



MASTER THESIS

**Impact of internal company
dynamics on circular
sustainable business
development.**

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Abstract

The concept of a circular economy is commonly acknowledged as a solution to ecological problems such as resource scarcity and waste production. New economic opportunities emerge by transitioning from a linear to a circular economy. Therefore, innovative business models are needed to translate these opportunities into business reality. This thesis tackles the adoption of circular business models in young and small companies and organisations in Germany. The purpose of this thesis was to provide an overview about internal dynamics in circular business model adoption. Therefore, internal barriers, enablers, capabilities and personal drivers were elaborated to develop strategies based on best-practice solutions for startups and innovative ventures deciding for circular business model implementation. First, relevant literature was presented. As a second step, a case-based research design was applied based on semi-structured interviews with twelve founders and managers of businesses and organisations with a circular business model. Conclusively, best-practice solutions for overcoming barriers were derived from the interviews. Strategies for a successful adoption of a circular business model in young, small and innovative ventures comprise the necessity to take into account: (1) human-centeredness in all activities affected by circular business model adoption, (2) high commitment for circularity on managerial level, (3) requirement of special skills and capabilities, and (4) consideration of cultural aspects inside and outside the company. The thesis has several limitations as it does not explicitly cover external barriers or enablers such as market barriers or political enablers. In addition, organisations from the sample are young, small, and located in Germany which is why results for companies of different age, size or country can be different. Hence, further empirical research for established incumbents and companies located in other countries is needed to be able to compare internal dynamics and requirements to establish a circular economy.

Keywords: circular economy, circular business model, barriers, enablers, capabilities, drivers

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List of abbreviations

Chief Executive Officer	CEO
Circular Business Model	CBM
Circular Business Model Innovation	CBMI
Circular Economy	CE
Small- and Medium-sized Enterprise	SME
Sustainable Business Model	SBM
Sustainable Development	SD

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1. Introduction

The current economy is based upon a linear model of resource consumption at which raw materials are extracted, products are manufactured and sold to consumers who finally dispose them after usage. This current phenomenon of consumption is called a ‘take-make-dispose’ system (The Ellen MacArthur Foundation 2013). Negative effects on natural ecosystems occur due to tonnes of waste and energy use with high carbon emissions which in turn fuels climate change. For example, significant volumes of materials already get lost in the production chain, as over 21 billion tonnes of material get wasted within production in OECD countries each year. 2.7 billion tonnes of waste of discarded products after usage was generated already in 2010 (The Ellen MacArthur Foundation 2013). In fact, there are two problems. Firstly, natural resources on Earth are finite and resource capacities get exceeded (Lüdeke-Freund et al. 2019). Resource scarcity is a big problem. It is estimated that resources are consumed 50 percent faster than they can be replaced (Esposito et al. 2018). By 2050 resources of three planets will be needed to satisfy demand (Esposito et al. 2018). Secondly, ecosystems get harmed by both high extraction rates of natural resources such as water or soil, and by carbon emissions released by almost all economic activities, fuelling climate change. In this vicious circle, negative effects on natural ecosystems, human wellbeing and security of supply are consequences (The Ellen MacArthur Foundation 2013).

When looking into the future, numbers show frightening scenarios: “according to the UN Environment Programme, the amount of minerals, ores, fossil fuels and biomass consumed globally per year could triple between today and 2050 unless a way is found to decouple economic growth from the rate of consumption of natural resources.” (Preston 2012, p. 10).

Despite of great achievements in improving resource and energy efficiency, a new system of material use, disposal and consumption is needed, as the focus on non-renewable resources automatically leads to major losses of economic value combined with negative effects on the environment (The Ellen MacArthur Foundation 2013). Or as The Ellen MacArthur Foundation puts it: “A deeper change of the operating system is necessary.” (2015, p. 19).

