Accelerating the Circular Economy in the Netherlands

How the regional government can accelerate the circular economy by supporting circular projects.



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Abstract

The goal of this thesis is to create a structured approach for the Dutch regional government to support Circular Breakthrough Projects. This structured approach is based on the Stage Gate Theory, a model used for product development and not often used in project management. Therefore, this thesis will test if the Stage Gate Theory can be used in the project management of the circular economy.

This study started with a literature review to identify the current barrier in the Circular Economy and to design a model based on the Stage Gate Theory. The next step was to interview several actors who are involved in the circular economy to arrange the several criteria and policy instruments. This is done by the use of Template Analysis.

The result of this thesis shows that circular economy is at the start of the transition. Therefore the model can be used in the first phases of a circular project. It cannot be used as a structured approach further in the model as there are no policy instruments or criteria found or discussed during the interviews. This can be the reason there are no Circular Breakthrough Projects found, as the transition of the circular economy is not in that phase yet.

Further research should focus on circular projects who are finished and operational to make sure the last two phase of the model can have a set of policy instruments and criteria.

Keywords: Circular Economy, Stage Gate Model, Acceleration, Project Management

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Chapter 1. Introduction

1.1 Problem Introduction

In the second half of the 20th century, the impact of the human activity on the Earth system did increase greatly and caused the Earth system to near her ecological boundaries. If these planetaries boundaries are crossed the resilient Earth system will not be able to recover and ecosystems will destabilize (Steffen et al, 2015). Steffen et al. (2015) have created a model to identify these planetary boundaries and the current impact of human impact on these boundaries. Because of this growing human impact on the planet there is more interest for the relation between the environment and humanity and how humanity can develop in a more sustainable way (Hopwood, 2005). However, sustainable development has been called too vague to be implementable and therefore started to lose momentum. The concept of the Circular Economy is viewed as an operationalization for businesses to implement the concept of sustainable development (Kirchherr et al., 2017).

Economic growth was the main driving force of human well-being and an ongoing increase of productivity equals economic growth. There was a shared believe that human knowledge can overcome any environmental problem (Hopwood, 2005). This productivity is designed by a standard, linear pattern of extraction, production and waste of raw materials (Dutch ministry of infrastructure and Water Management, 2018), also called the 'take-make-dispose 'economy (Ellen MacArthur Foundation, 2013). Many environmental issues of the planetary boundaries can be related to the way raw materials are being processes. As half of total greenhouse gas emissions and more than 90% of biodiversity loss and water stress come from resource extraction and processing (European Commission, n.d.).

in addition to the impact on the environment, it also has economic consequences. Many companies have noticed that the price of resources is rising and getting more volatile, due to the increasing world population and the fact that resource extraction moves to places that are much harder to reach (Ellen MacArthur Foundation, 2013, p. 15). Therefore, countries are looking for ways to use products more intensively and for longer use. By doing so, this will reduce the environmental problems and can improve the security of supply of raw materials (Hanemeijer, 2021).

The Circular Economy is a concept that decouples the use of resources from economic growth and, therefore, is getting attention from governments and industries (Ellen MacArthur Foundation, 2013). The European Union prioritized scaling up the circular economy as it will make a decisive contribution to achieving climate neutrality by 2050 and decoupling economic growth from resource use, while ensuring the long-term competitiveness of the EU and leaving no one behind (European Commission, n.d., p.4). The Dutch government has a great interest in the circular economy and is aiming at developing a CE in the Netherlands by 2050 and to have a reduction of 50% of the use of raw materials by the end of 2030 (Dutch ministry of infrastructure and Water Management, 2018).

In recent years, the switch to a circular economy has been on the agenda with government, companies, citizens, NGOs and knowledge institutions in the Netherlands. The goal of the government to have a fully circular economy by 2050 has now been included in the Grondstoffenakkoord endorsed by more than 400 actors and elaborated in five transition agendas for the priority themes Biomass and food, Construction, Plastics, Manufacturing and Consumer Goods. This transition agendas include legislation and regulations, market incentives, monitoring, knowledge and innovation, and producer responsibility. With this, the policy has laid a foundation and structure to initiate the transition to a circular economy with a public-private approach (Hanemeijer, 2021).

The next phase of the transition is the upscaling of circular initiatives. Upscaling circular initiatives can lead to more market demand for circular goods and services, which also inspires more businesses to adapt to the circular economy. Eventually, this leads to the institutionalization of the circular economy in the society as the rules of the game are now focused on optimizing the linear economy. However, there is not a structural approach for the regional government to support such circular initiatives and the current circular initiatives seem to stagnate (Hanemeijer, 2021). On a regional level it is usually easier to exchange products and services than on a national level as they seem to be more supportive than the national government (Hanemeijer, 2021). Therefore, the regional government is better able to support circular initiatives.

One theory that could help in this approach is the Stage Gate Theory. This theory is often used in the innovation process of products. The Stage Gate Theory is a cascading model in which products start as an idea and could be developed to a real product. In this process there are several gates to decide if an idea will be further developed or if it will be rejected. That way, promising projects will receive more resources and less promising projects will be rejected in the early phase, which means that those resources can be invested in projects at other gates (Mulder, 2018). However, this theory is not often applied in project management, but scholars suggests that it can be used in that field.

Therefore, Royal HaskoningDHV wants to test the Stage Gate Model in project management. Part of this study is a graduate internship at that company to develop such model. Royal HaskoningDHV is an international engineering and project management consultancy in sustainable development and innovation. RoyalHaskoningDHV has 6000 employees, with projects in 140 countries (RoyalHaskoning DHV, z.d).

1.2 Research problem

As our society is based on the 'take-make-dispose-economy', there is a challenge for businesses to develop circular business models. The Dutch government wants to support these efforts to create a more circular business model. However, different initiatives and networks still work alongside each other, and the lack of consensus and standardization hinders large-scale investment. For many actors, the CE is still not very clear and lacks mass (Loorbach, 2017). There is a need for more insight in what measurements the government can take to support the transition towards circular economy, as today's society is optimized for the linear economy.

The goal of the Dutch government is to have a circular economy by 2050, therefore many businesses will have to change their business model. The Dutch government wants to support these businesses in transitioning with several policy instruments. However, the government has not the funds to support all the circular initiatives and it is searching for businesses that can function as a breakthrough project. The regional government is the scale of government that can facilitate this transition. They are more in contact with regional businesses and have a better understanding of the possibilities within their region (Hanemeijer, 2021). Therefore, the regional government is better able to support circular breakthrough projects.

1.3 Research aim

The transition towards a circular economy seems to stagnate (Hanemeijer, 2021), therefore the Dutch government is searching for ways to accelerate this transition. One of these methods is to support breakthrough projects. However, there is not a structured approach to select and support these projects. Therefore, this study aims to develop an approach based on a stage-gated model.

Select and support are two different activities in this model, but they are connected with each other. In a stage-gate model there are several criteria that are necessary for a project to be selected, or to go to the next phase. In each phase, the regional government has several policy instruments to support businesses in meeting the criteria. Since policy instruments can require a lot of investment, these instruments are categorized at several stages in the stage gate model. That way, the regional government uses the more expensive policy instruments at projects who fit the criteria.

This research aims to develop a innovation funnel based on a stage-gate model. In this funnel, there are several stages which contains criteria and possible policy instruments for projects in that stage. This creates a approach for regional governments to select and support circular projects.

1.4 Research Question

1.4.1 Main question

How can the Dutch regional government select and support circular breakthrough projects using a stage gate-based model?

1.4.2 Sub questions

- What is the circular economy?
- What is a breakthrough project?
- What are the current barriers for businesses that are developing and implementing circular business models?
- What policy instruments does the Dutch government already use in supporting circular initiatives?
- What policy instruments where successful at other circular initiatives in overcoming these barriers?
- How can the Dutch government connect the results of this research to their long-term goal of having a full circular economy in 2050?

1.5 Societal Relevance

As the linear economy approaches its end, there is a need for the economy for a transition towards a circular economy. A circular economy aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models. To facilitate this transition, the Dutch government is searching for a breakthrough project that can function as a lead example.

Circular Breakthrough Projects are sustainable innovative projects by leading businesses. Breakthrough projects are of great importance in the transition, they show the government what is necessary for the transition towards the CE and show the society how the CE works. With this, leading businesses in their sector become a role model and show other businesses in that sector that new, circular business models can work. Breakthrough projects contribute to changes in regulations, market conditions and routines (Koot, 2021). The path of their transition could be analysed to identify criteria and policy instruments that can be used in the innovation funnel.

If the government uses a structured approach it prevents them from investing in projects that cannot meet the criteria. If a breakthrough project succeeds it can accelerate the transition towards the circular economy, as it can lead by example. Therefore, this study contributes to the sustainable development of the society.

1.6 Scientific Relevance

The goal of this study is to create an innovation funnel based on the Stage Gate Theory in project management for the Circular Economy. Therefore, this study contributes to existing research about implementing the CE in society.

The Breakthrough Projects that lead by example can demonstrate the regional government what barriers they are facing or what policy instruments they needed. The regional government, as the closest government to Breakthrough Projects, could apply these results to a general innovation funnel to create a structured approach in the transition towards the CE.

It will provide a better insight in what policy instruments can be used at different stages during development. Therefore, this study connects the scientific approach of the CE to a more practical approach of the CE in regional government.

Chapter 2. Theoretical Framework

The first section of the theoretical framework is about sustainable development. This chapter describes sustainable development and what the circular economy can contribute towards that development. Furthermore, the CE is operationalized in the R-strategies. Therefore, this section answers the first sub-question of this thesis.

After the operationalization of the CE, section 2.3 will create a current state of the CE in the Netherlands and the EU and gives a brief overview of circular businesses in the Netherlands. This section of the theoretical framework also explains how a breakthrough project can help in accelerating the Circular Economy, connecting chapter 2.3 to the second sub question of this thesis.

Section 2.4 describes how to develop or shift from a linear model to a circular business model and section 2.5 explains what barriers businesses will face during that transition. Therefore, these sections will contribute towards the third research question.

The fourth sub question is part of section 2.6, as it explains how the innovation motor of the Dutch government work and how innovation can help projects that a facing barrier as described in section 2.5. Section 2.7 expands on the previous chapter and gives a brief overview of the policy instruments the Dutch government can use as part of their innovation motor.

Section 2.8 explains the Stage Gate Theory and why it can be used in the innovation funnel for accelerating circular business models. Eventually, all of the sections mentioned above come together in the conceptual model that is shown in section 2.9.

2.1 Sustainable development

The term sustainability founds is roots the forestry and is based on the idea that the volume of harvested wood should not exceed the volume that grows back. Nowadays it is used to define a situation that human activity in such a way the ecological systems of the earth can be conserved for coming generations (Geissdoerfer et al, 2017).

Sustainability as a policy concept started in 1987 with the Brundtland Report. The report describes the tension between increasing the well-being of present mankind on one side and the limitations imposed by nature on the other side. Sustainability is concerned with the well-being of future generations and with irreplaceable natural resource humanity is using today (Kuhlman & Farrington, 2010, p. 2). This well-being is based upon three dimensions: economic dimension, environmental dimension and the social dimension (Murray et al, 2017).

These dimensions have been conceptualized by the United Nations. In 2015 developed and developing countries agreed on the sustainable development goals (SDGs). The SDGs have set the 2030 agenda to transform the world by ensuring, simultaneously, human well-being, economic prosperity, and environmental protection. There are 17 SDG's and their aim is to tackle the multiple and complex challenges faced by humanity (Pradhan et al, 2017).

Since the Brundtland Report businesses are looking for guidance for implementing strategies for sustainable development (Murray et al, 2017). This might have to do with the fact that the concept of sustainable development is seen as too vague and therefore not implementable (Kirchherr et al.,

2017). However, businesses are searching for a better operationalization to become more sustainable. This process started with the Industrial Ecology and developed into the Circular Economy (CE) (Andersen, 2007). While the complete definition is described in the next section, the CE is commonly understood as transforming inter-linked production-consumption systems to ones 'where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised' (Holmes et al, p1. 2021).

The transition towards the CE also contributes to several SDG's. The CE mainly works towards the twelfth SDG, that goal is about sustainable production and consumption patterns (Schöggl, Stumpf, & Baumgartner, 2020). Besides the twelfth SDG, it also contributes towards the SDG about water, energy, economic growth and climate change (SDGs 6, 7, 8 and 13). (Geng, Sarkis, & Bleischwitz, 2019). Therefore, the CE is a promising operationalisation of sustainable development and the concept will be discussed in the next section.

2.1.2 Circular Economy

Circular economy (CE) is often presented as a new economic model. However, the concept of the CE is not new and there were several other iterations from decades ago (Reike, Vermeulen & Witjes, 2018). The concept of the CE is based on is the industrial ecology. Industrial ecology is a concept that assumes material symbiosis between otherwise different companies and productions processes. The goal of the industrial ecology is to promote resource minimalization and implementing cleaner technologies by recycling waste materials and by-products (Andersen, 2007).

The concept of the CE aims to be more than an improved model for waste management. CE is about implementing new processes to help society reach for increased sustainability and wellbeing with low or no material, energy and environmental costs (Ghisellini , Cialani, & Ulgiati, 2016). The CE is widely seen as an alternative model of production and consumption, being a growth strategy that decouples the use of resources from economic growth and therefore contributes towards sustainable development (Reike, Vermeulen & Witjes, 2018). The goal of the CE is clear, but there was not a commonly accepted definition of the CE (Kirchherr, Reike & Hekkert, 2017). Most definitions of the CE are based upon the principle that products, components and materials will have to retain their value for the longest time, at all times. Therefore, businesses will have to redesign their business models based upon slowing, closing and narrowing of resource loops. When these principles are taken in account, the best definition of CE is provided by the Ellen MacArthur Foundation (Geissdorfer et al. 2017, p. 259). Their definition of CE is best defined as (2015):

"A circular economy is an industrial system that is restorative or regenerative by intention and design. it replaces the 'end-of-life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models (Ellen Macarthur Foundation, 2015, p. 7)."

However, this definition does not give a clear operationalisation of the CE. To measure the highest value of products and materials, there is a need to identify the possibilities how to retain this value or how to process it. To measure this value the CE is based on the principles of reduction, reuse and recycle, often known as the 3R principle (Su et al., 2013). These R's are called retention options (RO). Reduction means minimalizing the input of energy and raw materials, often realised by the improvement of production efficiency. Reuse aims to use the waste and by-products from one

company to resources for other firms and also extend the life cycle of a products by good maintenance. Recycling is about processing recyclable materials into new materials to reduce the use of new raw materials (Su et al., 2013).



Figure 1. Reprinted from "Circular business models: A review", by Geissdoerfer et al. (2020). from https://www.sciencedirect.com/science/article/pii/S0959652620337860?casa_token=3_sUB4xu9eYAAAAA:zETyk13SPcOCjO ZZs3AKYvxnLWwPXb-02LKPEBtG6P8Ou3IRo3nmvrhDb_LH4T6OgEkp8fTXOA

Figure 1 is simplified model of the CE. In this model the three loops that were described in the article of Su et al (2013) are added. On the top side there are the three main loops to ensure that products and materials will keep their highest value possible from a producers perspective. These loops will be discussed in section 2.1.3.

