

Circular Economy Proposition for the Province of North Brabant

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Facilitating Effective Knowledge Sharing Between Parties Surrounding The Transition to a Circular Economy Facilitated By Midpoint Brabant Circular as a Regional Development Program.

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Summary

The problem researched within this report goes into the challenges that players within the region in the scope of Midpoint Brabant Circular faces when effectively participating in the transition to a circular economy. Players within the Triple Helix Model, such as educational institutions and textile businesses, are willing and enthusiastic to support the transition, but cannot do it on their own. This research aims to identify the definition and scope of MPBC as a regional accelerator, in order to piece together their position within the system. Furthermore, it aims to identify the key players and how MPBC decides who to collaborate with. Finally, it aims to intertwine all of the results to create an effective plan to move forward and allow MPBC to effectively accelerate the transition to a circular economy.

In the end, they need more guidance and support from MPBC as a regional accelerator, which can be provided in a variety of ways. Although these solutions can be mapped out in the shape of creating ecosystems and living labs, many of the solutions also entail MPBC to create structural and organizational changes internally. By creating a foundation that is strong and shows more problem ownership within, they will position themselves to create a more proactive approach for facilitating the collaboration between the educational institutions and textile companies within their scope.

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List of Abbreviations

GHG	Greenhouse Gas
MPBC	Midpoint Brabant Circular
UPCM	Uitvoeringsplan Circulaire Maakindustrie (Execution Plan Circular Manufacturing Industry)
FECT	Fontys Expertise Centrum for Circular Transition
FEHS	Fontys School of Economics
CE	Circular Economy

1 Introduction

The concept of a circular economy, challenging the current linear economic model, has become an ever increasingly urgent topic as a response to the growing concerns surrounding climate change. Although new frameworks are continuously being proposed for a circular economy, the overall concept for implementation remains constant with the aim to minimize waste and pollution, maximize recycling products and materials to keep them in use. Despite this increasing coverage of circular economies and increasing number of organizations that are continuously starting the transition, implementing circular business models is not a simple feat. With this reason top-down orientated governance pushes for accelerators and support that can be deployed.

1.1 Necessity of Circular Economy

The current linear economic structure has the simple guideline to extract the materials, apply energy to them and then in the end sell the product to a consumer who will, in turn, simply dispose and waste any remainder of the product (MacArthur, E., 2013). Such a linear model is “heavily extractive [and] resource intensive” without taking into consideration the long-term environmental effects on land, water, and minerals, consequently leading to significant environmental impacts (MacArthur, E., 2013). In addition to the environmental impact that this model incurs, it is also known to create imbalances that overall affect the economic growth on local, regional and global levels that will continue to worsen due to the continuously changing demographic trends, infrastructure needs, political risks, globalized markets and consequently changing climate (MacArthur, E., 2013).

As the economy is currently structured it allows, at each stage of the value chain, waste which is causally linked to Greenhouse Gas Emissions (GHG), the primary cause of global warming, to be emitted. GHG emissions are amongst the most commonly explored topics in the climate change discussion around the world. Fossil fuels are still a key aspect of our everyday lives, as they are being used in everyday activities such as, heating up houses, kinetic energy in transportation, electricity and especially in the production processes related to extracting and transforming materials used for the products we use daily (Sustainability, D., 2016). This acceleration of climate change shows the urgent need to move away from this current “take, make, dispose” economy and research conducted over the last decade in relation to this need has uncovered a variety of perspectives, models, and strategies of circular economies.

As can be understood from the basic principles and models that are associated with the basis of circular economy, there are various, effective perspectives that can be adopted to support the transition to a more circular business model. It can also be easily argued that the need for such a drastic shift is becoming increasingly urgent. There is plenty of theoretical support to persuade and motivate the organizations and major players within the industries to not only take the first step into this transition, but really to see it through to the end.

1.2 Introduction to Host Organisation

Midpoint Brabant Circular or MPBC is a program of Midpoint Brabant aimed at accelerating the transition to a circular economy. They aim to achieve this by working with business, educational institutions, governments and public organisations. With these organisations they aim to create circular products and services within the entire production and development chain. This program is funded and influenced by different governmental bodies

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Although MPBC is, as a regional accelerator, still in development it offers aspects within its program such as the concept of 'Up-New' which are divers and multiple physical centra where you can experience and see the practical implementations of transitioning to a circular economy. These centres are committed to utilize the so-called 'R-ladder' which describes the different ways of preserving energy and value of products that otherwise would be discarded.

Examples such as these aim to support the main goal of the program of MPBC to contribute and initiate the transition of Mid-Brabant to a 100% circular economy by 2050, because of this MPBC aims to become an international circular hotspot and a pioneer within the European field (Midpoint Brabant, 2020).

1.3 Problem Statement

As earlier mentioned, there are plenty of theories and models to support the implementation of circular business models, but because of its vastness and complexity, companies can't be expected to complete the transition on their own. The transition can be approached in different ways and is often strengthened through the collaboration of different partners. MPBC aims to act as a regional accelerator to support these businesses and entrepreneurs in their transition by making use of the Multi Helix Model. For this study, it will focus on the Triple Helix Model, which is part of the Multi Helix Model, specifying educational institutions and textile companies as players.

Educational institutions have expressed interest in playing a role in the transition to a circular economy. Although they are key players in providing knowledge, ideas and experience on an academic and practical level, the lack of a centralized approach to connecting this interest with business and research opportunities, is limiting the scalability of providing these services of knowledge transfer.

The problem as it is now, is that there are active participants pursuing the transition to a circular economy, as well as educational institutions, willing to offer their support but there is no concrete approach to facilitate the collaboration. By making use of their position within the region of Brabant, MPBC could potentially facilitate the cooperation of industry and university spheres through their governmental sphere. The Triple Helix Model, forms a collaborative

relationship between industry, government and academic institutions in order to share knowledge and competences as accelerating factors.

1.4 Research Objective and Questions

The research objective is to explore and describe MPBC's opportunities for collaborations between business and educational institutions. To come up with an assessment of the regional possibilities and working towards a systematic approach to achieving these collaborations and to explore the possible options within the set framework. Achieving this will open up possibilities regarding professional products and deliverables, these will be determined during the research.

Research Question:

How can **Midpoint Brabant Circular**, act as a regional accelerator within the Triple Helix Model as a facilitator of change connecting educational institutions and the transition to a circular economy within the region of Middle- Brabant?

Sub-questions

1. What is the scope of Midpoint Brabant Circular and the definition of a Regional Accelerator?
2. How are the relevant players within the scope of Midpoint Brabant Circular regarding the transition to a circular economy identified and utilized?
3. What is the perception of educational institutions towards the transition of circular economy?
4. How could the transfer of knowledge towards businesses and organizations help accelerate the transition?

1.5 Research scope

The scope of the research will be limited to the region of Mid-Brabant consulting regional educational institutions and textile companies. The stakeholders for interviewing within the educational system will be limited to MBO and HBO. Information surrounding WO is gathered through personal observations and information from the interviewees, no WO institutions were interviewed following a preliminary conversation with a WO. Feedback from this WO decided it would not participate within the study. The scope within the private sector will be start-ups and small sized companies within the manufacturing industry specifically business operating within the textile industry.

Governmental stakeholders:

- **Midpoint Brabant Circular or MPBC**
 - External advisor

Educational stakeholders:

- MBO:
 - Sint-Lucas
- HBO:
 - Fontys/Avans within FECT(Circular Textile)
 - BUAS (leisure and spatial development)
- **Private stakeholders:**
 - Textile:
 - 20BO (start-up)
 - Schijvens
 - Textiel museum (consortium Drogepand) textile lab

2 Theoretical Framework

The concept of a circular economy is a constantly developing theory and throughout the existing literature, there are many models that present how businesses can begin their transition. However, the transition in itself is a complicated endeavour that needs to take into account multiple levels within society. For a single institution to endure this transition without the support of partners or other institutions would be inefficient. Therefore, it is important to make the link between the different levels within society throughout the macro, meso and micro levels and how they can share their knowledge to accelerate the transition.

The ambitions shared by institutions within these three levels can be strengthened and interlinked by the use of various concepts and theories that will be presented in the chapters below. These theories aim to develop an understanding of the underlying theory that will support the research conducted in order to effectively answer the research questions. The transition theory will introduce the importance of taking into account the macro, meso and micro levels. Thereafter, the Triple Helix Model will be presented to provide an example of how the relevant institutions are seen within such a societal construct. Finally, the transition management cycle will provide a structured approach for the different institutions as they embark on this transition.

2.1 Transition Theory

How institutions successfully make the switch from linear to circular institutions, often include an in-depth transition through multiple levels of their supply chain. Taking this one step further, in order for the overall transition to be successful, it is key that there is a transition at each level of the societal systems. To provide context and full in-depth analysis of such transitions, the transition theory as presented by Loorbach (2007) will provide the base theory that will be explained within this chapter and provide as an overarching framework for the theoretical framework. This theory is the most relevant theory within literature as the practical implications of it are directly seen within the execution plan within Mid-Brabant, this will be explained further once the base of transition theory by Loorbach (2007) is established.

Loorbach (2007, p.17) defines transitions as, “transformation processes in which existing structures, institutions, culture and practices are broken down and new ones are established” and further defines societal transitions as, “processes of change that structurally alter the culture, structure and practices of a societal system”. Within transitions there are many complex processes that need to be taken into account, but for the purpose of this transition theory, Loorbach (2007) claims that the transition theory is based on two major elements specifically: the multi-phase and multi-level concepts. These two concepts are seen to be correlated with each other and together with the system analysis, create a foundation for a strong analysis of the overall status of the system and any possibilities presented for a structural change. For the purpose of this research, the focus will be central to the multi-level concept of the transition theory, providing context surrounding the importance of different societal levels.

This multi-level model originates from research done surrounding innovation and technology as seen by Geels and Kemp (2000) who introduced the model as seen in the figure below. The highest level, the Macro-level, is seen as the landscape which is built around the social values,

political cultures, environments and economic status represents the platform where the change occurs (Loorbach, 2007). This level develops rather independently of the other two levels but still significantly influences the lower levels by initiating change from a top-down perspective.