The Circular Economy (CE) among scholars and practitioners is acknowledged as a solution to those problems as it is a new industrial paradigm to tackle waste generation, resource scarcity and sustainable economic growth (Urbinati et al. 2018). The great potential of the CE is more and more known among different actors of society. The significantly growing interest among scholars in topics of CE is represented by an increased number of publications by ten times within the last ten years (Geissdoerfer et al. 2017; Ünal et al. 2019).

Regional, national as well as international politics also take up this development. For instance, the EU Waste Framework Directive in 2008 included a 50 percent target for recycling household waste by 2020, 70 percent recycling of demolition waste by 2020 and 85 percent recycling of cars by 2015 (Reike et al. 2018). Those high targets are not reached yet but show the willingness of politics to not only support but accomplish a CE in the future.

This thesis goes into detail of current CE implementation in Germany. The focus is on Circular Business Models (CBM) in young businesses and organisations. The thesis is structured as followed: section two covers research gaps, presents future research suggestions from state-of-the-art academic studies and ends with the presentation of the research questions which are guiding this thesis. Section three is all about theories in CE research. There, all relevant terms used in this thesis are defined and the most important concepts in current CBM research for this thesis are presented. It ends with providing context to the Sustainable Business Model (SBM) domain. In section four, the methodology of this research is pointed out including the research set up, description of selected organisations of interest and interviewed persons. The fifth section presents findings of the interviews. Findings are evaluated, grouped in different analyses covering different aspects and strategies are formulated to overcome barriers of CBM adoption in organisations. The last section concludes by demonstrating contributions of this research for scholars and practitioners.

2. Research gap and research questions

Despite of the acknowledged great potential of a CE, the implementation of it in businesses remains underperformed. There are many assumptions why there is this obvious gap between affirmations for a CE and the actual behaviour representing a non-uptake of circular structures in business (Liu and Bai 2014). The question comes up why CE is apparently not widely applied in industry. A very recent study concludes the high relevance of business model research in the domain of CE to stimulate CE implementation in practice (Centobelli et al. 2020).

Existing literature suggests various barriers for the slow adoption of the CE in business (Araujo Galvão et al. 2018; Bey et al. 2013; Guldmann and Huulgaard 2020; Murillo-Luna et al. 2011; Rizos et al. 2015; Vermunt et al. 2019). This thesis adds to the existing literature

about barriers for CE adoption by focusing on barriers but also on drivers, enablers and internal capabilities that altogether result in strategies to overcome those barriers.

The transition from linearity to circularity in a firm is undertaken by a new business model that establishes circular structures. Literature recently focused on the topic of circularity from a business model perspective only (Centobelli et al. 2020; Ghisellini et al. 2016; Lüdeke-Freund et al. 2019). There are several gaps in literature concerning barriers of CBM adoption and more research is needed in this domain to explain those phenomena and to effectively support organisations to implement CBMs (Bocken et al. 2019). This thesis builds on the suggestion of Urbinati et al. (2017), focusing on the exploration of internal barriers of firms, especially understanding internal reasons that convince managers to implement a CBM and how they manage to overcome existing barriers of adoption. In essence, this thesis covers the question from an internal company point of view about how companies are willing to become circular and to create a new business model based on CE principles (Urbinati et al. 2017).

Research already explored strategies to achieve CE adoption on a macro level and on circular strategies on a business level like in the study of Chen (2020). What is still missing is going beyond the more general findings of Chen (2020) as they do not consider any internal processes or operational issues or a human perspective. That is why the focus of this thesis goes beyond general findings and digs deeper into internal dynamics and human aspects.

Several authors refer to scarcity of research concerning the actual transition of incumbent firms across sectors towards circularity and their implementation struggles (Franco 2017; Pieroni et al. 2019). However, this thesis is focused on establishing new CBMs in young organisations, ventures and start-ups. Most research about barriers to CE transition focuses on individual cases (Linder and Williander 2017), specific sectors (Franco 2017) or specific geographic areas (Liu and Bai 2014). In comparison, this thesis builds on multiple cases, adapts a narrow geographic area like the study of Liu and Bai (2014) as organisations of investigation are located in Germany but vary across sectors, like the studies of Guldmann and Huulgaard (2020) and Rizos et al. (2015). Other studies compared results on circular strategies between incumbents and SMEs or start-ups (Guldmann and Huulgaard 2020).