Figure 1 also shows the traditional, linear economy and added the loops to show what is different in a CE. In the linear economy the use of materials is usually cheaper than the cost of human resources. This has resulted in business models that rely on extensive use of materials, with the least effort of human resources. The consequence of this development is that cheaper to use new materials instead of recycling and reusing materials (Sariatelli, 2017). With the adoption of a circular economy, unlimited resources like labour take on a more central role in economic processes, and resources that are limited by natural supply play more of a supporting role. This concept holds considerable promise, as has already been verified in a number of industries (Ellen MacArthur Foundation, 2013, p. 14).

Lastly, there is a loop under the production chain and that loop contains the behaviour of the consumer. In the circular economy consumers usually do not own a product, they use it and return it after use. This means that the producer repairs and refurbish his product if needed (Hunka et al., 2021). This system is called *product as a service* and is developing fast in the CE (Vasiljevic-Shikaleska et al., 2017). Consumers need to not only return products after use, but also purchase products that are remanufactured. However, research finds that consumers have a poor opinion of remanufactured products and are typically not prepared to adopt them (Hazen et al., 2017). The role of consumers is important in the CE, but this thesis will mainly focus on the production chain.

2.1.3 R-Loops

The 3R principle is seen as a big umbrella with big production loops. Reike et al. (2018) stated there was need for more nuance. With these nuances there is more room for conceptualizing of CE. They developed a cascading RO-hierarchy as seen in table 1. In this table they identified three main loops: short loops, medium loops and long loops.

Short loops (RO-R3) are close to the consumer and is about expanding the life span of the product. It is shown in table 1 that in the short loop there is no need for producers to intervene in the life cycle and the product does not go to waste. This can be achieved through appropriate design. This means that products are designed for a cycle of disassembly and reuse (Ghisellini, Cialani, & Ulgiati, 2016).

If the life span of the product is exceeded the product cycle moves to the middle loop. In the middle loop the function of the product is. Medium loops (R4-R6) are most interesting for businesses as they are mainly seen as business activities and is a new source of materials. The middle loop introduces three types of materials: metals, plastics and nutrients. Metals and plastic have to be designed and processed to be reused at the end of the life cycle. Used nutrients should be non-toxic and could return to their environment (Ghisellini, Cialani, & Ulgiati, 2016).

Large loops (R7-R9) can be seen as improved waste management. It is seen as the least desirable loop of production. However, resources obtained with recycling can be applied to new products that can end up in the small or middle loop (Reike et al., 2018). This loop is also seen as a low-circular strategy as the small and middle loop are a high-circular strategy (Hekkert et al, 2020)

Based on these loops, businesses can develop circular business models (CBM) and identify their products in certain loops and governments can develop specific policies to support businesses in this transition towards the CE. In section 2.3 and 2.4 it becomes clear that the EU and the Netherlands are most active in the recycling-loop and less in the small and middle loop, therefore operating in lower R-strategies.

R0 -> R9 Hierarchy of CE options

R-imperative	Description	
R0 Refuse	For consumers to buy less. Also for producers who can refuse to use specific materials or designs.	
R1 Reduce	Linked to producers, stressing the importance of concept and design cycle, e.g. less materials per unit of production (dematerialisation).	
R2 Resell, Reuse	Second consumer of a product that hardly needs any adaptation and works as good as new.	
R3 Repair	Bringing back into working order, by replacing items after minor defects. This can be done peer-to-peer or people in the vicinity.	
R4 Refurbish	Referring to large multi-component remains intact while components are replaced, resulting in an overall upgrade of the product.	
R5 Remanufacture	Referring to large multi-component product is disassembled, checked, cleaned and when necessary, replaced or repaired in an industrial process.	
R6 Re-purpose	Popular in industrial design and artistic communities. By reusing discarded goods or components adapted for another function, the material gets a new life.	
R7 Recycling	Processing of mixed streams of post-consumer products or post-consumer waste streams, including shredding, melting and other processes to capture (nearly) pure materials. Materials do not maintain any of their product structure and can be re-applied anywhere. Primary recycling occurs B2B, whereas secondary recycling takes place post municipal collection.	
R8 Recovery	Capturing energy embodied in waste, linking it to incarnation in combination with producing energy.	
R9 Re-mine	Landfill re-mining	

Table 1. Reprinted from The Circular Economy and Cascading: Towards a Framework. Campbell-Johnston, K., et al. (2020).From: https://www.sciencedirect.com/science/article/pii/S2590289X20300098

The Dutch government has already implemented the 9R's in their vision for a CE. The model in figure 2 shows how the R-ladder can be used to determine how consumed products can be re-used again (Hanemeijer et al, 2018). As seen in section 2.3.2 the Dutch CE is mostly operating in the R8-cyclus. However, in a CE the use of products will have to go towards higher R-scores aiming for R4 or higher. In that re-use-loop the value of a products remains the highest in the cycle.



Figure 2. Reprinted from "Circulaire Economie: wat we willen weten en kunnen meten". Hanemeijer et al,(2018). From: https://efro-wsk.nl/wp-content/uploads/sites/277/2018/08/pbl-2018-circulaire-economie-wat-we-willen-weten-en-kunnen-meten-2970.pdf

2.2 The transition model of the circular economy

The European and Dutch strategy behind the acceleration of the CE is based upon the X-curve of transition as seen in figure 3. This strategy is discussed in section 2.3, but the theory behind that strategy is discussed here first. This section also gives a brief explanation why Circular Breakthrough Projects can be used in this transition.

The top line shows the linear economy, and the bottom line shows the circular economy. The expected scarcity in resources has led to the situation that the linear economy is destabilizing; this means that actors are willing to change their production patterns. This ultimately leads to phasing out he linear economy (Loorbach et al, 2017). According to the EU, this will be in 2050.



Loorbach D, et al. 2017. Annu. Rev. Environ. Resour. 42:599–626

Figure 3 Reprinted from 'Staat van Transitie' from Loorbach et al. (2017). From https://drift.eur.nl/wp-content/uploads/2017/09/DRIFT-Werkdocument-Staat-van-Transitie.pdf.

On the other hand, there is the upward line of the CE. The acceleration phase means that circular initiatives are gaining more attention in policy documents and become more influential in different economic sectors. In the emergence phase the CE gains even more attention, is more implemented in several economic sectors, but is not ready to operate on a larger scale. However, several large, leading companies have the ambition to become fully circular in a few years and have the potential to change their sector with it. Lastly, the CE will have to be institutionalised and will stabilize as the replacement of the linear economy (Loorbach et al, 2017).

Furthermore, Loorbach et al. (2017) indicates that there are signals that the CE is in the acceleration phase in specific sectors in the Netherlands. For example, the concept of the CE is gaining more attention in policy instruments of ministries and municipalities. Loorbach et al. (2017) also signals in the emergence phase that interest in the CE is increasing, but does not upscale. A more in-depth approach of the status of the CE in the Netherlands is given in section 2.3.4, but these examples by Loorbach (2017) indicates that there is a gap between those phases. A Circular Breakthrough Project (CBP) can fit in this gap as it can lead by example. The next section of this thesis defines what a CBP is and how it contributes towards the acceleration of the CE, closing the gap between the acceleration phase and emergence phase.

2.3 Circular Economy in the European Union and the Netherlands

With a better understanding of the CE, the next chapter explains the framework in which the European Union (EU) and the Netherlands are operating in. This chapter discusses the policy documents of the EU and the Netherlands and the underlying theory behind this policy. Therefore this section creates the space and environment in which governments can operate.

2.3.1 Circular Economy in the European Union

Before going to the CE in the Netherlands, it is important to point out that the Netherland is part of the EU. The EU draws the framework in which member-states will have to move in their transition towards a CE. It is important to give a brief overview of their Green Deal, because it gives some context in which framework the Netherlands can operate.

The EU launched its first Circular Economy Action Plan in 2015. In December 2019 the European Commission presented the European Green Deal, the new agenda for sustainable growth and it revisited the Circular Economy Action Plan. The new Action Plan announces initiatives along the entire life cycle of products, targeting for their design, promoting circular economy processes, supporting sustainable consumption and ensure that the resources used are kept in the EU economy for as long as possible. It introduces legislative and non-legislative policy instruments targeting areas where action at the EU level brings real added value (European Commission, n.d.).

The ambition of the Green Deal is to achieve climate neutrality by 2050 by decoupling economic growth from resource use. To achieve this goal, the EU wants to accelerate the transition towards a circular growth model that gives back to the planet more than it takes, advance towards keeping its resource consumption within planetary boundaries. The first goal towards climate neutrality is to double the circular material use rate by 2030 (European Commision, n.d.).

2.3.3 Circular Breakthrough Projects

A Circular Breakthrough Project (CBP) is essentially a circular business model (CBM). A CBM is necessary for the acceleration of the transition, but what makes a CBP different than a CBM is the impact it has on its sector. A CBP can be a network of several CBM's working together and has a impact on the entire sector.

Breakthrough projects are circular, innovative projects by frontrunners in the industry, they show what is necessary for the transition towards the CE. A breakthrough project involves several actors. For example: customers, investors, experts and regulators. With this, leading enterprises in their sector become a role model and show that new business and revenue models can work. Breakthrough projects contribute to changes in regulations, market conditions, paradigms and routines. This leads to mainstreaming and up-scaling of CBM in that specific sector (Koot, 2021). A Breakthrough project has to be more than an improvement in process innovation, but it has to have impact on the entire production or supply chain (Israëls, 2021). Developing CBP's will give the regional government more knowledge about how and when support CBM's. This relates to figure 3 as a breakthrough project can push a sector from acceleration to emergence. The government will have to stimulate these projects, because otherwise these projects will not launch easily. The government has several policy instruments to support circular project in general as can be seen in section 2.6 and 2.7.

2.3.3 Implementation in the Netherlands

Based on the European Green deal, the Dutch government has embraced the CE and is aiming at developing a CE in the Netherlands by 2050 and to have a reduction of 50% of the use of raw materials by the end of 2030 (Dutch ministry of infrastructure and Water Management, 2018). The Dutch government started with accelerating the transition around 2015 with the national plan: "Nederland circulair in 2050". This means that the Netherlands will have to follow the same X-curve as seen in figure 3. Part of this plan is het Gronstoffenakkoord and five transition agendas for five economic sectors: biomass and food, construction, consumption goods, plastics and manufacturing industry (Lijzen et al., 2020). This plan is supported by several Dutch actors: Rijksoverheid (government), VNG (union of municipalities), Unie van Waterschappen (water government), Stichting Natuur en Milieu (enviromental organization), IPO (union of provinces), VNO-NCW (employers' organization), MKB-Nederland (union for SME's), FNV (Labour Union) and other NGO's have signed the national plan (Monsma, 2018). This emphasizes the importance of the transition.

Five years later, the Dutch government published the first report of the progress of the CE. To accelerate this transition, they developed several policy instruments. These instruments relate to legislation and regulations, market incentives, monitoring, knowledge and innovation, and producer responsibility. This has laid a foundation for the policy and structure to initiate the transition to a circular economy with a public-private approach (Hanemeijer et al, 2021). In the same report the authors conclude that there is an increase in circular businesses. However, most of these businesses are focused on recycling and repairing and these practices were common before there were any plans for a CE. Concluding that most businesses are aiming for lower-R strategies (Hekkert et al, 2020). Hanemeijer et al. (2021) mentions repairing, which is a R3-score and therefore should be good. However, these businesses are, for example, car garages. Hanemeijer et al. (2021) means with their definition of repairing that products move up on the ladder. For instance, instead of recycling a phone repair it to retain a higher value. Consumers usually do not buy a new car when a small part is broken. There are not many businesses that emphasize on innovation that will reduce the use of raw materials. Therefore, the Dutch economy is still heavily based on a linear economy (Hanemeijer et al, 2021).

According to MVO Nederland the Dutch economy was 14,1% sustainable in 2021. (MVO Nederland, 2021). MVO Nederland has developed the Nieuwe Economie Index (NEx) and contains seven pillars to measure the transition towards a sustainable economy, in which CE is one of the seven variables. The other six being: new welfare, real prices, transparent supply chains, inclusive entrepreneurship, green energy, biodiversity (Groenewegen et al., 2021).

As their survey turns out, the businesses with more than 50 employees are more focused on the transition than businesses who have less than 50 employees and businesses with less than 10 employees. They also conclude that Covid-19 is not accelerating the transition, nor did it delay the sustainable transition. However, Covid-19 did deepen the gap between the businesses with more than 50 employees and those who have less than 50 employees. Groenewegen et al. (2021) advise

that bigger companies can serve as role model, as it can set new sustainable values and norms when they are cooperating with smaller businesses in the supply chain. They also advise that the government should also support businesses with less 50 employees with more specific policies to help them transitioning (Groenewegen et al., 2021).

The implementation of the CE in the Netherlands has started, several actors in the civil society has agreed upon the transition in het Grondstoffenakkoord. As it turns out there is more attention for lower-R strategies and bigger businesses turns out to be driving force in the transition. Therefore, national and local Dutch governments are searching for breakthrough projects in the Netherlands.

2.3.4 Regional Government

The first paragraphs of chapter 2.3 focused mainly on the EU and the Netherlands and their goal to have a full CE by 2050 by explaining the current state of the CE in The Netherlands. The scale of these politics is known as the macro-level. Ghiselinne et al. (2016) defined three of those levels: macro level, meso level and micro level.

The micro level consists of products or companies. The meso levels consists of industrial parks and the macro level is about cities up to the global economy. The distinction between meso level and macro level is seen as vague (Ghisselinne et al., 2016). For example, cities and nations are both seen as macro level. In the Netherlands, between cities and national government there are provinces and municipalities, and they play a critical role in the transition.

The national government is important in accelerating the transition and setting goals, but, according to the ICER, the regional level is important as well. The regional level is not only a political scale, but also contains businesses and other civil societies. On a regional level it is usually easier to exchange products and services than on a national level as they seem to be more supportive in helping businesses transitioning than the national government (Hanemeijer, 2021). Therefore, the regional government is better able to support circular initiatives. However, the regional government must follow the framework that is designed by national or European governments and often uses resources of the national government.

2.3.5 Breakthrough Projects in the Netherlands

Part of the research question is the Circular Breakthrough Project (CBP). With the definition of Koot (2020) it is possible to see if there are any CBP's in the Netherlands. There were several studies that identified the first successful circular projects.

RoyalHaskoningDHV created a database that contains circular activities at local governments. RoyalHaskoningDHV analysed 1800 circular activities. They also concluded that most of this activities are based on the first phase of the transition that can be seen in figure 3. This phase mostly consist of exploration, pilots and feasibility studies (RoyalHaskoningDHV, 2020).

However, as another study points out, not all businesses employ the same activities, and these problems can differ at the different business models. There also seems to be a distinction in start-ups and established companies. (Vermunt et al, 2016). This distinction was also seen in the study of Groenewegen et al. (2021) which shows that bigger companies are more willing to adapt to the transition than start-ups. However, even a start-up nor a bigger companies have big circular projects.

According to these surveys and database there are no successful CBP's in the Netherlands yet. This is an implication for this thesis, as CBP's are part of the research question. Despite the lack of CBP's, there is still a need to create a structured approach for the local government. Therefore, it is still possible to create a model based on the Stage Gate Theory.

2.4 Circular Businesses Models

The previous section gave an overview of the concept of the CE, the implementation in the Netherlands and the phase of the transition. With the NEx it signals what businesses are best able to start the transition.

However, it did not include the transition of the businesses itself, as businesses will have to go from a linear business model to a CBM. This section contains the pilot-study of Jonker (2017). This study can be used to find criteria and barriers that can be applied to the stage gate model mentioned in the research question.

