

# **The Groningen Doughnut**

A study on how the Doughnut Model can be used as an approach for climate adaptation and co-creation in Groningen



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## Colophon

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## **Abstract**

In the last couple of years, the Municipality of Groningen has been developing climate adaptation projects and policies in the city. The aim is to create a safe living environment and become resilient to the effects of climate change. In order to combine both the social and environmental concerns, the approach of the Doughnut Model of Raworth (2012) was used in this research as a new perspective to rethink the way Groningen will be dealing with climate adaptation. To study how the Doughnut Model can be applied, the three case studies Amsterdam, Brussels and Leeds were analysed. Qualitative research methods were used, including a document analysis and semi-structured interviews, to answer the main question “*How can the Doughnut Economics Model be used as an approach for climate adaptation planning and contribute to co-creation in the city of Groningen?*”. Based on the theoretic and empirical research it can be concluded that there are two main ways of how the Doughnut Model can be operationalised. These include the Doughnut Portrait, which is a place-based approach that connects the local aspirations with the global responsibility of a place. Moreover, the themes within the Doughnut are part of the Social Foundation and Ecological Ceiling. The themes help to concretise the performance of a city through the selection of indicators. The analysis of Groningen showed that the municipality recognizes the importance of the involvement of citizens. Therefore, the Municipality of Groningen carries out various projects and policies in which citizens have the opportunity to participate and collaborate. The way Groningen is dealing with the effects of climate change is mainly focused on the physical side of climate adaptation. Furthermore, an overarching framework, that guides all projects and policies related to climate adaptation, is missing. Based on the lessons learned from the case studies of Amsterdam, Brussels and Leeds, an advice for the Municipality of Groningen is formulated. This advice includes that in order to combine both social and environmental concerns, the approach of the Doughnut Model of Raworth (2012) can be used to rethink how Groningen is dealing with climate adaptation. In addition, the Doughnut Model can contribute to co-creation with citizens in Groningen as it supports collaborative action for the planning of climate adaptation. Citizens can be involved in the formulation of the Doughnut Model to align the needs and values of citizens with the goals of the municipality. For future research it is relevant to investigate people’s attitude and understanding of the Doughnut Model in Groningen. Since the Doughnut Model is a relatively new approach it is essential to understand how citizens perceive and react to it. Future research on citizens’ views and preferences can also provide insight into how to align the Doughnut approach with citizens’ values.

**Keywords:** climate adaptation, co-creation, The Doughnut Economics Model, communicative planning approaches, climate change, comparative case research

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## 1. Introduction

Over the last decades cities are becoming increasingly vulnerable to climate change (Boogaard et al., 2020; Mi et al., 2019). As a result of climate change, cities are getting warmer, while urbanization trends intensify this phenomenon via urban heat island effect (Kumar, 2021). Due to the high density of cities and effects such as this urban heat island effect, local temperatures in cities will be significantly higher than the expected 1.5 °C global warming (Huang, et al., 2021). The impact of climate change on cities can aggravate existing problems, such as air pollution and water scarcity. The continuous urbanization trends and the increasing amounts of floods and droughts force action to be taken (Huang-Lachmann, 2019). The report of the Intergovernmental Panel on Climate Change (IPCC, 2022) showed that greenhouse gas emissions must be reduced by 27% before 2030 to not exceed the 1.5°C global warming. Since climate change will have an impact on the temperature and weather patterns in cities (Boogaard et al., 2020; Velasco et al., 2018), the environment will suffer from drastic consequences, such as longer periods of drought and heat and increased risks of flooding. Nonetheless, the impact of climate change will also have social and economic effects (IPCC, 2014). Long periods of heat will impact the health, liveability and well-being of citizens and floods will cause damage and maybe even displacement. Therefore, climate adaptation, which Dessai and Hulme (2004) refer to as both preparing for and adjusting to current effects and predicted impacts in the future of climate change, can help to deal with these challenges. At the same time, social and economic inequalities reach unprecedented levels (OECD, 2019). Due to Covid-19 the health emergency and economic downturn have amplified existing societal challenges, such as unequal access to healthcare systems (Wahlund & Hansen, 2022). These circumstances get people questioning whether the conventional (economic) policies are sufficient and suitable to address all these challenges.

Until recently, environmental models on climate change mainly included the ecological side of sustainability. Because of this, the focus was on mitigation of GHG-emissions or biodiversity loss (Vandenhoe, 2018). A perspective to rethink action to climate change and the planning of climate adaptation is the Doughnut Model from Raworth (Raworth, 2012). With this approach she redraws the economy as a doughnut with a social foundation and an environmental ceiling as boundaries. With this concept, Raworth proposes to not fixate on the growth of gross domestic product (GDP), but on the social and ecological needs of humans and nature as well as planetary boundaries. The Doughnut Model has the objective of pursuing sustainable development by protecting people against critical deprivation and remaining within the environmental limits on a global scale. This way, within the Doughnut Model, multiple social and environmental concerns are included, while enlarging people's capabilities (Raworth, 2017). Over the past few years, several cities and regions, such as Amsterdam, Barcelona, Brussels, Cornwall, Devon, Leeds and Melbourne, have started with the implementation of this approach. All with different processes, perspectives and actors (Wahlund & Hansen, 2022).

### **Scientific relevance**

The aim of this study is to get more insight into how the Doughnut Model can be used for the implementation of climate adaptation planning policies in the city of Groningen. Until recently, research on the Doughnut Model focused on the theoretical side of this model on a global scale (Millward-Hopkins et al., 2020; Stopper et al., 2016). Research has been done on the differences between the Doughnut Model and other approaches aiming to rethink economic development policies, such as the foundational economy (Olsson, 2020; Wahlund & Hansen, 2022). The Doughnut Model can be an approach for high-income countries to help them to refocus from growth to purpose-driven economic strategies (Olsson, 2020). Furthermore, research by Wahlund and Hansen (2022) mentions that the Doughnut is a flexible and guiding framework that can be a tool for exploring place-specific interventions for more sustainable economies. However, research that elaborates on the practical implementation of the Doughnut Model and the involvement of citizens is quite limited so far (Turner & Wills, 2022). The results from this study can be valuable for many other Dutch and European cities that are also trying to deal with the planning of climate adaptation like Groningen. This research can provide insight into the similarities and differences between the case studies Amsterdam, Brussels and Leeds in how they have applied the model. At the same time, it can provide an understanding of how citizens can be engaged in the implementation of the Doughnut. This to gain insight into how co-creation can be integrated in the process of climate adaptation planning in the city of Groningen.

### **Societal relevance**

The city of Groningen will experience increasing impacts on weather and temperature patterns as a result of climate change (Velasco et al., 2018). This will cause extreme weather and longer periods of heat and drought. However, a changing climate will also have an impact on the economic and social situation in Groningen. Long periods of heat can decrease the well-being and health of citizens and extreme weather, such as flooding caused by heavy rain, can cause displacement of people and damage to buildings (Ten Boer, 2018). Besides these considerations, another main goal of this research is how the Municipality of Groningen can engage citizens in the process of the implementation of the Doughnut Model. The process of collaboration and integration of stakeholders' needs can be referred to as co-creation (Ziervogel et al., 2022). Until now, climate adaptation in the city of Groningen tries to involve citizens in their planning practices (Kern et al., 2021). However, collaboration between planners and stakeholders has been lacking in several climate adaptation projects (Roest & Boogaard, 2020). Furthermore, social issues, such as equality, work and income, are not always included. With the approach of the Doughnut these social challenges can be integrated, while also focusing on the ecological boundaries of the earth.

### **Problem statement and research questions**

In recent years, the Municipality of Groningen has been implementing climate adaptation projects and policies in the city. This with the aim of creating a safe living environment and limiting the high costs and (economic) damage in the future (Municipality Groningen, 2020). Several projects have already been carried out, such as the redevelopment in Paddepoel, where streets were



redesigned to make them resistant to heavy rain and heat (Climate Adaptation Groningen, 2020). However, the main focus of these projects and policies are based on the ecological or physical side. In the projects, such as Paddepoel, citizens have partly participated in the process. The Doughnut Model of Raworth (2012) combines both the ecological and social needs of the earth and humanity. The integration of social needs has so far not been a priority in the way the Municipality of Groningen deals with climate change (Gemeente Groningen, 2019 & 2021). That this integration is necessary is also shown in a recent report by the Groningen Social Planning Office. This report shows that for example structural inequality is not decreasing, despite policies to counteract social differences. There are large differences in self-reliance among residents. The differences are particularly substantial between people who have more and less access to resources such as work and income, social networks, care and support, or education (Groningen Social Planning Office, 2022).

While the Municipality of Groningen is trying to become climate adaptive and at the same time has to deal with social inequalities, an approach, such as the Doughnut Model, can potentially support this. This leads to the main question: *“How can the Doughnut Economics Model be used as an approach for climate adaptation planning and contribute to co-creation in the city of Groningen?”*.

To answer the main question, the following sub-questions are formulated:

- How can the Doughnut Model be conceptualized from a theoretical perspective?
- How is Groningen currently dealing with climate adaptation planning?
- How has the Doughnut Model been operationalised in the cities Amsterdam, Brussels and Leeds?
- How is co-creation integrated in the implementation of the Doughnut Model in the cities Amsterdam, Brussels and Leeds?
- How can the lessons learned from the other cities help the implementation of the Doughnut Model in Groningen?

In order to answer these questions a theoretic background is given. In this theoretical framework several concepts are explained and operationalised. These operationalisations are the basis for the empirical research, that will be elaborated on in chapter 3. Chapter 3 describes the research methodology that was used for this research. The results from this research are described in chapter 4. Based on the lessons learned, a policy advice for the Municipality of Groningen is given in chapter 5. To end this thesis, the discussion and conclusions are described in chapter 6.

## **2. Theoretical framework**

In this chapter, a discussion is presented on how climate change links to spatial planning. Due to the complexity and urgency of climate change and its consequences, both technical and especially communicative rationalities need to be dealt with. While doing so, the concept of co-creation is introduced here to describe the discussion around the different forms and goals of communicative planning and how co-creation can contribute to communicative approaches in climate adaptation planning. Furthermore, this chapter will discuss how the Doughnut Economics of Raworth in theory can contribute to the adaptation of climate change in cities.

### **2.1 Spatial planning**

Spatial planning can contribute to purposeful interventions to create the future we want. Over time, spatial planning has gone through many changes. These changes went from a centralized system to a system that has a focus on decentralization with consensus seeking (De Roo, 2006). At first, the assumption was that the physical environment can be controlled on the basis of expertise and knowledge (Forester, 1989). In the case of climate change and climate adaptation planning, traditional planning approaches can be helpful, since problems related to climate change can be urgent. Therefore, they can be useful to quickly make sufficient decisions. Nowadays it is accepted that the technical expertise in a traditional planning approach is far too limited (De Roo, 2006; Innes & Booher, 2015). Furthermore, the interaction with stakeholders has become an important element in communicative planning practices to create equal power relations and to build consensus between the stakeholders (Healey, 2020). As a consequence, not only expertise and facts are used to overcome planning problems, also non-professional knowledge, values and informal consultation have to be integrated. Communicative planning also gets more attention in relation to climate change as the perspective on the climate problem widens (Saunders & Luukkanen, 2022). Before, the focus was mainly on the ecological limits of the earth, nowadays the social and societal side of climate change are increasingly being considered. An example of this is the Doughnut Economics Model by Raworth (2012), which will be discussed further in section 2.3. This model shows that adding a social foundation makes it more necessary to involve people in planning around climate change and climate adaptation.

#### **2.1.1 Co-creation in spatial planning**

When spatial problems involve a diversity of uncertainties and a high complexity, they are often called ‘wicked’ problems (Rittel & Webber, 1973). These problems are not wicked because they have an unsolvable character, but because these problems are highly complex (Meister Broekema et al., 2022). Some of these wicked problems, such as climate change, are urgent and therefore need both top-down and communicative planning to be solved. An instrument that strives for collaboration among stakeholders for climate adaptation planning is co-creation (Leino & Puumala, 2021). Originally, co-creation is a process in which enterprises and consumers

collaborate together (Meister Broekema et al., 2022). In this case, the stakeholders are not seen as a target group, but rather as an influential and integrated part of a system. Today, the term co-creation in spatial planning has the aim to improve the effectiveness and efficiency of the planning process and to increase the satisfaction of everyone that is involved in this process. This can be done by involving multiple stakeholders and actors in not only the ideation, but also in the implementation and assessment of the planning process (SISCOE, 2019). The essence of co-creation is that the personal experiences of the different stakeholders are integrated, because the ones that have experienced a situation or problem are the ones who know what the needs are (Ramaswamy, 2011). Through the integration of the needs, an approach can be better designed to the perceptions or wishes of the stakeholders. Co-creation can thus be seen as part of the continuous discussion around the different forms and goals of collaborative or communicative planning. Furthermore, co-creation can be an instrument that strives for collaboration and communication between stakeholders.

When applying the concept of co-creation to climate adaptation the article of Ziervogel et al. (2022) shows that co-creation can help with capacity building and ensuring legitimacy and ownership of longer-term interventions related to climate adaptation planning. At the moment, climate adaptation policies do not pay enough attention to the needs and experiences of citizens and these policies are mainly transferring information and knowledge top-down. Therefore, most efforts related to co-creation are mainly focused on educating and communicating to citizens. When local knowledge and experiences are integrated in those climate adaptation policies, collaboration can help to confront inequalities and enable transformative adaptation (Blythe et al., 2022; Ziervogel et al., 2022). This is relevant for this research, since one of the aims is to find out how citizens in Groningen can get engaged in the implementation of climate adaptation planning.

As many different attempts are being made to involve citizens in climate adaptation planning, there are different types of co-creation (Vargas et al., 2022). These different types of co-creation are characterized by different roles of citizens, different levels of involvement and different phases of involvement during a planning process. The different types of co-creation can be divided into citizens as co-implementers, co-designers and co-initiators (Voorberg et al., 2015). The first one, citizens as co-implementers, refers to the idea that citizens only perform some implementation tasks during a process. Citizens are important to make a service work, however they do not play a role in the design or initiation phase. This does not impose too great a demand on both citizens and public authorities, which makes it easy to let citizens participate during a process. Nevertheless, this type of co-creation cannot enable citizens to be part of the solution of a complex problem (Lund, 2018). Citizens as co-designers requires collaboration and ownership of all parties involved. In this type of co-creation citizens can decide how a certain service delivery is designed, which can facilitate collaboration between authorities and citizens (Voorber et al., 2015). The demands made of citizens is greater in terms of collaborative capabilities, competences and time consumption (Lund, 2018). However, the initiative of this approach lies within a public organization. The final type of co-creation are citizens as co-initiators (Mogstad et al., 2018), in

which citizens are internally motivated and have the most resource demanding and active citizen role. (Voorberg et al., 2015). Authorities are often an actor that follows and they support initiatives of citizens, which makes the citizens more autonomous.

The different roles for citizens show that citizens can get involved in different phases within the co-creation process. When citizens are seen as co-implementers they are only involved in the final stages of a planning process. When citizens are seen as co-designers they are part of the collaboration during the planning process, which increases their influence on the decision-making process and outcomes (Voorberg et al., 2015). Lastly, when citizens are the co-initiators during the process they play a key role throughout the whole planning process. As many citizens can be involved in different phases and degrees, it is important that the communication and interaction between the authority and citizens is done systematically. A topic that is often mentioned in this are platforms (Gouillart & Hallett, 2015; Ramaswamy 2011). Platforms enable the possibility for stakeholders to get informed about a problem and to contribute with their experience to this problem. Examples of these platforms are websites, online and physical meetings or living labs. These platforms can contribute to the creation of mutual values, which is in line with the focus of consensus seeking in the communicative rationality. Co-creation can hence be defined as “an exchange process, with multi-sided interactions, through continuous dialogues and transparency, access and visualization of experiences” (Ramaswamy 2011, p. 195).

In their article, Leino and Puumala (2021) put an emphasis on the potential of co-creation for fundamental change in regard to the positions, roles and relationships between all stakeholders that are involved. In addition, they mention that co-creation is not per se a top-down or bottom-up approach, instead it is a multi-directional approach to problem solving. This is because co-creation can replace public-private competition or a public service monopoly with a multi-actor collaboration (Leino & Puumala, 2021; Torfing et al., 2019). This collaboration is needed since the consequences of climate change cannot be solved by the planning authorities alone. As a result, the hierarchies between authorities, citizens and other stakeholders break down. Nonetheless, this shift toward a more collaborative or communicative approach can at the same time be an obstacle for co-creation (Murray et al., 2010). This since the implementation of collaboration between governmental organizations and stakeholders can be time consuming and complicated. A reason can be that laws are binding the government to fulfil a certain role or function. This can hinder the implementation (Gouillart & Hallett, 2015).

## **2.2 Climate change in cities**

Climate change has large impacts on cities, which makes them vulnerable to the effects of climate change (Kumar, 2021). The risks for cities include heat stress, drought, water scarcity, extreme precipitation, inland and coastal flooding, landslides and air pollution. These risks are amplified for those who lack essential services and infrastructure or those who live in poor-quality housing

and exposed areas (IPCC, 2014). As a result of climate change, cities are warmer, while urbanization trends intensify this via urban heat island effect (Kumar, 2021). Due to the high density of cities and effects such as this urban heat island effect, local temperatures in cities will be significantly higher than the expected 1.5 °C global warming (Huang, et al., 2021). The impact of climate change on cities can aggravate existing problems, for example water scarcity and air pollution. In addition, cities are often built on coastal areas or next to rivers, which makes those cities vulnerable to the effects of sea level rise (IPCC, 2021). Rockström et al. (2009) describe that there are nine planetary boundaries that are at increasing risks due to human activity. Paragraph 2.3.1 will further explain what those are.

Moreover, climate change has a huge impact on the environment as well as on the social and economic situations in cities (Roest & Boogaard, 2020). The increased risk of flooding and longer periods of heat and drought are examples of this. These floods can result in damages to houses or infrastructure and inescapable displacement of people. Long periods of heat can negatively impact the health of people, especially elderly. Moreover, heat can impact liveability and productivity. Added to this, a long period of drought has an impact on biodiversity and food production. Thus, the effects of climate change do not only have an impact on the environment, but have also social and economic effects (IPCC, 2014). To combat climate change itself and the effects, climate adaptation becomes more important (Kern & Alber, 2009; Klein et al., 2019; Roest & Boogaard, 2020).