Looking inside organisations which facilitated a CBM successfully, suggestions for future research recommend to investigate on internal teams and tasks which are organised differently in a CBM than in the linear way (Franco 2017). Internal problems with a change towards CE implementation can also incorporate the barrier of company environmental culture. This in-

cludes capability and competency problems of management and staff such as a lack of time to investigate on CBM possibilities which in turn refers to a lack of resources (Charter and Keiller 2014; Rizos et al. 2016). It was found that there is still a lack of research of the cultural dimension of CE and discussions about social impacts constituting present major challenges to transitioning towards a CE (Homrich et al. 2018).

Another internal barrier is the lack of information either about the concept of CE or due to the unknowledge of success stories of implemented CBMs as companies usually do not exchange information among each other especially if they are competitors. Similar to the cultural barrier, there are also contradictory findings about the barrier of lack of information. Some studies conclude that these barriers are not ranked highly (Rizos et al. 2016) while others consider them to be important (Kirchherr et al. 2018). Further research is also recommended on management level about managerial practices of CBM adoption and especially about managerial directions supporting companies to implement a CBM (Urbinati et al. 2018). All conclude that further research is needed to elaborate on generalising findings.

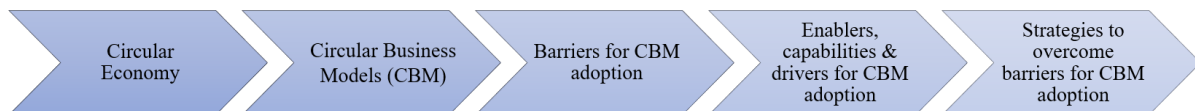
Those barriers concern human behaviour which is still perceived mystery when it comes to the decision for a CBM transition by a firm and the actual implementation in the company. Boons and Lüdeke-Freund (2013) discuss normative aspects like leadership and company culture as an enabler for a transition towards sustainable business model innovation. This indicates that normative aspects in human-behaviour for CBM implementation could be an important future research project as well (Pieroni et al. 2019). In general, there seems to be a lack of research about how CE interacts with normality like habits and norms. Another study focused on managerial control to successfully implement a CBM (Svensson and Funck 2019). It was found that formal and informal control mechanisms are needed for good a circular performance. Additionally, in big incumbents reward and compensation systems have to be transformed to positively influence CE measures and to make managers follow the strict line of CBM implementation (Svensson and Funck 2019).

This highly concerns human aspects like attitudes, mindsets and behaviour of people towards the CE. This comprises a social dimension of CE implementation. More specifically it shows the impact that a transition towards CE has on people of all stakeholder groups like society or employees (Padilla-Rivera et al. 2020). There is a need to do research for SME specific enablers with their specific needs and requirements (Rizos et al. 2016). This thesis adds to also cover drivers, capabilities and competences next to enablers of CBM implementation.

The aim of this master thesis is to indicate ways on how to make companies more engaged in CE by identifying the internal barriers, enablers, drivers and capabilities to develop strategies to overcome barriers experienced by managers or (co-)founders of young SMEs who adopted a CBM in their company.

The focus of this thesis lays on SMEs in Germany which already implemented circular economy business models and have experience in overcoming barriers of adoption and change. The aim is to collect internal barriers that companies faced when implementing a CBM and assemble solutions to overcome them, so other companies can learn from each other's experience. This will expectantly lead to an increased uptake of CE initiatives in firms as the whole internal process of change does not seem to be a whole black box anymore which incorporates high risks and unforeseen outcomes. In this sense, Centobelli et al. (2020) raise attention to important topics within CE research that are part of investigation in this thesis. They stress to look how commitment of managers can enhance this transition and how it has an impact on human capital as well as how managers can overcome companies' inertia (Centobelli et al. 2020). The process of topic refinement is shown in Figure 1.