2.4.1 Circular Business Models

The transition towards CE requires new ways of entrepreneurship. Business models based on the linear economy will have to change to circular business models (CBM). A business wants to add (monetary) value to their product. This value creation is exclusive to this business, it will only sell their waste to other recycling companies. In a CE this model has to change, in a CE several businesses are operating in a network. Therefore, participating business will have to cooperate to design a closed production loop. That way, there will be a circular business model between several organizations and businesses that are dependent of each other and that includes multiple value creation (Jonker et al, 2019). In his pilot-study Jonker (2017) describes five pillars that support a circular business model: Loops, value creation, strategy, organization and the revenue model. With this model it is possible to measure a micro level how circular a project is. These pillars can be seen as dimensions of a CBM.

The first pillar is based on the principles of the CE in chapter 2.2. The core of the CE is the closing of production cycles. It is about reusing raw materials, reducing the use of raw materials and energy and the extending the life of products by making use of the R's displayed in table 1.

The second pillar is value creation. In a CBM the value creation has to move from selling the product to providing access to the product and optimizing its performance along the value chain (Lacey, 2015). For example, the case where twenty households have a power drill. This power drill is not part of a daily routine, is only used when something needs to be fixed and not all the households will have to use it at the same time. In a CBM, the business could stop selling power drills to every household, but instead they arrange convenient access to one power drill if the household will need one. The business will mainly focus on longevity, component reuse, recycling, GPS tracking for finding the nearest tool, mobile payments to simplify pick-up and drop-off. This way of thinking breaks away from the traditional view of buying products that eventually breakdown so households will have to buy a new one (Lacey, 2015). The circular value created here is that in the linear economy the use of a drill goes from R1 to R7 (Recycle) for every household. In this example, there is one drill for several households. Consumers do not buy this drill, giving the households a R0 score (Refuse). The business that leases the drill operates in R2 (Reuse) or sometimes R3 (repair), if a drill returned defect.

The third pillar is strategy. The transition towards a CBM requires a reform of traditional systems of human activity, both in the production process as the consumption process (Zhang et al., 2011). Therefore, if innovative solutions in creating multiple value creation can be found by closing loops with the participation of final consumers, the design of such a circular strategy should start from a careful assessment of the consumers' willingness to engage in and accept different innovation pathways (Borello et al, 2017).

The fourth pillar is organization. As seen in the first and second pillar, an organization must cooperate with other businesses. A CBM does not have its own organization as centre, but the network of organizations participating in the multiple value creation is the focus. This new way of organising can also be seen in the last pillar.

The last pillar is the revenue model. As seen in the first pillars the profit does not come from selling products, but in cooperating with each other in a closed production loop. This mean that the costs and benefits need to be distributed equal between participating businesses in the loop. This change in revenue model also needs new ways of financing, since that cannot be based on only the sales (Jonker, 2017).

The pillars of this pilot-study show that a CBM consists of many actors and possible innovations. The pillars behind a CBM are very useful for businesses who wants to start the transition and are also very useful for the regional governments to monitor the CE. In the conceptual model of this thesis, these pillars will be converted to wider dimensions. In section 2.9 there is a more detailed explanation, but working with wider dimension will make the conceptual model more comprehensible.

2.5 Circular Innovation Barriers

The previous section is used to explain how a linear business model can transition towards CBM. Nonetheless, as seen in figure 3, the transition has yet to start with the acceleration and is nowhere near the emergence phase. Therefore, it is important to know what barriers might slow down this acceleration. This section contains the barriers that were observed by the pilot-study of Jonker (2017). The barriers that are found will also be part of the dimensions of the conceptual model.

2.5.1 Circular Innovation Barriers

The transition towards a CE requires a lot of innovation and there are three main problems identified by the participating businesses (Jonker et al, 2017). These problems can be categorized in three main barriers:

- 1. Rules and legalisation
- 2. Lack of funding
- 3. Participating businesses are not ready

The next sub sections give a brief overview of these barriers.

2.5.2 Rules and legalisation

As seen in figure 2, the linear economy is still optimal as the CE is still in its acceleration phase. This means that legalisation and regulation is designed for the linear economy and this can hinder businesses in transitioning towards a sustainable business model (Loorbach, 2018). For a business that processes waste flows in new materials the legalisation in the Netherlands is hindering. There is not a clear definition of waste and there is no description of how this waste can be processed. This leads to a lack of innovation, since businesses are interpreting the waster rules differently and this makes it harder to experiment with innovations (Hanemeijer , 2021).

Although sometimes legislation is giving more experimental space for innovation, the local government can be a hindering authority in authorizing circular projects. Local governments seem to tend to a more risk-averse approach of circular initiatives and therefore are hesitating in issuing permits, even if the legalisation allows for a more experimental approach (Hanemeijer , 2021).

Tura et al. (2019) agrees with mentioned barriers. They think that these legal barriers are deeprooted, pointing out that industry policies still favour linear business models. The complexity of laws and regulations harm CE business, as she brings up the example of transporting waste across national boundaries is often difficult

In this section the rules and legalisation are defined as a barrier. However, rules and legalisation are designed by the government and can also be used as a policy instrument instead of a barrier. It depends on the goal of that government. Rules and legalisation are not mentioned in the pilot-study of Jonker (2019) as such, but, as Hanemeijer (2021) points out, are important in the transition. Therefore, rules and legalisation are a separate dimension in the conceptual model of this study.

2.5.3 Lack of Funding

Another hindering factor in the transition towards the CE is the lack of funding. The lack of funding can be divided in two parts. The first paragraph is the financing the business model by financial actors and the second paragraph is the revenue on the consumer side.

Financial institutions gained a lot of social pressure through the media and politics. So insurers, pension funds and the banking sector are looking for ways to finance sustainable business models, as the purpose of a company became more important the last decade. The purpose of the company is described as the value it adds to civil society. However, it is important that this purpose is connected to a green revenue model, otherwise investors might not be interested (Frusch et al., 2020).

Generally, CBM's are facing the same barriers green business models are facing, but there are some additional barriers. These barriers are: higher cost price because social costs are better discounted in the product, risks of unstable government policy and the lack of a track record (SER, 2016). If the real cost of linear products was allocated to their products, most existing businesses are not viable (Schulte, 2013).

The lack of funding is mainly a financial barrier, Jonker (2019) also focused on the financial transition of CBM. The fourth pillar is the revenue model and connecting this pillar with the lack of funding will create a financial dimension containing a barrier and criteria.

2.5.4 Regional government is not ready

The observed barriers of this pilot study do show that the regional government is not ready for the transition as the problems are mainly institutional (Jonker et al., 2017). Rules and legalization might be too strict and Jonker advocates for a more pioneering role for the government with more funding and laws that support the transition towards a CE. This leads to a situation in which circular projects cannot scale up, therefore stagnating the acceleration.

However, as the database of RoyalHaskoningDHV shows, the regional governments are starting to participate more in the development of the CE. The 1800 circular activities RoyalHaskoningDHV has analyzed, 70% of them is a regional government who is cooperating with a business. This cooperation can entail the use of several policy instruments, which are described in section 2.7.

The observation Jonker did in 2017 is outdated by the database of RoyalHaskoningDHV. This is a promising development. However, RoyalHaskoningDHV is still signaling that the transition is at the start of the acceleration.

2.6 Innovation Management

This section will discuss the system to help businesses to challenge their barrier. Due to the barriers, business is facing a gap towards their desired circular business model. To close this gap the Dutch government can use innovation management to support and facilitate businesses. This section will be elaborated on the underlying theory behind innovation management.

As seen in section 2.2 and 2.3 the CE requires new business models, but it also needs new ways of thinking about how products are used and how they are produced. This requires new innovations. The goal of innovation is to create products and services that are newer, better and more cost efficient than their previous products and services. Without innovation, economic growth will stagnate (Centraal Plan Bureau, 2020).

Innovation is based on two main principles. The first one is the known knowledge to develop a new product or service. The second one is the reward of innovation. Big innovations often require a great investment, and these investments are not made if there is not an incentive of a reward. A good economic growth requires sharable knowledge and incentives of investing (Centraal Plan Bureau, 2020). It is the role of the government to operate as an innovation manager and it will have to develop a strategy

2.6.1 Innovation system

Section 2.6 implies that innovation management is of great importance in the transition. The Planbureau van Leefomgeving (PBL) have combined innovation management with the transition towards the CE and that model can be seen in figure 4.



Figure 4 Reprinted from "Parts of a succesful innovation system", Hanemeijer et al. (2021). Retrieved from

In this wheelwork, the gears together form a system. In this system, if something changes in one gear it can have consequences for the other gears as well. According to the PBL, this means that it is not only valuable to monitor key components itself, but also the interaction between these components. (Hanemeijer, 2021. P. 136).

The PBL has developed several indicators for each component. These indicators are used to monitor the transition. However, at this time not every key component has developed its indicators (Hanemeijer, 2021. P. 136). This situation is also described in section 2.3 of this thesis. As the CE is in the acceleration-phase on the transition curve. This means that the CE is getting more attention of policy makers, but it is not as optimal as the linear economy. This makes the study of the CE abstract, but it also gives policy makers space to experiment with supporting the CE.

The development of CBM's started with the pilot-study of Jonker (2019). He also added some barriers in the process of transiting from a linear model to a CBM. These barriers are limiting the transition and that causes a gap between the actually outcome and the desired outcome. It is up to regional government to make use of innovation management to close this gap. Therefore, the government can use the innovation motor to support the transition. The gears in the gearwork can be addressed with proper policy instruments at several dimensions.

2.6.2 Gears in the Innovation Motor

Entrepreneurs: SME and corporates, play an important role in the transition. They play a crucial part in introducing and upscaling of circular initiatives. Therefore, it is important that there are enough entrepreneurs that are willing to developing scalable, circular initiatives (Hanemeijer, 2021, p. 143).

The development of knowledge is another gear in the innovation motor. This knowledge is needed for the development of innovations and thus it helps entrepreneurs and the government in accelerating the CE. This innovation is not only technological, but can also happen with business models (Hanemeijer, 2021, p. 144).

Besides the development of knowledge, it is also important to exchange the knowledge with others (Hanemeijer, 2021, p.145). The exchange of knowledge is also described in chapter 2.6.

The fourth gear is giving direction to the search process. At the start of the transition there is much uncertainty and discussion about how to address and identify problems and opportunities. This can be tackled by creating a clear vision and expectations (Hanemeijer, 2021, p. 147).

The fifth gear is Market Creation. There must be a market for circular products and resources to create a demand. A big market demand creates the certainty for entrepreneurs and investors to invest in scalable circular initiatives (Hanemeijer, 2021, p.149).

Mobilisation of financial resources is the sixth gear and is about subsidies, investments and other financial options. There must be enough financial resources to allow entrepreneurs to scale their project or invest more in their project (Hanemeijer, 2021, p. 155).

The seventh gear is Breaking the Resistance. This means that society needs to break away from the linear economy (Hanemeijer, 2021, p.155). As seen in chapter 2.3.2 the transition is based upon the X-curve in which the linear economy declines and the CE accelerates.

Coordination is the eighth and last gear. There is not a clear definition of Coordination in the report of Hanemeijer (2021), but one can argue that coordination is needed in every other gear to achieve the best results.

These gears are the fundament of policy instruments. If a policy instrument is used, then it usually has a connection with the innovation motor. These policy instruments are important for the dimensions that will be used in the conceptual model in section 2.9. However, this is an underlying theory of why regional governments should create policy instruments. The next section of this thesis describes the policy instruments more specifically.

2.7 Policy Instruments

The previous chapters were used to describe the CE and to explain what barriers businesses are facing in their transition towards the CE. As seen in chapter 2.6, the Dutch government has an innovation system to help accelerate the transition. However, it is not clear what policies the government can use to support businesses. The next chapter will discuss what these policy instruments are.

2.7.1 Policy Instruments

Jonker et al. (2017) concludes that the government is not ready for this transition yet, however the government is developing several instruments and initiatives to support the transition towards CE on European, national and regional level (Versnellingshuis Nederland Circulair, n.d.). In a letter to the parliament the responsible secretary of state acknowledges the barriers circular business models are facing. Stating that innovations strand because the lack of financing, restraining laws and the need of collaboration with several actors (Van Veldhoven, 2018). In developing policy instruments the government usually uses three types of policies: the carrot (financial), the stick (regulative) and the sermon (informational) (Serbruyns & Luyssaert, 2006. P 285).

The stick is often used to discourage behaviour. The stick wants to discourage polluting activities by internalising the environmental costs. Commonly used instruments are environmental taxes, levies, emission trading systems, progressive standards and prohibitions. A fine can be imposed on violation of the set rules (SER, 2018). The stick is not very useful for the Innovation Motor of the PBL, because it can block innovation. However, as the transition towards the CE goes to the next phase in the transition model, it will be used to push the linear economy towards the CE.

The second type is the carrot. The financial benefit tempts producers or consumers to adopt to the desired environmentally friendly behaviour. Commonly used instruments are grants, tax exemptions, tariff facilities, guarantees and loan facilities. Besides financial instruments, the carrot can also contribute of developing knowledge and stimulating innovation (SER, 2018). In the Innovation Motor the carrot has its own gear, mobilizing resources, but it can also be applied to several other gears. Therefore, the government subsidized accelerators. These organizations could cover all of the gears that are mentioned in the innovation motor or specialise on one. Some of the accelerators will be highlighted in chapter 2.7.1.

The last policy type is the sermon. By informing producers and consumers about the consequences of their purchasing and user behaviour, they are encouraged to change their behaviour towards a more socially desirable behaviour. The effectiveness of certain policies differs for each case or desired goal (SER, 2018, p. 57). The sermon also covers all of the gears of the Innovation Motor.

Usually, the three types of policies will get mixed together in one policy (SER, 2018, p. 57). For example, if there is more need of mobilizing resources the government or private parties can organise network meetings to introduce initiatives to financiers. Or initiatives can meet with each other to organise research and development.

2.7.2 Policy instruments in the innovation motor

With the innovation motor and the theory behind policy instruments explained, it is important to look at several policy instruments the regional governments already use to accelerate the innovation motor. These policy instruments are widely discussed in the literature. RoyalhaskoningDHV has conducted a research to find five types of policy instruments. These five types are based upon the carrot, the stick and the sermon, which form the base of the innovation motor and should emphasize on gears in the innovation motor. This section gives a operationalisation of the innovation motor and theory behind policy instruments.

2.7.2.1 Research

Research is often used to give guidance or to remove uncertainty. It can also be used to evaluate to measure of something works or not (RoyalHaskoningDHV, 2020). There are several types of research that can be done at several stages of the development of a circular initiative.

For the discovery phase in can be important to use a feasibility study to see if there is any interest for the initiative. It also gives data about the requirements of the product and the chance of success.

Another type of research is the market exploration. The exploration tries to find out what other market parties have to offer and is often be done before a product is purchased.

The third type of research is the evaluation. This is often done after the circular project launched or stopped to learn for the next circular project.

2.7.2.2 Business support

This policy instrument is often used when a government already has a policy or strategy drawn up in which objectives or course are laid down. Through business support and financing, a government can make a targeted contribution to these objectives or course.

2.7.2.3 Circular procurement

Circular procurement is used for several reasons. First of all to do the good for itself as a government to give an example. Circular procurement is also used to combine an innovation with a putting the company on the market (launching customer).

2.7.2.5 Network and knowledge

This type of policy instrument focuses on the exchange of knowledge and information and the bringing different parties and sectors into contact with each other. This way there can be experiences shared, learning from each other and working together to transition to a circular economy.