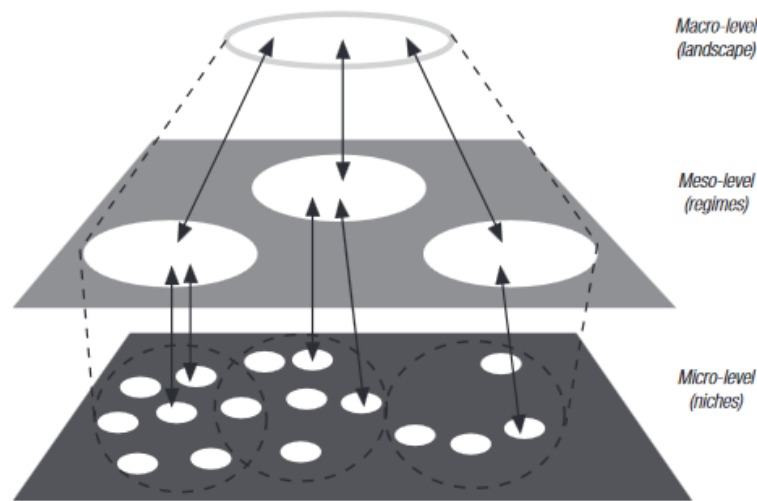


Figure 1 Interaction between different scale levels (Geels and Kemp, 2000)

The middle layer, the meso-level, represents the central level at which a ‘regime’ is located. The regime is where the “dominant culture, structure and practice embodied by physical and immaterial infrastructures (for example roads, power grids, but also routines, actor-networks, power relationships, regulations)” exist (Loorbach, 2007, p. 20). This level provides the systems with a structural and stable direction for individual actors within the model, for example those located within the lower micro-level. With those in the micro-level representing individual entities providing innovations and ‘niche’ novelties that are being developed and tested, often acting as a source of new projects and ideas (Loorbach, 2007).

Although this distinction between the different levels within the multi-level model is a significant step forward in analysing the key players of a transition, a system analysis is needed to context to the interactions happening within the different levels and cross-level as well. Therefore, Loorbach (2007) continues on to present a model of analysis for the systems that provide the necessary information of these interactions, as presented in the next sub section.

2.1.1 System thinking

Taking the multi-level model as presented in the chapter above into account, the system analysis takes this theory one step further by taking into account multiple aspects and how they interact. Such a system analysis is important to provide a full analysis that includes external factors as well as other relevant system dynamics (Loorbach, 2007). This system analysis will provide more insight to the competition that occurs between regimes and niches as found on the meso and micro levels, in addition to the other developments that also occur within the macro level, more considered to represent the external environment (Loorbach, 2007).

Such a system analysis aims to distinguish between “system-internal, system-specific and system-external developments”, which means that this analysis must include the different elements and their interrelations, relating to the regimes (meso level), niches (micro level),

external environment (macro level) and the societal system level (Loorbach, 2007, p. 21). The system analysis components are modelled as seen in the figure below.

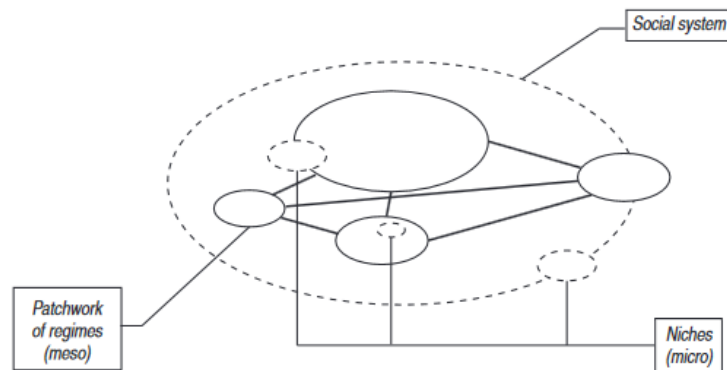


Figure 2 Complex Systems Model based on the MLP (Loorbach, 2007)

For the purpose of this model, the figure presents 4 levels that need to be taken into consideration, however the number of levels can vary throughout different system analyses (Loorbach, 2007). By using this system analysis, there can be more clear boundaries between the levels established, leading to a more in-depth assessment of the overall interactions of the elements.

2.1 UPCM

The Uitvoerings Plan Circulaire Maakindustrie (UPCM), in English Execution Plan Circular Manufacturing Industry for regional accelerators focused on the manufacturing industry (Circulaire Maakindustrie, 2019). The transition theory provided by Loorbach (2007), Geels and Kemp (2000) in collaboration with TNO (The Dutch Organization for Applied Scientific Research) act as a basis for this plan. The UPCM approaches their execution plan following the same structure within the transition theory presented above, with some alterations of their own.

They begin with implementing their plan according to different levels and then go deeper into how each of the levels will interact with each other. In addition to separating the levels and responsibilities, as this is part of an execution plan, they provide timelines for each level. As can be seen in the figure below, UPCM have expanded upon the already defined levels by Geels and Kemp (2000) and added additional levels as found relevant to the timelines over the span of 10 years. The UPCM realises that a transition is not constructable but is born because of independent parties, networks and initiatives work in tandem but independently on common and previously defined goals. Regional circular acceleration programs focused on the manufacturing industry are operating entities working independently towards solving these common goals, working with the UPCM.

Actoren per beslisshorizon

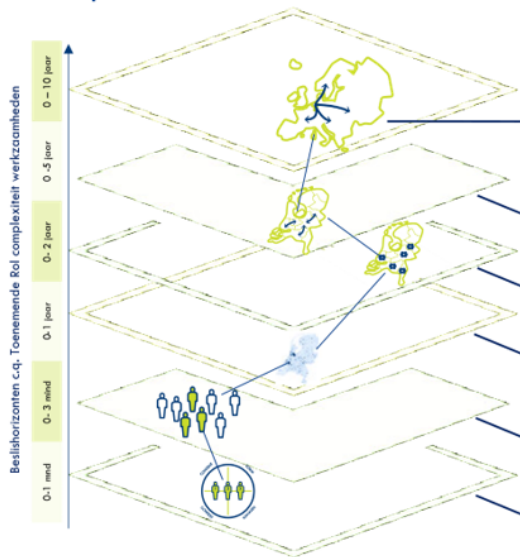


Figure 3 Actors per level (Circulaire Maakindustrie, 2019)



Figure 4 Actions (Circulaire Maakindustrie, 2019)

As the plan moves further down the timeline and correspondingly upwards as seen in the figure, the scopes continuously become broader and broader, which are in line with the different levels as presented by Loorbach (2007). These begin on the individual level (micro levels) and then continue forward through more regional levels (meso levels) all the way to the National and European Union Level (macro levels). In addition to this division of levels in relation to the

roles of each level, the UPCM defines clear relationships between the different levels (Circulaire Maakindustrie, 2019).

This study aims to take this plan one step further and scale it down by investigating where the educational institutions (relevant actors) can play a significant role within the transition limited to mid-Brabant, taking textile companies as a case study within the manufacturing industry.

2.2 Triple Helix Model

To present an example of how the different levels of a multi-level model can be put into practice within the society, as aimed within the research aim of this paper, the Triple Helix Model will be introduced. Triple Helix Model is a model which has had an impact pertaining to innovation emergence and management. This model focuses on facilitating the transfer for knowledge, technology and competences between industry, government and academic spheres (Anttonen et al., 2018). Within this model it is important to consider the scopes that each sphere encompasses in order to assign the right level within a system.

The academic sphere is represented by universities and other institutions within higher education, which can often times be classified within the niche or regime levels. Businesses and different industries range in many varieties of ways. Most businesses operate within the niche level but the bigger the business, the higher the possibility for them to operate within the regime level. For example, with multi-nationals, this is a common theme as they facilitate the possibility to initiate change.

The governmental sphere consists of the public government entities ranging from municipal, regional, national and even international. In addition to these, very specific governmental organizations exist such as waterboards, Nasa and other very specific oriented governmental players. In addition, these institutions can act as a regional accelerator which has a special role within these different scale levels. It aims to translate agendas of change provided by the landscape or so-called innovation cloud into best practices together with organisation within their respective region. Therefore, it works with different organisations on the different scale levels. These organizations are often seen to operate on a regime or landscape level.

Research finds that finding a “balanced configuration” within the actors of a Triple Helix Model, the governmental agencies, industry players and academic institutions could support the acceleration from the current low-risk, low-gain circular economy transition model to a higher-risk, higher-gain developmental model which could create more of an impact in the growth of circular economy (Ranga & Etzkowitz, 2013). This balanced configuration is key to creating a partnership between the three actors, which consequently could facilitate new and innovative organizational models and social interactions (Ranga & Etzkowitz, 2013).

Within this model, each actor has a separate role where they specialize in their own innovations, therefore the creation of a “consensus space” could bring together industry, government, and academia in hopes of putting their “knowledge into practice, transforming it into innovations, patents, new business and organizational formats” which consequently could accelerate the systemic transformation needed in order to make circular economy a reality (Anttonen et al., 2018). This consensus space can act as a place that brings together the spheres to engage in collaborative thinking, discussing, and innovating for advancements that could result in an accelerated transition model (Ranga & Etzkowitz, 2013). In order to reach a successful sustainable and resource efficient improvement, the industry and government spheres could “benefit from closer cooperation with the university sphere” (Anttonen et al., 2018).

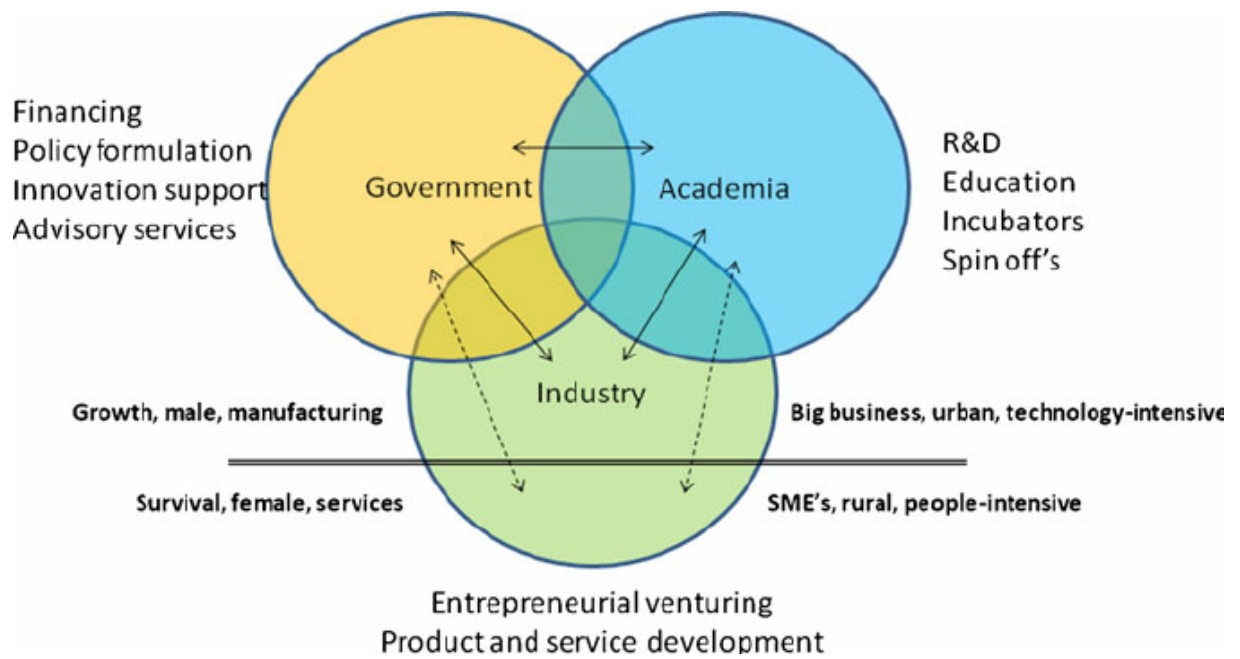


Figure 5 Triple Helix Model (Lindberg, 2014)

2.3 Transition Management Cycle

Although the focus in the previous chapters was centralized on the structure of the system and how different relevant levels interact with each other, this chapter will focus on how those institutions involved with this transition can move forward to efficiently manage the transition, with each institution assuming different roles. Although every transition management process will be unique as there is no one best practice to manage an ever-changing situation, Loorbach (2010) presents a clear and concise model through The Transition Management Cycle, seen in the figure below.