### **2.2.1 Climate adaptation**

As mentioned, spatial planning can help to create a desired future through making purposeful interventions. Therefore, spatial planning can be a requirement for cities to facilitate adaptation to climate change (Roggema, et al., 2012). This is because climate change has severe spatial consequences (Hurlimann & March, 2012). Since the acknowledgement that climate change cannot be avoided completely, but the most severe impacts can be decreased or avoided by reducing the GHG-emissions, climate mitigation strategies have been developed (VijayaVenkataRaman et al., 2012). Climate adaptation puts an emphasis on anticipating on the effects of climate change as well as taking action to minimize or prevent the consequences of current and future climate change (Dessai & Hulme, 2004). Cartalis (2014) describes climate adaptation as a process that deals with the effects of climate change through increasing the carrying capacities of individuals and space. In this way, individuals are expected to cope with more diverse impacts of climate change. Kaika (2017) argues that increasing peoples' carry capacities is more than dealing with the impacts of climate change, it also means dealing with power and inequality.

Furthermore, climate adaptation includes both physical and behavioural changes (Gasbarro & Pinkse, 2016). Physical aspects refer to a reduction of the sensitivity or the increased adaptive capacity of a place, such as reducing flood risks or mitigating heat. The behavioural aspects are related to the carrying capacity of people and communities, this includes sharing knowledge or making action plans. However, insight into which factors make climate adaptation successful and

how to involve stakeholders is not yet completely known (Klein et al., 2019). Fagiewicz et al. (2021) argue that an active role of stakeholders, especially local citizens, is crucial when a communicative planning approach is applied. An active role for stakeholders can increase the effectiveness of climate adaptation, because it bridges the gap between technical rational, with top-down approaches, and communicative rational, with bottom-up approaches, to climate adaptation (Sarzynski, 2015). Additionally, communication and collaboration between stakeholders can connect the knowledge of experts with (risks) perceptions of citizens, for example through co-creation. When developing and implementing effective climate adaptive strategies, it is thus vital to involve stakeholders and to give them the opportunity to contribute to the process (Gouillart & Hallett, 2015; Sarzynski, 2015).

The concept of climate adaptation planning is sometimes used in the literature to describe the interface between climate adaptation and spatial planning overlap (Uittenbroek et al., 2019). It refers to the idea that planning strategies focus on the long-term impacts of climate change, while also taking opportunities to integrate urgent, short-term issues into account (Dai et al., 2018). The combination of long-term goals with short-term functions represents the multi-functionality of public space. In this, the importance lies in tailor-made solutions that fit in the context of a place (Hudec, 2017). What the Municipality of Groningen has done regarding climate adaptation and how they are executing it is discussed in the next paragraph.

### **2.2.2 The planning of climate adaptation in Groningen**

The city of Groningen has started to work on climate change related issues since 2006. This mitigation policy was focused on the institutionalization of energy neutrality by the year 2025. It explored how alternative energy could be provided for the city. This search for alternative energy and the extraction of natural gas in the Province, has led to a strong focus on reduction and replacement of natural gas as mitigation strategy (Kern et al., 2021; Sovacool, 2016). This goal targeting an energy transition shifted the attention away from adaptation policies. In 2010, the energy program ‘Roadmap Groningen CO2-Neutral 2035’ was developed to implement the mitigation policy. The document put an emphasis on the reduction and transition of the energy consumption (Kern et al., 2021). In 2016 the Municipality of Groningen has set the new goal to be climate adaptive in 2050. The main cause for this was the growing awareness and urgency of climate change. The National Climate Agreement of 2019 was the first agreement that set national guidelines for Dutch municipalities. One of the goals in this agreement is that a fifth of the total amount of households should be gas-free by 2030. The Municipality of Groningen has the possibility to translate this goal to their own local level. As a result, several projects are implemented, such as the decoupling of gas grids for households. However, the implementation of the plans is difficult, as these plans are highly dependent on external funding and the municipality is not able to control the provision of energy for households, because the energy companies in the Netherlands are privatized (Kern et al., 2021).

While at first the policies in Groningen were mainly focused on mitigation, the efforts and attention for climate adaptation planning in the city of Groningen is increasing. Two factors that play a role in Groningen, related to climate adaptation planning, are spatial and institutional path dependencies (Roest & Boogaard, 2020). The decisions that are made in the past are limiting the decisions that have to be made in the present. Spatial path dependency can be linked to developments in a city that have led to a diversity of spatial design. An example in Groningen is the densification of the city centre (Roest & Boogaard, 2020). As a result, multiple stream channels have been buried, which reduced the efficiency of the natural stream network. Now, the remaining channels in the city centre are getting congested (Napieralski & Carvalhaes, 2016). This spatial path dependency has thus led to a situation where space for climate adaptation planning is limited. The institutional path dependencies refer to the formal (laws and policies) and informal (social patterns, values and standards) rules in Groningen, that have an impact on the current approach to climate change. An example of institutional path dependency is the traditional focus on land-use decisions between public and private spaces (Roest & Boogaard, 2020). Public spaces are responsible for providing public services and goods, while private spaces are used and determined by the preferences of the owners. This has led to limited cooperation between public and private stakeholders. The limited application of communicative planning approaches is an example of the institutional path dependency in Groningen (Roest & Boogaard, 2020). Because climate adaptation planning needs both physical and behavioural changes complex challenges arise in Groningen. Therefore, climate adaptation planning in the future requires more attention to the collaboration and participation of governments, citizens and other stakeholders.

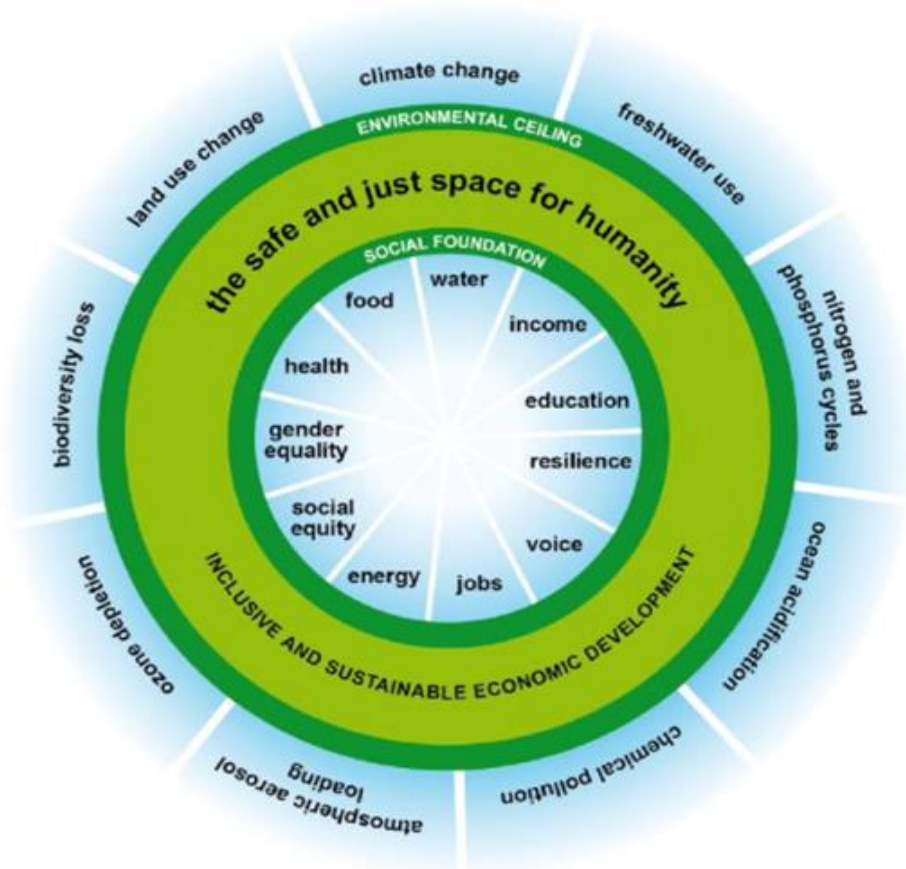
### **2.3 The Doughnut Economics**

The Doughnut Economics Model is created by Kate Raworth as a response to the main challenges we must deal with in the 21st century (Raworth, 2012). In this paper *A Safe and Just Space for Humanity* she describes that by pursuing sustainable development it is necessary to eradicate poverty, so people can live without deprivation. For a good part this depends on ensuring that our collective use of natural sources remains within sustainable limits while also being mindful about the wellbeing of people. The Doughnut Economics Model thus unites ecological elements with social elements. This with the idea that social theory can only provide useful answers to the global ecological crisis when it is combined with ecological theory and vice versa (Saunders & Luukkanen, 2022).

The Doughnut Economy is a response to the different environmental models, such as the planetary boundaries concept from Rockström et al. (2009). Until recently, environmental models mainly included the ecological side of sustainability. Based on these models, the focus was on mitigation GHG-emissions or biodiversity loss (Vandenhole, 2018). The Doughnut Model from Raworth (2012) has added a social dimension to this ecological perception of sustainable

development, which is visualized in figure 2.1. The Doughnut Model has the objective of pursuing sustainable development by protecting people against critical deprivation and remaining within the environmental limits on a global scale. In the middle of the model there is a space for critical human deprivation. The first priority should be that people do not end up in this space. Moreover, all people must be empowered with resources and rights, which they need to establish a base for their social needs. At the same time, we need to recognize that many systems on earth have certain limits that are at risk of climate change, land use change or biodiversity loss. The limits must not be crossed if we want to avoid critical nature thresholds and the earth's system to remain in its current state, which enables civilizations to develop (Raworth, 2012). The whole Doughnut Model has a shape that looks like a doughnut. The space between the social foundation and the environmental ceiling is a safe space for humanity. In this space human well-being and planetary well-being are both assured and the interdependence between them is respected.

*Figure 2.1. A visual representation of the Doughnut Model*



Source: Raworth, 2012

### **2.3.1 The Ecological Ceiling and Social Foundation**

The ecological ceiling in Raworth's model is based on the planetary boundaries concept set by



Rockström et al. (2009). This concept provides a base to understand the natural processes and resources on which humanity depends in case of sustainable development. The planetary boundaries concept exists of a set of nine critical earth-system processes, which all have a kind of tipping point of increasing risks. When those tipping points are crossed, irreversible and sometimes abrupt environmental changes can appear. These environmental changes can move the earth out of the current stable state and can have major impact for humanity (Raworth, 2012). Based on the planetary boundaries it can be concluded that many systems on earth have certain limits that are at risk from climate change, biodiversity loss and land use change impacts (O'Neill et al., 2018). The ecological limits must not be crossed when avoiding critical nature thresholds and the earth's system to ensure the earth will remain in its current state.

Raworth's model is a response to the planetary boundaries from Rockström et al. (2009). Because an Ecological Ceiling is not enough to contribute to sustainable developments, she therefore adds a social dimension (Raworth, 2012 & 2017). The basis of the Social Foundation are human rights. This way people can live their lives with opportunity and dignity (Raworth, 2012). According to international human rights norms all people need to have access to life's essentials, which include water, food, education, health care, freedom of expression, personal security and political participation (United Nations, 1948). However, from the sustainable development vision of the Doughnut Model this is a minimum. People's lives should also include fulfilment and creativity. However, since there is extreme inequality in the world and a big extent of deprivation, the key aspect of the social foundation are human rights (Raworth, 2012). The establishment of the Millennium Development Goals in 2000 have addressed the presence of deprivation in the world since 2000 (Lomazzi et al., 2014). Even though the focus of the Millennium Development Goals helped achieving parts of the Social Foundation there are additional challenges that have arisen. As a result of extreme events, such as the financial crises or extreme weather events, people see the importance of building a long-term resilience. After the United Nation Conference on Sustainable Development (2015), also known as Rio+20, the focus was especially on the differences in progress of the goals between countries and on gender equality and empowerment (Larionpva, 2020). Based on the priorities of different governments during the Rio+20, Raworth (2017) created a set of twelve social priorities. These priorities are food, health, water and sanitation, education, income and work, peace and justice, political voice, social equality, gender equality, housing, networks and energy.

One of the main critiques on the Doughnut Model is related to the scale of the model (Biermann & Kim, 2020). When the model is implemented on a city scale, local problems such as waste management must be dealt with. However, the causes of these kind of problems, which, for example in the case of waste management is related to mass consumption, keep existing. Therefore, the Doughnut Model can be an approach to deal with both social and ecological problems on a smaller scale, nevertheless the overarching causes are not being tackled (Biermann & Kim, 2020; Lavilley, 2021). This does not imply that the Doughnut Model is not an useful

approach for sustainable development. Moreover, the implementation of the model can be an example for other cities to start thinking differently about the well-being of people and the earth.

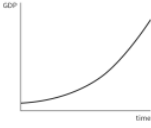





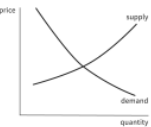
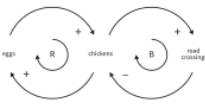

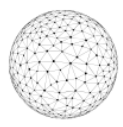

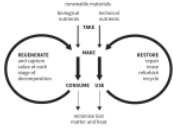
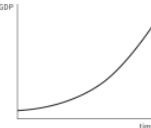
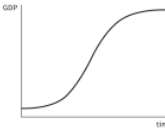
## **2.4 The Doughnut Model in practice**

While the Doughnut Model was developed as a global model, attention from policymakers in cities and regions has been growing (Turner & Wills, 2022). Over the last couple of years, several cities and regions have been implementing the Doughnut Model in their area. This has resulted in an operationalisation of the theory of The Doughnut into practice in several ways. A total of three types of operationalisations can be found. The first are the seven principles to think like a twenty-first century economics. The second one include the Doughnut Portrait with the four lenses for different scales. The final operationalisation is the formulation of themes within the Doughnut. This section describes and explains these three ways on how the Doughnut Model can be put into practice.

### **2.4.1 How to think like a twenty-first-century economics**

In her book *Doughnut Economics: Seven ways to think like a 21st-economist*, Raworth (2017) describes that if the goal is to meet the needs of all humans within the means of the living planet, a new way of economic thinking is needed. This new way of thinking is not a set of institutions or concrete policies, however, it is about regenerative and distributive dynamics that fit in the context and challenges from the 21st century. Drawing insights from institutional, ecological, behavioural, feminist and complexity economics, Raworth describes seven ways to think like a 21st century economist (see figure 2.2).

Figure 2.2. Seven ways to think like a 21<sup>st</sup> century economist

Seven Ways to Think:	From 20th-Century Economics	To 21st-Century Economics
1. Change the Goal	 GDP	 the Doughnut
2. See the Big Picture	 self-contained market	 embedded economy
3. Nurture Human Nature	 rational economic man	 social adaptable humans
4. Get Savvy with Systems	 mechanical equilibrium	 dynamic complexity
5. Design to Distribute	 growth will even it up again	 distributive by design
6. Create to Regenerate	 growth will clean it up again	 regenerative by design
7. Be Agnostic about Growth	 growth addicted	 growth agnostic

Source: Raworth, 2017

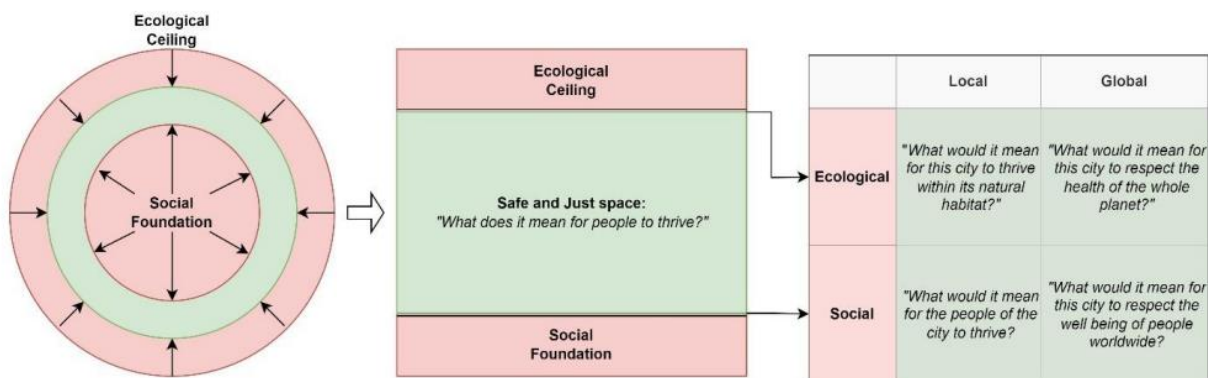
Even though Raworth’s principles are a starting point to change the goal away from GDP and show that regenerative and distributive dynamics, it can contribute to a system that deals with current challenges, such as climate change and inequality (Ross, 2019), there are some critiques on the Doughnut Model and the seven principles (Lavilley, 2021; Milanovic, 2018; Schokkaert, 2019). Schokkaert (2019) addresses some ambiguities around the seven principles. For example, Raworth mentions several times that ‘we’ can change the world or ‘we’ should build a more democratic and sustainable economy. However, it is not always clear who ‘we’ exactly is, and sometimes it is even less clear how ‘we’ can or should realize this (Schokkaert, 2019). In addition,

economist Milanovic (2018) argues that the Doughnut Model does not take into account that without a greater GDP-growth global poverty cannot be eradicated. In doing so, he also raises the question on how wealth can be measured, if GDP is not used. Lastly, Milanovic points out that citizens are becoming more commercially motivated, which leads towards a more self-centred and money-oriented world. This is in contrast with the more gentle and cooperative world that Raworth (2017) mentions in the seven principles.