2.7.2.6 Rules and legalisation

This policy instrument is not used as a first step in the transition to a circular economy economics: a government must first have formulated policy and goals before this to deploy the instrument. Many regional governments do not yet have a concrete policy to be able to steer with legislation and regulations. It is often seen that circular developments conflict with existing legislation and regulations. Various regional governments undertake activities aimed at removing obstacles to existing legislation and regulations

2.7.3.7 Overview of the instruments

All of these types of policy instruments identified by RoyalHaskoningDHV are mentioned in table 2. Although these instruments are proven useful, they are not arranged for the model of this thesis. The instruments that are mentioned in table 2 are the toolbox of the regional government in which they can choose how to support circular projects.

Policy Type	Instrument	Explanation
Research	Feasibility Study	Analysis of the potential of a product, including what resources are needed
	Evaluation	Research that evaluates the outcomes of a completed project
	Market Exploration	With a market survey it is possible to discover what other parties have to offer
Business Support	Subsidy	Financial support for simulating activities that are not viable yet
	Loan	Can be used if traditional investors thinks it is too risky
	Participation	Government becomes a stake holder and co-owner
	Revolving Fund	Funds that offer loans and participation for a specific reason. The money must come back for new projects.
Circular Procurement	Launching Customer	To support a project for market intro
Network and Knowledge	Online Platform	A platform where circular projects can exchange and share their knowledge
	Networkmeeting	Meeting in which actors within or between different sectors are brought together
	Knowledge Network	Network in which several actors like government, businesses and education work together
Rules and Legalisation	Concession	Allows the project to do something, that normally is not allowed
	Exemption	Necessary for operating within the law

 the law

 Table 2. Adjusted from "De 22 beste regionale voorbeelden voor een circulaire ecnomie", RoyalHaskoningDHV (2020).

 Retrieved from https://www.royalhaskoningdhv.com/nl-nl/nederland/nieuws/nieuwsberichten/de-22-beste-regionale-voorbeelden-voor-een-circulaire-economie/10975

2.7.3 Accelerators

Regional governments are supporting businesses in their circular transition by founding accelerators. These accelerators are a cooperation between several actors. Regional actors usually have better overview of raw material flows and have close contact with each other, at least more than the national government. That way it is easier for circular initiatives to start initives. Regional governments usually facilitate this acceleration or pay a circular case manager (Hanemeijer, 2021, p. 36). This way of cooperation fits in the innovation system described in chapter 2.6.2.

There are many accelerators of different scale. Some accelerators are covering all of the themes in Het Grondstoffen Akkoord, other focus on mainly one theme. A accelerator' main advantage is that it has knowledge about all the policy instruments that can be used, therefore it is very useful for businesses to use them as a guide in their transition.

Het Versnellingshuis is a collaboration between circular entrepreneurs, the government, civil society and financers. The main goal of Het Versnellingshuis is to support circular entrepreneurs in taking their business case to the next step (Het Groene Brein, n.d.). Entrepreneurs can ask questions about knowledge, financing and laws and regulations. They also host a website in which circular businesses can come in touch with each other and helping each other building a network. Another aspect of het Versnellingshuis is the possibility for entrepreneurs is direct help from a case manager. This person can help the business tackle barriers they are facing in their own transition towards a CBM (Versnellingshuis Nederland Circulair, n.d.). Het Versnellingshuis seems to be a good solution to the difficulties Jonker et al. (2017) identifies as it knows all types of policies and can find a solution according to their problem.

Another accelerator is the Innovation Quarter. Innovation Quarter is the regional economic development agency for the Province of Zuid-Holland. Their goal is to strengthen the regional economic structure by stimulating the innovation potential of his region. In close collaboration with all major corporations and many SME's, educational and research institutes as well as government organizations, we align the efforts required to design a brighter tomorrow (Innovation Quarter, z.d.). The main difference between Innovation Quarter and Het Versnellingshuis is that Innovation Quarter actually have budget to invest in circular initiatives.

The last accelerator of this study is Circulair Friesland. Circulair Friesland differs from Innovation Quarter and Het Versnellingshuis, because the regional government is not involved. They work together with regional governments, but the organization is founded by local entrepreneurs. Their budget is created with the contribution of participating members (Circulair Friesland, z.d.).

Accelerators can operate in two ways. It can be a policy instrument itself, as it can financially support circular projects. However, they can also operate in the role of the regional government. They can even connect circular projects with other accelerators. For this study, the accelerator is an operator and therefore can use policy instruments to support circular projects.

2.8 Stage Gate Model

As seen in section 2.2 and 2.3 the transition towards a CE requires innovation of production and businesses that are willing to innovate are facing several barriers. To funnel this business transitions there is the approach of project management developed by Robert Cooper (1990) as the Stage-Gate System. This system is a model that can be used to move a new product from idea to launch. As seen in Figure 3 there are five stages of development and there are five gates.



Figure 5 Reprinted from "Stage-Gate Systems: A New Tool for Managing New Products" Cooper R., (1990). Retrieved from https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.474.1777&rep=rep1&type=pdf

At each gate there is a Go or Kill decision point that decides if the project goes to the next stage with a go or has to be reworked with a kill. Projects at a stage can only take the next step when they meet several criteria. This way is a way of risk mitigating as resources, like investments, will support promising projects that passed certain gates. However, this approach is very top-down (Cooper & Sommer, 2016) and figure 5 may be too specific for a government that wants to support circular initiatives as it focusses on the development of one product.

However, as seen in figure 6, it is possible to create a more simplified approach of the stage gate model. Figure 4 is an innovation funnel and it can be seen that the amount of initiatives is decreasing as several projects does not meet the requirements to go to the next phase. In these model there are three main phases (Koen, 2011):

- 1. Ideas
- 2. Development
- 3. Market Intro

Phase 1 is the idea-phase, and this means that an idea must be developed to a more commercial concept. There is also the possibility to cluster ideas, creating a more potential initiative. To go to the next phase the commercial relevance has to be underpinned (Koen, 2011).



Figure 6 Adjusted from "Inzicht in Innovatie Management", Koen C., (2011) Retrieved from: https://www.tias.edu/docs/default-source/Kennisartikelen/carla-koen----inzicht-in-innovatie.pdf

In the second phase the initiative will have to develop to a business model. In this phase the feasibility of the initiative will be tested. This contains the feasibility of the logistics, productions and also the impact on the environment. Eventually, this leads to a prototype or experiment with the initiative (Koen, 2011).

In the last phase the initiative will be released on the market. In this phase there is not only a need to invest in the initiative, there is also a need of a good marketing strategy for customer acquisition (Koen, 2011).

The strengths of Stage-Gate Model is that all steps and requirements are known before the start of the execution. It assumes that if a stage is completed there is no need to revisit that stage (Salameh, 2014). The feedback that is generated in figure 6 can be used for coming circular projects. This feedback is a result of using the conceptual model. Criteria and policy instruments can change over time and might need some adjustment if the transitions starts accelerating.

2.9 Conceptual Model

2.9.1 Phases in the model

Figure 7 is the conclusion of the theoretical framework. The design of this innovation funnel is discussed in section 2.8 and figure 6. However, the demonstration gate is added. This is because the step between development and market intro is much larger in project management and there might be significant differences between criteria used for development and demonstration.

The discovery phase is a phase in which circular projects consist of ideas. It can contain ideas about circular products or problems that could be solved.

If a circular idea meets the criteria of the development phase it moves to the development phase and can be seen as a project. In this phase the circular project is exploring the possibilities of cooperation with other actors and the creation of CBM's.

The third phase is the demonstration phase, this phase is added to the conceptual model in comparison with figure 6. This is because the gap between development phase and demonstration phase. The demonstration phase is more focused on the operation of a circular project, as the development phase is more focused on developing a CBM.

The last step is market intro, this means that the circular project has had a successful demonstration and is ready to release.

2.9.2 Dimensions in the model

The model also shows the following four dimensions:

- Legal
- Financial
- Organization
- Product

Each dimension consist of three indicators: barriers, criteria and policy instruments. However, the barriers are not shown in the conceptual model, but they are often a source of policy instruments and criteria. Therefore, it is important to understand what those barriers are and they part of the analysis. In this model, the criteria will have to be met before a project can go to the next phase. The policy instruments that are shown in the model are available at said phase in the Stage Gate Model.

The decision to use these four dimensions is based on the theoretical framework. Most barriers, criteria and policy instruments are focused on one dimension. They are operationalized individually, but the four dimension must reach the phase at the same time. Policy instruments might influence other dimensions as well.

The criteria in the model will be used to decide if a circular project can go to the next phase. For example, an idea in the discovery phase will have to meet the criteria to go to the phase of development. Therefore, criteria can be used to select circular projects, but the policy instruments is the support of a circular project.

Figure 7 is abstract and it is the goal of this thesis to complete the model. In a complete model the policy instruments and criteria are split in actual policy instruments and criteria. These policy instruments and criteria are found by interviewing actors who are involved in circular projects. Therefore, it the most important sub questions that generate input for the model are:

- What are the current barriers for businesses that are developing and implementing circular business models?
- What policy instruments does the Dutch government already use in supporting circular initiatives?
- What policy instruments where successful at other circular initiatives in overcoming these barriers?
2.9.3 Conceptual Model



Figure 7 Conceptual Model (Own work)

Chapter 3. Methodology

Van Thiel (2014) states there are three steps during the development of a research design. These steps are research strategy, research method and research technique. However, these are often confused with each other. Research strategy can be seen as the main outline of the research, while research method is a description of the methods that will be used. The data collection describes which techniques will be used for the analysis of data.

3.1 Research Strategy

3.1.1 Research Philosophy

To start the design of a research it is important to know the author's role in the research. This position is called a research paradigm and is defined by ontology, epistemology and methodology. Ontology is about what reality is and what can be known about it. Epistemology is about the relation between the researcher and that what is researched. Methodology is about the methods that can be used to observe this reality (Guba & Lincoln, 1994). The aim of this study is to create a structured approach for governments in supporting circular projects in their transition towards CE. This means there is human involvement with different actor and different observations of the phenomenon. Therefore, this study will use qualitive data and its paradigm can be seen as post-positivist. The post-positivist paradigm assumes that reality exist but cannot objectively be observed. To observe the phenomenon the researcher will have to use critical realism in which he will have to use several sources and methods to gather the most objective knowledge (Guba & Lincoln, 1994).

3.1.2 Research Design

Research can be conducted in a qualitative way or quantitative way. Both ways use different methods and data collection to answer the research question. Quantitative research is based on collecting numerical data and analysing this data with the use of statistics to test hypothesis. Qualitative research is based on language and interpretations of meanings, so the data collection is often based on human involvement and theory development (Walliman, 2006, p. 2).

There are several reasons that a qualitative approach is preferred instead of a quantitative approach, as this study is mostly explorative (Creswell, 2003). Sarantakos (2005) states that exploratory studies can be used to generate new ideas and theories that could operationalise essential concepts. As this thesis connects several theories and methods it creates a new model that is explorative.

Furthermore, this study will consist of several steps, as seen in figure 8. This means that this study follows six steps in a set order. The first step of this study is about defining the dimensions in the Stage Gate Model that are needed for the transition towards the CE. This will be based on a literature review study. These results result in an innovation funnel, which is the conceptual model.

The conceptual model will be used for the interviews, as it will be discussed during the interviews. These interviews are with several actors in the CE. Based upon the analysis of the seven interviews and the outcomes of the literature review, the conceptual model will be completed with policy instruments and criteria at the several stages of the model. The completed model will be used for the two interviews in S4. During this last round of interviews the completed model will be discussed with actors who are involved discission making around circular projects. Based upon their experiences they can give feedback on the completed model and adjust policy instruments and criteria. This results in the final model. Based upon the final model, conclusions can be made and advice can be given.

The conclusion is S5 and will be based upon the outcomes of the final model. This conclusion eventually leads to an advice for the government.



Figure 8 Research Design (Own Work)

3.2 Data Collection

3.2.1 Review Study

A review study is a meta-analysis of existing sources. The findings of earlier studies are gathered to create new insights and conclusions (Van Thiel, 2014, p.187). The theoretical framework of this thesis is based on two main concepts: Circular Economy, Stage Gate Model. This resulted in the conceptual model seen in section 2.9. There is a lack of knowledge in what extent the Stage Gate Model can be used by the government for supporting circular projects and project management. However, there are many studies that observed the several barriers companies are facing while transitioning to a circular business model and there are also studies who identified successful policies the government can take to support the transition.

For this review study there are several databases that can be used. There is the online database of Google Scholar, the university library of the Radboud University and the internal and external documents of sustainability consultant Royal HaskoningDHV. Royal Haskoning DHV conducted a study that shows there are around 1.500 circular businesses initiatives and 2.000 circular initiatives at decentralized authorities that started in 2020 (Royal HaskoningDHV, 2020). This source of data can be used for a review study. The conclusions of this desk review can be used to adjust the conceptual model for the second phase of this research.

3.2.2 Observation

Part of this thesis is the internship at Royal HaskoningDHV. Therefore, the researcher can intentionally and unintentionally use his own observations and interpretations to use for certain conclusion and results. Doing an internship means that the observation will be a participant observation and that there is much interaction between the researcher and the subject (Van Thiel, 2014). The contact the researcher has during his internship also results in possible respondents for interviews as a second method of data collection.

3.2.3 Interviews

Part of a case study is the interview, interviews are the main source of data collection in S2 and S3. In an interview the researcher gathers information by questioning respondents, for example employees and participants. An interview can be open or structured or the in between: a semi-structured interview. In a semi-structured interview, the researcher has more flexibility since he can ask supplementary questions to gain a better understanding. The downside of the semi-structured interview is that the collected data can differ each interview since the supplementary question can differ each interview and this can compromise the reliability (Van Thiel, 2014).

For this study, there will be several semi-structured interviews. Based upon the review study, four dimension are created. These dimensions consist of criteria and policy instruments and they will be discussed and added to the conceptual model. By doing interviews with several actors in the CE, like consultants and policy makers it can become clear what kind of policy businesses will need from the government and what the government is expecting from circular projects.

3.2.4. Respondent Selection

The interviews of S2 are based upon the conceptual model. The conceptual model is very abstract and the experience of the respondents is needed to create a more complete model. There are nine respondents for this interviews. Seven of them are used in S2 (R1-7) and two of them will be are in S3 (R8 and 9).

It is important in S2 to have a diversity in respondents, as that will give several perspectives on the model. Respondent 1 and 2 work for RoyalHaskoningDHV as a senior consultant in the CE. This means that they have great experience with circular projects, finished and unfinished. They are also experienced with all the four dimensions of the conceptual model.

Respondent 3 works for Innovation Quarter. With her experience as a business developer, she decides if business models are ready for investments and she can help businesses to create a business model that works. Therefore, she can have a great contribution to the financial and organizational dimension.

Respondent 4 works as a project manager for the regional government. He also defined the CBP in section 2.4.2. He can give the perspective of the regional government on the conceptual model. That perspective can differ from other respondents, as he needs to achieve the goals of government. The other respondents are more focused on creating successful circular projects.

Respondent 5 works as an innovation manager at Royal HaskoningDHV. He is experienced with innovation funnels like to one in the conceptual model. He did work on sustainable projects, but his expertise in innovation management can help to create a better model.

Respondent 6 works as case manager for Het Versnellinghuis. Therefore, she connects circular projects with the government. In this role she observed several barriers and she also helps circular project in their development. She has a good view on all the dimension of the conceptual model

Respondent 7 works a business developer at Friesland Circulair! He helps circular projects the same way respondent 6 does. However, Friesland Circulair! mainly connects circular projects with other market parties instead of the government. He also has a good view on all the dimensions of the conceptual model.