The Transition Management Cycle

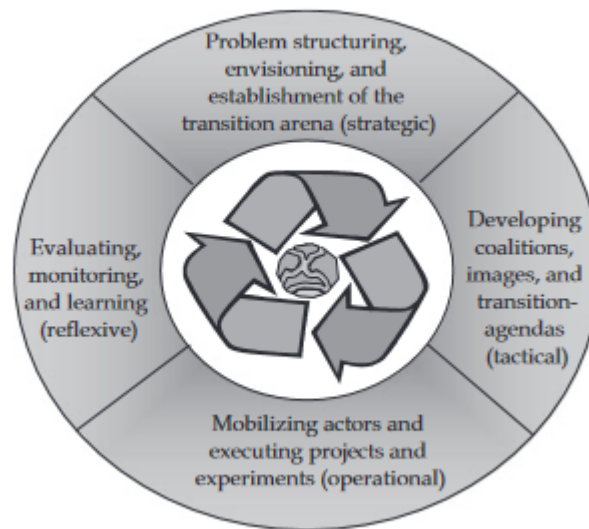


Figure 6 The Transition Management Cycle (Loorbach, 2010)

Similar to the earlier presented transition theory, Loorbach (2010) presents a multilevel framework to approach that provides an analytical perspective of how different societal institutions manage the different levels of a transition. Within this framework, Loorbach (2010) presents four different spheres that refer to the governance process that can be adopted within the transition management processes. These four spheres include, strategic, tactical, operational and reflexive approaches, which will each be developed in the following paragraphs. Although the model presents a clear structured base for managing a transition on a descriptive level, Loorbach (2010) takes the model one step further by diving deeper into the practical, more prescriptive strategy that can be seen parallel with the four governance processes.

The **strategic process** focuses on identifying “processes of vision development, strategic discussions, long-term goal formulation, collective goal and norm setting, and long-term anticipation” (Loorbach, 2010, p. 168). The activity cluster that is most connected to the strategic process refers to the problem structuring and envisioning. These activities focus specifically with debating the cultural aspects of the societal system, bringing together a small group of individual frontrunners, known as the Transition Arena, that each bring various experiences and new perspectives on solutions (Loorbach, 2010). The aim in this process, is to allow the group of frontrunners to work and discuss their various perspectives towards creating a common focus and joint perspective that will make a strong

transitional process. Once these joint perspectives are joined together, a common transition agenda is drawn up.

The transition agenda falls within the **tactical process** which focuses on identifying “steering activities that are interest driven and relate to the dominant structures (regime) of a societal (sub-)system” (Loorbach, 2010, p. 169). This process falls within the activity of coalition and image building. The actors within this sphere are those that are busy dealing with actions such as developing programs, regulation, organizing networks (etc.) and can be found working in different levels of departments and subsectors (Loorbach, 2010). In practice, these groups of actors focus on exploring the possible regime barriers that can be faced during the transition and formulate certain transition paths and translate it into a concrete transition agenda. This transition agenda is then put into play at the operational process level. Possible barriers that these actors are faced with range from regulatory, economic conditions to consumer routines and physical infrastructure (Loorbach, 2010).

Within the **operational process**, the short-term concrete actions are identified and then put into practical use through innovation projects and different business and industry programs, but overall, often referred to as innovations (Loorbach, 2010). In this context, innovation refers to “all societal, technological, institutional, and behavioural practices that introduce or operationalize new structures, culture, routines, or actors” (Loorbach, 2010, p. 170). This level of transition management consists of individuals with ambitions and entrepreneurial skills who carry out the activity cluster of transition experiments that aim to broaden and deepen the already existing knowledge and plan of actions (Loorbach, 2010). These experiments are conducted in the hope that at this level of transition management that a portfolio of transition experiments that strengthen each other can be created (Loorbach, 2010).

2.4 Construct Map Theoretical Framework

This figure (figure 7) aims to clarify the cohesion of the theories and how they apply within the scope of this research.

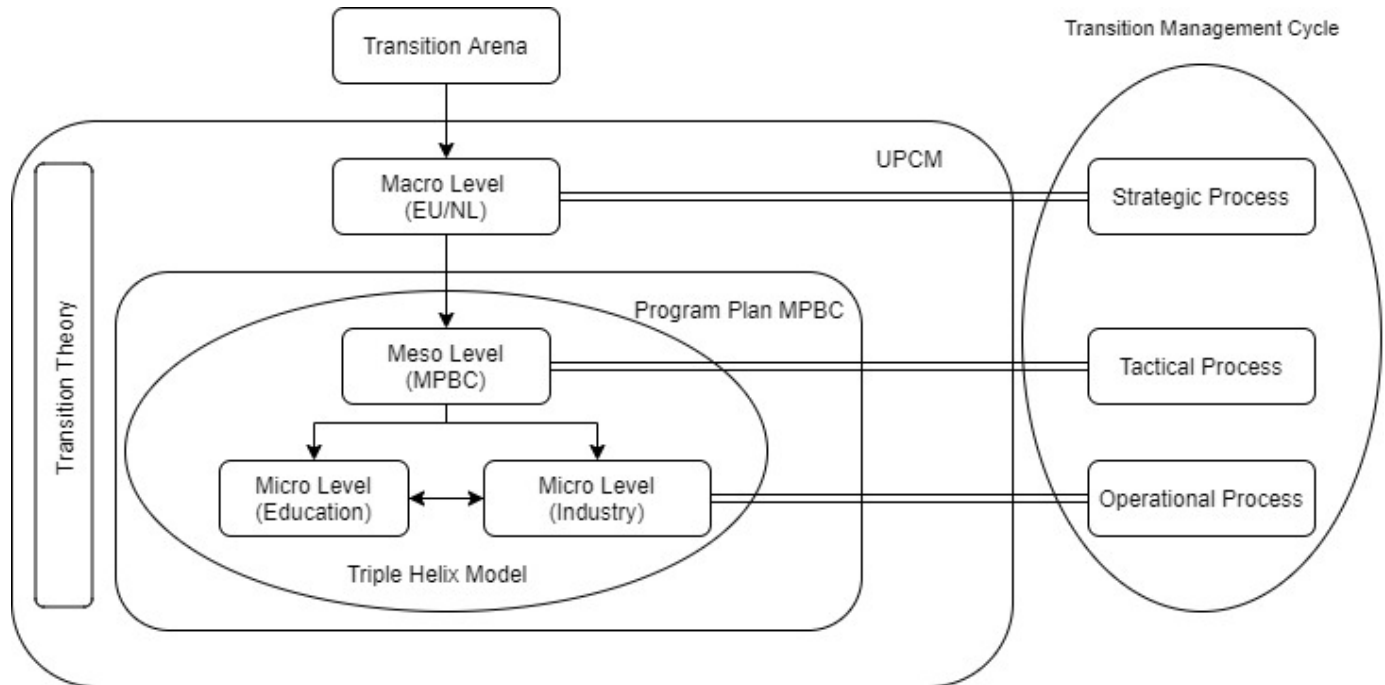


Figure 7 Construct Map of Theoretical Framework

3 Research Design and Methods

3.1 Aims and Objectives

The method of research to be used for this study will follow an exploratory holistic case study approach, MPBC and its role as regional developer as the case. By focusing on the region of North Brabant, specifically with the actions of MPBC, with the main data collection consisting of desk research and interviews with employees, partners of MPBC and the relative organisations as described in chapter two.

The problem statement, as currently defined, will allow the different possibilities to be explored that MPBC can facilitate through making use of the Triple Helix Model theory. Thereafter, drawing a conclusion upon which opportunities within the consensus space of the Triple Helix Model are the most efficient and beneficial for MPBC, the circular economy transition, the regional educational institutions and business.

Considering the specific aims of the research, observation will be important to come to an accurate understanding of specifics and conclusions, regarding the opportunities within the consensus space of the Triple Helix Model. Observations will be a key part of the research as this study is being conducted during employment at the host organization, MBPC. To make sure observations made are accurate, relative, and observed in the right way the study sets out to test, discuss and validate the made observations. This is done by in-depth discussing of made observations to test their accuracy and relevance with in-company employee's and stakeholders.

3.2 Research Type

Case study

Throughout the research there were weekly feedback sessions looking back at obtained insights. This was to ensure maximum effectiveness and understanding of obtained insights. The research aimed to be led by proof and understanding of insights within the complex matrix of facilitating change. By this the research aimed to achieve full utilisation and implementation of proposed products (Kumar, 2019).

Explorative research: The research aimed to explore different possible relations of educational institutions with the circular economy specifically textile companies within the region of Mid Brabant and the possible facilitation role MPBC can play.

Multi-method: the following methods were used: Desk research, semi-structured interviews and observation.

Case study: The case within this study is MPBC.

3.3 Research Design

The figure below presents a visual on how the above mentioned research methods contribute and intertwine to create answers for the research question and sub questions.