### 2.4.2 The Doughnut Portrait: four lenses

Since the Doughnut Model was first published in 2012, it has gained considerable attention worldwide to rethink sustainability (Turner & Wills, 2022). At first, the Doughnut Model was mainly applied in the rethinking of global sustainable development, but recently the model has also been used in the context of climate change. Therefore, the Doughnut Model has been downscaled in a wide range of ways. Fanning et al. (2022) developed an approach that enables to ‘unroll’ the Doughnut Model, see figure 2.3. This place-based approach is created with the purpose to open up space between the Ecological Ceiling and the Social Foundation, without neglecting the fact that each place on earth is inextricably connected to each other. Fanning et al. (2022) created this model because it combines local aspirations with global responsibility. This requires that every place needs to consider the many complex interconnections they face with the rest of the world. Attention needs to be paid to these interconnections because local lifestyles can have many impacts on a global scale (Turner et al., 2021). Moreover, the global context shapes many different challenges that places face when achieving local aspirations. In addition, the unrolling of the Doughnut can be adapted and applied on different scales.

Figure 2.3. The four lenses of the Doughnut Portrait



Source: Hassan, 2022

When combining the two domains, ecological and social, and the scales, local and global, four lenses arise. Fanning et al. (2022) refer to these four lenses as the Doughnut Portrait. When zooming in on the four interconnected lenses, the first one is the Local-Social. The Local-Social lens is part of defining the set of dimensions that form the social foundation of a place (Turner et

al., 2021). This refers to the basic standard of wellbeing of all residents. These dimensions range from decent work and income to the availability of food and healthcare. The second one is the Local-Ecological lens. In this lens the focus is on the environmental targets of a place. The aim is to identify and develop key ecosystem services, so places can become resilient members of their natural environment in which they are embedded. The Global-Ecological lens looks at whether the resources, consumed by the citizens in a place, could be extended to everyone on earth without degrading the earth's ecosystems (Fanning et al., 2022). This lens is more technical when compared to the others, because this lens compares the consumption of resources of a place to the place's fair share of a globally sustainable level of the use of resources. Thus, the approaches to downscale the planetary boundaries to places and to account the environmental footprint of a place are combined (Turner et al., 2021). The last one, the Global-Social lens, focuses on how the unique patterns of places are connected with other parts of the world. These patterns are shaped by the history, culture, location and commerce of the places. This lens looks at how these patterns and connections impact the wellbeing of people worldwide. A lot of these impacts are beyond the scope of a smaller geographic area. This lens brings these into view as part of a holistic recognition of the worldwide implication of city life (Fanning et al., 2022). These four lenses connect local aspirations with global responsibilities, which requires places to consider the complex interconnections with the world in which the place is embedded. Therefore, the four lenses can be seen as a tool for places to localize the Doughnut Model to its context.

### **2.4.3 Themes in the Doughnut Model**

In 2.3 an in-depth explanation of the Ecological Ceiling and Social Foundation is given. In these paragraphs it is mentioned that both exist of several indicators. The Ecological Ceiling exists of the nine earth-system processes: climate change, ocean acidification, ozone layer depletion, air pollution, nitrogen and phosphorus use, freshwater withdrawals, land conversion, biodiversity loss and chemical pollution. The Social Foundation is based on the twelve social priorities: food, health, water and sanitation, education, income and work, peace and justice, political voice, social equality, gender equality, housing, networks and energy (Raworth, 2012). When the Ecological Ceiling and Social Foundation are operationalised in several cities, the indicators are divided into themes (DEAL et al., 2020). The visualisation of these themes can be found in the figure below.

Figure 2.4. Themes within the Doughnut Model



Source: DEAL et al., 2020

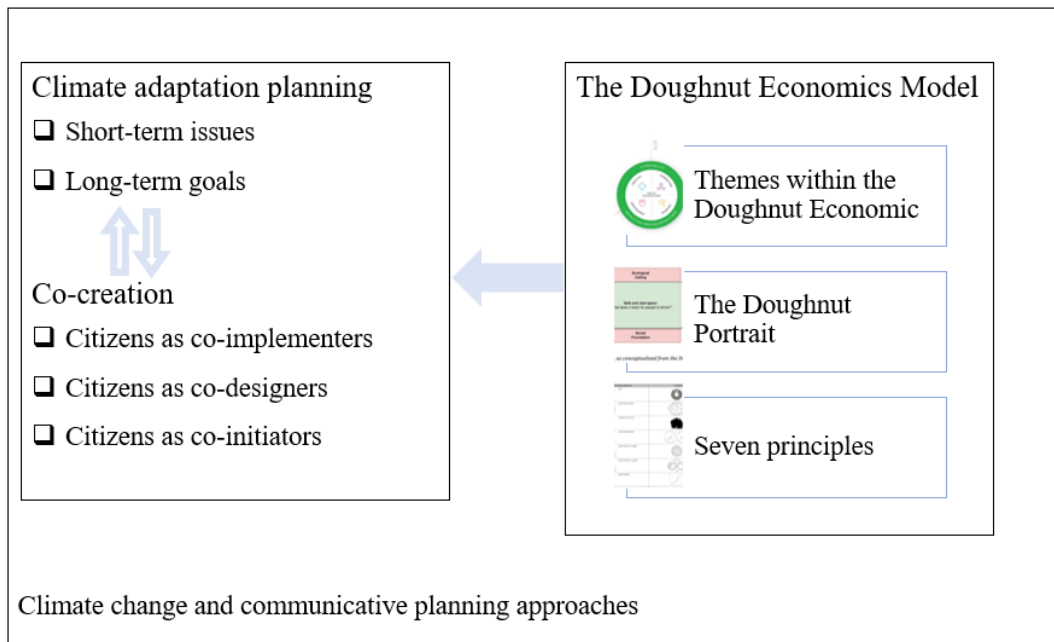
When the Ecological Ceiling is put into practice the indicators are used to reflect on the key ecosystem services of a city (Deal et al., 2020). With the use of available data each ecological target can be assessed to get an overview of the performance of the city. The indicators are used across the three themes water, air and land. Which indicators are assessed differs per city, depending on the ecosystem services. When the Social Foundation is applied in reality, it is translated as the basic standard of wellbeing for all citizens (Raworth, 2012). These social dimensions range from decent housing and nutritious food to political voice and community connection, which are all derived from the twelve social priorities. This is in line with the Local-Social lens of the Doughnut Portrait. However, when analysing the documents of different cities (e.g. Leeds and Amsterdam) more priorities have been added. Examples of this are culture and additional equality, such as racial and gender equality. This since these priorities are recognised as essential elements for a thriving life of citizens. A total of four themes can be distinguished into which the indicators are divided (DEAL et al., 2020):

1. Health: focusing on clean water, nutritious food, good healthcare and decent housing.
2. Connected: focusing on urban mobility, access to culture, a sense of community and internet connectivity.
3. Enabled: focusing on decent work, sufficient income, good education and access to affordable energy.
4. Empowered: focusing on social equity, peace and justice, political voice and equality in diversity.

## 2.5 Conceptual model

As described in this chapter, climate change has large impacts on cities. Cities are at risk for floodings, heat stress and extreme weather events among other things (IPCC, 2014 & 2022). Because of the high density of cities, the local temperatures in cities will be significantly higher than the expected global warming of 1.5 °C. Besides the fact that these impacts of climate change can affect the environmental, social and economic situation of a city, it can also aggravate existing problems in cities, such as air pollution and water scarcity (Klein et al., 2019). At the same time, a shift towards communicative planning approaches took place in spatial planning. Communicative planning approaches are often used to deal with complexity and uncertainties. In these approaches the interaction with stakeholders is an important element to build consensus between the stakeholders and to create equal power relations. This way, not only technical expertise and facts are used to overcome planning problems, in addition, non-professional knowledge and values are integrated in the planning process (De Roo, 2006). In consequence, climate change and communicative planning approaches are the context in which the concepts of the Doughnut Model, climate adaptation planning and co-creation take place. The conceptual model below shows the relation between the different operationalisations the Doughnut Model, climate adaptation planning and co-creation in cities.

*Figure 2.5. Conceptual model of the contribution of the Doughnut Model to climate adaptation planning and co-creation*



Source: Author, 2023

Climate adaptation is a process that deals with the effects of climate change through increasing the carrying capacities of individuals and space. This adaptation requires both physical

and behavioural changes in society and, as a result of this, climate adaptation can be viewed as a complex process that needs involvement of stakeholders. Climate adaptation planning can be seen as the interface between climate adaptation and spatial planning. It refers to the idea that planning strategies focus on the long-term impacts of climate change, while also taking short-term issues into account. Dealing with the planning of climate adaptation is an urgent and complex problem, therefore communicative planning practices are useful (De Roo, 2006). Furthermore, communicative planning practices are getting more attention in relation to climate change. This since public support and initiatives are needed to solve climate-related problems. In addition, the Social Foundation shows the importance of humans in new perspectives dealing with climate change. A way to include the personal experiences and values of different stakeholders in the planning of climate adaptation is co-creation. Co-creation strives for different forms of citizens involvement and collaboration between stakeholders, to deal with the impacts of climate change. There are different types of co-creation, distinguishing between citizens as co-implementers, co-designers and co-initiators (Lund, 2018 & Voorberg et al., 2015). When citizens are seen as co-implementers they are only involved in the final stages of a planning process and only perform some implementation tasks. When citizens are seen as co-designers they are part of the collaboration during the planning process, which increases their influence on the decision-making process and outcomes. However, the initiative of this lies within a public organization. Lastly, when the citizens are the co-initiators during the process they play a key role throughout the whole planning process. Citizens are internally motivated and are more autonomous in this role.

A perspective to rethink this climate adaptation planning is the Doughnut Economics Model from Raworth (Raworth, 2012). With this approach she redraws the economy as a doughnut with a Social Foundation and an Environmental Ceiling as boundaries. Raworth proposes to not fixate on environmental models, such as the planetary boundaries of Rockström et al. (2009), but on the social and ecological needs of humans and the earth. This way, within the Doughnut Model multiple social and environmental concerns are included, while enlarging people's capabilities (Raworth, 2017). Climate adaptation planning should therefore focus on the space between the social foundation and the ecological ceiling. In the last couple of years cities have been implementing the Doughnut Model. Literatures showed that there are so far three operationalisations for the Doughnut Model. These three are the seven principles to think like a twenty-first century economy, the Doughnut Portrait with four lenses and themes within the Doughnut. The seven principles are used as an abstract way to show how the system must change. The Portrait is a place-based approach that connects the local aspirations with the global responsibility of a place. Finally, the themes within the Doughnut concretising the performance of a city through the selection of indicators. This thesis will focus on how these three operationalisations of the Doughnut Model can contribute to co-creation in climate adaptation planning practices in Groningen.



### **3. Methodology**

Qualitative research methods were used in this research to answer the main and sub-questions. In this chapter the methodology of this research, including the data collection, data analysis and positionality are discussed.

#### **3.1 Case study as research methodology**

This research used qualitative research methods. Qualitative methods were used to gain understanding, develop empirical knowledge and elicit meaning (Hay, 2016). Since only a few cities have implemented the Doughnut Model at the start of this thesis, quantitative research methods were not logical to compare differences and similarities between cases. Furthermore, the reason for this research was to get insight into the different motives and reasons why and how the cases have applied the model. This is in line with the reasoning of qualitative methods since the insights are more in-depth and subjective, unlike quantitative research (Bowen, 2009). The analysis of the different cities provided insights into how they have operationalised the Doughnut Model and thus how they have put the theory of the Doughnut into practice. Moreover, there was a focus on the process of how the case studies did this, for example how they dealt with the participation and co-creation of different actors. These understandings helped to develop knowledge of how the city of Groningen can use the Doughnut Model as an approach to deal with climate adaptation planning.

This research aims to answer the question “How can The Doughnut Economics Model be used as an approach for climate adaptation planning and contribute to co-creation in the city of Groningen?”. To answer this question a combination of theoretical research and empirical research were conducted. The theoretical research, chapter 2, consists of a literature review of academic knowledge to gain understanding in the relevant theoretical insights of this topic, such as climate adaptation planning and co-creation. The empirical research was conducted by the means of a comparative case study (Bartlett & Vavrus, 2017). Case studies in general are a useful research strategy when you want to answer ‘how’ or ‘why’ questions and when the focus of the research is on a current phenomenon within real-life context (Yin, 2003). Since both characteristics apply to this research, case study research is a suitable method to get insight into the way other cities have implemented the Doughnut Model. Through these insights, lessons were learned on how the city of Groningen can use the Doughnut Model for the planning of climate adaptation. Additionally, a comparison on the different processes of how the municipalities used the Doughnut contributed to recommendations on how Groningen can integrate different types of co-creation.

### 3.2 The case studies

In case study research it is important to define the cases (Yin, 2003). This is because the unit of analysis functions as a basis, which determines the boundary of a case. By placing these boundaries, the scope of the research is limited and it becomes clear what is and what is not researched in the case study (Bascarada, 2014). According to Yin (2003), setting a boundary of a case can be done by placing a theoretical scope, a spatial boundary and a timeframe. The theoretical boundary of this research was defined based on the academic literature in the theoretical framework. The spatial boundary was set out by the selection of the cases, which form the units of analysis. Since this research aims to get insight into how the Doughnut Model can be implemented in the climate adaptation planning in the city of Groningen, the case selection consists of cities that have implemented the Doughnut Model. Over the last decades, cities are becoming more vulnerable because of social and economic inequalities combined with the impacts of climate change (Boogaard et al., 2020; OECD, 2019; Wahlund & Hansen, 2022). The Doughnut Model has been a useful response as a way of thinking to adapt to both ecological and social challenges (Saunders & Luukkanen, 2022). Given these insights, cities that have been implementing the Doughnut are considered relevant research areas. When selecting cases, it was important to choose information-rich cases, so they were worthy of in-depth studying. This especially when small samples are used so the utility of the information can be maximised (Flyvbjerg, 2006). The selection of cities in this research was done with the use of some criteria. These criteria are:

- The selected cases have implemented the Doughnut Model. Only cases that have implemented The Doughnut Economics can give insight into the integration and operationalisation of it.
- The selected cases are cities. Although the cities differ in demographics they are more comparable to each other than to towns and/or regions.
- The selected cases have implemented the ideas of the Doughnut Model in their policies. The cases have to be information-rich, therefore they have to be able to provide relevant information on the concepts of climate adaptation planning and the Doughnut Model. Adding to this, the policy documents have to be accessible, so the data can be collected.

This research looks into how the Municipality of Groningen can make use of the Doughnut Model of Raworth (2012) to deal with climate adaptation planning in the city. To gain insight into this the total amount of three case studies was chosen, to take into account the time constraints, since only limited time is available to do this research. However, the selection of cases was based on information-oriented selection (Flyvbjerg, 2006). The three units of analysis are Amsterdam, Brussels and Leeds, which can be found in figure 3.1. This is because these cities implemented the model several years ago. Each city has implemented the model for different reasons and/or with different approaches. For example, for Brussels (financial) inequality has been important as a reason and has applied four different lenses at different levels. The Municipality of Leeds, on the other hand, started as a community-led initiative and used a data-first approach. Finally, the

Municipality of Amsterdam has mainly focused on the participation of actors and wants to shift to a circular economy. These different approaches and reasons for the application of the Doughnut Model in the case studies provided insight into the different applicability of the model and the conditions under which the model is applied. These cases are rich in information (e.g. policy documents and/or grey literature) and have a variation in circumstances.

*Figure 3.1. Map of selected cases*



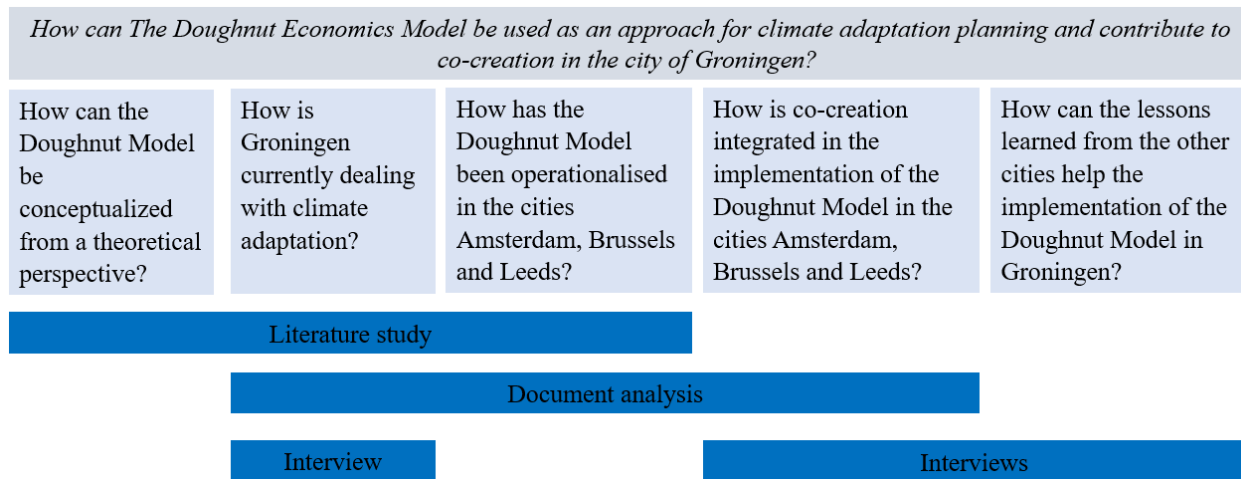
Source: Author, 2022

The temporal boundary, or timeframe, of this research consists of the period of the data collection. The data collection started in December 2022 and lasted until February 2023.

### **3.3 Data collection**

To assure the validity of the research multiple data collection methods were applied. A combination of theory, interviews and document analysis was used. Hay (2016) refers to this as triangulation of data, this to enhance credibility. Moreover, the empirical data was continuously compared with academic literature to assure validity and to strengthen the connection between the results of this research and academic literature. In this paragraph, the use and collection of the literature study, document analysis and interviews are explained. The figure below gives an overview of what methods are used to answer each sub-question.

Figure 3.2. Research design



### 3.3.1 Literature study

As already mentioned, the theoretical framework in chapter two is the theoretical scope theoretical foundation of this research. The articles were gathered by using Google Scholar and Scopus. Key terms that were used to find relevant information were ‘communicative in spatial planning’, ‘climate adaptation’, ‘co-creation’ and ‘Doughnut Economics Model’. Moreover, additional scientific literature was found in the articles by using the reference list of the used articles. Furthermore, chapter 2 critically discusses how these different topics and concepts are linked to each other. This has resulted in a conceptual framework (figure 2.6) that steered the empirical research.