Respondent 8 and 9 both work for organizations that are supporting circular projects. They have a lot of experience with how to support circular projects and how to bring in to the next phase. Therefore, they are very useful to validate the model.

The set of respondents consist of several different actors. However, there are no circular businesses included. There are two reasons for their absence. The first reason is the lack of CBP's. There was not found any during the literature review and during the internship. If there was a successful CBP, then they should be found more easily.

The second reason is that smaller circular projects do exist and are successful, but they are just one sample. All of the interviewed respondents, except 5, had worked on several circular projects. This means that their experience consist of many samples and that gives more input during the interviews.

Respondent	Date	Name	Function
Respondent 1	6-7-2021	Albert Bakker	Senior Consultant Circular
			Economy at
			RoyalHaskoningDHV
Respondent 2	7-7-2021	Paul Mul	Consultant/manager
			Circular Economy at
			RoyalhaskoningDHV
Respondent 3	18-8-2021	Angelique	Business developer at
		Erkenbosch	Innovation Quarter
Respondent 4	16-8-2021	Hans Koot	Project Manager at
			Provincie Zuid-Holland
Respondent 5	18-7-2021	Sem Boersma	Innovation Manager at
			RoyalHaskoningDHV
Respondent 6	24-8-2021	Mara Haverkort	Case Manager at Het
			Versnellingshuis
Respondent 7	20-9-2021	Niels Boersma	Business developer at
			Friesland Circulair!
Respondent 8	20-10-2021	Stephan Roos	Project Manager at
			RIjkswaterstaat
Respondent 9	29-10-2021	Carolien Huisman-	Senior Consultant at
		Zilverentant	RoyalhaskoningDHV
Respondent 10			

Table 3 Overview of respondents

3.3 Data Analysis

To analyze the data from interviews, it is necessary to use a transcript. A transcript gives a written text of the entire interview, this can be verbatim or literal. In a literal transcript every 'uh' and 'euh' is also included, together with interactions like laughing during the interview. A transcript that is verbatim does not include these additional interactions during interviews to make the transcript more readable (Van Thiel, 2014). All the interviews that were held are literal, as recreates the atmosphere around the interview the best.

After transcribing the interviews, the next step is to code the data by analyzing all the data in Atlas.TI. The interviews will be coded on the four dimensions in the conceptual model.

This study will use Template Analysis. Template Analysis is a structured approach that emphasizes on hierarchical coding and comparing patterns. During the coding there is a coding template based upon the set of data. This template can be reapplied, revisited and refined during the analysis (King & Brooks, 2015). This connects with an semi-structured interview, because Template analysis balances between structure and flexibility.

After the first seven interviews, the conceptual model has transformed to the first template. Each dimension in the template consist of policy instruments and criteria, however the template is based upon seven separate interviews. Which means that the input of respondent 1 is not used in the interview with respondent 2.

The template is discussed with the last two respondents to validate the model and to see if they agree with the placement of criteria and policy instruments. This second template will form the base of the conclusion.

3.4 Validity and reliability

3.4.1 Validity

There are two forms of validity, internal and external. Good internal validity means that the researcher measured what he wanted to measure. In other words, is the theoretical construct adequately operationalized and can this operationalized construct solely be used for the research question? If these measurement instruments can be applied for other theoretical constructs this can lead to confusion (Van Thiel, 2014, p. 49). To strengthen the validity, a researcher can use method triangulation. Method triangulation means that researcher is using more than one method to gather his data, resulting in a double check of the gathered data (Van Thiel, 2014, p. 52). External validity describes in what extent the study can be generalized, this is more important for quantitative research than qualitive research (Van Thiel, 2014, p. 49).

In this study, the theoretical construct is based upon an literature review to see what the CE in the Netherlands is built upon, what it means and how this can be applied to a Stage Gate Model. The first round of interviews is with consultants and other specialist in the field to optimize the conceptual model and guarantee the use of method triangulation.

The external validity is guaranteed by the selection of respondents. The respondents that are used for this study form a diverse group of actors involved in the CE. The respondents are experienced with a lot of circular projects.

3.4.2 Reliability

Reliability of a study means that the study is accurate and that there is consistency in which the variables are being measured. A consistent study means that it is repeatable and that the outcomes are the same. This is harder to achieve in qualitative research, as respondents can change their perspective overtime (Van Thiel, 2014, p. 48).

To make this study reliable, every step in the research is documented and discussed in the methodology. Furthermore, the collected data is stored and transcribed, so it is easy for other to trace back the logic this study has followed.

Chapter 4. Analysis S2

This section is the analysis of the first rounds of interviews. In the conceptual model there were 4 dimensions identified Legal, Financial, Organization and Product. These dimensions are described in the next sub-sections and are based upon the barriers, criteria and policy instruments. The sub-section end with a table to summarize the finding. The outcomes of the analysis will result in a template of the conceptual mode based upon the tables. All interviews started with the conceptual and all dimensions were discussed from left to right. The barriers are discussed, but there is no room for the barriers in the first template (figure 9). Barriers could often lead to criteria or policy instruments.

4.1 Legal Dimension

4.1.1 Legal Barriers

The most discussed topic of the legal barrier is the waste stream. The use of this secondary products is often bound to strict regulation as it is labeled as waste instead of raw material. Respondent 6 states that these waste streams often have a special status and you cannot use it easily. This is also underpinned by respondent 6 who mentioned that he often meets parties who want to retrieve a valuable, renewable resource from waste water, but is due to legalization it is not allowed.

Respondent 2 also points out that most projects need a certification and that it takes a lot of investment and time to complete that process, without the certainty that the project will get a green light. This creates more risk for circular initiatives, although it requires a lot of additional investment. This is a barrier that occurs when a circular project goes to the development-phase.

Respondent 7 gives an example of how restraining legalization works in the construction sector. He stated the reason for this as follows: "And certainly in the construction industry, certain laws and regulations are attached that still hinder things for circular solutions. Certain obligations how to build. And I think that's still a tricky one. I see some problems especially in that corner."

The last barrier has to do with the scalability of certain projects. According to respondent 6, sometimes circular initiatives are tolerated. This means that a circular initiative can operate in violation with laws and regulations. However, this prevents a circular initiative to scale up or professionalize, as it is uncertain if it will still be allowed.

4.1.2 Legal Criteria

Before going to circular criteria specifically, respondent 4 came up with several criteria. He states that the project must be registered at the Chamber of Commerce in some way. This criterion is not specific for circular projects but is a more general condition. These general criteria are important as well and therefore included in the criteria list. This criteria will be applied to the development phase as it will be used when an idea gets more serious.

The barrier of strict regulation of waste streams can be used as a criterion, because it also gives an indication of what legal problems a circular project might face. According to respondent 5 it is

important that projects have an awareness of legalization that might be a barrier. This is underpinned by respondent 2, he states that: *"but if it is all new to you, for example you have never had anything to do with waste, then you just think I just do something with it, and then you only come into contact with it much later if you really want to do something you shouldn't."* This criteria is best used in the discovery-phase, because the circular project only exist on paper in this phase.

4.1.3 Legal Policy Instruments

In section 2.7.2 it became clear that the regional government has two policy instruments to support circular projects. The concession or the exemption, both instruments work in the same way as it allows to project to bypass regulation. This criteria starts in the development phase, because the circular projects can start with pilots in the real world.

A instrument that was not found in section 2.7.2 is the legal counter of the regional government, where circular projects can ask their legal questions. The idea behind the legal counter is that the government can answer difficult question the circular project. Although respondent 7 supports these counters, he warns that these counters often are not flexible and often stay close to the law. These counters can help circular projects in their discovery-phase, but can also help circular projects with exemptions and concessions.

Legal	Policy Instrument	Criteria	Barrier
Discovery	 Legal Counter 	 Awareness of legalization 	 Secondary products bound to strict regulation
Development	Legal CounterExemptionConcession	 registered at the Chamber of Commerce 	 Scalability of projects Certification of the project
Demonstration	ExemptionConcession		
Market-Intro			

Table 4 Legal Dimension split in Policy Instrument, Criteria and Barrier (Own Work)

4.2 Financial Dimension

4.2.1 Financial Barriers

During the interviews with the respondents, it appears that the financial dimension is heavily linked with the business case and that this business case grows during the development of the project. Respondent 2 described this development as follows: "at the beginning you only need to have an indication of I need about so much money, I can get that from those parties, but at a certain point you also have to recruit those parties to get that money and that can be in the form of equity capital, loan capital, participations, in various ways that can be..."

There are several financial barriers in circular projects. Respondent 2 states that it is hard to create a sales market for a circular project and that can cause uncertainty for a circular project, making it less attractive for potential investors.

Respondent 3 also states that entrepreneurs are unexperienced and have a different mindset: "you often experience in the field of circular economy that the entrepreneur is not really an entrepreneur. That sometimes it is rather on' we're going to save the world' then we're going to set up a new company." Without having a clear idea of how to develop a business case, investors would not invest in projects. This is a barrier in creating a CBM and therefore fits in the discovery phase.

The third barrier are the cost of developing prototypes or plants, according to respondent 3 these costs can take up millions and they increase by phase. According to respondent 3, the cost of developing a demo plant or prototype is expensive and the costs increase as the project goes to the next phase. Demonstrating a prototype of a plant fits in the demonstration phase.

The last barrier is the scalability of the project. Respondent 5 states that the first prototype might be expensive and return on investment might not feasible. However, when it is produced at a larger scale it might be more feasible. He concludes that that makes a calculated business case so important. Testing and creating prototypes is part of the development phase, but it is important to upscale the pilot, therefore it is placed in the development phase.

4.2.2 Financial Criteria

Every respondent emphasizes the importance of the business model. Respondent 2 describes that importance of a complete business model grows at each phase. The growing importance is underpinned by respondent 5, as he states that in the first phase it is important to have an indication.

Respondent 2 thinks that it is enough to have an indication of the business model in the discovery phase. Going to the development-phase, it is more important to have a better business model. With better calculations of the business model. Therefore, the start of a CBM starts in the discovery-phase, but the CBM needs to be more complete when it goes to the development-phase.

Respondent 3 says that she, as an investor, does not go further than the development-phase as she expects that the demonstration-phase needs bigger investments, and she thinks that there are better alternatives available for the project. She mentions that her organizations is not involved in those bigger investments. This is validated by respondent 2 as he states: "but at a certain point you also

have to recruit those parties in order to get that money eh and, and that can be in the form of equity, loan capital, participations, in various ways." This means that accelerators often do not have the financial funds that are needed to support circular projects in the development phase. As they cannot fund it themselves, an accelerator can link circular projects with bigger investors as part of their function.

4.2.3 Financial Policy Instruments

There are several policy instruments the government can use in the financial dimension as seen in section 2.7.2. Respondent 3 and respondent 7 both offer network- or knowledge meetings to help project design their business case in the discovery phase. However, these kind of meetings can be applied to all dimension. In the financial dimension it is more important to understand what instruments circular projects can use to fund their project.

Respondent 3 organizes a knowledge meeting for initiatives. She organizes an investor readiness program and a market readiness program in which entrepreneurs face difficult question about their circular project and how the project is going to make profit. The same thing is organized by respondent 6 in which a case manager helps an entrepreneur to bring his project further into development.

Their first financial policy instrument is the revolving fund. According to respondent 3, a revolving fund is a fund that eventually pay for itself. Respondent 3 and 1 both came up with these funds. Respondent 3 states that she uses public revolving funds to fund a circular business case that might be too speculative for institutional investors. However, respondent 1 warns for revolving funds being too ambitious: *"Then you're bulking up with money, but you are not getting it invested in anything because nobody can meet your demands."*

A second instrument are the subsidies. Respondent 3 uses subsidies to make certain business cases come through. Respondent 6 also works with subsidies as he states there are a lot of subsidies to stimulate the CE.

The third policy instrument is a guarantee that it buys the product of the project. Respondent 2 gives as a reason for a guarantee: "*it can be difficult to get people to do very early in such a process that they give a guarantee that they will but the product and that is often very nice.*"

The last policy instrument is the Launching Customer. In the theoretical framework it was mentioned that the government can function as one. However, respondent 7 proves that the government is not the only one that can be a launching customer. He came with the following example: *"And what we have created now is at least one contractor has said, despite the fact that it is not yet grown here etcetera "I'm going, the upcoming project I'm just going to apply it in 50 homes"*. Respondent 5 also says that she, as an accelerator, often tries to connect circular projects with potential Launching Customers.

All of the financial policy instruments are placed in the development phase. This might have to do with the costs in the demonstration phase, these can be too high for involved respondents to support the circular project in that phase.

Financial	Policy Instrument	Criteria	Barrier
Discovery	 Network- Knowledge meetings 	 Indication of the Business Model 	 Inexperience of the entrepreneur
Development	 Revolving Funds Subsidy Loan Network- Knowledge meetings Launching Customer Guarantee 	 Complete Business Model 	 Scalability of the project uncertainty about the sales market
Demonstration			 The cost of developing a prototype/plant
Market-Intro	ion culit in Policy Instrument Criter	in and Parrier (Own Mark)	

 Table 5 Financial Dimension split in Policy Instrument, Criteria and Barrier (Own Work)

4.3 Organizational Dimension

4.3.1. Organizational Barriers

The main barrier of the organizational barriers is cooperation in the supply chain. Respondent 2 states that the more actors are involved, the harder it gets to be successful. He says that businesses rather keep the knowledge for themselves instead of sharing them with others. Respondent 6 also thinks that is one of the harder things to achieve for the CE, describing both the challenge as the barrier: *"I really see that often it is said that you have to work together and that should also be the case in the circular economy, because you have to use each other's raw materials and each other's resources, but that is also a very big barrier, because you become dependent on each other and as a start-up you just want to accelerate instead of slowing down."*

Respondent 6 also distinguishes start-ups and bigger corporates in the supply chain, as big corporates have much more impact on the supply chain than a start-up. This could lead to a situation that a big corporate declines a circular initiative as it could harm their own position. This shows that it can be hard to align all participating businesses to the same goal in the supply chain or even internal operations.

4.3.2 Organizational Criteria'

Collaboration in the chain can be a barrier and this can result in risks for other partners in the chain. Therefore, respondent 1 advocates for some form of a risk management plan. This plan should contain the expected risk in the supply chain and how to handle with them, if it occurs. Respondent 2 thinks that this should be organized by using contracts and guarantees.

Respondent 3 thinks that new project must fit with other, established, local supply chains. This means that her organization does not support initiatives that are completely new to the region. Their reason is that space is scarce and that they want to innovate existing supply chains. As she operates in the province of Zuid-Holland, she gave the example of the textile industry. She thinks that there is a low chance of investing in this sector, because it is not active in Zuid-Holland. This is a criteria for the circular ideas in Zuid-Holland and therefore is placed in the discovery phase.

Respondent 5 states that scalability is of great importance, as other companies could adopt to the new standard. This is underpinned by respondent 4 as he thinks that scalability is important as well. The scalability is also mentioned in the financial and legal dimension.

Furthermore, respondent 4 adds that the project must have impact on the social-economic side and therefore must be defined as a substantial change. He thinks the project should not be a small improvement of a technique and that the knowledge that is gained must freely be accessible.

4.3.3. Organizational Policy Instruments

To stimulate the collaboration in the chain, respondent 4 organizes knowledge and network meetings. Another instrument respondent 4 uses are case managers. These case managers are not paid by the circular project, but with funds from the accelerator.