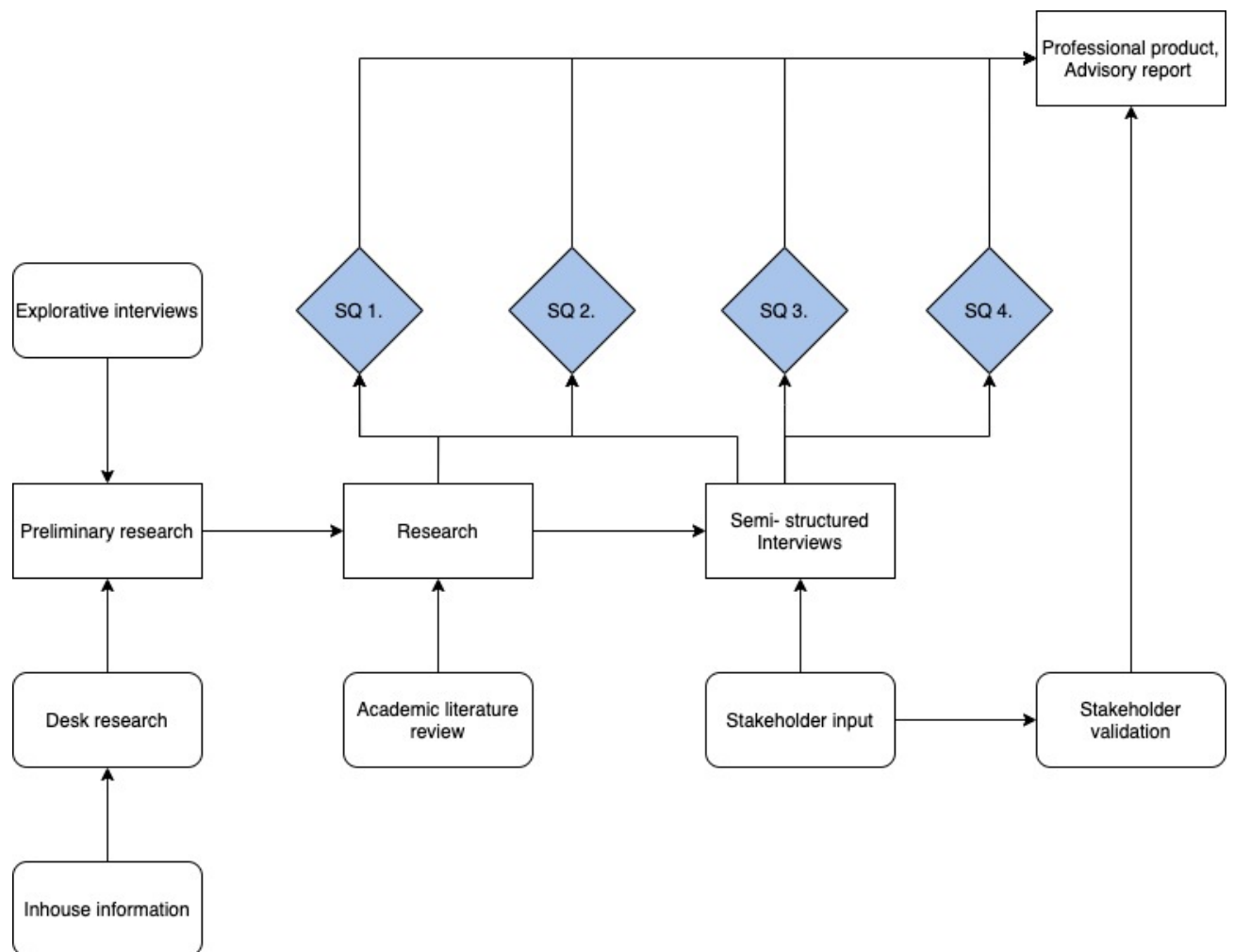


Figure 8 Research Design

3.3.1 Phase 1: Preliminary research

3.3.1.1 Preliminary interview format

Coming to a better understanding of the problem, preliminary conversations were setup to explore different views on the proposed problem statement and research questions (Kumar, 2019). Research questions were incorporated into different interviews format aimed and coming to new understandings of the topic. Three groups were created, one group focussed on educational institutions, another on the textile industry. Next to this observations and in-depth discussions were held to gather more information. Next to this it further strengthened and determined the framing of the research scope and its research questions.

3.3.1.2 Stakeholders Spoken to for Explorative Interviews and Information Gathering

- ERAC
- Midpoint Brabant
- Kennis pact MBO (regio Noord – Midden Brabant)
- University of Tilburg
- BUAS

3.3.1.3 The Educational Group

The educational group consist of interviewee's that work for educational institutions. The following educational institutions were interviewed: Fontys and Avans through their collaboration within the 'Fontys Expertise Centrum for Circular Transition' (FECT), Sint-Lucas and Fontys School of Economics (FEHS). The goal here was to find and explore their perspectives on the questions of how an educational institution can be activated within the region of mid-Brabant through Midpoint Brabant as a facilitator, within the scope of the transition to a circular economy.

3.3.1.4 Textile Industry

The private sector group consisted of one start-up, one small to mid-sized company and one textile lab that have business models aimed at utilizing the R-ladder (circular business models) within their production process. This study limits itself to textile business. The size of these business is determined by its full-time employees (FTE) ranging from small sized (1-15FTE) to midsized business (15+ FTE).

The goal here was to find out what their perspective is on having educational institutions collaborating on achieving their goals and to help with initiating innovation. Another objective was to gather information on how previous experiences have been with working with educational institutions. The interviews with the private sector were aimed at coming to a good understanding of how and what is important for companies when it comes to creating an effective collaboration with educational institutions within the region.

Overall, the goal was to develop the ability to be able to understand the so called “needs” and involvement of these companies within their business models or aim of expanding and improving their business models.

3.3.1.5 The Regional Public Regime

The regional regime consists of the Municipality of Tilburg and surrounding municipalities within the region of Mid-Brabant. Midpoint Brabant is a regional development organization, which aims to accelerate or put in practise the objectives of the area of Mid-Brabant and the Municipality of Tilburg.

3.3.2 Phase 2: Research

3.3.2.1 Literature Research

Considering that the circular economy is a broad topic, it was especially important to research how to form the scope of the research. Transition theory and systems thinking are two theories which are relevant for the research, and this in relation to the circular economy.

The first step of the literature research was to use sources to elaborate on the necessity of the circular economy and the possible implications of educational institutions within the Triple Helix Model, as well as any constructs directly related. Considering that the circular economy is a broad topic it will especially be important to make use of diverse sources.

The literature research was conducted by using electronic search engines such as Google Scholar and Research Gate. As well as the Program Plan of MPBC.

- Academic research reports
- References in diverse reports e.g., external advisory reports
- National and local development plans

Keywords used included circular economy, the necessity of a circular economy, implementation of the circular economy, innovation management, The Triple Helix Model. Next to defining the previously mentioned subjects the research went deeper into the current role of MPBC and its objectives.

Literature research aimed to solve and answer certain sub-questions, specifically sub question two.

3.3.3 Phase 3: Interviews, Product Development and Validation

3.3.3.1 Semi-structured Interviews

Overall, the semi-structured interviews aimed to create an understanding of the opportunities and challenges perceived by educational institutions while the other pool consists of demands, questions, obstacles and more presented and delivered by interviewed textile business. More specifically, these interviews aimed to discover how educational institutions and textile business perceive their own role as well as the role of the other. In this process, potential challenges and opportunities will arise which will play an important role in defining the possibilities of MPBC to become a facilitator of change. Next to this an interview with an advisor of ERAC will be conducted in the same way going into. Figure below shows the key stakeholders. Specific questions and talking points regarding these interviews can be found Appendix A.

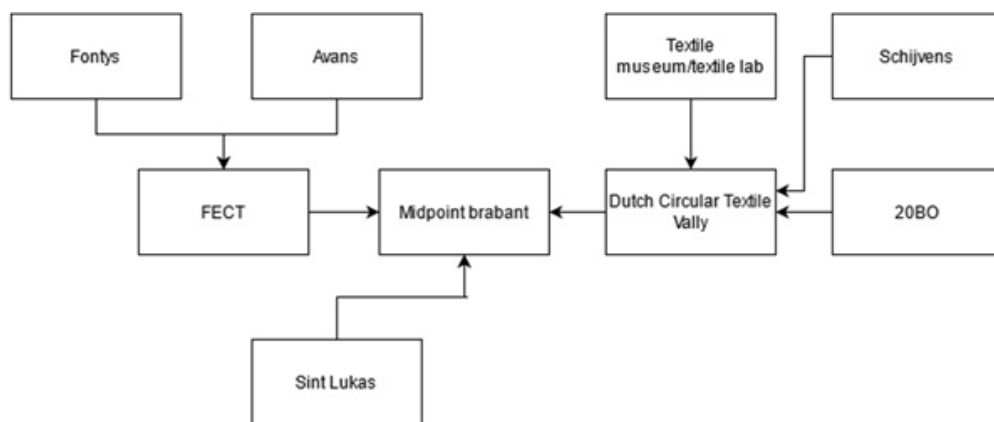


Figure 9 Stakeholder Overview

3.3.3.2 Educational Institutions

The semi-structured interviews with educational institutions were aimed at finding out how the engagement of the educational institutions within the system transition to a circular economy could be done in an effective way. Specifically exploring, for each sphere, which roles can be played, which roles are preferred and the level of necessity for educational institutions to be a part of this transition.

To arrive at these answers, semi-structured interviews were conducted, aiming to paint a clearer picture of the possibilities and preferences. With this information the study engaged in a research by design, with the goal of finding out the demand and supply of knowledge transfer and assistance by educational institutions, designing how an educational institution can systematically fulfill a specific role within the region of North-Brabant to help accelerate the transition to a more circular economy.

3.3.3.3 Textile Industry

The semi-structured interviews with textile companies aimed to explore the so-called ‘demand’ side of knowledge sharing and specifically the challenges and needs they would like to see solved. The problem statement and hypothesis of this study suggest the interviews would go into finding out what the specifics are of this demand. However, next to this, the semi-structured interviews allowed even more about challenges and possible point of assistance relative to the business to be found out. This allowed for the semi-structured interviews held with business to paint a full picture in what way they can be assisted by educational institutions.

3.3.3.4 Analysing results

Analyzing the results of the semi-structured interviews and the data obtained by the interviews was done in the way of thematic analysis.

Analyzing interviews can be a simple or complex task. To make sure assumptions don't cloud the ability to analyze the results properly, this research has chosen for a thematic analysis.

The steps to be followed within the thematic analysis according to Caulfield (2020):

- Step 1: Familiarization
- Step 2: Coding
- Step 3: Generating themes
- Step 4: Reviewing themes
- Step 5: Defining and naming themes
- Step 6: Writing up

Within this thematic analysis there are also a couple of ways to conduct it. The different approaches within thematic analysis are inductive and deductive ways of interpreting the data. When analyzing firstly the data will be analyzed based on earlier perceived themes in a deductive way. However, remaining open for any new insights and themes coming from the data. Which is a more inductive way of analyzing.

When it comes to analyzing people's opinions Caulfield (2020) proposed two different approaches. A semantic and a latent approach. Again, this study utilizes both. First off, the semantic approach which involves analyzing the explicit content of the data will be conducted. This to accurately define the vision and opinion of the interviewees. Afterwards a latent approach might be valuable as it will show assumptions within their social context.

In order to complete this analysis, the program of Atlas.ti will be utilized in order to create coding schemes for each group of interviews. These codes will be broken into themes and used to create a complete, interlinking picture of how the groups would like to work together and what would be needed to make this happen. Coding schemes will be discussed within the results sections and can be found in the appendices.

3.4 Analysis as Conducted

Within this section, the execution of the analysis will be discussed in relation the description in the sections above, going back to the thematic analysis steps as presented by Caufield (2020).

Interviews were conducted through Microsoft teams, consisting of approximately 30-60 minute interviews. These interviews were transcribed from the recordings in order to create documented data that was able to be analyzed and coded. The familiarization with the data was clear once the transcriptions were completed. Thereafter, the data was uploaded into Atlas.ti in order to start the coding process of the documented data.