### 3.3.2 Document analysis

In addition to the literature study, this research made use of a document analysis, in which mainly policy documents were analysed. The policy documents are from the cities Amsterdam, Brussels and Leeds. The analysis of these documents provided information about the reasons, motives, context, challenges and opportunities of the different cities and the conditions in which the Doughnut Model is applied (Bowen, 2009). Furthermore, the documents gave insight into how the municipalities have operationalised the Doughnut Model in their city. Next to this, the documents provided insight into the process of the implementation of the Doughnut and the extent of co-creation and participation during this process. By doing so, a comparison between the case studies was made to see how the Municipality of Groningen can use the Doughnut Model as an approach for climate adaptation planning. In addition, several policy documents from the Municipality of Groningen were analysed to get information on how Groningen is currently dealing with the planning of climate adaptation.

The policy documents, reports and websites were selected by searching on the websites of the municipalities. Additionally, the websites of organisations associated with the Doughnut Economics network were searched, such as the Doughnut Economics Action Lab (DEAL). In this

way, the documents related to the Doughnut Model and the municipalities came up. This search revealed that each city released at least one policy document on how they applied the model in their city. An overview of the documents that are collected is given in table 3.1. The policy documents from the cases Brussels and Amsterdam are in Dutch the other documents are all in English.

*Table 3.1 An overview of the collected documents*

<i>Case</i>	<i>Year</i>	<i>Name document</i>	<i>Author</i>
Amsterdam	2022	Circular Economy: Lessons and recommendations 2020-2021	Gemeente Amsterdam
Amsterdam	2021	The Amsterdam Doughnut Days <a href="#">Website</a>	DEAL
Amsterdam	2020a	Amsterdam Circular Monitor	Gemeente Amsterdam
Amsterdam	2020b	The Amsterdam City Doughnut: A tool for transformative action	Gemeente Amsterdam
Brussels	2021a	Lessen voor het Brussels Gewest	Municipality of Brussels
Brussels	2021b	Samenvatting van de resultaten	Municipality of Brussels
Brussels	2021c	Tools om de Donut in Actie te Zetten	Municipality of Brussels
Brussel	2021	Designing the Doughnut: A Story of Five Cities <a href="#">Website</a>	DEAL
Leeds	2022	The first Leeds Doughnut City Portrait: towards a safe and thriving city for all	Municipality of Leeds
Leeds	2022	Transforming places with DE, climate action Leeds.	DEAL
Leeds	2022	Community Hubs <a href="#">Website</a>	Climate Action Leeds
Leeds	2021	Climate Action Leeds Guidebook	Climate Action Leeds
Groningen	2021	Act&Adapt Klimaatadaptatie Groningen	Gemeente Groningen
Groningen	2020	Klimaatagenda Provincie Groningen 2030	Provincie Groningen
Groningen	2019	Klimaatbestendig Groningen 2020-2024	Gemeente Groningen
Groningen	2018	Stresstest Klimaatadaptatie Groningen	Ten Boer

### **3.3.3 Semi-structured interviews**

The last method of data collection in this research was qualitative semi-structured interviews. These interviews were conducted with key actors such as policymakers and employees of the municipalities. The interviews with the policymakers and/or employees from the case studies Amsterdam, Brussels and Leeds were important to gather more information on the application of the Doughnut Model in these cities. In the meanwhile, they provided information on what conditions in the cities had an impact on the implementation of the model and how different stakeholders are involved in the process. Three interviews with policymakers in Groningen have been conducted to give insight into the current climate adaptation planning in Groningen.

Furthermore, these interviews provided insight into the fact that Groningen is interested in implementing the Doughnut Model, but there are some stumbling blocks in doing so. In addition, another interview was conducted with an expert who works at C40. C40 is a company linked to the DEAL and is specialized in dealing with the challenges of climate change in cities. This interview provided insight into how the Doughnut Model can specifically contribute to climate adaptation and the involvement of citizens in this. The interview was conducted before the last interview with an employee of the Municipality of Groningen. This way, the insights from the interview with the expert were discussed with the employee of the Municipality of Groningen.

Semi-structured interviews were conducted since they are intended to focus on specific research interests. In the semi-structured interviews, a set of topics were explored in-depth, while there was also space for new questions that emerged. The interviewees were selected through criterion sampling. This refers to the idea that the interviewees were selected by the means of certain criteria (Suri, 2011). These criteria were important to ensure the appropriateness of the samples. The criteria are:

- The interviewee is familiar with climate adaptation planning and the Doughnut Model of Raworth.
- The interviewee is actively involved in the process of climate adaptation planning or in the implementation of the Doughnut Model.

An overview of the selected interviewees is given in table 3.2. Most of the interviewees indicated that work-related function can be mentioned. However, the majority specified that they did not want their name to be mentioned. Therefore, the results refer to the interviewees as ‘participant X’ or the function of the person.

*Table 3.2. An overview of the selected interviewees*

<i>Who</i>	<i>When</i>	<i>How</i>	<i>Length interview</i>
Employee Municipality of Amsterdam	December 20, 2022	Videocall	53 minutes
Employee Brussels Regional Public Service Economy and Employment	January 12, 2023	Videocall	36 minutes
Employee of the Leeds City Council	December 22, 2022	Videocall	40 minutes
Employee Municipality of Groningen, department Urban Development	January 19, 2023	Videocall	38 minutes
Employee Municipality of Groningen, department Urban Development	January 20, 2023	Videocall	34 minutes

Employee Groningen	January 30, 2023	Videocall	32 minutes
Expert from C40	January 23, 2023	Videocall	29 minutes

**3.4 Data analysis**

The data from the documents and interviews were analysed through deductive coding (Pearse, 2019). Deductive coding was chosen because the concepts from the theoretical framework are used as codes to find patterns and insights into how the case studies have applied the Doughnut Model.

**3.4.1 Analysis of the documents**

The first step of the analysis of the documents was to develop the theoretic framework in chapter 2. In this theoretical framework, the concepts such as co-creation, climate adaptation planning and the Doughnut Economics Model were operationalised. These operationalisations led to the formulation of the analytic framework with codes and subcodes in Appendix 2. The documents were analysed according to this analytic framework. For each operationalisation of the Doughnut Model, there was analysed if and how each case has implemented this operationalisation. However, there were also new operationalisations identified, such as the Circular Economic Monitor in Amsterdam and the Four levels of action in Brussels. Most of the documents only addressed the role of citizens in the implementation process of the Doughnut Model. Consequently, only codes related to the types of co-creation were found in the policy documents of the cases.

**3.4.2 Analysis of the interviews**

As for the documents, the first step of the analysis of the interviews was the theoretical framework. The operationalisations in the theoretical framework led to the interview guide with the questions (see Appendix 1). The analysis of the interviews was done by transcribing the interviews in the app ‘Otter’. During the analysis the codes from the analytic framework were reviewed, confirmed and/or revised. As consequence, through inductive coding new codes were added. These codes were connected to the process of co-creation, such as how, when and who was involved. Since the documents discussed the involvement of citizens relatively briefly, there were moments in the interviews to ask about this. The existing and emerging codes were connected to each other and patterns within them were identified. As a result, several themes were formulated. The findings of the analysis of both the documents and interviews are written down in chapter 4 and 5.

**3.5 Ethical considerations, data management and positionality**

While doing research it is always important to take ethics into consideration (Hay, 2016). The participants should be protected and effort should always be made to provide a safe environment

for them. Throughout this thesis, no ethical dilemmas have been identified that require extra consideration. Reasons for this are that the methods for data collection were not expected to harm or burden anyone involved and the subject of this thesis was not considered sensitive. Before the interviews were conducted and the participants agreed to the interview, an information sheet was sent to them. Twice, this was not sent but discussed orally before the interview started. The information sheet states the purpose of the study and the interview. In terms of informed consent, each participant received an agreement to participate and signed it before the interview took place. This agreement to participate can be found in Appendix 3 and 4 (English and Dutch). In this agreement, it was made clear to the participants that the data would be used anonymously. Therefore, the interviews could not be traced back to the participant if they do not want this. Moreover, the participants were asked beforehand for permission to record the interview. Subsequently, with permission, the interviews were recorded and only listened to by the researcher. Moreover, the participants were informed about their options to be able to not answer questions or to withdraw from the interview at any time.

In order to create reliability in this research, a data management plan is used. This can be found in Appendix 5. The choice was made to collect all the data during the research on the protected RUG Google Drive. RUG Google Drive has adequate storage, which made it suitable for storing valuable data. After the research the data is stored on a protected hard drive.

Furthermore, it is important to acknowledge that a researcher is never fully objective. Nevertheless, the researcher is a master student studying Environmental and Infrastructural Planning at the University of Groningen. She did not have any relation to the different cases, besides studying (not living) in Groningen. Additionally, the researcher had no self-interest in the study and was not involved with any organization that has an interest in the topic. Related to this, Yin (2003) mentions that preconceived ideas can be partly avoided when someone immerses themselves in the settings and theoretical backgrounds of the case studies. This was the case with this researcher.



## 4. Results: The Doughnut Model and co-creation

Through the interviews and document analysis, a variety of insights have emerged that are discussed in this chapter. For each case study, a description of how the city has implemented The Doughnut Economics Model is made. This has been done through the operationalisation of the model. Furthermore, the process of how each case study has involved their citizens is reviewed. This chapter ends with a table, summarizing the lessons Groningen can learn from the three case studies.

### 4.1 The Doughnut in Amsterdam, Brussel and Leeds

As the theoretical framework in chapter 2 has shown, there are three ways in which the Doughnut Model can be operationalised. The table below gives an overview of how each case study has implemented the doughnut using the three operationalisations, however, all three did so differently. The following paragraphs will explain in more detail how Amsterdam, Brussels and Leeds have conducted this.

*Table 4.1. Operationalisation of the Doughnut Model per case study*

	<b>Seven principles</b>	<b>The Doughnut Portrait: four lenses</b>	<b>Themes within The Doughnut</b>	<b>Additional</b>
<b>Amsterdam</b>	Yes: Change the goal and be regenerative	Yes	A focus is on the three value chains: food, consumption and built environment	Circular Economic Monitor
<b>Brussels</b>	Yes: See the big picture, design to distribute and be regenerative	Yes	Water-air-land & Health-connected-enabled-empowered	Four levels of action
<b>Leeds</b>	Yes: be generative and distributive	Yes	Water-air-land & Health-connected-enabled-empowered	No

#### 4.1.1 The Amsterdam City Doughnut

The Municipality of Amsterdam officially declared the use of The Doughnut Economics Model in April 2020 to recover from the COVID-19 crisis and to avoid future crises (Gemeente Amsterdam, 2020b). Amsterdam is working on a circular transition with the main goal to reduce, reuse and recycle materials that are connected to food, goods of consumers and building materials. The plans are to cut 50% of its primary resources by 2030, and to be fully circular by 2050 (Gemeente Amsterdam, 2020a). Moreover, Amsterdam has the vision to be “a thriving, regenerative and inclusive city for all citizens, while respecting the planetary boundaries” (2020b p. 3). These goals are in line with the core principles, especially to be generative and change the goal, that Raworth (2017) has described. One of the key elements in Amsterdam is to become a circular city. Therefore the goal is not to have endless growth but to thrive within the doughnut.

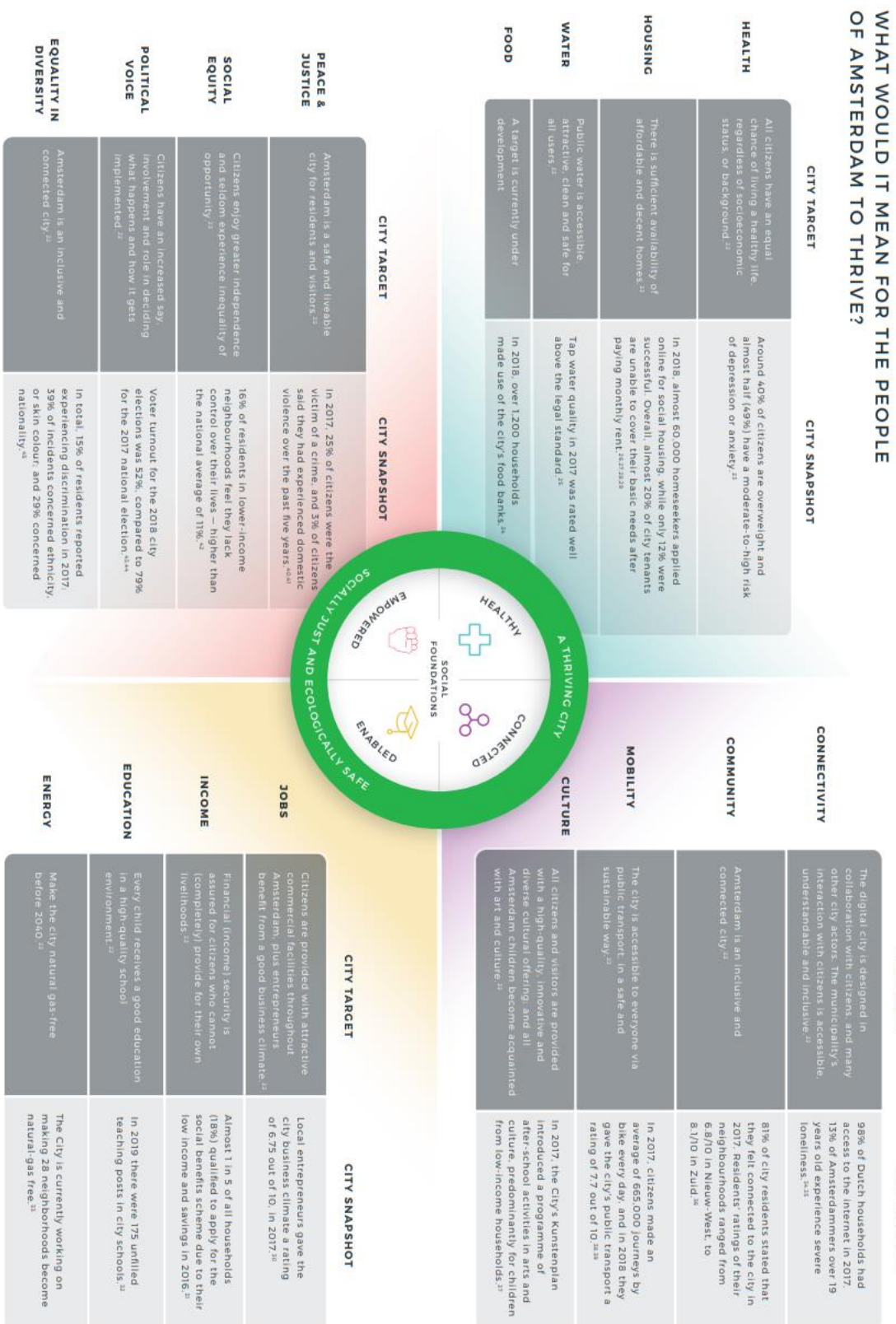
As part of the Thriving City Initiative (TCI), the Municipality of Amsterdam developed the Amsterdam’s City Portrait to downscale The Doughnut Model to their city level. As the first Doughnut Portrait, the aim is to create an overview, or so-called snapshots, of how Amsterdam is performing socially and ecologically. After that, these insights are connected to the global social and ecological impacts of Amsterdam. The employee of the Municipality of Amsterdam mentioned the following:

*“The Amsterdam city portrait points out places as well as moments for initiatives (...) and therefore shows the challenges that Amsterdam has to deal with in the coming years. This way, the existing policies and projects are shown and it created a shared or collective vision for what we want for Amsterdam in the future.”*

The doughnut policy document of Amsterdam starts with the question “How can our city be a home to thriving people in a thriving place, while respecting the wellbeing of all people and the health of the whole planet?” (2020b, p. 5). To answer this question Amsterdam’s City Portrait comprises the four lenses to show the interconnectedness of the location, culture and context of Amsterdam. The social lenses, both local and global reality, are divided into the themes healthy, enabled, connected and empowered. Each theme consists of various targets with a snapshot of the relevant data to show the state of the target. The global lenses, both local and global reality, are divided into the themes water, land and air. Each theme is substantiated either by targets or by data. The overview of the Social-Local lens can be found in the figure below. There are a number of standouts from the way the City of Amsterdam has set up these four lenses. Something remarkable is that the indicators are operationalised in a broad way, when compared to the other case studies. For example, culture is operationalised by the provision of cultural offerings. Additionally, in the Social-Global lens, the indicator culture is also operationalised as the diversity of local identities and cultures (Gemeente Amsterdam, 2020b). As a result of this broad approach, the context of Amsterdam is included in the operationalisation of the indicators. As Amsterdam is known for the (cultural) diversity, this characteristic becomes visible in the operationalisation of

this indicator. Another striking feature of the four lenses is that the indicators already include an immediate look at what projects and initiatives are already taking place. This way, an inventory of what is happening in the city is made before new projects are created. Therefore, the Doughnut Portrait enables the Municipality of Amsterdam to make a connection between the existing projects and initiatives in the city and the new doughnut projects.

Figure 4.1. The Social-Local lens in Amsterdam



Source: Gemeente Amsterdam, 2020b

Even though data is still lacking in certain areas and research is still conducted to find additional indicators, several shortfalls and overshoots of indicators can be identified in Amsterdam. These include an overshoot of excessive land use, excessive fertiliser use and climate change and a shortfall in housing. These insights are driving the initiation of new projects. The employee of the Municipality of Amsterdam adds:

*“We see a shortfall within the indicator housing, in 2018 only a bit more than 7000 people were able to find housing out of more than 60.000 people that applied for social housing (...). At the same time, the rise of housing and energy prices of the last few months and years have caused many Amsterdammers to be unable to cover basic needs, such as food, after paying rent and energy bills.”*

The Amsterdam City Doughnut resulted in the formation of the circular strategy (Gemeente Amsterdam, 2020a). For the purpose to become a circular city, Amsterdam has selected three value chains; food, construction and consumer goods. These three are chosen because of their environmental impacts and economic significance (Gemeente Amsterdam, 2022). Next to the City Portrait and the circular strategy, Amsterdam published the Circular Economic Monitor in 2022. This Monitor links and analyses the data that is related to the lenses and themes from the City Portrait and track the circular process of the city. This way, all the material resource and waste stream flows are tracked. The Doughnut Model is for Amsterdam thus a strategic framework and a tool for policymaking, whereby the municipality can examine the performance of the city and determine policy according to this. A visualisation of all the elements of Amsterdam can be found in figure 4.2. In parallel with the formation of these policies and strategies, several small-scale and citizen-led initiatives were created. This will be further discussed in paragraph 4.2.1.