Figure 1: Topic refinement of the master thesis



Different barriers of CBM adoption are identified in scientific literature. The barriers of CBM adoption are divided into technological, policy, regulatory, financial and economic, managerial, performance indicators, customer and social barriers (Araujo Galvão et al. 2018). The aim of this research is to investigate on a combination of the managerial and social barrier to dig deeper in reasoning of decision making of managers, show the impact of managers commitment and its influence on internal company dynamics that in the end leads to a successful CBM implementation in the firm.

The following research questions will be answered by this thesis:

- (1) What are internal barriers and enablers in small companies in Germany when adopting a Circular Business Model?
- (2) What are necessary internal capabilities and strategies in small companies in Germany to successfully implement a Circular Business Model?

3. Theoretical background

The beginning of this theory section presents definitions of all relevant terms used in this thesis. Subsection 3.2 elaborates on relevant theory and frameworks of CBMs from literature. In the third subsection, differences and similarities between SBMs and CBMs are outlined. Subsection 3.4 covers the most important literature streams concerning internal barriers of CBM implementation whereas subsection 3.5 presents enablers and capabilities for CBM implementation from literature.

3.1 Definitions

Circular Economy

The concept of a CE provides a solution to the myriad of problems concerning the linear economy as it suggests a redesign of the linear system to make closed-loop resource flows possible which can preserve the embedded environmental and economic value in products over a long period of time (Urbinati et al. 2017). This implies that a circular system is aiming at increased resource efficiency and therefore generates environmental gains by using less primary materials and producing less waste (Nußholz 2017). In other words, the CE is “a strategy to decouple economic growth from resource depletion” (Veleva and Bodkin 2018, p. 20) and aims to foster economic growth in a sustainable way (Antikainen and Valkokari 2016).

Antikainen and Valkokari (2016) figure that there is a shortage on academic literature covering CE and particularly covering novel business opportunities created by the CE (Blomsma

and Brennan 2017; Ghisellini et al. 2016; Lieder and Rashid 2016). To create such a CE on a macro level, companies need to change their current way of doing business on a micro level. This is feasible by adopting CBMs (Nußholz 2017). Similar to the lack of literature concerning the CE in general, academic literature is also missing about the implementation of CE in a company by introducing a CBM and facilitating Circular Business Model Innovations (CBMI), including its challenges (Guldmann and Huulgaard 2020).

The European Union 2014 presents the CE as an economic system that uses resources including energy and materials in circles. Resources are transformed, used, segregated, retransformed and reused most efficiently and sustainably as possible (European Union 2014). The circular system allows to combine important policy objectives to benefit from one another. There are two main benefits of a CE: economic growth is generated by newly created employment, whereas simultaneously environmental impact is reduced by less carbon emissions and waste (The Ellen MacArthur Foundation 2015). The European Commission emanates from building a new and sustainable competitive advantage of the European economy by transitioning towards a CE (European Commission 2015).

The CE is defined by The Ellen MacArthur Foundation (2015) as “one that is restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles. This new economic model seeks to ultimately decouple global economic development from finite resource consumption” (The Ellen MacArthur Foundation 2015, p. 19). It is stressed that waste can be avoided and circular mechanisms such as reuse or remanufacture can be successfully in place if products, services and the whole consumption and production system are thoughtful designed for a CE. Therefore business models for a CE need to be consciously created to serve CE implementation (The Ellen MacArthur Foundation 2013).

There are several definitions of the CE. Blomsma and Brennan (2017) put it like that: “an emergent framing around waste and resource management that aims to offer an alternative to prevalent linear take-make-dispose practices by promoting the notion of waste and resource cycling” (Blomsma and Brennan 2017, p. 603). Another definition from highly cited academic literature is this one: the CE is “an economic model wherein planning, resourcing, procurement, production and reprocessing are designed and managed, as both process and output, to maximize ecosystem functioning and human well-being” (Murray et al. 2017, p. 2). This view is complemented by Korhonen et al. (2018) who consider that the CE supports the concept of sustainable development by incorporating all three dimensions of economy, ecology

and society. In fact, the CE enables the economy to grow by not harming the environment and staying within the Earth's natural capacities and creating balance and harmony between the three dimensions (Ghisellini et al. 2016).