Atlas.ti is a computer program that can be used for the analysis of qualitative research data, in this case the documented interviews. When analyzing within Atlas.ti, the first steps taken were structure the documented data and read through them to fully understand the information before coding. Thereafter, the key statements through the interviewed were analyzed and tagged based on their perceived relevance and importance to the research question and sub-questions. This was completed through a first round ‘open-coding’ system, where key statements were coded with phrases that identified the importance of the information highlighted.

Once the ‘open-coding’ was completed, the list of codes were grouped into coding groups in order to recognize similarities between the open codes and begin building relationships between the independent codes. From there the codes and groups were reviewed before grouping the code-groups by relevance into overarching themes found within the interviews. These themes are important for understanding what was prominent throughout the interviews in order to prepare for the comparison and interlinking phase of the analysis.

Throughout the analysis and coding, both a deductive and an inductive method of analysis was used. As this was an exploratory study it was key to, in addition to key aspects of the preliminary research, also keep the interpretation of the interviews open for new discoveries. Additionally, due to the semi-structured method of conducting the interviews, there remained room for interpretation of the direct responses from interviewees as well as observing the inferred reactions presented through their personal expressions and responses. This allowed both a semantic and latent approach to be utilized.

The process of coding can be found in the Appendices for further reference and was completed for all interviews, educational institutions, textile companies and the consultant from MPBC. Next to this the process of coding was also applied to the interview with interviewee of Midpoint Brabant. The important findings of the coding schemes for all will be independently discussed within the results section, with independent codes, coding groups and themes presented in bold and then further interlinked to create an overview of the problem in the following section. This will create a response to the main research questions and sub-questions.

3.4.1.1 Observations

During phase 3.3.3 the research allows for observations. These observations were done during the research to allow for the possibilities of obtaining insights through unconventional research measures, such as phone calls, meetings with stakeholders outside of research hours and dialogue.

3.4.1.2 Product Development

Professional product is in the form of an advisory report that provides the research results and proposes a possible approach to act on the obtained results.

3.4.1.3 Validation

Stakeholders for Validation of results.

MPBC Stakeholders - Transition approach and implementation.

- – MPBC/ERAC
 - System analysis + relation to strategic processes
- – MPBC
 - Relation to operational and tactical processes

Educational stakeholders – Validation of practicality and relevance

- – Fontys University of Applied Sciences
 - Educational stakeholder
- – Sint-Lucas
 - Educational stakeholder

3.4.2 Phase 4: Finalising

With the advisory report delivered and the defined recommendations made, the research was finalized.

Advisory report

To develop an advice report for MPBC regarding the research hypothesis. Within the advisory report, the results were used to make visualizations.

Presentation

Develop a presentation regarding given results and professional product.

4 Results

Within this results section, the results are presented individually of each other in order to specifically discuss the different perceptions. However, these perceptions will be joined together within the interpretation and recommendations to answer the research questions.

4.1 Results of Analysis of Educational Institutions

There were overall themes that were discovered throughout all of the interviews. Some key aspects that were the aim of this analysis were to identify how the educational institutions perceived their own role within the system, as well as how they perceived the expected role of regional accelerators, MPBC in particular. Another key aspect was to identify challenges and obstacles recognized by the educational institutions regarding the subject of CE within their own organization, as well as in general. The coding scheme as presented in Appendix B will be discussed within this section.

When discussing the role that educational institutions play within the transition to a circular economy, the interviewees were positive when recognizing the **opportunities for the students** and also **contributions to the companies** that they could bring when in the right situation to participate. As the interviewees discussed that the students could bring a **fresh outlook** and **new ideas** to the companies that are struggling to make connections within the transition. These fresh perspectives would bring innovative ideas that could help the companies overcome a current problem and help them **let go of the old ways** of working. In addition to the contributions this collaboration would have on the companies, it was considered that the impact it would have on the students would present positive outcomes. The **real practices** that the students would be able to work on would foster additional **self-learning** opportunities that could enrich their education.

When discussing the awareness and aims regarding CE, the interviewees recognized challenges within their own organizations regarding the transition to a CE. The interviewees were skeptical surrounding the **limited time and budget** given to them to actively incorporate the subject into their curriculums and to create **real practices for self-learning opportunities**. A **clear agenda was not present** by the management team of the educational institution regarding CE, also a **CE coordinator** was not always present. This is limiting group involvement to address CE within curriculum and left the assignment of taking CE into the curriculum on individual's shoulders. **Individual involvement is strong, but the group involvement is not as present**, therefore the interviewees recognized the positive impact MPBC can have in guiding and collaborating with the educational institutions surrounding the creation of clear roles, agenda's, goals and funding for the organizations.

Further challenges that were emphasized throughout the interviews were strongly related to the topic of real practices presented by working with **real life case studies** interviewees gave a broad set of opportunities, challenges and suggestions for facilitation. Challenge's interviewees proposed in the interview can roughly be divided in two sections. The first section is the **quality of the student**, related to **intrinsic motivation that varies** across student research groups as well as **the lack of quality control of academic requirements** at some schools. The interviewees found significant challenge surrounding the effectiveness of **controlling the**

quality of a student and curriculum, this was also confirmed throughout the interviews. One interviewee supported the idea of having **a tougher program to increase knowledge** and skill of the students. Other interviewees talked about the importance of having **multi-disciplinary student squads** where students with different expertise and education can all work together on solving one issue.

The second challenge is the ability to work with real life case studies. **Real life cases surrounding CE are in very limited supply** according to the interviewees, finding real life case studies, challenges the institutions to actively search for companies who can present them with such cases. Costing time and budget. This in the end is also difficult as **the academic schedules often do not line up with project timings**. These challenges are seen, from the educational institution, as challenges that can be eradicated through additional guidance and support from MPBC.

4.2 Results of Analysis of Textile Companies

Similar to the educational institutions, the textile companies identify their own roles and needs within the transition to a circular economy and partnerships within the Triple Helix Model from a different perspective. The current role of textile companies as presented by the interviewees, brought up different themes of **general challenges**, **challenges more specific to collaboration with educational institutions**, **current actions** they are taking to enhance collaboration as well as the **needs and wants they suggest from collaboration** within the Triple Helix Model specifically educational institutions. The coding scheme presented within this section can be found in Appendix C.

The majority of the **general challenges concerning the transition** are seen to be surrounding the misalignment and **mismatch of perspectives** on what circular economy is and how to tackle the transition. More specifically, the interviewees identified that there is **no common way of working** or **communicating** across the different businesses and partners, which often creates difficulty when working together. This goes deeper into how each business and collaboration partner has **different individual goals** and **different rules** about how to move forward regarding the transition to a CE.

Following the discussion surrounding general challenges, the interviewees were asked to elaborate on more specific collaborations, either existing or potential, with regional accelerators such as MPBC and educational institutions. When discussing the **current collaboration with educational institutions**, interviewees described that their businesses were often **choosing schools that were within their own industry**, as well as placing a focus on **MBO and HBO**. The collaboration between these businesses and educational institutions were seen in the form of **real-life projects** in which the businesses were **creating real life questions for the students**, which would **allow the students to work in a systematic way**.

Although the interviewees explained that they **do not mind supervising and educating students** and **contribute to the general education of new professionals**, they had quite some feedback surrounding the quality of the students work. The major **challenges surrounding the quality of students' work** were mostly tied back to the **quality of academics** within the educational institutions themselves. Overall, the students presented by educational institutions are seen from the interviewees as **students who have limited knowledge on circular economy**. This lack of knowledge was seen to be because there is **no specific department in educational institutions for circular economy** and the topic itself is **limited in the curriculum**. Although the quality of students is a challenge that needs to be addressed, the businesses still showed a positive perspective on the knowledge sharing between the institution; however, expressed the **need for a middleman**, such as MPBC, to **facilitate the knowledge sharing**.

Having a regional accelerator such as **MPBC as a middleman** would be beneficial when guiding and facilitating the partnerships between businesses and educational institutions, as well as other beneficial aspects of such a partnership. The interviewees saw the role of regional accelerators, as MPBC, to cover a variety of responsibilities that address their needs. By **facilitating the matching of educational institutions and businesses**, they would support the businesses with finding suitable students for projects. In addition to support surrounding

matching the competencies, they can also support with financial questions as well, as the interviewees identified their challenges surrounding **not knowing what options of financial support there are**. The interviewees explained that **MPBC should act as a central regional platform for financial support**. Overall, textile companies are seen as asking for support in creating the connections needed to add value to their existing efforts in many different forms, through facilitation of connections as well as advice around practical matters.

4.3 Results of Analysis of External Consultant from MPBC

The definition of a regional accelerator differs as the concept of a region accelerator is still being developed. Around the topic of circular economy there are a number of prominent examples of regional accelerators, including MPBC. For this interview an external consultant from MPBC was interviewed with the aim of understanding their perspective of the collaborations with educational institutions, textile businesses and their overall role within the Triple Helix Model. Within the circularity theme, the transition task is considerable and can only be fulfilled through intensive cooperation of different parties in the socio-economic landscape. The coding scheme for this section can be found in Appendix D.

A regional accelerator, within circularity, is required to have validation and mandate in order to take a leading role in the transition, which is a major aspect that was discussed in the interview. Throughout the interview there were common themes surrounding the **present state and role** of both **educational institutions** and **regional accelerators** within the Triple Helix model, **overall challenges** faced by all players in the Triple Helix model, **suggestions from MPBC for future collaboration** and further **system** and **validation** information.

When discussing the role of a regional accelerator surrounding the theme of the transition to a circular economy, the interviewee presented that they are given **the goal of helping with resolving the challenges a circular economy aims to solve**; the **reduction of Co2** and the associated environmental pressure, **the scarcity of physical resources and the scarcity of rare materials**, preserving the **value of materials and products** to reduce wastefulness. Different levels of government write out plans and policy to push business and organisations but **cannot support small businesses directly** due to legislation on governmental support, the so called ‘staats steun toets’ or state aid test. That’s why regional accelerators see their role as needing to **facilitate this change within their own respective regions**.

MPBC focuses primarily on **small to midsize enterprises** or SMEs. Companies in the region will have to make the transition to a more circular way of doing business, they become part of a circular value chain. In order to select the right parties to work with, regional accelerators focus on the so-called early adopters. These are companies that are aware of their transition task and want to implement it now. The means for selecting these collaborators come down to the role of MPBC **analysing their willingness to cooperate in the system transition** as well as **their willingness to take risks and innovate**. Validating their way of operating in a circular way of can be done by means of various instruments that have been developed such as a **material passport, the fingerprint method** and more. Other tools are still being developed.

Within this study the cases for these companies were limited to companies within the textile industry. Within the textile industry, the interviewee presented many success stories of companies with a high-quality circular business model. One of the important roles of and for these companies is to share their success stories and to focus heavily on inspiration and awareness. According to the interviewee, MPBC should take an active role in this, in order to cash in on their success stories by inspiring society and more specific the younger generations, as they are needed to become the **CE professionals** of the future.