Figure 4.2. An overview of the strategy of Amsterdam



Source: Gemeente Amsterdam, 2020a

It can be concluded that Amsterdam operationalised the Doughnut Model by developing four lenses and creating themes and indicators. These two operationalisations are a diagnosing tool to get an overview of the current state of the city. When operationalising indicators Amsterdam used a broad scope that fits with the challenges and the context of the city. The diagnoses of the city enable the Municipality of Amsterdam to develop policies that are fitting to the state of the city. Moreover, Amsterdam already did an inventory at the projects and initiatives already taking place to better connect them to new doughnut related projects. However, the principles of Raworth

(2017) are only reflected in the city's objective of becoming circular and are therefore not part of the operationalisation of the Doughnut Model in Amsterdam.

#### 4.1.2 The Brussels Donut

The Brussels Donut project started in September 2020 and began to explore several ways of implementing The Doughnut Economics Model in the Brussels Capital. The Brussels Donut is led by Confluences, an organisation that is specialised in supporting co-creation during projects. There were multiple reasons for Brussels to start with the implementation of the doughnut. These include the two climate objectives formulated in 2019: the 2030 objective entails a re-orientation of public means towards economic activities and the goal for 2050 is to become climate neutral and have a decarbonized economy (Municipality of Brussels, 2021a). At the same time, due to COVID-19, the city was facing public health issues. Another reason is that Brussels deals with a capital paradox, in the interview the employee of Brussels explained the following:

*“The GDP per capita in Brussels is quite huge, nonetheless, at the same time almost 30 percent of the population in Brussels lives under the poverty rate.”*

Therefore, the Municipality of Brussels decided that an economic transition was necessary, with the Doughnut Model as instrument (Municipality of Brussels, 2021c). The aim of the project is to make the donut a shared compass that is used by all involved actors of the city. This to create a shared future of Brussels and make coherent decisions that are in favour of a social and ecological transition. The Municipality of Brussels (2021b) has implemented The Brussels Donut based on the existing operationalisations of the model. This is evidenced in part by the fact that the city has established the four lenses. Additionally, the goal of the Brussels Donut is based on Raworth's seven principles. In doing so, the city puts extra emphasis on three of these principles; see the big picture, design to distribute and create to regenerate (Municipality of Brussels, 2021b). The employee of the Brussels mentioned:

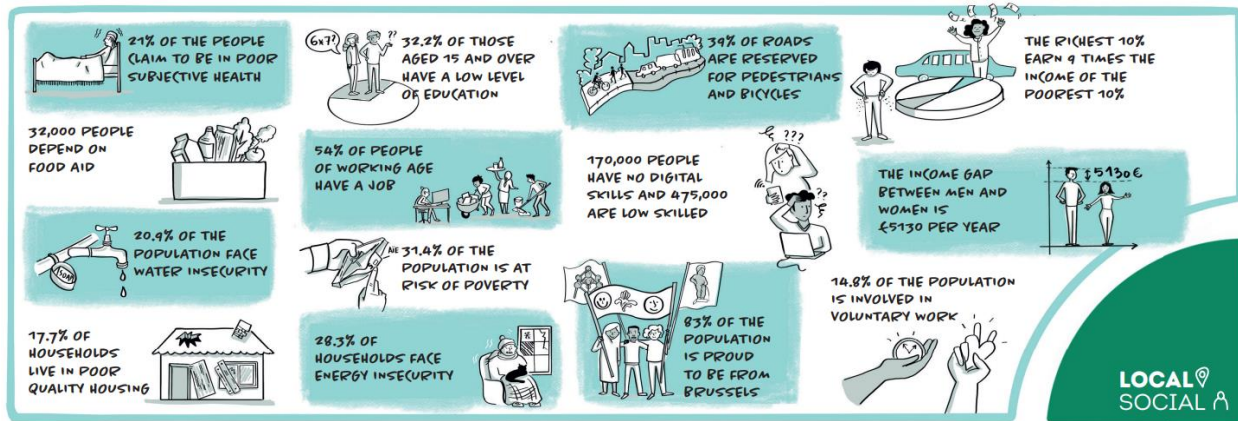
*“The very first step in our donut is that we must recognize that the economy is only a part of our society and that it does not determine everything we do and say (...). Moreover, it [the economy] is part of our nature and thus depends on the boundaries of the earth”.*

The Doughnut Portrait of Brussels exists out of four lenses with different themes. The two social lenses are divided into the themes healthy, enabled, connected and empowered. The two ecological lenses are divided into the themes water, land and air. The formulation of the indicators within these themes has been done through collaborations between stakeholders, including citizens, in order to select and elaborate the relevant indicators (Municipality of Brussels, 2021b). Moreover, the indicators were selected through cooperation as this selection is highly political (Municipality of Brussels, 2021a). These collaborations resulted in new indicators that were selected in Brussels. Examples of these new indicators can be found in the Social-Local lens,



shown in Figure 4.3. Two of those new indicators are the income gap between men and women and the percentage of roads for pedestrians and bicycles. In the case of Brussels, the indicators are thus context-dependent since citizens are included in the selection and formulation process of the indicators. What can be learned from this is that the problems, experienced by citizens, can be included in the selection of indicators. This allows that in the Doughnut Model the context of a city can be integrated. Therefore, through collaboration with citizens, indicators can be selected that fit with the challenges of a city.

Figure 4.3. The Social-Local lens in Brussels

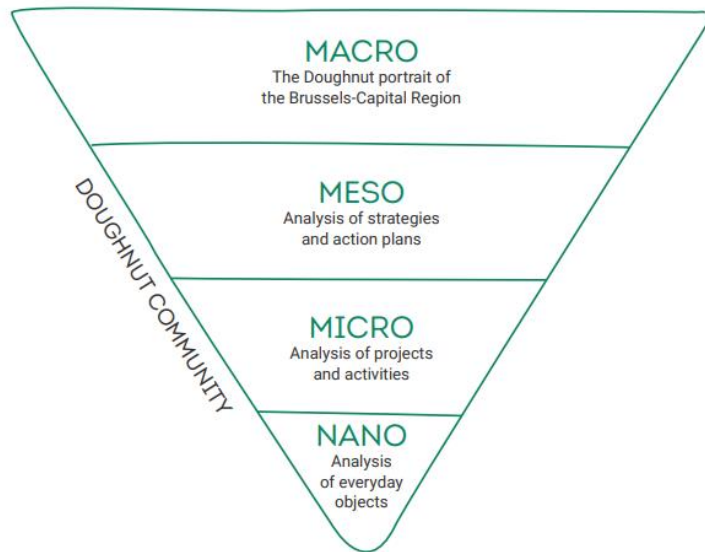


Source: Municipality of Brussels, 2021a

Besides putting the Doughnut Model into practice through existing operationalisations, the Municipality of Brussels has also given it its own interpretation. They did this by formulating the so-called four levels of action (Municipality of Brussels, 2021b), which is visualized in figure 4.4. The levels act as a kind of funnel. The macro-level consists of the Doughnut Portrait with an overview of the four lenses as mentioned above. The main goal of the Doughnut Portrait is to show the pathways for the city and “to suggest a horizon to attain” (Municipality of Brussels, 2021a p. 15). If an authority is going to implement a particular policy, the strategies and action plans will be analysed on the meso-level. This to investigate which conditions and what ways can contribute to concrete steps towards a transformative economy. The micro-level is there to shed light and leverage on what is already happening inside the Brussel Donut, by taking people’s experience and knowledge into account. This level can help to understand how the donut can help actors to move forwards and to understand any blocking factors (Municipality of Brussels, 2021a & 2021b). Finally, the nano-level looks at the social and ecological impacts of daily consumptions, this to make people and organizations more conscious. The analysis of the four levels shows that Brussels still has a long way to go to reach a situation where there is a balance between social and ecological elements as described by Raworth. At the moment, the four levels of action are still abstract, this is because the application in practice of them is still minimal. Therefore, it is not completely clear how, when and which people will be involved in these levels. Further elaborations in the future will lead to a better understanding and the extent of success of the four levels of action.



Figure 4.4. Four levels of action in the Brussels Donut



Source: Municipality of Brussels, 2021b

From the way the Municipality of Brussels has operationalised the Doughnut Model, it is interesting to see that by establishing the four levels of action, the city has added a spatial dimension to the model. This is something that is missing in the two case studies of Amsterdam and Leeds. The creation of the four levels of action is possibly interesting, however, they have to be more concrete in order to work. In addition, the Municipality of Brussels has involved citizens in the selection of the indicators. This has ensured that the indicators not only match citizens' experiences, but also fit with the conditions of the city. This allows cities to apply the Doughnut Model appropriate to specific characteristics of the city. Finally, it appears that the Raworth's (2017) principles do not play a relevant role in the operationalisation of the Doughnut Model in Brussels.

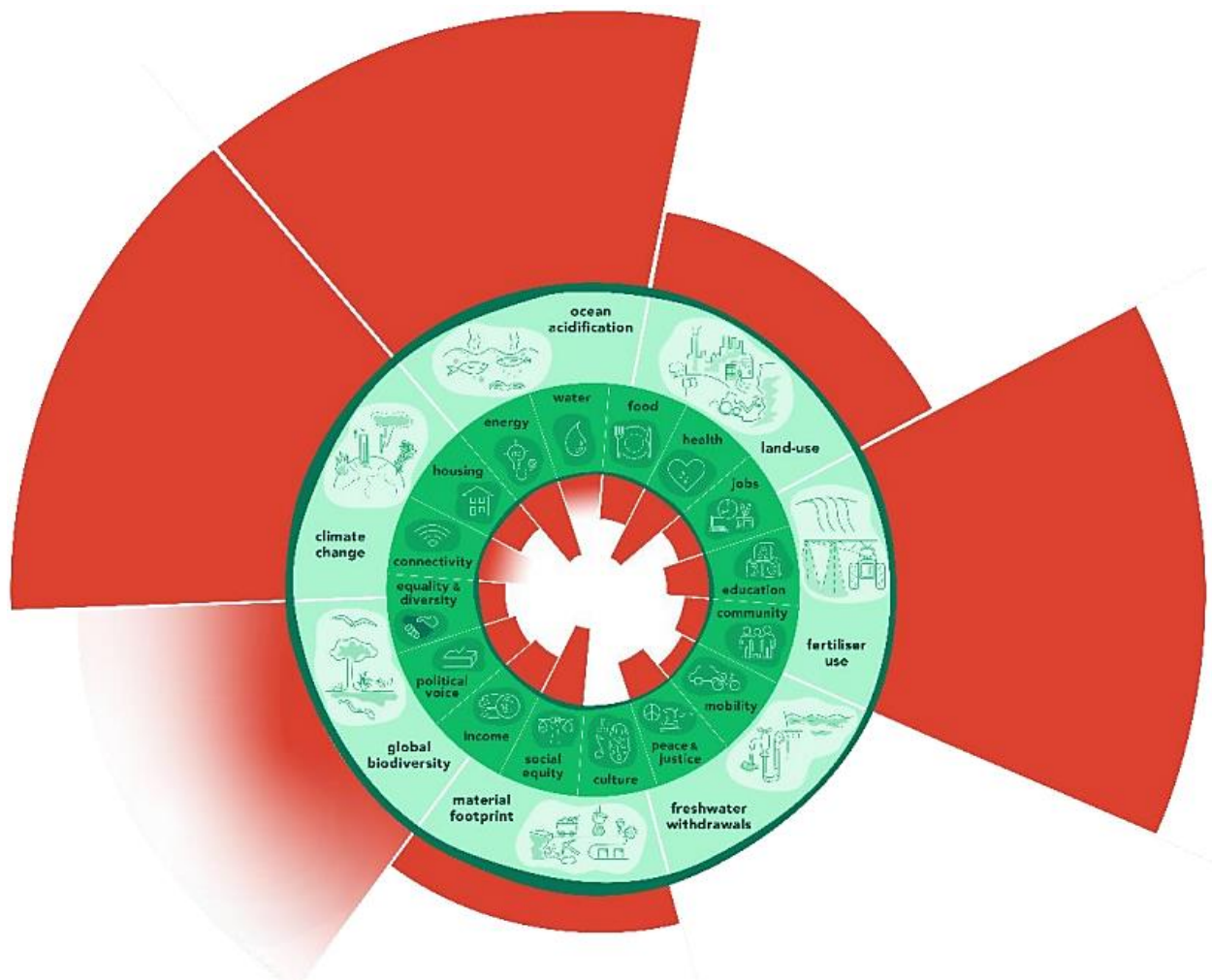
#### 4.1.3 The Leeds Doughnut

In April 2019 the Municipality of Leeds declared a climate emergency in which they pledged to become carbon neutral by 2030. Consequently, the national funded Climate Action Leeds program was established (Climate Action Leeds, 2021). Part of this program is The Leeds Doughnut, which Leeds sees as a tool that can help to create a link between the strategic plans and the local community. According to the Municipality of Leeds the Doughnut Model has the aim “to support a longer-term city planning process and create a zero-carbon, nature-friendly, socially just city by the 2030s” (2022, p. 65). Therefore, the Doughnut helps Leeds to start thinking about how to respond to climate change and how to live a zero carbon life without leaving people behind. This makes the Doughnut Model a guiding framework that provides a direction for the municipality for the coming years. An employee of Leeds adds to this:

*“The Doughnut is a starting point for the bigger conversations about city-based transformation. Along with that, it is not just technical solutions but about how we can deal with the changing climate and social and racial injustices in Leeds. That’s why we were so excited about the four lens approach so we can look at both the people and planet side of these problems.”*

The first step of The Leeds Doughnut was to unroll the doughnut and develop the Doughnut Portrait. As with the other cities, the Leeds Portrait consists of the four lenses. Each of the four lenses were broken down into themes (healthy, enabled, connected and empowered & water, land and air). This approach of operationalisation is consistent with the other case studies. However, Leeds chose to use a data-first approach when formulating the indicators. Most of the indicators are inspired by the Sustainable Development Goals from the United Nations. Moreover, indicators were selected based on the availability of data at Leeds level and the representativeness for specific challenges in Leeds (Municipality of Leeds, 2022). This resulted in the formulation of thresholds for each indicator with the qualification of the colours green, orange and red. The visualisation of this can be found in the figure below. The advantage of this data-first approach is that the Doughnut is visualized clearly and understandably for the citizens of Leeds before they are involved in the further implementational phases of the Doughnut Model. Nonetheless, what the Doughnut Portrait of Leeds shows is that the indicators are formulated rather narrow and superficially, which makes them not context-dependent. An example is the indicator ‘culture’, which is measured by the number of visitors at local galleries and museums in Leeds. This perspective on culture only looks at the quantification of cultural services, while the other case studies take a much broader view of this indicator. Further, it does not include the local identities and experiences of citizens of Leeds.

Figure 4.5. The Leeds Doughnut Portrait



Source: The Municipality of Leeds (2022)

Besides the narrow formulation of indicators, the indicators are formulated in a certain context of time. The selection of indicators took place in a time where Leeds was slowly recovering from the Covid-19 pandemic (Climate Action Leeds, 2021). That this specific context has influenced the selection and formulation of indicators is evident, for example, in the indicator community. This indicator is focused on social cohesion and inclusion, as the Municipality of Leeds has indicated that social isolation has impacted the satisfaction of citizens concerning connectivity with their community (Municipality of Leeds, 2022). Simultaneously, the Covid-19 pandemic and the related economic downturn have caused a wide range of impacts on the education and the availability of healthcare and food of Leeds's citizens, which is visible in the red thresholds in figure 4.5. The timing of operationalisation of the Doughnut Model can impact how indicators are formulated.

As in the other case studies, the seven principles did not play a key role in the operationalisation of the Doughnut Model. While the current economic model of Leeds generates

ecological degeneration and social division, the most important principles of the Leeds Doughnut are to be generative and distributive (Climate Action Leeds, 2021). The regenerative key principle is shown in the circular patterns that Leeds is trying to build. Examples of this include zero waste initiatives and blue-green infrastructure. With a distributive economy Leeds wants an economy that creates income, work and local ownership. However, these principles are only named when describing the city's aims and goals. The employee of the Leeds municipality adds to this:

*“We [Leeds] don’t want to have linear growth or constant extraction, instead of this, we want an economy that helps every citizen in Leeds to thrive. We try to get there by including the community and local businesses in the plans we make and build on local trust.”*

To give some concluding remarks for the way Leeds has operationalised the Doughnut Model, it can be said that the Doughnut Model is used as an overarching framework to guide the planning for Leeds to become carbon neutral in the 2030s. Additionally, by adapting a data-first approach an overview of the state of Leeds was created. The benefit here is that Leeds first concretized the model itself before involving citizens. This ensured that thresholds in the model were established and clear communication with citizens was possible. The downside is that the indicators are based primarily on the Sustainable Development Goals and are therefore rather narrow and not always specific to the context of Leeds. Consequently, the experiences of citizens can only be included in later stages. Nonetheless, the case of Leeds shows that the selection and formulation of indicators are impacted by the events that are taking place. This shows that the Doughnut Model can integrate the specific challenges a place has to deal with in a certain time. This makes the Doughnut appropriate for cities to deal with a wide range of challenges.

Looking at how the case studies Amsterdam, Brussels and Leeds have operationalised the Doughnut Model, there are a few similarities that can be found. First, it appears that the seven principles of Raworth (2017) are mainly reflected in the goals the three case studies want to achieve. Therefore, the principles are interesting as an inspiration and background story, but not suitable as tools for operationalisation and further implementation. The creation of the Doughnut Portrait, including the four lenses, prove to be a good diagnosing tool for the case studies. Hence, for Groningen the four lenses can help to not only show how the city is doing, but also where the city wants to go in the future. The selection and formulation of indicators appears to be different in each case study, however, it can be concluded that that the Doughnut Model is translated by the case studies into a tool for place-based thinking and policy determination. However, it should be noted here that the selection of indicators is highly political. Therefore, the indicators do not only match the characteristics of a city, but they can also be the consequence of political decisions.