Respondent 3 organizes an investor readiness program and a market readiness program. According to her in these programs the following is being done: *"Circular project really look the mirror to them and put them to the test. Who is your customer anyway? Who is going to pay for your product?"* Respondent 6 organizes the same meeting, stating that they bring an circular project to a phase that a Minimum Viable Product can be produced. This is a policy instrument that can help a circular idea to the development phase.

Another kind of meeting respondent 6 wants to organize is a round table meeting. She describes the content of round table meeting as follows: *"We can organize a round table with the sector, so we bring all kinds of partners together, then we're going to look from ok what is the reason or what yes that this problem occurs and why is there no other way and are what are the solutions for this."*

Accelerators is mentioned as a policy instrument in this table as they support circular initiatives and can help the organization behind the circular project to improve. However, accelerators can be applied at each table. They are placed in this table, as the organization behind the circular projects often asks them for help.

The accelerators also came up with several types of network and knowledge meetings. However, all those different types have the same goal as general policy instrument.

Organizational	Policy Instrument	Criteria	Barrier
Discovery	 Network/Knowledge meetings 	 Fit with local supply chains Scalability Substantial Change 	 the inexperience of the entrepreneur Partners do not cooperate
Development	 Accelerators Network/Knowledge meetings 	 Risk management plan Contracts & guarantees 	
		 Gained Knowledge accessible 	
Demonstration			
Market-Intro		 Evaluation 	

Table 6. Organizational Dimension split in Policy Instrument, Criteria and Barrier (Own Work)

4.4 Product Dimension 4.4.1 Product Barriers

There are several product barriers. First of all, it is the definition of the CE. Respondent 6 states that if a product is more circular than an alternative, it can already be called circular. She questioned if that is the circularity governments is looking for.

The main issue is that a circular product will have to compete with a linear product, which is always cheaper according to the literature. Respondent 7 states that circular products are often seen as a premium products and so is their pricing. There are methods to price product differently. For example, respondent 1 thinks that the True Pricing Method can be used for pricing, but that it is not yet used in the linear economy. A True Pricing Method calculates the costs of a product different, as it also take the impact on the environment in account.

Respondent 3 states that circular projects often know how to name the benefits for society but not the benefits for their customer. Respondent 6 underpins this by saying that: *"is the reason that they come to us because it is indeed difficult to find the right parties or is the reason that they come to us because they actually do not have a good product and that it is therefore difficult."*

4.4.2 Product Criteria

Respondent 2 expects that product must in any case meet a number of circular criteria to be determined. He mentions that a product must have something to do with a R-score and something in terms of materials. Respondent 4 thinks it is important that it is clear what raw materials are saved, therefore adding that a higher position on the R-ladder is often desired. The place on the R-ladder should be discussed in the discovery phase.

Scalability is often mentioned during this analysis and is also important for the product dimension. To test scalability respondent 5 states that there must be a Minimum Viable Product. This product can be used to show it to the market. The Minimum Viable Product is the result of the development phase and therefore it is placed there.

Respondent 3 adds that intellectual property is also important. This is important to her as she invest with a revolving fund, stating that: *"if there is no intellectual property, then the neighbour can also do it tomorrow. That is just a lot of trouble."* However, intellectual property fits better in the legal property as it has to do with rules and legalization.

Respondent 6 adds that it is also important to test the feasibility of a product. This can be in the development phase, but can also be applied in the discovery phase. This study is used to see if there is market potential.

4.4.3 Product Policy Instruments

Respondent 4 and 5 both mentions the tender as a policy instrument. The tender can contain several criteria for the project, therefore stimulating the entrepreneurs to fit the tender. However, respondent 5 states that the criteria of the tender should be low threshold. If a tender is too strict, businesses are not participating.

Product	Policy Instrument	Criteria	Barrier
Discovery	• Tender	 Which step on the R-ladder 	 the inexperience of the entrepreneur
Development	• Tender	 Intellectual Property Developed Minimum 	
		Viable Product	
Demonstration			
Development Demonstration Market-Intro	• Tender	 Intellectual Property Developed Minimum Viable Product 	entrepren

Table 7. Product Dimension split in Policy Instrument, Criteria and Barrier (Own Work)

4.5 Results of S2

The results of the S2 is displayed in figure 9. Every table mentioned in section 4 is integrated in the conceptual model. The orange boxes in the model are the criteria and can be seen as the gates of the model. The blue boxes are the policy instruments and can be seen as the support tools. The barriers that are discussed during the interviews cannot be included in figure 8. Barriers have an impact on the development of circular projects and are used for developing policy instrument, but they do not directly have influence on the model itself. However, it still is important to know what barriers there are.



Chapter 5. Analysis S4

The results of section 4 came together in figure 9. The figure contains several policy instruments and criteria that can be used at the different stages of the conceptual model. This is the first template of the Template Analysis.

Template Analysis can be redefined or readjusted with the input of new respondents. This input is S4 of this study, the two interviews with respondent 8 and 9. The interview with these respondents is based upon figure 8 and every dimension was discussed. They had the opportunity to move criteria and policy instruments if they could, if they could argue it was better for the template.

5.1 Legal Dimension

A policy instrument in figure 10 is the exemption or concession. Respondent 8 states that an exemption in the demonstration-phase is often not desirable, as it is officially still illegal. If a project is dependent of the tolerance of the local government, than it is not attractive for investors to invest in the circular project. He states that in a demonstration phase there must be a regular permit application.

Respondent 9 adds that the government already implemented some Green Deals, stating that: *"Green Deals were specifically intended to address restrictive laws and regulations and, for example, to temporarily avoid them in the form of field labs."* Field labs can be used to test circular project as a pilot, but are not specifically designed for the legal dimension. Field labs are often used in the product dimension and have an exemption.

Another criterion in the model is the intellectual property. Respondent 9 strongly advocates against the inclusion of intellectual property in the model. She states that intellectual property is something of the linear economy and its competitiveness. She thinks there must be another way to secure business interests, but that can also be done in a different way than protecting intellectual property.

Respondent 8 also adds that intellectual property is often part of the discussion, as Rijkswaterstaat often owns the resource stream and is product owner, but does not convert it to new products. This shows that intellectual property can also be a barrier instead of a criteria. The producer that processes the resource stream of Rijkswaterstaat must have their intellectual property to do so.

There is a much discussion about intellectual property. Respondent 8 and 3 are arguing that it is needed if the circular projects needs funding. However, respondent 9 thinks that it is a remnant of the linear economy. The example that respondent 8 shows that the intellectual property is a barrier for Rijkswaterstaat. Therefore, the intellectual property is removed in the final template.

5.2 Financial Dimension

In the discussion about the financial dimension, most of the policy instruments mentioned are linked to the status of the business case. In figure 8 every policy instruments that provides financial support

are in the development phase. However, both respondents disagree with the placement of these instruments.

Respondent 8 states that a launching customer is not needed in the development phase, but needs to go to the demonstration phase. He thinks that circular projects can start searching for a launching customer, but that a launching customer itself belongs in the demonstration phase. He argues that in the demonstration phase there is an established product that needs a sales market. A launching customer' function is to be a sales market. Moving the launching customer to the demonstration phase is a better option as it gives more certainty in the demonstration phase. This certainty is also needed for the next policy instrument in the demonstration phase.

Respondent 9 also adds that a loan in the development phase is not common. This is because the uncertainty of the project in that phase might be too high, therefore it can be too risky to provide a loan. She advises to use a loan at the demonstration phase. A loan was often not offered by the accelerators in the previous phase as it often was too big of an investment. Respondent 8 underpins that outcome by replacing the loan to the demonstration phase. A launching customer can reduce the uncertainty and makes the circular projects more interesting for loans.

5.3 Organizational Dimension

Both respondents emphasize the inexperience of the entrepreneur and the possible policy instruments that can help. In figure 9 they are summarized as network and knowledge meetings, but respondent 9 is missing the policy instruments that actually help in developing an organization. She stated the reason for this as follows: "I think there are many more tools in this phase, in the organizational phase of development. I think a lot of regions have accelerators on that. But accelerators are of course also network organizations. I think coaching could be very much part of this so that you get real advice. I think that Circo Tracks, for example, also go into this a lot, because they also start thinking with you about: how do you set up an organization in order to progress? So 'business development', somehow I would add this as a blue box." In figure 9 different kind of meetings are generalized in network and knowledge meetings. Coaching is a good addition as type of this meeting, as it differs from a network or knowledge meeting. Using specific instruments like Circo Tracks will make figure 10 to specific.

Both respondents do miss the importance of cooperation in the chain between entrepreneurs as a criterion. Respondent 8 suggests Letter of Intends or cooperation agreements as a criterion, because these contracts are often used in the field and serves as a proof that an organization is willing to cooperate with other organizations on a project.

Respondent 8 also states that an impact assessment can be used. This is in addition of a CBM, but is more related to the organization and product. An impact assessment can be used to see what the goal of a circular project and what in contributes towards the CE.

5.4 Product Dimension

The production dimension has only a tender as a policy instrument in figure 9 and the place on the Rladder as criterion, however both respondents had some comments on what policy instrument the regional government could also use.

Respondent 9 did miss a market study. She states that a market consultation is often used by governments to explore if the market can deliver the desired outcome of the product. In a market study the regional government can discover if it is possible to operate with a project on a certain step of the R-ladder. A market study can be used as a separate policy instrument, but it can also be incorporated in the tender. A market study also helps the government to identify the place on the R-ladder, to see if it is a realistic criteria or if the R-score is too high for circular projects.

Another suggestion respondent 9 brings up are covenants. She brings up an example of her own field to explain the use of covenants: "Sometimes a government enters into a covenant with a company. In the Foodvalley region, for example, we had a concrete covenant, in which it was promised that both the market and the government will work on that percentage of circular concrete. And there were working groups in which this was actually discussed, such as: 'what should be included in the specifications for tenders? And what can market parties do and what kind of results will that yield?' A covenant therefore can be used to by government to give guidance to the process. However, it does not contribute in the development of a circular project, it can be a cause to develop circular projects.

Respondent 9 not only thinks that covenants can be used for product development, but that circular project should participate in regional knowledge networks to stimulate the development. She describes these regional networks as delta's and states that the Netherlands have different delta's for different sectors. These networks can also offer Field labs. In which a Minimum Viable Product can be developed or tested.

5.5 Results S4

After the second round of interviews, there were several new insights and adjustments. The respondents agreed with most of policy instruments and criteria in the model, but also added some new policy instruments or suggested that it should be more specified. This new input can be seen in table 8. Furthermore, table 8 shows what the actual adjustment is.

Figure 10 is the final result of this analysis. The respondents in S4 used their experience to adjust figure 9. However, not every dimension and phase has criteria and policy instruments. During all of the interviews the respondents did not have clear examples for this dimensions.

During the analysis of S4 it also became clear that the dimensions are linked with each other. This means that the model works. One of the links is that a project with an exemption cannot upscale its organization or apply for financial policy instruments. That indicates that the four dimensions needs to develop simultaneously, otherwise a dimension cannot go any further.

Policy Instrument	Name	Adjustment
Legal	Exemption	Removed from demonstration phase
Financial	Launching Customer	Moved to demonstration phase
	Loan	Moved to demonstration phase
	Subsidy	Added to the discovery phase
Organizational	Letter of Intent	Added to the development phase
	Coaching	Added to development and discovery phase
Product	Fieldlab	Added to development phase
		Added to development phase

Table 8. Overview of policy instruments that were adjusted (Own Work)

Both respondents also have added adjustments for the criteria. These adjustments can be seen in table 9

Criteria	Name	Adjustment
Legal	Intellectual Property	Removed from the model
Financial	-	-
Organizational	Letter of Intend	Added to development phase
	Impact Assessment	Added to discover phase
Product	Validated Market Study	Added to development phase
Table 9 Overview of the criteria that were adjusted (Own Work)		

Table 9. Overview of the criteria that were adjusted. (Own Work).



Chapter 6. Conclusion and Discussion

6.1 Conclusion

The goal of this qualitative thesis was to explore if the regional government can use a model based on the Stage Gate Theory to support the transition towards the Circular Economy. Therefore, the research question of this study was: *how can the Dutch regional government support circular breakthrough projects with a stage gate-based model?* In order to answer the research question, this study was split in six steps.

The first step is the literature review. The first result of the literature review was the lack of CBP's. Although there are plenty circular activities and projects, there is not one project that meets the definition of a CBP. However, there is still a need of a structured approach to support circular projects. Therefore, this thesis did not use the CBP's and aimed for regular circular projects.

The second step entailed seven semi-structured interviews to collect data about policy instruments, barriers and criteria. The template analysis of these interviews are used to create figure 9. Figure 9 is based on the conceptual model and figure 10 is the final outcome of this study. The result shows that there is much activity in the discovery phase and the development phase of the model and that further down the funnel the policy instruments, criteria and barriers are not often known or mentioned by the respondents.

The results of the sub questions are used to answer the main research question by exploring the policy instruments, barriers and criteria. The results in figure 10 show that there are not policy instruments or criteria for every stage in the Stage Gate Model. Other phases have multiple policy instruments and criteria. There are several criteria and policy instruments missing in the phase between demonstration and market-intro and that makes as a whole model not usable.

However, figure 10 shows that the dimension can be developed separately from each other, but that they cannot go to the next phase if another dimension is behind. This is a goal of the Stage Gate Theory and the model proofs that it can be applied. The Dutch regional government therefore can use the first two stages of the model.

6.2 Discussion

6.2.1 Results of this research

The result of this study is disappointing, but promising. The model cannot be fully used due to the lack of criteria at some stages. However, based upon the literature it was somewhat expected. As the transition towards the Circular Economy is based upon the X-curve in section 2.3.2, it became clear that this transition was at the beginning of the acceleration. This means there are not many successful circular projects to start with, to find a Circular Breakthrough Project is even harder. In the X-curve the linear model will decline and the circular economy will be institutionalized , it might be possible that in the current phase the linear model is still too present to allow good alternatives for linear business models.

Another reason can be the role of the regional government. In section 2.3.3 it is mentioned that the bigger companies should start the acceleration, but it might be possible that they do not need the regional government. These companies often are experienced and have enough resources to fund their own research and development. Their only barrier might be in the legal dimension, but that barrier can only be solved by governments on a higher scale than the regional government.

The last reason for the focus on the two first phases of figure 10, might be the success of circular projects. As respondent 3 says in her interview, if a circular project goes to the demonstration phase, then there are other options of financing such project. It might be possible that the bigger companies just buy these circular projects and therefore exclude the role of the regional government as mentioned in the previous paragraph.

The function of the four dimension of the conceptual model did work out pretty good. There policy instruments and criteria in each dimension are easy to distinguish and this makes it possible to focus on each dimension separately. In addition, a dimension cannot go to the other phase if the other three are not ready. For example, the legal dimension often prevents an organization to upscale. This prevents several policy instrument to support the organizational barrier, because the legal dimension is not on that same phase. This proves that this model reduces the risk of using resources on less promising circular projects.

Although the model of this particular research might not be used yet, the theory of the Stage Gate Model can be used for the support circular projects. During the interviews it became clear that there is not a structured approach yet. Figure 10 incorporates several dimensions in one comprehensible model. It shows what criteria should be used to develop circular projects and what policy instruments can be used to support these projects. With the use of the stages it is clear for a regional government which steps it can take to support these project and how to decide if a circular project meets their requirements.