Contradicting to that stand these findings showing that the CE stands for a dynamic system where all different actors throughout the whole product's lifetime count. Therefore, the CE system is considered as a positive feedback loop that has the power to either make this system grow exponentially or let it fail by preventing to take off. It was found that not only the different actors in each life stage of a product but also the corresponding business activities and business model strategies are decisive to activate consumer demand to activate a critical mass necessary for different CE requirements such as take-back systems at a big scale (Franco 2017).

In general, the CE is the umbrella concept that builds a regenerative economic system by intentionally slowing, closing, and narrowing material and energy loops (de Pádua Pieroni et al. 2018). Kirchherr et al. (2017) add the systemic aspect of the concept: "[...] operating at the micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond), with the aim to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations." (Kirchherr et al. 2017, p. 224). They furthermore define CE "as an economic system that replaces the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes. (...) It is enabled by novel business models and responsible consumers" (Kirchherr et al. 2017, p. 229). It becomes apparent that a transition on a system level is necessary (Mentink 2014).

Similarly, Homrich et al. (2018) perceives the CE as a strategy to replace the current traditional system by showing the win-win situation of a CE in which simultaneously the economic and value perspective is incorporated. The authors created a list of definitions for a CE to summarise the different perspectives on it (Homrich et al. 2018).

The most recent definition of a CE is this one: "we will define circular economy as an economic system in which resource input and waste, emission, and energy leakages are minimised by cycling, extending, intensifying, and dematerialising material and energy loops. This can be achieved through digitalisation, servitisation, sharing solutions, long-lasting product design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling."

(Geissdoerfer et al. 2020, p. 3). Herein, the authors add important solutions that can support the implementation of a CE realistically in modern business.

Business Model

A conventional business model is described in the work of Osterwalder and Pigneur (2010) who state that it represents the rationale of how organisations create, deliver and capture value (Antikainen and Valkokari 2016). A business model outlines how business is done (Bocken et al. 2019). There are three essential components of a typical business model, namely value proposition, value creation and its delivery as well as value capture (Richardson 2008). The value proposition typically constitutes of a product or service offering. The value creation and delivery elaborate on how this value is provided to customers enabled by internal resources and capabilities of the firm to generate specific offerings and how it is delivered concerning the company's value chain and activity system. The value capturing mechanism deals with the economic system of the company and ensures revenue streams, turnover and profits (Bocken et al. 2019; Guldmann and Huulgaard 2020).

From a CE standpoint a business model ensures to recreate value by different mechanisms such as reusing, repairing, remanufacturing or recycling possibilities. These new offerings are named circular services. The way products are offered can also differ from conventional business models such as offering leasing or sharing models. The business model needs to make sure that also value from these additional services is recaptured to generate profit from sales, leasing and sharing of the circular products and from the circular services (Guldmann and Huulgaard 2020). Therefore, the value proposition is extended by the new circular activities in the business model which is supposed to extend the product life time resulting in several benefits for the consumer like a lower price of an upgraded or repaired product and for the environment as less primary resources are consumed to produce new products (Bocken et al., 2016).

Companies are enabled to choose to which extend it aligns the circular value creation logic with circular principles because a company can also integrate only a subset of the CBM components in the business model. For instance, CBM components are value recreation and redelivery, value recapture and extended value proposition which can be added to or replace conventional business models with one or multiple components. Of course, the most advanced CBM includes and integrates all CBM components and links all together to achieve a 100

percent circular way of doing business (Geissdoerfer et al. 2018; Guldmann and Huulgaard 2020).