## 4.2 Co-creation in Amsterdam, Brussels and Leeds

The analysis of the policy documents and interviews showed that the three case studies all included citizens at different ways and moments during the implementation process of the doughnut. The role of citizens in each city will be explained in the following paragraphs.

### 4.2.1 Collaboration with citizens in Amsterdam

Amsterdam has taken a combination of a bottom-up and top-down approach during the development of the Amsterdam City Portrait and the Circular Strategy. The collaboration between the municipality of Amsterdam, Kate Raworth, Circular Economy and Thriving Cities Initiatives was the starting point for the Amsterdam Doughnut (Gemeente Amsterdam, 2020b). At the same time, different kinds of experimentation of small-scale and citizen-led initiatives were already happening in Amsterdam. These initiatives were already identified during the operationalisation of the Doughnut, as mentioned in paragraph 4.1.1. One of these initiatives is Pakhuis de Zwijger, which is a platform that organises projects related to Amsterdam and sustainability. A total of twenty organisations and people were brought together in the Amsterdam Doughnut Coalition at the end of 2019. This coalition was established by the municipality to promote collaboration and bring together organisations that were connected to the Amsterdam doughnut. At the beginning of 2023 the coalition had around 1000 members and had more than 100 projects running.

The Municipality of Amsterdam (2022) describes the use of the Doughnut as a kind of umbrella, it is an overarching framework to which projects are connected. The role of the Municipality of Amsterdam in this is to establish certain frameworks. These frameworks, that are formulated in several policies, indicate the city's goals and how the municipality intends to achieve them. At the same time, the municipality has created space for initiatives and projects for people who want to be part of and accelerate doughnut-related processes (Gemeente Amsterdam, 2020b). An employee of the Municipality of Amsterdam adds to this:

*“When you have such an advanced goal [of becoming a circular city by 2050] it is really necessary to have strong collaborations between governments, businesses and especially citizens. Because citizens play an important role if we want to realise the doughnut in Amsterdam, since we are the ones that must make the sustainable choices.”*

Furthermore, bottom-up initiatives were encouraged by the Amsterdam City Doughnut by the means of workshops and Doughnut Deals. These Doughnut Deals are local initiatives set up by citizens or local business owners to boost a neighbourhood both socially and sustainably, without a negative impact globally. An example of a Doughnut Deal in Amsterdam is Quick Fix Brigade. The Quick Fix Brigade is a team of residents who do ‘quick fixes’ to make their own homes more sustainable and then act as ambassadors in the neighbourhood. At the moment, most projects and initiatives rely on volunteers. Nonetheless, the goal of the municipality is to broaden these up (DEAL, 2021a). The employee of the Municipality of Amsterdam mentioned that if the city want to upscale these projects financial support is necessary. Eventually, the goal is to create

a synergy between the already existing initiatives and new projects of the Doughnut (Gemeente Amsterdam, 2020b).

When looking at the way Amsterdam has been trying to include initiatives of citizens it cannot be said whether these projects are successful yet. This is because the elaborations of the projects are still in their infancy since many have started recently. What Amsterdam has done well is that they have used both top-down and bottom-up approaches in the co-creation process. It is interesting that they are trying to create a synergy between citizen initiatives that are embedded in a larger framework. This top-down framework gives a clear direction to the development of the city, while at the same time trying to support bottom-up initiatives from citizens. Mainly financial support will be needed in the future to scale up local initiatives and to create this synergy.

#### **4.2.2 Co-construction with citizens in Brussels**

Different from other cities, The Brussel Donut project is led by Confluences. Confluences is an association that is specialised in supporting co-creation during projects. This way, the Donut project has developed a participatory methodology during the formulation and integration of the doughnut in their city (Municipality of Brussels, 2021a). The policies pay extensive attention to this methodology and refer to this as a form of co-construction. The first goal of co-construction is to collect raw data. Through workshops and interviews, the Municipality of Brussels collected information on missing data about the indicators of the doughnut. The other role of co-construction is to include participation to enrich and give meaning to the raw data. As a consequence of this participation, the most meaningful and relevant indicators for the Doughnut Portrait were selected. The Municipality of Brussels added to this that co-construction gives citizens “an opportunity to voice their opinions on issues that affect them, of identifying gaps, or of highlighting the transitions already at work but that slip under the radar. That is why, in our view, participation in the portrait was a first step towards ownership of the Doughnut: it shakes up collective representations and stereotypes about the territory” (2021c, p. 5). Participation in Brussels has thus played a prominent role since the beginning of the process. Related to this, an employee of the Municipality of Brussels mentioned:

*“We did not include participation to just collect data, we did this because the way we measure the indicators can be very political. Therefore, we ask our residents what they think should or should not be part of our portrait”.*

The co-construction with citizens is applied at the four different levels, connected to the four levels of action (macro, meso, micro and nano) and the four lenses of the Doughnut Portrait. For each lens workshops were organised so people could share knowledge and discuss which indicators could best embody the elements of the doughnut. Sometimes, people could only participate in these workshops when they were already active in the fields covered by the doughnut (DEAL, 2021b). Furthermore, an online form was published about the same topics as the workshops. Despite the fact that an online form does not provide enough tools for citizens to be part of the participatory process, it was a solution given the Covid-19 context. These four levels of participation form together a comprehensive approach, with a mix of expert knowledge and

citizens experiences. The Municipality of Brussels mentioned that “it is essential to create a climate of trust, security and respect where everyone feels comfortable enough to express themselves” (Municipality of Brussels, 2021c p. 16). Although involving citizens is seen as very important, a downside is the amount of time it takes.

The next step for Brussels is to integrate the insights from the Brussels Donut to concrete policy and projects that contribute to achieve the city’s goal. Despite the fact that these policies and projects are in their early stages, something that is missing is the development from citizens as co-designers to citizens who also have the role as co-initiators of projects. In the operationalisation phase of the Doughnut Model citizens were actively involved and collaborated with other stakeholders. However, in recent projects the approach tends towards a less prominent role for the citizens of Brussels (DEAL, 2021b). The employee of the Municipality of Brussels mentioned that the offer of supply of volunteers is quite low. Reason may be that in the operationalisation phase only people that were already active in the field connected to the Doughnut could participate. Now, a shortage of volunteers may be the reason for a more top-down approach in Brussels, in which citizens have the role of co-implementers.

What can be concluded is that citizens in Brussels mainly have the role of co-designer during the operationalisation. This ensures that citizens have the opportunity to share their experiences and opinions from the very beginning. The downside of this process is that it takes a lot of time. A lesson that can be learned is that citizen participation is valuable, however it is difficult to mobilize enough citizens throughout the implementation of the Doughnut. Especially when executing projects, it appears difficult to find enough people willing to participate.

#### **4.2.3 Engagement with citizens in Leeds**

The Climate Action Leeds program, of which the Leeds Doughnut is a part of, is a community-led initiative. Climate Action Leeds is a collaborative program that is a network of individuals, organisations and sectors. Our Future Leeds is part of this network and is a citizen-led activist group that is responsible for The Leeds Doughnut (Climate Action Leeds, 2021). As mentioned in paragraph 4.1.3, Leeds used a data-first approach to get an overview of how Leeds is doing at all of the indicators. The selection and formulation of each indicator was carried out by four experts. Therefore, both citizens and businesses were not involved in the formulation processes of the Doughnut Portrait (DEAL, 2022). After the Leeds Doughnut was launched in April 2022, the emphasis was put on bringing the Doughnut to the communities and involving them in local climate action plans. The Leeds Doughnut Portrait, in the policy documents often referred to as City Plan, is the overarching framework for the direction of Leeds in the future (Climate Action Leeds, 2021). According to the employee of the Municipality of Leeds, The Doughnut Portrait was first used as a conversation starter, later on it was also used as a tool to actively engage citizens.

The Climate Action Leeds program exists out of a number of projects that all work together towards the aim of creating a nature friendly, zero carbon and socially just city. These projects include community hubs, city hub, the Leeds Portrait and transitions partners (Climate Action Leeds, 2022). The community hubs are eight local community-led projects that are located in local buildings in the neighbourhoods. These community hubs are run by people living in the neighbourhood, who can choose their own agenda and focus around climate action. The goal is to tackle everyday problems that people face, such as poor transport links or low-quality housing, and to represent the diversity of Leeds. The city hub is a central place where information and experiences can be shared. Here, the insights from the eight community hubs can be gathered and workshops or collaborative activities can be organised. The transition partners act as sector organisers and support the Climate Action Leeds program by connecting with citizens and the community hubs. The Climate Action Leeds program was thus initiated by citizens, however the designing process of The Doughnut Portrait took place without the involvement of citizens. Besides the designing process, citizens play a crucial role throughout the implementation process of the Leeds Doughnut.

From the way Leeds has engaged citizens, it can be concluded that the Doughnut Model was used as a framework to guide the direction of planning for Leeds in the future. The implementation of the Doughnut and the projects related to this is done in consultation with citizens. To involve the experiences of citizens and connect these to the Doughnut of Leeds, the Climate Action Leeds program has developed community hubs. It is interesting to see that councils at a local level make it possible for citizens to be involved by sharing their experiences and needs. These community hubs create a place where initiatives of citizens can be envisioned, implemented and supported.

*Table 4.2 Types of co-creation per case study*

	<b>Co-implementer</b>	<b>Co-designer</b>	<b>Co-initiator</b>
<b>Amsterdam</b>	In order to reduce waste from households, citizens were encouraged to implement waste sorting.	Citizens involved in workshops and interactive meetings.	Small citizen-led initiatives were already happening during the start of the Doughnut project.  Projects that underpin the goals of the doughnut are supported by the municipality.



<b>Brussels</b>	To improve air quality citizens are encouraged to include more active travel.	Citizens part of workshops to select relevant indicators for the Doughnut Portrait.	The initiative of the doughnut was from the government.  Nonetheless, small-scale projects are supported by the government.
<b>Leeds</b>	Citizens are part of water saving projects, led by local authorities.	Citizens are part of various projects, such as community hubs and city hub.	The local community took initiative to start the Climate Action program.  Local initiatives are supported.

Citizens play different roles and are included at different moments for different purposes in the three different case studies. In the table examples are mentioned in which citizens are the co-implementers of certain public services. For example, the Municipality of Brussels encourages their citizens to include more active travel in their daily life. The goal of this is to improve the quality of the air in the city, therefore several apps to share electric bicycles are introduced. In this case, citizens are involved in the final stages of the process and only perform some implementational tasks (Voorberg et al., 2015). At the same time, citizens perform the role of co-designers. In these cases, the initiatives are with the local authorities, however, citizens can decide how a certain project is being designed. In the case of Leeds, citizens are invited to community hubs to tackle everyday problems. In one of the community hubs, Horsforth, citizens came up with projects to reduce food waste. Finally, the authorities are sometimes actors that follow the initiative of citizens. In all three cases, examples can be found where local initiatives are supported by the municipality. These projects include the Quick Fix Brigade in Amsterdam.

Yet clear differences can also be found between the three case studies. Amsterdam has integrated a combination of a top-down and bottom-up approach in the co-creation process. As a result, this top-down approach has provided a clear direction, in which bottom-up initiatives of citizens were supported. Therefore, the citizens in Amsterdam mainly had the role of co-implementer, as citizens are encouraged to implement the policies and projects that the municipality has created as part of the top-down framework. Furthermore, citizens play the role of co-initiators, since their initiatives are embedded in the larger framework of the municipality. In the case of Brussels, the Municipality of Brussels took initiative when implementing the Doughnut

Model. As a consequence, citizens had a role of co-designers during the operationalisation of the model. Nonetheless, the Municipality of Brussels takes charge in the other phases of the implementation of the Doughnut. This has caused the level of co-creation to remain low and citizens are mainly co-implementers of the policies created by the municipality. While Brussels has a more top-down approach, the case study Leeds has a bottom-up approach. Multiple community hubs are developed to create a place where citizens can talk and discuss about the challenges they have to deal with. These community hubs also create a place where initiatives of citizens can be envisioned, implemented and supported. Therefore, all three levels of co-creation are happening in Leeds.

In all the three cases the implementation of the Doughnut has opened up a debate between the municipality and the citizens. The municipalities recognize the importance of involving and engaging citizens, in achieving the goal of becoming a city that thrives and respects the needs of both people and the earth. Citizens are included at different stages of the process, through which the citizens conceive the Doughnut Model. At the same time, citizens are using the approach of the doughnut as a demand for more action in their city. This is demonstrated in the citizen-led initiatives in all three cities. However, the three case studies also show the difficulties related to the involvement of citizens. One of these problems is visible in Brussels but has also been briefly mentioned in Amsterdam. The problem is that there has to be sufficient support among the public, who themselves start initiatives and support projects. The municipality can support this by creating physical spaces where people can meet or by supporting initiatives and projects financially. However, without the commitment of citizens, higher levels of co-creation are not possible and the role of citizens remains limited to co-implementers. The cases also show that inclusiveness is important but difficult. Only people who are interested in the workshops attend, but these people are not representative for the whole city. Representativeness is important as different communities have different experiences and face different problems. This is related also to the last problem, which refers to the issue of time. Including citizens at different moments during the implementation of the Doughnut Model can be rather time-consuming. This while the challenges in the case studies need urgent action.

### **4.3 Lessons learned from the case studies**

This chapter has shown that the three case studies of Amsterdam, Brussels and Leeds all have operationalised the Doughnut Model differently and took different approaches to include co-creation in this process. The table below summarizes the lessons Groningen can learn from these three case studies when implementing the Doughnut Model. The green boxes show which actions can be a good example for Groningen. The red boxes show stumbling blocks that the case studies encountered, which Groningen needs to pay attention to or approach it differently if it is also going to implement the Doughnut Model in the future.

Table 4.3 Lessons from the case studies

Case study	Doughnut Model	Co-creation process
<b>Amsterdam</b>	The Doughnut Portrait can be used as a diagnosing tool for a city.	The combination of a top-down and bottom-up approach provides both steering and freedom for co-creation.
	Formulating broad indicators can help to create a context specific framework.	Voluntary projects are not sufficient enough, therefore financial support is necessary.
	The principles of Raworth are not relevant to the operationalisation of the Doughnut Model.	Synergy can be developed when existing initiatives and new projects are connected into a larger framework.
<b>Brussels</b>	The Doughnut Model offers a vision and can help to establish clear goals for a city.	A participatory methodology can contribute to an open space for citizens to share their experiences.
	A spatial dimension can be added through the four levels of action.	A lack of volunteers can result in lower levels of co-creation.
	Including citizens during the formulation of indicators can help to create a context specific framework.	During the executing projects, it can be difficult to find enough people willing to participate.
	The selection and formulation of indicators is highly political.	
<b>Leeds</b>	The Doughnut Model can be a tool to create a framework to guide planning for municipalities.	The Doughnut Model can be a tool to actively engage citizens.

	<p>A data-first approach results in clear and understandable communication with citizens.</p>	<p>Local councils provide the possibility for citizens to be part of the Doughnut community.</p>
	<p>A data-first approach results in a model that is narrow and is not specific to the context of a city.</p>	<p>When achieving representativeness active emphasis should be put on inclusiveness.</p>
	<p>The Doughnut Model is appropriate to deal with a wide range of challenges as it includes the context of time.</p>	

## **5. Applying the Doughnut Model to Groningen**

This chapter focuses on the case of Groningen. In addition to the current approach to climate adaptation, it discusses what is lacking from this approach so far. Based on the lessons learned from the cases of Amsterdam, Brussels and Leeds, this chapter concludes with policy advice consisting of several steps for the Municipality of Groningen.

### **5.1 Current approach to climate adaptation planning in Groningen**

As described in paragraph 2.2.2, the Municipality of Groningen has been developing several climate mitigation and adaptation policies to deal with the effects of climate change in their city. The interviews with three employees of the Municipality of Groningen and the analysis of the documents has confirmed the insights from paragraph 2.2.2. The main goal of the Municipality of Groningen is “to increase the city’s resilience to climate change” (2019, p. 49). The municipality has identified four key areas that are linked to this objective. These key areas are floodings, urban heat, spatial quality and vulnerable groups (Gemeente Groningen, 2021). Floodings are a concern for Groningen, as the city is located in a low-lying area and extreme weather events occur increasingly. The policies regarding flooding include construction of flood barriers, improvement of drainage systems and the creation of green roofs. Urban heat is another key area since Groningen experiences increasingly frequent heat waves (Ten Boer, 2018). To address this issue, the Municipality of Groningen is planting more greenery and trees in public spaces. Moreover, the municipality has recognized that spatial interventions can help to improve the spatial quality. One of the ways the municipality has addressed the spatial quality of their climate adaptation is through the implementation of blue and green infrastructure. Additionally, climate adaptation measures are incorporated into existing buildings and new projects to make them able to withstand extreme weather events and become more energy-efficient (Gemeente Groningen, 2019). Finally, the Municipality of Groningen is taking a number of steps to ensure that vulnerable groups are included in climate adaptation. The municipality is working closely with vulnerable groups, such as elderly, low-income households and or people with disabilities. The municipality has conducted risk assessments to identify areas that are most vulnerable to the effects of climate change. Based on these assessments, specific target strategies were developed to address the specific needs of vulnerable groups in these areas (Gemeente Groningen, 2021).