6.2.3 Limitations and Implications of this Research

The results of this research are reliable since the interviews were based on the theoretical framework, but there were some limitations. The first and second interview was based upon a checklist of criteria that was based upon the literature, however it turned out that both respondents were unable to discuss this checklist. Therefore, the interview guide was changed to the format that it still was semi-structured, but it turned in a more open discussion about the Circular Economy and if the respondent thinks a Stage Gate Model can be used as a approach to the transition.

The respondents consist of consultants, policy makers, investors and accelerators, but it did not contain a circular business. These businesses were often sustainable and not circular. If there was a circular business, then they could not be labeled as a CBP, as it did not meet the requirements of the definition.

The model is not 100% complete, but it contains the input of several actors in the field. Further research could aim for a case study on several circular businesses to gain a better knowledge of the transition they made from linear business towards a circular business or the development from idea to a project ready for market-intro. That data is complementary to this research and can result in a complete model that can be used in practice.

The implications of this research is that the transition towards the Circular Economy stagnates, if the barriers remains a problem and there is not a policy instrument available to support in breaking this barrier. This restricts circular projects of upscaling their operations and therefore stagnating the acceleration.

The second implication are the sustainability goals of the Dutch government as they cannot achieve their goal. The respondents have mentioned the legal barrier the most during the interviews. The national government or the EU are not part of this study, but it is a legislator and therefore is the only actor that can address the legal barrier in creating enabling legalizations. This gives the regional government more space to experiment with circular projects. The regional government can only use exemptions and concessions, but these are not enough to upscale circular projects.

The last implication is the lack of a structure approach. If the regional government does not apply this model in their decision making, it is more likely that financial funds are going to less promising circular projects or the more expensive policy instruments is going to a circular project that does have met the criteria yet, increasing the chance the investment fails.

6.2.4 Suggestion for future research

This thesis opens up possibilities for future research. The transition towards the Circular Economy must continue and future research is needed to get a better understanding of the concept and how to develop approaches to accelerate the transition. This section contains three suggestion for future research.

The first suggestion is to do further research on CBP. In this research a CPB was subject of the research question, as if it is a CBM. However, one can argue a Breakthrough Project can be used as a policy instrument. In that scenario, the circular project will be labeled as such and that can give those

projects more flexibility in laws and regulation for example. That study should explore what kind of policy instruments should be assigned to a CBP to support its development.

The second suggestion is to do research on a specific circular topic. In Het Grondstoffen Akkoord the national government identified five main sectors. This study focused on the concept of the CE as a whole, but there a differences between these sectors. It might be possible that one sector is more developed than the general development. The study should focus on one topic and analyze the pilots that are already done. This should lead to a more complete model for that specific sector.

At the end of the internship, the Plastic Fabriek in Almere was opened. This initiative was mentioned in the Inspiratie Boek of RoyalhaskoningDHV. This plants collects the plastic waste and recycles it to new street furniture in Almere. With the result of this thesis, it can be interesting to test the model with actors who are involved in the development of this initiative.

6.3 Advice for regional governments and RoyalHaskoningDHV

The result of this thesis can be connected to the last sub question: *How can the regional government connect the result of this study to their long-term goals?* This long term goal is to have a fully CE in the Netherlands by 2050.

Figure 10 is a stepping stone for the regional governments. It gives a structured overview of developing circular projects, despite it is not complete. The respondents are positive about the structured approach the model offers. Regional governments should apply this model to circular projects to test it and if they could add more or less policy instruments and criteria. There more input the model has, the more flexible the model can become.

Another take away point of this model is the activity in the first two phases relative to the last two. According to the results of the interviews, the first two phases are functioning well, but the last two phases need probably more attention. Regional governments should focus on supporting circular initiatives towards the demonstration phase, as there are much policy instruments and criteria to discover.

RoyalHaskoningDHV needs to support the regional government, as they already did a explorative study towards circular initiatives and the policy instrument of the regional governments. They should do a meta-analysis to categorize these initiatives in the four phases. This analysis will result in a complete model and they can use that for other governmental clients.

RoyalhaskoningDHV could also use the model on one of the five themes of het Grondstoffenakkoord to design a more specific model. Every theme has a different place in the transition and that might require different approaches and input of the model.

Literature List

Andersen, M. S. (2007). An introductory note on the environmental economics of the circular economy. *Sustainability science*, *2*(1), 133-140. Retrieved on 29-03-2021, from

https://d1wqtxts1xzle7.cloudfront.net/33002983/ANDERSEN_CIRCULAR_ECONOMY_Files-6063-articles-15091-art12.pdf?1392490628=&response-content-

disposition=inline%3B+filename%3DNOTE_AND_COMMENT_An_introductory_note_on.pdf&Expires =1617927843&Signature=Wvl6Nu-09PkjRxPG4zq3GMCxi5eSQyL9U-

 $\label{eq:2.1} Zn7e9KC53tuK1XpWhuRsclwWoURXfOD1TIFJTzyz2zRuu8aOOWhJBBt8dfzkNzLQaZ-label{eq:2.2} National and the second second$

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Borrello, M., Caracciolo, F., Lombardi, A., Pascucci, S., & Cembalo, L. (2017). Consumers' perspective on circular economy strategy for reducing food waste. *Sustainability*, *9*(1), 141. Retrieved on 21-3-2021, from https://www.mdpi.com/2071-1050/9/1/141

Bryman, A. (2016). *Social research methods*. Oxford university press. Retrieved on 24-2-2021, from https://books.google.nl/books?hl=nl&Ir=&id=N2zQCgAAQBAJ&oi=fnd&pg=PP1&ots=dpJvDUN5nd&si g=BgUiF5UKsxy-11dvFOQ2emdYGBM&redir_esc=y#v=onepage&q&f=false

Campbell-Johnston, K., Vermeulen, W. J., Reike, D., & Bullot, S. (2020). The circular economy and cascading: towards a framework. *Resources, Conservation & Recycling: X*, 100038. Retrieved on 13-05-2021, from https://www.sciencedirect.com/science/article/pii/S2590289X20300098

Centraal Planbureau (2020). *Kansrijk Innovatiebeleid*. Retrieved on 25-03-2021, from https://www.cpb.nl/sites/default/files/omnidownload/CPB-Boek-20-Kansrijk-innovatiebeleid.pdf

Circulair Friesland (z.d.) *Our Ambition: We strive to be the most circular EU region in 2025.* Retrieved on 28-10-2021, from https://circulairfriesland.frl/en/?noredirect=en-US

Cooper, R. G. (1990). Stage-gate systems: a new tool for managing new products. *Business horizons*, *33*(3), 44-54. Retrieved on 24-2-2020, from https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.474.1777&rep=rep1&type=pdf

Cooper, R. G., & Sommer, A. F. (2016). The Agile–Stage-Gate hybrid model: A promising new approach and a new research opportunity. *Journal of Product Innovation Management*, *33*(5), 513-526. Retrieved on 14-3-2021, from https://onlinelibrary.wiley.com/doi/pdf/10.1111/jpim.12314

Creswell, J. W., Fetters, M. D., & Ivankova, N. V. (2004). Designing a mixed methods study in primary care. *The Annals of Family Medicine*, *2*(1), 7-12. Retrieved on 19-03-2021, from https://reader.elsevier.com/reader/sd/pii/S0959652616321023?token=C5AB5D7DCEC1C4111DE3A4 14E58696B63202D6EA73AFF93857E44EC9EDB8F31695D59BA01AF032DB04F82AC9C94A2F14 https://www.annfammed.org/content/annalsfm/2/1/7.full.pdf

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications. Retrieved on 3-12-2021, from http://www.drbrambedkarcollege.ac.in/sites/default/files/research-design-ceil.pdf

De Haas, W., & Kranendonk, R. P. (2019). *Circulaire gebiedsontwikkeling: Bouwstenen voor governance van circulaire clusters*. Wageningen Environmental Research. Retrieved on 9-4-2021, from https://library.wur.nl/WebQuery/wurpubs/fulltext/540255

Ellen MacArthur Foundation (2013). Towards the circular economy. *Journal of Industrial Ecology*, 2, 23-44. Retrieved on 25-02-2021, from

https://www.ellenmacarthurfoundation.org/assets/downloads/publications/Ellen-MacArthur-Foundation-Towards-the-Circular-Economy-vol.1.pdf

European Commision, (n.d.) *EU Circular Economy Action Plan.* Retrieved on 1-4-2021, from https://ec.europa.eu/environment/circular-economy/

European Commission, (n.d.) *Circular Economy Action plan, For a cleaner and more competitive Europe.* Retrieved on 1-4-2021, from https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf

Frusch, M., Kierkels, A., Maas, K., Nuijts, W., Sanders, M., van Staveren, I., & van Tilburg, R. Financieren met Purpose. Retrieved on 6-4-2021, from https://sustainablefinancelab.nl/wpcontent/uploads/sites/334/2020/12/Frusch-et-al.-2020-Financieren-met-Purpose-SFL-DNBkennispaper-1-1.pdf

Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017). The Circular Economy–A new sustainability paradigm?. *Journal of cleaner production*, *143*, 757-768. Retrieved on 29-03-2021, from sciencedirect.com/science/article/pii/S0959652616321023?casa_token=SfZK8X3ziEkAAAAA:SO6j43p EuwK9spsCAqidXoWVL0bCfk0POLrBTLQRbUIm6L9MQ5_UUe7CR6Ny9aiOQFuS26YUI1i9

Geng, Y., Sarkis, J., & Bleischwitz, R. (2019). How to globalize the circular economy. Retrieved on 2-4-2021, from https://www.nature.com/articles/d41586-019-00017-z

Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner production*, *114*, 11-32. Retrieved on 30-3-2021, from

https://reader.elsevier.com/reader/sd/pii/S0959652615012287?token=0D85F29374675185227FE16 9AE6A75DAFA910AC1277CCD0B3720A036A5A6D71989523E38A3A70B8FEADEFCC049E308BF

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. *Handbook of qualitative research*, *2*(163-194), 105. Retrieved 24-2-2021, from file:///C:/Users/s4479688/Downloads/10-guba_lincoln_94%20(1).pdf

Groenewegen, J., Hardeman, S., Poolen, D. & Raspe, O. (2021). *Coronacrisis splijtzwam voor transitie naar een nieuwe economie*. Retrieved on 22-3-2021, from https://economie.rabobank.com/publicaties/2021/januari/coronacrisis-splijtzwam-voor-transitie-naar-een-nieuwe-economie/#98dab1bd-9d1b-4025-9367-e865e968b5b0

Hanemaaijer, A., Delahaye, R., Hoekstra, R., Ganzevles, J., & Lijzen, J. (2018). Circulaire economie: wat we willen weten en kunnen meten: Systeem en nulmeting voor monitoring van de voortgang van de circulaire economie in Nederland.

Hanemaaijer, A., Kishna, M., Kooke, M., Brink, H., Koch, J., Prins, A. & Rood, T (2021), Integrale Circulaire Economie Rapportage 2021, Den Haag: PBL. Retrieved on 25-02-2021, from https://www.pbl.nl/sites/default/files/downloads/pbl-2021-integrale-circulaire-economierapportage-2021-4124.pdf Hazen, B. T., Mollenkopf, D. A., & Wang, Y. (2017). Remanufacturing for the circular economy: An examination of consumer switching behavior. *Business Strategy and the Environment, 26*(4), 451-464. Retrieved on 9-4-2021, from

https://onlinelibrary.wiley.com/doi/pdf/10.1002/bse.1929?casa_token=-WZvY8W4W0AAAAA:WW4Ux60FQt0JD0FzxiMWV9_jsEgpwKEL8yJaM-FTP0qxGOa18r7fBOfZJ5LIRYebSPvRnllZHqt4qdDFyw

Hekkert, M. Elzinga, R. Reubzaet, M. & Bastein T. (2020). *Transitie naar een circulaire maakindustrie*. Retrieved on 25-03-2021, from https://circulairemaakindustrie.nl/app/uploads/2020/10/Presentatie-Hekkert-UPCM-resultaten-NL2-Alleen-lezen.pdf

Het Groene Brein (n.d.) *Versnellingshuis Nederland circulair! Gelanceerd.* Retrieved on 18-03-2021, from https://hetgroenebrein.nl/2019/02/18/versnellingshuis-nederland-circulair-gelanceerd/

Hopwood, B., Mellor, M., & O'Brien, G. (2005). Sustainable development: mapping different approaches. *Sustainable development*, *13*(1), 38-52. Retrieved on 20

Hobson, K., Holmes, H., Welch, D., Wheeler, K., & Wieser, H. (2021). Consumption Work in the circular economy: A research agenda. *Journal of Cleaner Production*, *321*, 128969. Retrieved on 25-22-2021, from https://pdf.sciencedirectassets.com

Hunka, A. D., Linder, M., & Habibi, S. (2021). Determinants of consumer demand for circular economy products. A case for reuse and remanufacturing for sustainable development. *Business Strategy and the Environment*, *30*(1), 535-550. Retrieved on 8-4-2021, from https://onlinelibrary.wiley.com/doi/pdf/10.1002/bse.2636

Innovation Quarter (z.d.). *Invest & Innovate in the greater Rotterdam – The Hague area*. Retrieved on 28-10-2021, from https://www.innovationquarter.nl/en/

Israëls, G (2021). *Overzicht en inzicht innovatieregelingen Circulaire Economie*. Retrieved on 1-9-2021, from

https://onedrive.live.com/view.aspx?cid=F2F4D97511D60FEC&resid=F2F4D97511D60FEC%2134291 &canary=tW3CuReV9C5iOI6zLWtibsBAclq5iwwIfMjgndBdApA%3D6&ithint=%2Epdf&open=true&app =WordPdf

Ivankova, N. V., & Creswell, J. W. (2009). Mixed methods. *Qualitative research in applied linguistics: A practical introduction, 23*, 135-161. Retrieved on 19-3-2021, from https://www.booksfree.org/wp-content/uploads/2020/09/QUALITATIVE-RESEARCH-IN-APPLIED-LINGUISTICS-Juanita-Heigham.pdf#page=152

Jonker, J., Kothman, I., Faber, N., & Stegeman, H. (2017). Bouwstenen van circulaire business modellen. Retrieved on 12-3-2021, from https://repository.ubn.ru.nl/bitstream/handle/2066/198981/198981.pdf

Jonker, J., Stegeman, H., & Faber, N. (2018). De circulaire economie: denkbeelden, ontwikkelingen en business modellen-2018 update. Retrieved on 8-2021, from https://repository.ubn.ru.nl/bitstream/handle/2066/198996/198996.pdf

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, conservation and recycling*, *127*, 221-232.

