched cases. <i>Enabling and hindering factors</i> determine the possibility of implementing CE in the researched cases. <i>Risk management</i> is used to determine risks regarding the implementation of CE in the researched cases.
	Examples of a Circular Economy	F L	Citizen Initiatives Government Initiatives	Codes F and L are used to determine examples of the implementation of CE in the researched cases executed by <i>government initiatives</i> and <i>citizen initiatives</i> . Citizens are here again seen as non-state stakeholders in the implementation of CE.

Figure A.1: Deductive Coding Scheme. ¹ *Co-creation*: "an enactment of interactional creation across interactive system-environments (afforded by interactive platforms), entailing agencing engagements and structuring organizations." (Ramaswamy & Ozcan, 2017, p. 200) ² *Co-governance*: "societal parties joining hands with a common purpose in mind, and stake their identity and autonomy in the process." (Kooiman et al., 2005, p. 22)