The interviews reveal that Groningen is currently executing five concrete projects concerning climate adaptation in which they include citizens. These projects are Steenbreek, ‘Groen in de straat’, subsidies for green roofs and rain barrels and neighbourhood monitors. Steenbreek is a project that was started because of concerns about the increasing trend of tiling gardens and the decline of biodiversity in neighbourhoods. The project is neighbourhood-based and each year a different neighbourhood gets priority (Gemeente Groningen, 2021). The goal is to

increase green spaces in urban areas and promote collaboration. Citizens can provide input in the design, this includes the location of the green spaces and the types of greenery that is used. Citizens can participate in the planting and maintenance of the green space. Moreover, citizens can participate in citizen science projects related to Steenbreek. Citizens can track the biodiversity in or the growth of green spaces. The employee of the Municipality of Groningen added to this:

*“The data that citizens are providing us are used before we make final decisions and are used to monitor the success of the project”.*

The aim of the project ‘Groen in de straat’ is to expand greenery, especially to prevent heat stress, in residents’ immediate surroundings. The municipality supports initiatives put forward by citizens, whereby citizens themselves can choose what to do and where to plant what. There is an emphasis on locations where vulnerable groups live, such as areas around day care centres, elementary schools, hospitals and retirement homes. At the same time, the municipality tries to educate citizens and raise awareness. Furthermore, the municipality is providing subsidies to residents if they want to add green to their roofs or collect rain in water barrels. These financial incentives are applied to prevent flooding and heat stress, also they are used as a tool to raise awareness among residents (Gemeente Groningen, 2019). Finally, the municipality developed neighbourhood climate monitors for residents. These monitors give an overview of several physical and social characteristics of a neighbourhood. The employee of the Municipality of Groningen, working in the Department of Urban Development, mentioned that the monitors are not intended as an instrument for developing an integrated approach to deal with problems in neighbourhoods. Instead, the aim of the monitors is to make residents aware of the effects of climate change in order to increase their willingness to take action (Ten Boer, 2018).

Furthermore, the employees of the Municipality of Groningen emphasized the importance of collaboration. The employee of the Municipality of Groningen mentioned:

*“Since almost half of the space in Groningen is privately owned, collaboration with stakeholders is needed (...). If Groningen wants to make fundamental physical changes throughout the city, both the public and private spaces need to be included. Collaboration is thus highly important, without the commitment of citizens, organisations and housing corporations climate adaptation will not be sufficient enough”.*

The interview with the expert also revealed that a significant component of climate adaptation is leadership of public institutions. As public institutions have legal tools to make decisions, they have the power to support collaboration that is needed to provide for needs of the community. This is something the Municipality of Groningen is trying to propagate. The Municipality of Groningen carries out several projects that they are implementing top-down. An example includes the improvement of the water and sewage in public places (Gemeente Groningen, 2019).

In addition to the climate adaptation projects, one of the employees of the Municipality of Groningen stated that "*mitigation is actually the biggest part of adapting to climate change*". Therefore, the municipality collaborates extensively with citizens to achieve sustainability and the energy goals. These goals include that the municipality wants to be carbon neutral in 2035 (Provincie Groningen, 2020). In several neighbourhoods, the municipality has set up events to inform citizens and gather feedback about the energy transition. Along with involving citizens, other stakeholders are also part of the energy transition, such as energy cooperatives. The Municipality of Groningen promotes the formation of these energy cooperatives through financial and legal matters. Furthermore, energy cooperatives are involved in the decision-making process in regard to the energy transition of Groningen. For example, they participate in meetings and project teams to debate the energy policy of the city (Gemeente Groningen, 2019).

Overall, it can be concluded that the Municipality of Groningen recognizes that the involvement of citizens is critical for achieving the goal of becoming resilient to the effects of climate change. Citizens are provided various opportunities for participation and collaboration with the municipality. Therefore, citizens are involved in the decision-making, implementation, executing and monitoring phases of climate adaptation policies and projects. The planning concerning climate adaptation is mainly focused on the physical changes to the environment. Nonetheless, the municipality is trying to incorporate broader aspects of climate adaptation by for example the development of neighbourhood monitors.

## **5.2 Shortcomings and contextual conditions in Groningen**

Even though Groningen has a strong commitment to climate adaptation planning and attempts to address it holistically and integrated, the analysis also revealed some shortcomings in current policy. What emerges first is a focus on the physical side of climate adaptation. The starting point of climate adaptation projects in Groningen is often statistics related to the environment in the city (Gemeente Groningen, 2021). The statistics are stress-tests concerning for example heat or flooding, that are visualized in risk maps (Ten Boer, 2018). These risk maps were an important motivation for the municipality to start several projects such as Steenbreek in the neighbourhood of Vinkhuizen (Gemeente Groningen, 2019). The environmental focus also became evident in the interview with the employee of the Municipality of Groningen:

*“At a meeting we came up with the idea to add more green to this square because it is a heat island, and a lot of residents attended. But most of the residents did not understand why. They have to deal with an awful lot of nuisance, loitering and scooters driving over the square. The residents mentioned that adding trees is not going to solve their problems.”*

While the municipality was focusing on the physical side of climate adaptation, other problems appeared that were related to social challenges. So far, the focus has thus been put on the

environmental side and an emphasis on the social side is sometimes lacking. Key challenges in Groningen are related to economic and social inequalities. Examples of these challenges include affordable housing, in which a shortage of affordable housing has led to an increase in rent especially for students and low-income households (Groningen Social Planning Office, 2022). Furthermore, unemployment among particular groups, such as young people and immigrants, is a challenge in Groningen. Finally, one of the employees of the Municipality mentioned income inequality:

*“Groningen has a relatively high level of income inequality, both in neighbourhoods and between neighbourhoods.”*

These differences can significantly impact the vulnerability of groups to the effects of climate change. However, while the Municipality of Groningen takes an effort in engaging with vulnerable groups, the current policies on climate adaptation do not address these challenges. The core idea of the Doughnut Model perspective, to add a social dimension to an ecological perspective of sustainable development and in this case climate adaptation, can be applied to the case of Groningen. The Municipality of Amsterdam has shown that the Doughnut Model can be a diagnosing tool for the city. For Groningen, it can therefore be possible to see how the city is doing both socially and ecologically. Since Groningen has already developed neighbourhood monitors, Groningen can take the Municipality of Leeds as an example with their data-first approach. The neighbourhood monitors already contain a broad overview of how several neighbourhoods are doing in Groningen, which enables clear and understandable communication with citizens. As a next step, the Municipality of Groningen can include citizens to make the Doughnut Model more specific to the local context of Groningen and include the economic and social inequalities in the planning of climate adaptation.

Something else that seems to be missing is an overarching framework that guides and brings together all policies and projects related to climate adaptation in Groningen. The Municipality of Groningen has to deal with a variety of challenges, including ageing neighbourhoods, an energy transition and the effects of climate change (Gemeente Groningen, 2021). However, an integrated approach, that connects the projects within the planning of climate adaptation and policies between climate adaptation and other sectors, is lacking. The case studies have shown us that the Doughnut Model can be an approach that can help municipalities address various challenges in an integrated way. The case of Amsterdam showed that by combining existing and new projects both efficiency and effectiveness can be improved. This is because it makes it possible to identify overlap and create more comprehensive solutions that fit with the challenges. Moreover, the Municipality of Brussels has added a spatial dimension through the integration of the four levels of action. The advice to the Municipality of Groningen is to analyse the city not only as a whole, but also on smaller scales. On the macro scale, this includes the formulation of a Doughnut Portrait. This also includes an analysis of current strategies and



projects, as described above, which refer to the meso- and macro level. This spatial dimension can make the Doughnut more concrete, as different scales are included. This can also help make the Doughnut Model less theoretical and more practical, which can increase understanding and support among citizens.

Lastly, the interviews and document analysis show that citizens are involved in various projects. Nonetheless, the employee of Groningen (participant 3) mentioned that "enthusiasm among residents varies". As a consequence, depending on location or time, there is not always enough support to carry out projects. Reasons the employees mentioned are that in affluent neighbourhoods there is more support for implementing climate adaptation, as in these neighbourhoods, citizens have more money and physical space that can be utilized in climate adaptation projects. Moreover, extreme weather events can cause more urgency among citizens. Besides making the Doughnut more practical by adding a spatial dimension to increase support, the Municipality of Leeds has developed community hubs to trigger initiatives bottom-up. The community hubs are a place where initiatives of citizens can be envisioned, implemented and supported. Each of the neighbourhoods in Groningen already has a kind of neighbourhood association that have the aim to bring people together and represent the interests of residents. For the Municipality of Groningen it can be interesting to involve these neighbourhood associations and use them as a tool to promote citizen engagement and identify local priorities and concerns.

### **5.3 Policy advice for Groningen**

Following the insights of the previous paragraphs, a recommendation for the Municipality of Groningen is given here. First of all, like the Municipality of Leeds, Groningen can adopt a data-first approach to operationalise the Doughnut Model for the city. Since the Municipality of Groningen has already developed neighbourhood monitors, the Doughnut Model could be a good follow-up step for these neighbourhood monitors. The advantage of this data-first approach is that the Doughnut Model is already developed and visualized before citizens are participating or involved. By visualizing the model first, clear communication can take place between the municipality and the citizens of Groningen. In addition, by using a data-first approach it is easier to set measurable goals, both social and ecological ones, and track the progress of these goals over time. Taking this into account, urgency for pressing challenges can be addressed and clear goals can be formulated for the city.

Before starting any new projects, it is important as a second step to take a critical look at projects that are already performed in Groningen and evaluate those, just like the Municipality of Amsterdam has done. At the moment, various policies are formulated and projects are implemented regarding climate adaptation in Groningen. Taking an inventory of these initiatives, it can help to ensure that the Doughnut forms an overarching framework, which is currently

lacking. The benefit of an inventory is that it enables the Municipality of Groningen to gain insight into the areas of low and high investment in climate adaptation. By aligning existing and new projects, the inventory can improve efficiency and effectiveness. At the same time, it brings various projects and stakeholders together. This makes it possible for the Municipality of Groningen to create more opportunities for citizen engagement.

As a third step, when implementing the Doughnut Model, it is important to include citizens in this process. The case studies have selected and formulated indicators in the Doughnut that fit the conditions and problems in their city. In doing so, they actively involved citizens to participate. For example, the case of Leeds realised this by creating community hubs. Every neighbourhood in Groningen already has a neighbourhood association, which can function in the future as a community hub. For the Municipality of Groningen it may be interesting to involve these neighbourhood associations and use them to promote citizen engagement and identify local priorities and concerns. First, the Municipality of Groningen can develop a plan for the community hubs that include the objectives, resources and activities that are required to support climate adaptation in the neighbourhoods. Next, it is important that the municipality picks locations for community hubs. Since the neighbourhood associations in Groningen already have locations, some easily accessible locations scattered throughout the city can be selected by the municipality. Next, Leeds appointed a local employee at each community hub to guide actions and developments. This is also advised for Groningen, as the local employee can engage with the citizens to ensure that their needs are included. The critique of scale of the Doughnut Model remains, as only challenges on a small scale can be addressed and overarching causes are not tackled in these community hubs. Nonetheless, these community hubs can play an important role in the entire process of transforming Groningen into a city that lives within the boundaries of the Doughnut.

Following the previous steps, the last piece of advice is to start some concrete pilot projects in Groningen for a more integrated approach to the planning of climate adaptation. Experimentation to see what works and what does not is needed when implementing the Doughnut Model. During the execution of projects, it is important to have access to enough people that are willing to participate. With this said, an important lesson from Amsterdam is that financial support is needed, as voluntary projects alone are not sufficient enough for the long run. Consequently, it is important that the implementation of the Doughnut Model is budgeted properly. Also, the advice is to keep learning how other cities are applying the Doughnut Model. The municipalities of Amsterdam, Brussels and Leeds are already several years ahead, therefore there are plenty of lessons the Municipality of Groningen can continue to learn from them.

## 6. Discussion and conclusions

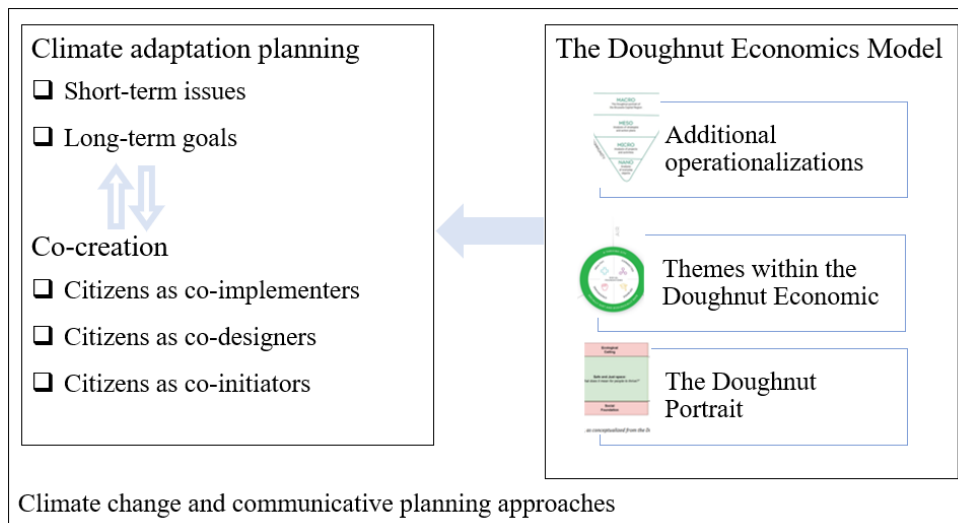
Based on the comparison of three case studies, this thesis investigated how the Doughnut Model can be an approach for the planning of climate adaptation in Groningen. This chapter discusses how this research has broadened the theoretical debate on the implementation of the Doughnut Model. Furthermore, the practical recommendations for planners as well as the limitations of this research will be discussed. Additionally, recommendations for future research will be addressed in this chapter. In the end, the main conclusions of this research will be discussed. This will be done by answering both the main and sub-questions.

### 6.1 Discussion

#### Contribution to theory

This research broadened and added to the theoretical debate on the practical implementation of The Doughnut Economics Model. It did so by comparing the application of the Doughnut Model in three case studies, rather than studying the Doughnut Model as a theoretical concept, as is done in other studies (Millward-Hopkins et al., 2020; Stopper et al., 2016). The literature provided insight into existing knowledge about the Doughnut Model, co-creation and climate adaptation. These insights were summarised in the conceptual model, which shows the relationship between these concepts. Based on the insights from this research, the conceptual model can be adjusted accordingly.

Figure 6.1. Revised conceptual model



While literature has shown three standard ways of operationalising the Doughnut Model, the case studies prove otherwise. In practice, two main operationalisations were found, including the Doughnut Portrait and the themes within the Doughnut. These two operationalisations provide concrete steps to put the Doughnut Model into practice and how to involve citizens in this process.

How to engage citizens in the implementation process of the Doughnut Model is something that was missing in literature beforehand. Additionally, cities aligned the Doughnut to their policies by developing new operationalisations. What became clear from the case studies is that the operationalisation of the Doughnut is based on political choices. An important criticism that emerges as a result is the impact of power relations. This requires attention in both literature and practice.

Furthermore, through the comparison of case studies valuable insights into the involvement of citizens in this process were found. By looking at how the Doughnut Model is applied, this research added insights into how to balance top-down and bottom-up planning in practice. Citizens are involved in the formulation of the Doughnut Model, which makes them part of the implementation process from the beginning. At the same time, both bottom-up and top-down approaches are combined to provide a clear direction to the development of the city, while at the same time trying to support initiatives from citizens.

Finally, the Doughnut Model shows that adding a social foundation makes it more necessary to involve people in planning around sustainability and climate adaptation. The involvement of citizens can increase the knowledge and awareness about sustainability and build support for policies regarding climate (adaptation). Through the integration of citizens' experiences and needs, policies can be fitted to the challenges in a place.

### **Practical recommendations for planners**

The Doughnut Model is relevant for planners because it is an approach that can bring together different aspects of climate adaptation, as both social and ecological elements can be included. However, this research has shown that the Doughnut Model has limitations, as it does not have a spatial dimension. The case of Brussels suggests four levels of action to include a spatial dimension. For other municipalities it can be interesting to also add levels when operationalising the Doughnut, as it enables municipalities to integrate multiple scales. Nonetheless, this approach is still a bit abstract due to little application in practice.

Moreover, the Doughnut Model can be used as an inspiration for spatial planners. While technical planning is characterized by a top-down approach, it has a focus on clear goals and objective criteria. Nowadays, communicative planning and the planning of climate adaptation in cities often focuses on how to implement physical changes to the environment. A strong vision behind this is frequently lacking and an emphasis is put on how to achieve this through collaboration and dialogue (Laws & Forester, 2015). Planning is not just about how, but also about what we want in the future. The Doughnut Model can become a long-term goal when dealing with wicked problems, such as climate change. This is especially relevant on a municipal or city scale, since spatial planners play an important role in developing and implementing policies regarding the effects of climate change. However, it is important to acknowledge that overarching causes of climate change cannot be tackled on just the local scale.

Moreover, what became evident in the city of Groningen is the focus on the physical side of climate adaptation. This does not only occur in Groningen, often the social side of climate adaptation is forgotten (Saunders & Luukkanen, 2022). With the approach of the Doughnut Model, social challenges, such as health, housing and income, can be integrated, while also focusing on the ecological boundaries of the planet. For planners the Doughnut Model can thus be an interesting approach to adapt to the effects of climate change.

### **Limitation of the research**

Looking back on the process of this research, there are some limitations that should be mentioned. This research was conducted by the means of a comparative case study. This method has provided various insights, from which the Municipality of Groningen can draw lessons. Even though the findings from comparative case studies can be generalized and applied to other cities, it is necessary to mention that the insights are always based on the specific context of cases. Therefore, the generalizability has its limitations. Nonetheless, the cases were carefully selected and diverse. In addition, the empirical data that were collected in this research were continuously compared with insights from literature. This confrontation with literature and collected data in the data analysis process has strengthened the connection of the results provided in this research with academic theories. Therefore, the result can be valuable for many other European and Dutch cities that are trying to deal with climate adaptation or other sustainable developments in their city by the means of the Doughnut Model. Some key elements that can be generalized include the importance of citizen involvement and the possibility of different approaches (top-down and bottom-up) when implementing the Doughnut Model.

Related to the research method, the number of selected cases were chosen based on three criteria. When selecting the cases, the number of cities meeting these criteria was quite low. This number has increased in the last year as more cities started to use the model. Due to the limited sample size, there is a possibility of bias in the results. However, the findings show a wide diversity of outcomes, so the results are not expected to differ greatly when other cases are selected.

Another limitation is the fact that three case studies were at different stages related to the implementation of the Doughnut Model. Consequently, the currently stated findings of this research can change over time. For example, the four levels of action in Brussels are now a bit abstract. In a year's time, this may become clearer, clarifying the insights about spatial dimension of the model.