King, N., & Brooks, J. M. (2017). Template Analysis for Business and Management Students. Thousand Oaks, CA: SAGE. Retrieved on 1-9-2021, from https://methods-sagepub-

com.ru.idm.oclc.org/base/download/BookChapter/template-analysis-for-business-and-management-students/i140.xml

Koen, C. (2011). Inzicht in innovatie management. *Perspectieven op management: een agenda voor de manager*. Retrieved on 8-04-2021, from https://www.tias.edu/docs/default-source/Kennisartikelen/carla-koen---inzicht-in-innovatie.pdf

Koot, H. (2021). *Wat is een circulair initiatief c.q. doorbraakproject?* Retrieved on 2-4-2021, retrieved from personal communications

Kuhlman, T., & Farrington, J. (2010). What is sustainability? *Sustainability*, 2(11), 3436-3448. Retrieved on 28-03-2021, from https://www.mdpi.com/2071-1050/2/11/3436

Lacy, P. 2015. *Circular Advantage: Innovative Business Models and Technologiesto Create Value in a World Without Limits to Growth*. Retrieved on 12-3-2021, from https://www.accenture.com/t20150523T053139_w_/us-en/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Strategy_6/Accenture-Circular-Advantage-Innovative-Business-Models-Technologies-Value-Growth.pdf

Lijzen, J. P. A., Bastein, T., van Bruggen, A. R., Hollander, A., van Kuppevelt, M. A., Rietveld, E., & Zwartkruis, J. V. (2020). Inzicht in beleidsacties richting een circulaire economie: Monitoring van acties en verkenning van transitie-indicatoren per prioritaire keten. Retrieved on 8-3-2020, from https://rivm.openrepository.com/bitstream/handle/10029/624448/2020-0078.pdf?sequence=1

Loorbach, D., Lodder, M., Roorda, C. & Spork, C. (2017). *Werkdocument als bijlage bij Staat van Transitie: patronen van opbouw en afbraak in vijf domeinen*. Retrieved on 2-4-2021, from https://drift.eur.nl/wp-content/uploads/2017/09/DRIFT-Werkdocument-Staat-van-Transitie.pdf

Lucas, P., & Wilting, H. (2018). Using Planetary Boundaries to Support National Implementation of Environment-related: Sustainable Development Goals: Background Report. PBL Netherlands Environmental Assessment Agency.

Ministerie van Infrastructuur en Waterstaat (2018). *A circular economy in the Netherlands by 2050.* Retrieved on 25-02-2021, from https://www.government.nl/documents/policy-notes/2016/09/14/acircular-economy-in-the-netherlands-by-2050

Monsma, M. M. A. (2018). Circulaire economie en afvalstoffenheffing. *Belastingblad. Tijdschrift voor Provinciale, Gemeentelijke en Waterschapsbelastingen, 2018*(5). Retrieved on 2-4-2021, from https://core.ac.uk/download/pdf/159137752.pdf

MVO Nederland. (28-1-2021). ONDERZOEK MVO NEDERLAND EN RABOBANK: DUURZAME BEDRIJVEN TIJDENS CORONA NÓG DUURZAMER, REST BLIJFT ACHTER. Retrieved on 22-3-2021, from https://www.mvonederland.nl/news/onderzoek-mvo-nederland-en-rabobank-duurzame-bedrijventijdens-corona-nog-duurzamer-rest-blijft-achter/

Mulder, P. (2018). Stage Gate model van Robert Cooper. Retrieved on 7-5-2021 from https://www.toolshero.nl/innovatie/stage-gate-model-robert-cooper/

Murray, A., Skene, K., & Haynes, K. (2017). The circular economy: an interdisciplinary exploration of the concept and application in a global context. *Journal of business ethics*, *140*(3), 369-380. Retrieved on 28-03-2021, from http://nrl.northumbria.ac.uk/id/eprint/44053/1/NRL_44053.pdf

Olechowski, A. L., Eppinger, S. D., Joglekar, N., & Tomaschek, K. (2020). Technology readiness levels: Shortcomings and improvement opportunities. *Systems Engineering*, *23*(4), 395-408. Retrieved on 25-03-2021, from https://onlinelibrary-wiley-com.ru.idm.oclc.org/doi/epdf/10.1002/sys.21533

Pradhan, P., Costa, L., Rybski, D., Lucht, W., & Kropp, J. P. (2017). A systematic study of sustainable development goal (SDG) interactions. *Earth's Future*, *5*(11), 1169-1179. Retrieved on 28-3-2021, from https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2017EF000632

Porter, M. E. (1998). *Clusters and the new economics of competition* (Vol. 76, No. 6, pp. 77-90). Boston: Harvard Business Review. Retrieved on 9-4-2021, from https://clustermapping.us/sites/default/files/files/resource/Clusters_and_the_New_Economics_of_C ompetition.pdf

Reike, D., Vermeulen, W. J., & Witjes, S. (2018). The circular economy: new or refurbished as CE 3.0?—exploring controversies in the conceptualization of the circular economy through a focus on history and resource value retention options. *Resources, Conservation and Recycling, 135,* 246-264. Retrieved on 21-03-2021, from

https://www.sciencedirect.com/science/article/pii/S0921344917302756

Royal HaskoningDHV (2020). *Bijna 2.000 circulaire activiteiten bij kopgroep decentrale overheden*. Retreived on 25-2-2021, from https://www.royalhaskoningdhv.com/nlnl/nederland/nieuws/nieuwsberichten/bijna-2-d-000-circulaire-activiteiten-bij-kopgroep-decentraleoverheden/10553

Royal HaskoningDHV (2020). *De 22 beste regionale voorbeelden voor een circulaire economie*. Retreived on 25-2-2021, from https://www.royalhaskoningdhv.com/nlnl/nederland/nieuws/nieuwsberichten/bijna-2-d-000-circulaire-activiteiten-bij-kopgroep-decentraleoverheden/10553

Royal HaskoningDHV (z.d.). *Company Profile*. Retrieved on 14-7-2021, from https://www.royalhaskoningdhv.com/en-gb/about-us/company-profile

Salameh, H. (2014). What, when, why, and how? A comparison between agile project management and traditional project management methods. *International Journal of Business and Management Review*, *2*(5), 52-74. Retrieved on 14-3-2021, from

https://d1wqtxts1xzle7.cloudfront.net/46679893/What-When-Why-and-How-A-Comparisonbetween-Agile-Project-Management-and-Traditional-Project-Management-

Methods.pdf?1466525775=&response-content-

disposition=inline%3B+filename%3DWhat_When_Why_and_How_A_Comparison_betwe.pdf&Expire s=1615721632&Signature=d7PG9vakt8Kg0FydphZLZQeyOCwJDsVbdzxAddDUXgQpT7UcKDJSBC0GZS Mlf5yI5zCVyVPI7aMXc~7S2a6vqaHjhoa1Tx0ubk61MLdbkiT~tAf~qVQOQIH~606enY9LmQGdtsC9rjSF1 VT3ENG7wSbNWoFRZFxRbHY2W-nzgnvaGDjU2BbgppGw8cQ3h4pVE9~ibMOqYmrcLyycMBv2mmk2nhBzUe9-

eAdRBZBuzoz~EqiKL0N9d9QPgxZm6Ak22M2HNTxPEuSKEuD0ko916UYdJVIRJcezZEhCyTWRCWZYKyf1 ~zzCwaE2F7svv8wyjWIU6cpNPAAhWpJfKOYPw___&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA

Sarantakos, S. (2005). Social Research. Palgrave Macmillan. Retrieved on 3-12-2021, from https://www.macmillanlearning.co.uk//resources/sample-chapters/9780230295322_sample.pdf

Sariatli, F. (2017). Linear economy versus circular economy: A comparative and analyzer study for optimization of economy for sustainability. *Visegrad Journal on Bioeconomy and Sustainable*

Development, *6*(1), 31-34. Retrieved on 29-03-2021, from https://vua.uniag.sk/sites/default/files/VUA_1_17_Sariatli.pdf

Serbruyns, I., & Luyssaert, S. (2006). Acceptance of sticks, carrots and sermons as policy instruments for directing private forest management. *Forest policy and Economics*, *9*(3), 285-296. Retrieved on 20-9-2021, from https://pdf.sciencedirectassets.com/272157/1-s2.0-S1389934106X00382/1-s2.0-S1389934105000936/main.pdf

Schöggl, J. P., Stumpf, L., & Baumgartner, R. J. (2020). The narrative of sustainability and circular economy-A longitudinal review of two decades of research. *Resources, Conservation and Recycling*, *163*, 105073. Retrieved on 2-4-2021, from

https://reader.elsevier.com/reader/sd/pii/S0921344920303906?token=BC5508CD09FD471AF2D040 E7973A594C82B5CC7D6A646E192C06052651609185960CB93F024614E189A16F626C08DB4E&origin Region=eu-west-1&originCreation=20210402074438

Schulte, U. G. (2013). New business models for a radical change in resource efficiency. *Environmental Innovation and Societal Transitions*, *9*, 43-47. Retrieved on 8-4-2021, from https://reader.elsevier.com/reader/sd/pii/S221042241300066X?token=74458BB96983AC847BE6643 3A3FC0D9E19C09FCFACD86C52FA069DA811A2B575D5CDE676C0A394492D58472A7081F065&origin Region=eu-west-1&originCreation=20210408220542

Sociaal Economische Raad (. (2016). Werken aan een circulaire economie: geen tijd te verliezen. *The Hague, The Netherlands: Sociaal-Economische Raad*. Retrieved on 6-4-2021, from https://www.allesovercirculairslopen.nl/site/media/upload/files/908_ser-advies-circulaire-economie_pdf_20181002121626.pdf

Sociaal Economische Raad (SER), 2018. *Financiële instrumenten voor een circulaire economie.* Retrieved on 19-03-2021, from https://www.ser.nl/-/media/ser/downloads/adviezen/2018/circulaire-economie-fin.pdf

Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., ... & Sörlin, S. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science*, *347*(6223). Retrieved on 24-02-2021, from

https://science.sciencemag.org/content/sci/347/6223/1259855.full.pdf?casa_token=0NJ1-E4kmGkAAAAA:57zfE_EYG1QnKdk2cq5U_0WALNSDwnCdv2fHlLa7lEGQZo4Ef_3wV-BdQNvVGdf7cQ8QJeT7som8gTKb

Su, B., Heshmati, A., Geng, Y., & Yu, X. (2013). A review of the circular economy in China: moving from rhetoric to implementation. *Journal of cleaner production*, *42*, 215-227. Retrieved on 25-02-2021, from

https://www.sciencedirect.com/science/article/pii/S0959652612006117?casa_token=WIIbGXstLD4A AAAA:M4_dLG7-9S_DjIIdyMIxm-GL26CSVsBpuPQc3IaUAlfm-gS-5S8pMnWIaLoSI_bo_4uTaj_--zhN

Tura, N., Hanski, J., Ahola, T., Ståhle, M., Piiparinen, S., & Valkokari, P. (2019). Unlocking circular business: A framework of barriers and drivers. *Journal of Cleaner Production*, *212*, 90-98. Retrieved on 4-11-2021, from

https://reader.elsevier.com/reader/sd/pii/S0959652618336059?token=AE0BF0E1BB6814ABB311126 4BD96100F6A87C1A20601595A3F1DD53D169548772F0093538352A90465C9C56FB8485D02&origin Region=eu-west-1&originCreation=20211104202658

Van Thiel, S. (2014). *Research methods in public administration and public management: An introduction*. Routledge. Retrieved on 24-2-2021, from

https://www.taylorfrancis.com/books/research-methods-public-administration-public-management-sandra-van-thiel/10.4324/9780203078525

Veenman, S., Liefferink, D., & Arts, B. (2009). A short history of Dutch forest policy: The 'deinstitutionalisation' of a policy arrangement. *Forest Policy and Economics*, *11*(3), 202-208. Retrieved on 4-3-2021, from

https://reader.elsevier.com/reader/sd/pii/S1389934109000306?token=285CDB0E9F64097652FEA0C E6F4AEC580D42F03AAD8EE6F21B840614F44C7A361698B1B556C038B230B4E5E6A63B98A4

Walliman, N. (2006). Research strategies and design. *Social research methods. London*, 37-50. Retrieved on 24-2-2021, from https://methods.sagepub.com/base/download/BookChapter/social-research-methods/n4.xml

Vasiljevic-Shikaleska, A., Gjozinska, B., & Stojanovikj, M. (2017). The circular economy–a pathway to sustainable future. *Journal of Sustainable Development*, 7(17), 13-30. Retrieved on 8-4-2021, from http://ibf.edu.mk/JSDv17.pdf#page=14

Van Veldhoven, S. (2018). *Kamerbrief met kabinetsreactie op de transitieagenda's circulaire economie*. Retrieved on 18-03-2021, from

https://www.rijksoverheid.nl/documenten/kamerstukken/2018/06/29/kabinetsreactie-op-de-transitieagenda-s-circulaire-economie

Vermunt, D. A., Negro, S. O., Verweij, P. A., & Hekkert, M. P. (2016). Het ontwikkelen van je circulaire business: een onvermijdelijke sprong in het diepe? Geleerde lessen van 18 koplopers. Retrieved on 5-4-2021, from

https://scholar.google.com/scholar_url?url=https://dspace.library.uu.nl/bitstream/handle/1874/341 129/ontwikkelen.pdf%3Fsequence%3D1&hl=nl&sa=T&oi=gsb-

ggp&ct=res&cd=0&d=512018685538603762&ei=wTK_YfObFY-

Ty9YPrsKZaA&scisig=AAGBfm1AafDbu4fu-VSMwsCedom63QFlog

Versnellingshuis Nederland Circulair (z.d.) *Circulaire economie*. Retrieved on 18-03-2021, from https://kenniskaarten.hetgroenebrein.nl/kenniskaart-circulaire-economie/beleid-circulaire-economie/

Zhang, N., Lior, N., & Jin, H. (2011). The energy situation and its sustainable development strategy in China. *Energy*, *36*(6), 3639-3649. Retrieved on 12-3-2021, from https://onlinelibrary.wiley.com/doi/epdf/10.1162/108819806775545321

Appendix

Appendix 1. Interview Guide S2 + S4

Opening

Beste meneer, mevrouw,

Voordat we beginnen: heeft u er problemen mee als dit gesprek opgenomen wordt?

Bedankt dat u mee wil werken aan dit interview. Ik ben Gijs Gilbers, masterstudent Geografie, Planologie en Milieu met als specialisatie Corporate Sustainability. Dit interview gaat over de transitie naar de Circulaire Economie. In deze transitie is de Nederlandse overheid opzoek naar doorbraakprojecten die deze transitie kunnen versnellen, zodat andere bedrijven zich kunnen optrekken aan dit circulaire initiatief. Deze versnelling is gebaseerd op een Stage Gate Model en in dit model heeft elke Gate zijn eigen criteria om door te mogen naar de volgende fase. Als het goed is heeft u de enquete ingevuld en die zou ik graag met u willen doornemen, maar allereerst zou ik graag wat van u willen weten.

Inleiding (zie enquête 0-meting)

Wie bent u?

Op welke afdeling werkt u?

Wat is uw functie binnen deze afdeling?

Bespreken conceptueel model

*Voorleggen van conceptuele model in S2

*Voorleggen van figuur 9 in S4

Wat vindt u van de legal dimension?

Wat vindt u van de financial dimension?

Wat vindt u van de organizational dimension?

Wat vindt u van de product dimension?

Afsluiting

- Dankwoord
- Vragen of ze interesse hebben in het uiteindelijke resultaat → opsturen → e-mailadres vragen

Appendix 2. Codeboek Interviews

To analyse the interviews, a code book is needed. As the goal of the interviews is to answer this 3 sub question, codes have to be formulated:

- What are the current barriers for businesses that are developing and implementing circular business models?
- What policy instruments does the Dutch government already use in supporting circular initiatives?
- What policy instruments where successful at other circular initiatives in overcoming these barriers?

The codes that will be used are focused upon policy instrument, barriers and criteria. These tables are based upon the four dimension in the conceptual model and are split in policy instruments, criteria and barrier. All interviews were in Dutch, which means the codes are mainly in Dutch.

The following codes are used Barrier Legal Barrier Financial Barrier Organisation Barrier Product Criteria Legal Criteria Financial Criteria Organization Criteria Product Policy Instrument Legal Policy Instrument Financial Policy Instrument Pinancial Policy Instrument Product