The partnerships between MPBC, companies and educational institutions are seen to be an opportunity for accelerating this transition and education of future CE professionals. However, in general the interviewee explains **overall challenges** that can be seen by all players in the

Triple Helix model, mostly related to the **misalignment amongst partners**, creating a challenging environment to collaborate in. It was stated that as CE is continuously developing, there is a **lack of problem ownership** that also creates this misalignment. Elaborating on this misalignment, the interviewee described the major points in regard to there **not being an aligned way of working** and that different partners **choose their own path regarding CE**. This misalignment and misunderstanding of processes and goals was seen to put the regional accelerator at risk for **supporting less meaningful innovations**. Due to this misalignment, the interviewee expresses that this is where MPBC has the opportunity to be a **one-stop-shop for facilitation** that would help align the different partners and all organisations and business within its region.

This is something that can be seen already to an extent in the collaboration with educational institutions. The role of the educational institutions according to the interviewee is multi-fold. Regional accelerators and in this case **MPBC set up ecosystems** which have the goal to **educate CE professionals** and solve **real life cases** according to the interviewee. According to the transition expert a difference within the perceived roles for the different education institutions can be seen within the different program plans they had worked on. The **MBO** is very much needed to solve the **technical aspects** within this transition question. In the end especially with the upcycling and value preservation aspect, it's very important according to the interviewee.

The interviewee mentioned that the non-technical **WO's (Universities)** are **harder to involve** within the transition. The Interviewee elaborated that as they operate in a less applied way, involving the WO within the transition is more difficult. The interviewee explained that the WO are **more valuable for in-depth research**, according to the interviewee this is harder to provide for a player as MPBC. The technical universities on the other hand play a role on their own as they are very valuable for providing technical expertise and ignite innovation within themselves. The interviewee presented that **HBO or universities of applied sciences** are more suitable to be activated within the regional scope of a regional accelerator. With their more applied approach they offer a **more pragmatic approach** and are more **suitable for living labs** surrounding the topic of the transition to a CE. According to the interviewee these living labs match nicely with the earlier described task of setting up **ecosystems**.

However, the interviewee recognized that there were challenges that arose in the past and need to be addressed to move forward with the collaboration. The challenges seen were in relation to the **quality control of the educational institutions and their students** as well as **the limited flexibility provided by the Department of Education** when changing and trying new curriculum. MPBC's suggestions surrounding these challenges relates to the educational institutions focusing on **educating new CE professionals** through a **change of curriculum**. By enhancing the quality of students that they can supply to businesses, they would strengthen their role as a **counterpart to the small businesses** within this transition. In order to support the educational institutions with these changes, MPBC recognized that they could be **collecting feedback in order to lobby for more adapted educational laws/criteria**.

Furthermore, the interviewee identified suggestions for the future of actions and responsibilities that they could take on in order to create a smoother environment for collaboration. These actions included but were not limited to, **aligning a common way of working and communicating, rewarding pioneers to encourage innovation**, as well as **facilitating**

ecosystems to spark innovation. These actions would not only benefit the educational institutions and businesses already working with regional accelerators such as MPBC, but also other important players such as **financial parties** (i.e. the financing table), **business support parties** (i.e. Braventure and business coaches) and other **governmental entities**.

5 Interpretation and Discussion

5.1 Sub-Question 1

What is the scope of Midpoint Brabant Circular and the definition of a Regional Accelerator?

Within this section, the above-mentioned results will be considered and interpreted, taking into consideration all of the different perspectives in order to answer the main and sub research questions. To begin with, sub-question one will be discussed in order to identify the working scope of MPBC and the overall definition of a regional accelerator in relation to the information the interviewees have provided. It is clear that the concept of a region accelerator is still being developed, but around the topic of circular economy there are a number of prominent examples including MPBC.

In general, the operational field of a regional accelerator is, a geographically limited area in which they act on a specific issue, in this case circularity. A regional accelerator is a hybrid organization that works in the Multi Helix system funded and validated from different layers of government, but also by private and public parties. These operate within their own respective regions and aim to facilitate change for the actors specifically within their region. MPBC operates within this definition and aims to be a player and facilitator of change surrounding the topic of the transition to a circular economy. First and foremost, MPBC shares the goal of helping with resolving various challenges that a circular economy aims to solve in general, including the preservation of value, scarcity of resources, reduction of Co2 and associated environmental pressures, with multiple players and partners within its sphere.

From a broader perspective, it is important to recognize the other governmental entities, falling in the Macro-level (landscape), are a separate class within the classification of relevance around the circular economy. The transition agenda presented to the lower levels in a top-down way makes sure of this. They are the beginning and sometimes the end of a process because these government entities fund MPBC's program and are also a key stakeholder in many implementations plans of Midpoint Brabant's circular program plan. Some proposed implementations of its program expect input or commitment from a specific (often municipal) government. The identity of a regional accelerator therefore isn't specifically governmental, it can fill a governmental role up until a certain degree but also works together when needed with all governmental entities. Qualifying the right government organization for a regional accelerator always depends on its own identity.

Within this role it aims to work with all parties within not only the Triple Helix but also the Multi Helix. MPBC does this through a number of different umbrella programs, namely 'uitvoeringsplan circulaire maakindustrie (UPCM). As introduced in section 2.3, the UPCM acts as a more applied transition theory built off of the transition theory presented by Loorbach (2007). Within this program MPBC acts as an independent player and engages in an actor analysis to analyse and prioritise the relevant actors within its operating field for the transition in their area. In this way it is able to speed up transition activities, initiatives and interventions. The scope of these activities places MPBC on the middle-layer of the multi-level transition, on the meso-level (regime). Their responsibility within this position of the transition places them

in a level to guide and facilitate cooperation for the micro-level (niche) players. On the other hand, it gives the macro-level (landscape) entities a pathway to effectively facilitate change through the position of MPBC in the meso-level (regime).

There are 44.000 companies, in the Netherlands, engaged in the manufacturing industry and even more other relative organisations such as educational institutions, financial institutions, government bodies and other companies play a role in this industry. As can be seen the entirety of the manufacturing industry is massive. The role of MPBC as a regional 'cluster' within the area of mid-Brabant, is to build small cornerstones for the overall transition towards a circular economy. Although it operated within this umbrella program, it also aims to involve itself in new and additional programs that align with its own identify.

MPBC has its own financed and validated program for the implementation and interpretation of its set goals aims and ambitions, which it does by operating within the transition management cycle specifically the tactical process. The tactical process as performed by MPBC allows them, as a regional accelerator, to steer and organize networks between the players within the micro level by providing plans and delivering programs to accelerate the transition. With this responsibility comes the support actions that MPBC should use this position to build inspiring images and visions for micro-level players to incorporate into their own processes.

Within the tactical level, it also acts as so-called hatch between the strategic and operational processes, which can be seen in the position that MPBC assumes within the Triple Helix Model. As MPBC fills the governmental sphere within the Triple Helix Model, it aims to translate the transition agendas provided by the landscape region into the best practices for the other (operational) spheres to interpret and act upon. More practical actions can be shown through the goals of setting up ecosystems, as well as lobbying and supporting the strategic processes by supplying them with insights collected on the operational and tactical processes.

As the governmental player within the Triple Helix Model, MPBC focuses on choosing partners to collaborate with within the educational sphere and industry spheres. MPBC specifically focuses on small to midsized enterprises, specifically textile companies within this study, as well as educational instructions spanning across MBO, HBO, and WO depending on the aim of collaboration.

It operates in the system thinking way as proposed by the theoretical framework by supporting and facilitating initiatives while also utilizing the available tools to validate these initiatives on their meaningful innovation and the way they operate. This validation prevents greenwashing and a so-called waterbed effect.

5.2 Sub-Question 2

How are the relevant players within the scope of Midpoint Brabant Circular regarding the transition to a circular economy identified and utilized?

This collaboration is a key aspect of the transition to a circular economy because the transition task is considerable and can only be fulfilled through intensive cooperation of different parties in the socio-economic landscape. Therefore, the Triple Helix model allows for a “balanced configuration” to be established between these spheres (Ranga & Etzkowitz, 2013). This partnership between the three spheres is a stepping stone to creating and facilitating new innovative models and interactions between the partners. MPBC has a choice of different parties in their operational field, with whom it can set up collaborations. Key to choosing their partners are those that are in line with their own program, their goals and the larger programs (UPCM) and policies that MPBC wants to implement, MPBC is critical of the collaborations it enters into.

As mentioned, MPBC places emphasis on SMEs to fill their industry sphere within the Triple Helix Model, which fall within the micro-level of the transition theory according to Loorbach (2007). Although not all companies fall within this level, those within the scope of this research do based on their smaller size, allowing them to act as individual entities acting as a source of new projects and ideas. These companies are important to choose based on extensive analysis of not only their willingness to cooperate in the system transition but as well as their willingness to take risks and innovate.

Creating pools and designing value chains with SMEs is a difficult task. It requires a lot of cooperation, sharing ways of conducting business, being open to change and sometimes also realizing that some business models are too polluting and out of date. This task is very intensive and requires a very innovative mindset from the companies. Most success stories are seen with small innovative companies that can more easily pick up a position in the circular value chain, or companies that cover a large part of its own production chain.

Once the players within the industry chain are identified, it is also important for MPBC to carefully decide and match educational institutions that create meaningful collaborations with the companies. Each of the different universities play a different role within the educational sphere and therefore MPBC utilizes them in different ways. MBO and HBO are more useful for technical aspects and creating a pragmatic approach to the problems presented by the companies. WO on the other hand create more opportunities to provide valuable insights for in-depth research. MPBC often prefers to work with MBO and HBO as they provide the operational approach that match more with company projects. The educational institutions act as a counter-part for the players within the industry. The industry provide real-life problems for the students to solve.

The decision on who to collaborate with plays a large role as the transition agenda created within the tactical level of MPBC, will be put into play on the operational process level, in which the industry and educational spheres operate on. The operational process represents the concrete actions that are identified and put into practical use by the players. Companies within the industry sphere are creating concrete innovation plans and hoping for support from students

to practically research and implement these innovations. MPBC facilitates this, therefore it first identifies fitting matches and then utilizes them by orchestrating their match.

In addition to the different players of the Triple Helix M as presented in section 2.3, this study discovered that other public-private organizations or so-called support organizations are also key within the collaboration to accelerate the transition to a circular economy. Business coaches, start-up facilitators and various living labs run by public and private stakeholders are important members of MPBC's network. Private financiers and partnerships that offer private funding are also an important player, when a circular value chain or a company with a circular way of doing business is a possibility. These are all part of the Multi Helix Model.

Successful initiatives, or declined initiatives not fitting within MPBC's identity, scope or boundaries, can still be utilized by MPBC. MPBC gives substance to this by means of a so-called Portal. This Portal has an enclosing function around its program. Through the portal, MPBC can pass on successful or appropriate (circular) initiatives or connect them with the right and appropriate organizations that will then help the initiative along.