### **Recommendations for future research**

In future research it would be relevant to investigate people's attitude and understanding of the Doughnut Model in Groningen. Since the Doughnut Model is a relatively new approach and differs significantly from other, more growth-oriented approaches to urban planning, it is essential to understand how citizens perceive and respond. Future research on citizens' views and preferences can provide insight into how to align the Doughnut approach with citizens' values. Furthermore,

these insights can help to address concerns or even resistance. This is relevant as this research on the case of Groningen revealed a variety in enthusiasm among citizens, which may lead to resistance in the future. Another recommendation links to the limited number of cases available at the beginning of this research. In the last year the number of cases all around the world has increased significantly, which provides opportunities to broaden academic insights into the Doughnut Model. It is now possible to compare the effectiveness of the implementation of the model across different regions and contexts. For example, research could investigate the differences of implementation between urban and rural areas or between low-income and high-income countries. While high-income countries face challenges such as inequality or overconsumption, low-income countries have to deal with other challenges, for example providing energy and infrastructure. A comparison in implementation can therefore help to determine the transferability of the Doughnut Model in different contexts.

## 6.2 Conclusions

In the last couple of years, the Municipality of Groningen has been developing climate adaptation projects and policies in the city. The aim is to create a safe living environment and become resilient to the effects of climate change. In order to combine both the social and environmental concerns, the approach of the Doughnut Model of Raworth (2012) was used in this research as a new perspective to rethink the way Groningen can be dealing with climate adaptation. This resulted in the following main question: “*How can the Doughnut Economics Model be used as an approach for climate adaptation planning and contribute to co-creation in the city of Groningen?*”. To study how the Doughnut Model can be applied, the three case studies Amsterdam, Brussels and Leeds have been analysed. Both theoretical research and empirical research have been conducted to answer the following questions.

The first sub-question is “How can the Doughnut Model be conceptualized from a theoretical perspective?”. The literature in chapter 2 describes that the Doughnut Model is a perspective that helps to rethink how to deal with the effects of climate change. With the Doughnut Model it is proposed to not fixate on environmental models, such as the planetary boundaries, but also on the social and ecological needs of people and planet. Literature showed that there are so far three operationalisations for the Doughnut Model. These three are the seven principles to think like a twenty-first century economy, the Doughnut Portrait with four lenses and themes within the Doughnut. The seven principles are used as an abstract way to show how the system must change. The Portrait is a place-based approach that connects the local aspirations with the global responsibility of a place. Finally, the themes within the Doughnut summarize the Social Foundation and the Ecological Ceiling. These themes are concretised through indicators, which show the performance of a city.

About the second sub-question “How is Groningen currently dealing with climate adaptation planning?” it can be said that the Municipality of Groningen recognizes the importance of the involvement of citizens for becoming resilient to the effects of climate change. Therefore, the Municipality of Groningen carries out various projects and policies in which citizens have the opportunity to participate and collaborate. The way Groningen is dealing with climate adaptation focuses on the physical changes in the environment. Challenges related to social and economic inequalities have not yet been integrated. It also lacks an overarching framework that guides and brings together all policies and projects related to climate adaptation in Groningen. The Municipality of Groningen undertakes action to incorporate broader aspects of climate adaptation for example by developing neighbourhood monitors.

Based on the sub-question “How has the Doughnut Model been operationalised in the cities Amsterdam, Brussels and Leeds?” it can be concluded that there are two main ways of how the Doughnut Model is operationalised in the case studies. These two include the Doughnut Portrait, consisting out of the four lenses, and the themes within the Doughnut. The creation of the Doughnut Portrait proves to be a good diagnosing tool for the case studies. The formulation of indicators within the themes appears to be a tool for place-based thinking and policy determination. However, it should be noted here that the selection of indicators is highly political. Furthermore, it can be concluded that the seven principles of Raworth (2017) are mainly reflected in the goals of the three case studies. Therefore, the principles are interesting as an inspiration and background story, but they are not suitable as tools for operationalisation of the Doughnut Model. Lastly, new operationalisations were identified, including the Circular Economic Monitor in Amsterdam and the four levels of action in Brussels. These new operationalisations show that the case studies have interpreted the Doughnut Model differently, to make the application of the approach align to their place, policies and projects.

The fourth sub-question “How is co-creation integrated in the implementation of the Doughnut Model in the cities Amsterdam, Brussels and Leeds?” can be answered with the insight that the citizens play different roles and are included at different moments for different purposes in the three different case studies. Amsterdam has integrated a combination of a top-down and bottom-up approach in the implementation process. Consequently, this top-down approach has provided a clear direction, in which bottom-up initiatives of citizens were supported. In the case of Brussels, the Municipality of Brussels took initiative and citizens had a role as co-designers when implementing the Doughnut Model. Nonetheless, the Municipality of Brussels took charge in the other phases. This has caused the level of co-creation to remain low and citizens are mainly co-implementers of the policies created by the municipality. While Brussels has a more top-down approach, the case study Leeds has a bottom-up approach. Multiple community hubs were developed to create a place where initiatives of citizens can be envisioned, implemented and supported. This way, all three levels of co-creation occurred in Leeds.

The last sub-question is “How can the lessons learned from the other cities help the implementation of the Doughnut Model in Groningen?” The analysis of the city of Groningen revealed some shortcomings in the way the municipality deals with climate adaptation. These include a physical focus on adaptation, lack of an overarching framework and variety of enthusiasm among citizens. Based on the lessons from the case studies of Amsterdam, Brussels and Leeds, a policy advice for the Municipality of Groningen has been provided in chapter 5. This advice includes a data-first approach to visualize the Doughnut Model and set clear and measurable goals. Furthermore, an inventory of existing climate adaptation policies and projects is advised to align new initiatives better. Despite that the case studies all had different approaches, a combination of a top-down and bottom-up approach to implement the Doughnut Model is recommended. The case studies have shown that a top-down approach can lead to a guiding framework. This framework enables the municipalities to give a clear direction to the development in their city. Yet, new bottom-up initiatives can be included and fit with existing policies and projects to increase efficiency and effectiveness. A way to engage with the local citizens of Groningen is through neighbourhood associations, which can function as community hubs. Finally, it is advised to the Municipality of Groningen to start with concrete pilot projects and keep learning from other cities that have already applied the Doughnut.

To answer the main question “*How can the Doughnut Economics Model be used as an approach for climate adaptation planning and contribute to co-creation in the city of Groningen?*”, it can be concluded that the planning of climate adaptation in Groningen is currently focused on the physical changes to the environment. At the same time, structural inequality in Groningen is not decreasing, even though policies have been developed to counteract these social differences. In order to combine both the social and environmental concerns, the approach of the Doughnut Model of Raworth (2012) can be used to rethink how Groningen is dealing with climate adaptation. Moreover, the Doughnut Model can contribute to co-creation with citizens in Groningen as the Doughnut approach supports collaborative action for the planning of climate adaptation. Citizens can be involved in the implementation of the Doughnut Model to align the needs and values of citizens with the municipality’s objectives.



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## Appendices

### Appendix 1: Interview guide

#### Introduction

- What is your role in the implementation of the Doughnut Economics in your city?
- How would you describe the Doughnut policy in your city?

#### The Doughnut Economics

- What are the problems in your city related to
  - Ecology (local/global)
  - Social
- Why did your city chose to use the DE as an approach for sustainable development?

#### Statements about the three operationalisation.

- Seven principles: From 1 to 10 how important are the principles in your policy? Or put the seven principles in a row from most important to least important.

1. Change the goal away from GDP
2. See the big picture
3. Nurture human nature
4. Get savvy with systems
5. Design to distribute
6. Create to generate
7. Be agnostic about growth

Can you explain why the principles are important or less important?

- The Doughnut Portrait:
  - What would it mean for the people of your city to thrive?
  - What would it mean for your city to thrive within its natural habitat?
  - What would it mean for your city to respect the wellbeing of people worldwide?
  - What would it mean for your city to respect the health of the whole planet?

From 1 to 10 how important is each lens in your policy?

Why do you think each lens is important or not?

- Themes within the DE:
  - Which indicators from the ecological ceiling does your city uses in the DE policy? And what theme (water, land, air) is the most relevant? Why are those indicators and themes relevant? How are you going to deal with those indicators? What are opportunities in your city to deal with them? What are barriers in your city that can impact the way you want to deal with them?
  - Which indicators from the social foundation does your city integrate in the DE policy? And what theme (health, connected, enabled, empowered) is the most

relevant?

Why are those indicators and themes relevant?

How are you going to deal with those indicators? What are opportunities in your city to deal with them? What are barriers in your city that can impact the way you want to deal with them?

#### Co-creation

- Which stakeholders are included in the process of climate adaptation? Why those stakeholders?
- How did you make sure that those stakeholders got involved? Did you make use of any platforms (website, meetings, living lab, other)?
- Which stakeholders are not involved in the process of climate adaptation? Why are they not included? Is this a problem? How would you solve this?/Why is this not a problem?
- In which part of the process did they get involved? Why was it important to involve stakeholders at this phase of the process?
- What role do the stakeholders play in the planning process (initiative/ideation, design, implementation)?
- What were bottlenecks during the process of stakeholder involvement?
- Which lessons did you learn from involving stakeholders? What would you do different next time? Or what tips would you give other cities if they want to involve citizens during the implementation of the DE?

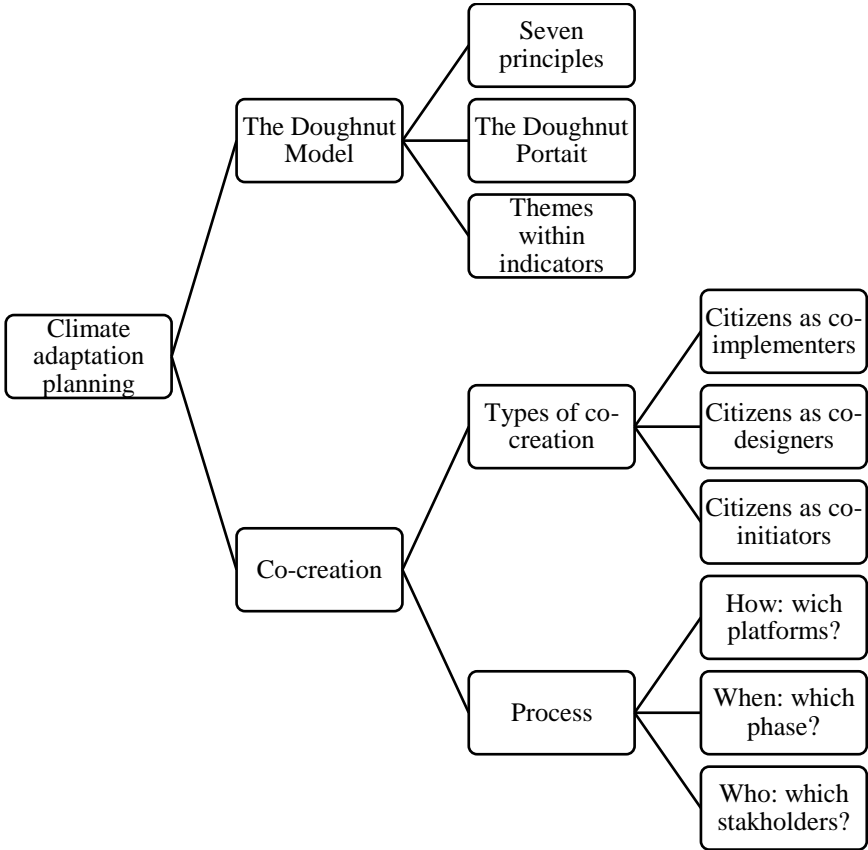
#### Application DE for other cities

- Are there any shortfalls in your approach of implementing/application the DE? What would you improve in your strategy?
- What conditions in your city have impacted the implementation of the DE?
- Do you advise other cities to implement the DE? Why?
- Can the DE help when cities are dealing with the impacts of climate change and climate adaptation?

#### Closing

- Do you have any question before ending this interview?
- Thank you for the interview.

Appendix 2: Analytic framework



### Appendix 3: Agreement to participate in English

*Agreement to participate*

Michèle Mac Lean

[m.mac.lean.1@student.rug.nl](mailto:m.mac.lean.1@student.rug.nl)

The purpose of this research is to get insight into how different cities have been implementing the Doughnut Economics model of Raworth and how they have involved citizens in this process. Participation in this study should help me increase the understanding in how the city of Groningen can use the approach of the Doughnut Economics to improve their climate adaptation.

The interview will last approximately 60 minutes.

The information that you give me will be stored for six months on the university's secured network drive, in a password protected encrypted files.

I, ... [name of the participant] confirm that,

- I have read and understood the information sheet of this present research project.
- I have had the opportunity to ask questions about this study. I am satisfied with the answers I have been given.
- I understood that taking part in this study is voluntary and that I have the right to withdraw from the study until the moment that the study has been published, and to decline to answer any individual questions in the study.
- I understood that my participation in this study is confidential. Personal information collected about me and that can identify me will not be shared beyond the researcher. Without my prior consent, no material, which could identify me will be used in any reports generated from this study.
- I understand that this data may also be used in articles, book chapters, published and unpublished work and presentation.

Please circle YES or NO to each of the following

I consent to my interview being audio-recorded	YES/NO
I wish to remain anonymous for this research	YES/NO
My first name can be used for this research	YES/NO
My work-related function can be used for this research	YES/NO

**“I agree to participate in this individual interview and acknowledge receipt of a copy of this consent form.”**

Signature of participant: .....

Date: .....

“I agree to abide by the conditions set out in the information sheet and I ensure no harm will be done to any participant during this research.”

Signature of researcher: .....

Date: .....

## Appendix 4: Agreement to participate in Dutch

*Overeenkomst tot deelname*

Michèle Mac Lean

[m.mac.lean.1@student.rug.nl](mailto:m.mac.lean.1@student.rug.nl)

Het doel van dit onderzoek is om inzicht te krijgen in hoe verschillende steden het Doughnut Economics-model van Raworth hebben geïmplementeerd en hoe zij burgers bij dit proces hebben betrokken. Deelname aan dit onderzoek kan de onderzoeker helpen het inzicht te vergroten in hoe de stad Groningen de aanpak van de Doughnut Economics kan gebruiken om hun klimaatadaptatie te verbeteren.

Het interview zal ongeveer 60 minuten duren.

De informatie die u mij geeft zal gedurende zes maanden worden opgeslagen op de beveiligde netwerkschijf van de universiteit, in een met een wachtwoord beveiligd versleuteld bestand.

Ik, ... [naam van de deelnemer] bevestig dat,

- Ik het informatieblad van dit onderzoeksproject heb gelezen en begrepen.
- Ik heb de gelegenheid gehad om vragen te stellen over dit onderzoek. Ik ben tevreden met de antwoorden die ik heb gekregen.
- Ik heb begrepen dat deelname aan dit onderzoek vrijwillig is en dat ik het recht heb mij uit het onderzoek terug te trekken tot het moment dat het onderzoek is gepubliceerd, en om te weigeren individuele vragen in het onderzoek te beantwoorden.
- Ik heb begrepen dat mijn deelname aan deze studie vertrouwelijk is. Persoonlijke informatie die over mij is verzameld en die mij kan identificeren zal niet buiten de onderzoeker om worden gedeeld. Zonder mijn voorafgaande toestemming zal geen materiaal dat mij kan identificeren worden gebruikt in rapporten die uit dit onderzoek voortkomen.
- Ik begrijp dat deze gegevens ook kunnen worden gebruikt in artikelen, boekhoofdstukken, gepubliceerd en ongepubliceerd werk en presentatie.

Kruis JA of NEE aan voor elk van de volgende punten

Ik stem ermee in dat mijn interview wordt opgenomen JA/NEE

Ik wil anoniem blijven voor dit onderzoek JA/NEE

Mijn voornaam mag voor dit onderzoek worden gebruikt JA/NEE

Mijn werk gerelateerde functie mag voor dit onderzoek worden gebruikt JA/NEE

**"Ik ga akkoord met deelname aan dit individuele interview en bevestig de ontvangst van een kopie van dit toestemmingsformulier."**

Handtekening van de deelnemer: ..... Datum: .....

"Ik ga akkoord met de voorwaarden in het informatieblad en ik garandeer dat geen enkele deelnemer tijdens dit onderzoek kwaad zal worden gedaan."

Handtekening van de onderzoeker: ..... Datum: .....

## Appendix 5: Data management plan

This Data management plan is based on the draft version of the Data Protection Guide for Student Research.

1. General	
Name and supervisor	The name of the researcher is Michèle Mac Lean (s4570901) and the supervisor of this thesis is Ina Horlings. This data management plan was discussed on December 5 <sup>th</sup> 2022.
Organisation	Rijksuniversiteit Groningen
Description of the research project	This thesis looks at how the cities Amsterdam, Brussels and Leeds have implemented the Doughnut Economics Model of Raworth. Furthermore, it tries to get insight into how these cities have involved their citizens. These insights can help to understand how the city of Groningen can improve their climate adaptation planning. This has been done through the following main question: <i>How can The Doughnut Economics Model be used as an approach for climate adaptation planning and contribute to co-creation in the city of Groningen?</i> .
2. Data collection	
Data formats	To assure the validity of the research multiple data collection methods are applied. A combination of theory, interviews and document analysis is used.
Methods of data collection	Several methods are used <ul style="list-style-type: none"> <li>- Formulation of a theoretical framework and conceptual model</li> <li>- Semi-structured individual interviews</li> <li>- Document analysis of policies, reports and websites</li> </ul>
3. Human object and research ethics	
Does the research involve participants?	Yes, several participants will be interviewed during this research.
Does the research collects personal data?	Yes, personal data can be referred to as information that can identify a participant. These participants are all adults, not considered vulnerable persons. An agreement to participate is formulated and required to be filled in before any interview, in terms of informed consent.

	The nationality, name and job information are the categories of personal data.
Storage, sharing and archiving data	During the research process all data will be collected on the RUG Google Drive. RUG Google Drive has an adequate storage, which makes it suitable for storing valuable data. After the research the data will be stored on a protected hard drive. The data will not be shared with others, unless needed for other scientific purposes.