Additionally, validation is of utmost importance here, the various tools for validating a circular initiative are needed and the conscious and proper application of these is a responsibility that MPBC needs to pay close attention to. A so-called waterbed effect must be avoided, which happens when a well-intentioned and apparently circular innovation in the long run still causes significant environmental damage. MPBC aims to identify and utilize the different parties within its scope taking the previously mentioned into account and act accordingly.

5.3 Sub-Question 3

What is the perception of educational institutions towards the transition of circular economy?

The educational institutions within this collaboration and partnership are a key player as they supply the students that can be assigned to different projects presented by the textile companies. Their position on the micro-level (niche) of the transition theory, places them as individual entities that are expected to bring students who are able to develop the research that are expected from them. This new and fresh perspective that the students are expected to bring are seen as strong opportunities for students to contribute to companies, but they are struggling to facilitate it on their own.

The current perception surrounding the concept of a circular economy itself within educational institutions is existent but still not developed. Individual players within the educational institutions are taking the lead, while the collective awareness is lacking. These individuals are struggling with current and potential challenges that they recognize, in which they recognize their responsibility to eradicate some of these challenges, but do need support with other challenges.

Challenges that they find difficult to fix themselves include specific topics surrounding information about circular economy in general. They view their need for a middle-man, such as MPBC, to provide them with a clear agenda, goal and inspiring vision to instil motivation and structure to the students who mostly do show intrinsic motivation and hopefully spark more interest. Additionally, the educational institutions are searching for nourishment for their programs, they want to do this by means of living labs and real-life practice within companies. However, the challenge of finding good questions around the theme of the circular economy is encountered or better said limited. Educational institutions indicate that they often do not have enough resources for this themselves. It was therefore indicated that they are mainly looking for guidance and an appropriate role that they can play. The educational institutions are keen to

5.4 Sub-Question 4

How could the transfer of knowledge towards businesses and organizations help accelerate the transition?

Although the educational institutions are aware and working towards solutions for their challenges, the contribution and investing in these challenges will add significant value in the future. This is also that the textile companies within the industry sphere is aware of as well. Although the companies feel the challenges as heavy as the educational institution, the long term education of these students have a benefit for the future of the transition in general.

By allowing students to come into their companies and create self-learning opportunities in the real-life problems that the companies bring forward, it creates a cycle of effective educating of CE professionals for the future. It is sometimes difficult for the companies to see the exact impact of the student's research and work on their problems due to the difficulty of measuring the quality of the research they are doing. However, by acting as mentors and educating these students within their projects and advocating for them on a higher level that could affect the level of education they will receive in the future, future CE professionals will be created.

This has significant impact on the future of the transition on a long-term basis, in the sense that this will in the future create an acceleration of the transition to a circular economy in general as well. As these students and the collaborators within the companies all land within the same operating process on the micro-level, they together are ambitious individuals would are able to try out different experiments and projects to hopefully broaden and deepen the already existing knowledge. Through this collaboration, companies benefit in strengthening the future position of these students and their own professionals by working together today.

5.5 Main Question

How can Midpoint Brabant Circular, act as a regional accelerator within the Triple Helix Model as a facilitator of change connecting educational institutions and the transition to a circular economy within the region of Middle- Brabant?

The collaboration between the different spheres, while utilizing MPBC as a regional accelerator and acting as a middle-man, will create a cycle of education and collaboration that will have long term effects for the transition to a circular economy. By created a balance configuration within this Triple Helix Model, the partners can contribute to the larger picture of the transition together by developing the future way of working. By finding a balance that works, new innovation, not only in the practical matters of the transition, but also within the management and social aspects, will be sparked and already set the future generation of CE professionals a step ahead.

MPBC must create an extensive system analysis of the players within their region and specifically map out the different elements and the interrelations between each of them in order to work as a matchmaker for the educational and industry spheres. Creating more concrete boundaries and responsibilities for the partners will allow all of the players to structure their internal contributions and in the end create a more effective partnership. This can be done in multiple ways and more concrete practical recommendations will be found within the next section, however, in summary MPBC can facilitate the consensus space for the spheres in order to bring them together to engage in collaborative thinking, discuss, and innovate for advancements. This can be understood on a literal level within physical hubs, that will further be discussed, as well as MPBC creating a network that will act as the space for the spheres to connect with the facilitation of MPBC.

6 Recommendations

The research generated an abundance of results and data that were very interesting but not specifically needed to answer the scope of this research. This data has been taken into account by the advisory report added within the portfolio and presented to MPBC.

Acting as a middleman itself, MPBC, in order to be proactive when it comes to actively facilitating, will have to increase their communication with business and educational institutions, to strengthen their role as a problem owner of the circular economy within the region of Midden Brabant. By taking ownership within this region, it can act as a guiding organization for those who have a less clear view on the steps they need to take within the transition. In order to facilitate this ownership and guidance, MPBC must hire more people with backgrounds that suffice in executing the tasks of account managing, relation management and communication. These employees will take ownership for certain pools either filled with educational institutions or companies.

A proactive stance makes for a more effective and aware regional accelerator. By working actively, MPBC will have a broader and deeper overview what goes on in their region, you can then more easily create the right and needed ecosystems acting on the things that are either already existing or very needed. With the different players within your Multi Helix system, everyone moves at their own pace, which makes it important for the responsible employees to create their own overview and clearly collaborate within MPBC to create effective partnerships. In that way, a designed approach on orchestrating and facilitation the right cross helix combination makes for a higher chance of success. Knowing with which players to play improves the success of designing circular value chains.

Furthermore, when involving educational institutions within these cross helix combinations it is important to be aware of their limitations. MPBC could engage with policy makers within these educational institutions to proactively discuss the importance of circular economy and the way the organisation would like to operate within this field. It should, together with the organisation research into the ways how educational institutions can add value to real-life problems bring forward new insights and efficient ways for collaboration. Being a leader in this still young socio-economic transition landscape is one of the core values MPBC should keep in mind; work with them, guide them and help solve their limitations by collecting their feedback and utilizing MPBC's position to lobby for improved position for educational institutions. These improvements can be done through strong and clear communication with the Department of Education and the Department of Climate and Economics.

In addition, when looking at the regional scope and the question on how to effectively connect the educational institutions with the manufacturing industry and specifically the textile industry, MPBC should take up a pro-active role in setting up more ecosystems together with business and educational institutions. These will strengthen MPBC's position to be an effective facilitator and orchestrator of cross sectional knowledge sharing and innovation. Within these ecosystems, it should further actively map out the demands of the regional textile business and find out which research questions would be doing this by matching with the right educations of regional educational partners and if not institutions.

Having one person talk to educational institutions and the other person to talk to textile companies and finding connections within this organisational network is very important. In the end, the study concluded that both educational institutions and businesses want to be guided and the business are seeking more support. These demands both require a very pro-active stance. Showing the validation and the socio-economic coherency of the way of working and identity of MPBC has led MPBC in the past to already collect increased financing for its program. Overall, because of the newness of this circular transition there is an increasing need surrounding the facilitation of knowledge and guidance surrounding the subject of circular economy. Further detailed recommendations can be found in the advisory report.

7 Limitations and Recommendation for Future Research

Due to the complicated nature of the circular economy transition in general, not all aspects that could be deemed important were able to be taken into consideration within the scope of this research. Additional steps can be taken in future research that could lead to more detailed and elaborated concepts surrounding this topic. Furthermore, barriers within this research could be cautiously thought of for future research.

Future research could go into more details on how to collectively combat challenges that are seen by the different players. More specifically, increasing the quality of the resources from the educational institutions. As this challenge surrounding the quality of the students, intrinsic motivation of the students as well as how to inspire the students was mentioned consistently throughout the interviews, it would be key to find an efficient way to work towards a solution.

Another topic for research that could add valuable insights to this topic would be to dive deeper into how MPBC could facilitate ecosystems effectively. As there are a lot of different players involved, who all move at their own pace, it is a puzzle that needs to be well thought out. Through this, it could find an effective way of utilizing these ecosystems and living labs to actively solve real life problems presented by the textile companies.

Some limitations found within this research could also be avoided in future research. As the interviews and the transcripts were in Dutch, translating of the results from the analysis of the transcripts, could have caused some of the information could have been lost in translation. When writing interpretation of Dutch interviews in English, it was sometimes difficult to explain the meanings found within to the same extent as it would have been if it did not have to be translated.

Additionally, the semi-structured interviews, although it allowed interviewees to speak freely, it also did not limit the amount of details that the interviewees could go into. Some went further into details that, although interesting, were outside of the scope of this research. This overflow of data sometimes made it difficult to pin point exactly what was relevant to answer the research questions. Therefore, within the coding presented within the appendices all initial codes from the analysis was included, although not all codes were brought forward in the results and conclusion.

During the analysis there were codes made that were seemingly relevant at the time of the analysis, but in the end were either too specific or limited relation to the scope. For example, the additional theories presented by the external consultant of MPBC added additional insight that could not be applied within the scope of this research, as they consisted of some abstract ideas that would need additional research to fully apply and understand.

Finally, due to Covid-19, there was a limitation of experiencing some of the topics and suggested ideas in person, which could have provided a broader personal perspective, that could enriched the analysis. For example, Sint Lucas wanted to show a makers facility where students put seemingly similar collaborations into practice. This would be something for future researchers to keep in mind to add to their perspectives.

8 Conclusion

As a concept that is continuously being developed within circular economy, Midpoint Brabant Circular, as a regional accelerator is positioned in a position that has potential for having a significant impact on the players within their region. The players within the Triple Helix Model, educational institutions and textile businesses, are eager to move forward with their contribution to the transition.

The need for more guidance and information surrounding the transition and circular economy in general is a key aspect of what these players need. MPBC can utilize their position, after some internal organization and prioritization, to be the middle-man for these two players. This can be done in a variety of ways in which this study aims to present. As this is an extensive topic that is not yet developed, many meaningful insights were provided and have created a base for further research.

By taking the recommendations above and within the advisory report into account, MPBC will be in a more situated position to facilitate collaboration for meaningful innovations. Within the entire system, it is clear that there are players that are looking for a place within the transition to a circular economy. By using their position to strengthen the already existing support and enthusiasm with more practical support, the system as a whole can make large strides forward within this transition.

The key aspect here is that MPBC needs to create their internal organization to become a strong foundation for their partners. With this base, it can provide the guidance that their players are already asking for. Although there is a lot of work being done and structure present for the transition to a circular economy in the region of mid Brabant, it can be concluded that some individual players are further ahead while others need more development. This proactive guidance provided by MPBC will have a strong impact.

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10 Appendices

Appendix A: Interview Questions and Talking Points

Interview Questions Research Phase 3

What is the operational field and definition of a Regional Accelerator?

Questions here are aimed more specifically at the external consultant of MPBC, however could be used to retrieve perceptions from all interviewee groups.

- a. Who is the problem owner of the transition?
 - b. What are we actually doing?
 - c. What resources do we have and what do we need to be an effective regional driver?
 - d. Why middle brabant?
2. How would you describe the role of MPBC?
 - a. How does this relate to the transition theory?
 - b. How does this help regional parties?
 - c. What are your problems with the rollout of a regional accelerator?
 - d. Do partners/clients get stuck in their way of thinking and are thwarted by laws and regulations?
3. Could you please describe the current scope of MPBC's
4. How would you describe the relationship that MPBC has with their clients?
5. How do you perceive the role of MPBC and regional developers like her?
 - a. What should they do?
 - b. What do you think from this perspective what role knowledge agencies should have?

View and role of educational institutions towards the transition of circular economy?

Questions here are aimed more specifically at the educational institutions, however could be used to retrieve perceptions from all interviewee groups.

1. How is your institution currently contributing to the transition to a circular economy (if any)?
2. How would you describe the added value the research conducted by the students and professors?
3. Do you feel that the sharing and applying of knowledge is done in a effective and efficient way
 - a. In what way would your organization be helped by the facilitation of designed problem statements and assignments regarding the transition to a CE?
4. In which fields of study does your organization excel/feels it can add value
 - a. The more technical studies?
 - b. The more socio/economic studies?
5. Please describe your current experience within the Triple Helix Model.
 - a. Have you worked with companies before? Describe the dynamics of this collaboration.

- Please describe which different ways your organization collaborates with companies regarding innovation questions surrounding the circular economy?
 - How would you describe the experience surrounding the effectiveness of the way of knowledge transfer?
 - Can you tell me about success stories?
- b. Have you worked with regional governmental agencies before? Describe the dynamics of this collaboration.
6. How would you describe the current alignment between your company's agendas and timeframes with your semester schedules and curriculum?

How could the transfer of knowledge towards businesses and organizations help accelerate the transition?

Questions here are aimed more specifically at the textile companies, however could be used to retrieve perceptions from all interviewee groups.

1. With the transition agenda and change management, most of the time we perceive a top-down approach out of international or national governments. How does your organization feel about that?
 - a. Do you feel that your organization has a clear image at what it needs or can act on?
 - b. Would your organization be helped by more hands-on regional or local guidance regarding these agenda's?
2. How can regional accelerators facilitate the cocreation and joint development of the transition to a circular economy through business and educational institutions?

Triple helix model

Questions here are aimed at all interviewee groups.

1. How does your organization see itself within the triple helix model and does it find itself acting accordingly
 - a. What is going well?
 - b. What could be improved?
2. With the transition agenda and change management, most of the time we perceive a top-down approach out of international or national governments. How does your organization feel about that?
3. Do you feel that your organization has a clear image at what it needs or can act on?
4. Would your organization be helped by more hands-on regional or local guidance regarding these agenda's?
5. What is your perspective regarding bottom-up and top-down change? Do you feel that the top-down approach necklets the hands-on perspective of the bottom niche layer when it comes to implementing change?

Appendix B: Coding Scheme from Interviews with Educational Institution

Codes	Code Groups	Themes
Host Company cannot effectively measure academic level of research	Quality of Research From Students	Challenges Educational Institutions Face Concerning the Transition to a Circular Economy
Lack of quality control of academic requirements at university		
Lack of quality control of curriculum		
Difficult to have Effective Quality Control of Student Research		
Quality of student research is not same as professionals		
Edu. Inst. Face budget and time pressure	Challenges for Edu. Inst. Concerning CE	
No coordinator for CE at Edu. Inst.		
Friction between Edu. Inst. and host companies		
Other things take precedent on agenda over CE		
Supply of real projects is minimal with CE		
No clear agenda for CE in Edu. Inst.		
Individual involvement in CE is strong, but group involvement is difficult		
Mismatch between academic schedules and project timing		
Motivation between student research groups differs		
New generation seem to be struggling with abstract material surrounding CE, real life projects needed		
Unwillingness to adapt/change		
Real-life projects popular	Current State and Opportunities within Educational Institutions in General	Current State of Educational Institutions Not Concerning Circular Economy
Students eager to learn from each other		
Expertise centers in progress		
Edu. Inst. Have existing collaboration with companies outside of CE		
Lack of follow-up on projects in general	Challenges for Edu. Inst. In General	
Hiring an account manager for company relations	Actions From Educational Institutions	Future Actions to Enhance Collaboration between Partners within the Triple Helix Model
Lectures around CE integrated in curriculum		
Increase difficulty of program to ensure higher quality later in program		
Create multi-disciplinary student squads		
Physical hub for collaboration		
Regional Accelerator to be Delivering Case	Actions Educational Institutions Want From Collaborators within the Triple Helix Model	
Regional Accelerator to act as middle man in collaboration		
Clear Conversations about Collaboration with Partners		
Companies to Approach Edu. Inst.		
Edu. Inst. Need to be fed more knowledge		
Inspiring Vision is Needed from partners		
Importance of CE needs to be more emphasized	Key Aspects Emphasized	Aspects of Interviews that were Emphasized Throughout
Misalignment of mindsets		
Importance of Expertise Centers		
Opportunity for students to contribute to companies		
Students bring fresh outlook and new ideas to help companies let go of old way of working		
Importance of real life cases for self-learning opportunities		
Projects have created unexpected positive results		
All codes within this coding scheme were taken from interviews from Educational Institutions and therefore also highlights the perspective of the Educational Institutions		

Appendix C: Coding Scheme from Interviews with Textile Companies

Codes	Code Groups	Themes	
Interested in the results more than the research	The Needs and Wants of Businesses	The Needs and Wants of Businesses for Future Successful Collaboration in the Triple Helix Model	
Business wants to design the questions so results solve a real problem			
Businesses do not know what financial support is available in region			
Businesses need partner to balance the collaboration and keep knowledge sharing effective			
One central regional platform for financial support			
MPBC should facilitate the mix and match of companies and Edu. Inst.	MPBC as facilitator THM links between Businesses and EDU. Inst.		
MPBC needs to learn from others and implement them in mid brabant			
MPBC should lobby for CE at Edu. Inst.			
Businesses want middle-man like MPBC			
Intrinsic motivation from students are limited	Challenges Surrounding Quality of Students' Work		Challenges within the Current State and Level of Education within Educational Institutions
Value of student often disappointing			
Edu. Inst. Should upgrade curriculum and be selective on students that should be assigned to a project			
Using retired professionals to guide students			
Edu. Inst. Should be strict with selecting students for these programs			
Suggested quality control through strict agreements between Edu. Inst. And businesses	Challenges Surrounding Education		
No specific department in Edu. Inst. For CE			
Students' knowledge on CE is limited			
Frictions between businesses and edu. Inst			
Transition to CE needs more specialists			
Quality of Academics			
Mismatch of timing between academic schedule and projects			
Students are educated too generally to be specialists			
There is no common way of working or communicating with CE	General Challenges Concerning Transition to a Circular Economy	Challenges within the current Transition to a Circular Economy in General	
Mismatch of perspectives on what CE is			
Different individual goals regarding transition to CE			
Different rules regarding transition to CE			
Awareness of customers about CE limited			
Product quality and details decrease when using circular materials	Product quality		
Difficult to find reusable materials			
Businesses are contributing to educating new professionals	Businesses Educating Future Circular Economy Professionals		Businesses Current Actions to Support Transition
Businesses do not mind supervising and educating students			
Businesses create real life questions for students	Real life projects		
Real life projects give opportunity to choose own research after visit			
Allow students to work in systematic way			
Students can add additional value to previously done research			
Businesses chooses schools that are within their own industry	Current Collaboration with Educational Institutions		
Often work with MBO and HBO			
All codes within this coding scheme were taken from interviews from Textile Businesses and therefore also highlights the perspective of the Textile Businesses			

Appendix D: Coding Scheme Interview with External Consultant Working for MPBC

Code	Code Groups	Themes
Dept. of Edu. Limits the Edu. Inst. in their level of cooperation	Challenges for Educational Institutions in General	Present State and Role of Educational Institutions in Triple Helix Model
Quality Control of Edu. Inst. and their students		
Educating new CE professionals for the future	Suggestions for Educational Institutions in General for the Future	
Changing Educational Curriculum		
Edu. Inst. acting as counterpart for small businesses	Role MBO	
MBO students valuable for technical aspects		
Non-Technical WO are less involved in CE tranision	Role of WO	
Non-Technical WO are valuable for in-depth strategic questions		
More pragmatic approach	Role of HBO	
HBO's suited for livinglabs		
Gov. cannot directly support all small businesses	Challenges for Regional Accelerators	Present State and Role of Regional Accelerators (MPBC) Towards Partners within the Triple Helix Model and in General
Regional Accelerators not yet fully developed		
MPBC shoud design and offer ecosystem to Edu. Inst. to support them to educate CE professionals	Role of MPBC Towards Educational Instutions	
Collecting feedback from edu. inst. to lobby for better edu. laws		
MPBC needs to facilitate multi-diciplinary knowledge sharing	Role of MPBC Towards Players in the Triple Helix	
MPBC needs to facilitate ecosystems to spark innovation		
Programming function to supply nat. gov. with building bricks	Role of MPBC in General	
Program has 3 layers		
Focus small to midsized enterprises		
Goal is to help resolve challenges that a CE aims to solve		
One-Stop-Shop for facilitation in their own regions		
Analyze businesses on their willingness to cooperate in system transition	MPBC Selection of Companies to Collaborate	
Material passport, fingerprint method		
Analyze businesses on their willingness to take risks and innovate		
Lacking of problem ownership of CE	Misalignment	Overall Challenges faced by all players in Triple Helix Model
No aligned way of working amongst other regional accelerators/support org.		
Misalignment on projects leads to less meaningful innovations		
Not all players aligned in "A Film"		
All parties choose their own path regarding CE		
Double taxation on re-cycled items	General Challenges	
Results only visible in mid-long term		
Aligning the ways or working and communicating	Suggestions for Future	
Regions should be utilized as they understand needs of local business better		
Rewarding pioneers to encourage innovation		
Scarcity of resources and materials	What Circular Economy Aims to Solve	Purpose of Circular Economy
Co2 reduction, environmental pressure		
Financial Parties i.e. the Financing table	Important Players	Important Players within Collaboration for the Transition to a Circular Economy
Business Support Parties i.e. Braventure & Business Coaches		
Educational Institutions		
Government		
Marco hekkert	System	Theory Discussed and Applied by Interviewee
Swimminglanes		
Sector road maps		
Trans-system: MMIP, Paris goals,		
UPCM		
Feeding Nat. Gov. with meaningful innovation	Validation	Validation of Projects
Validating innovation projects with agenda nat. gov.		
Validation of indiv. player by financial (public/private)		
All codes within this coding scheme were taken from interviews from the external consultant at MPBC and therefore also highlights the perspective of the external consultant at MPBC		