However, Ünal et al. (2019) consider two main dimensions when it comes to implementing CE business models: “One dimension is the value network, which mainly concerns the management of the supply chain and the role of value creation along the entire network of suppliers, manufacturers, and retailers (...). The second dimension is the customer value proposition and interface, which mainly concerns the capture of value through the management of relationships with clients, such as demonstrated by the increasing appeal of pay-as-a-service mechanisms.” (Ünal et al. 2019, p. 562)

What becomes clear is that adapting business models to include CE aspects is considered to be ‘a means to an end’ (Stubbs 2017) and according to Nußholz (2017) the key difference of a CBM compared with a traditional linear business model is that a circular strategy must be embedded. The business model is adapted or newly designed to fully integrate those circular components needed to practically implement the circular strategy into the firm’s business. It has to be noted that by implementing circular components to the business model there is not automatically environmental improvements. This can be due to rebound effects at the system level which compromises environmental improvements at product level (Nußholz 2017). This is why a proper CBM also includes system level consideration such as consumer education to for example avoid rebound effects.

Business Model analysis by Richardson

Richardson (2008) developed a widely applied framework for business model analysis. According to him, the concept of value reflects the logic of strategic thinking of companies to create the highest amount of value for customers and to capture the highest amount of value as well as gaining competitive advantage over competitors. The framework is structured into three main areas of analysis: the firm’s value proposition, value creation and delivery, and value capture. By describing the value proposition of a firm, it becomes clear which value a firm aims to deliver to its customers, what is the unique offering and who are their target customers. The basic strategy of each firm to win customers is described in this category as well as how they gain competitive advantage (Richardson 2008). The value creation and delivery system is to find out the source of the competitive advantage of a firm. It is a description of their value chain, activity system, and business processes. This category includes internal ca-

pabilities and procedures. If applicable, the position in the value network of the firm is described with connections to suppliers, partners, and customers (Richardson 2008). The category of value capture elaborates on how the firms generate revenue and/ or profit including revenue streams and cost structure (Richardson 2008).

Circular Business Model

In academic CBM literature it becomes apparent that hardly clear definitions of CBMs are developed (Nußholz 2017). An explanation for this could be the fact that in comparison to traditionally linear business models, CBMs are more complex constructions (Guldmann and Huulgaard 2020).

For instance, a hot topic for practitioners is how to develop a successful economic model when it comes to the implementation of the CE concept in business. For this reason, CBMs conform the creation of commercial value by applying specific circular strategies to capitalise the economic and environmental value embedded in products (Nußholz 2017). Therefore, a CBM creates, captures and delivers value with a certain logic: by extending useful life of products and materials (for example, through long-life design, repairing or refurbishing opportunities), resource efficiency is improved and material loops are closed (Nußholz 2017). CBMs can be defined as business models that are “cycling, extending, intensifying, and/or dematerialising material and energy loops to reduce the resource inputs into and the waste and emission leakage out of an organisational system. This comprises recycling measures (cycling), use phase extensions (extending), a more intense use phase (intensifying), and the substitution of products by service and software solutions (dematerialising)” (Geissdoerfer et al. 2020, p. 7).

Nußholz (2017) found that existing definitions for CBMs are only developed for specific areas and purposes of studies. An overview of existing definitions is provided in the study of (Nußholz 2017, p. 8). Nevertheless, this master thesis also provides the most prominent definitions of CBMs. Like it was explained above, Nußholz (2017) provides this definition: “A circular business model is how a company creates, captures, and delivers value with the value creation logic designed to improve resource efficiency through contributing to extending useful life of products and parts (e.g., through long-life design, repair and remanufacturing) and closing material loops.” (Nußholz 2017, p. 12). A similar view says: “A circular business model can be defined as the rationale of how an organization creates, delivers, and captures

value with and within closed material loops (Mentink 2014).” (Antikainen and Valkokari 2016, p. 7). Smith-Gillespie (2017) add to this by focusing on the regeneration of finite natural resources and keeping existing products, components and materials at their highest value and utility within the system’s boundary (Smith-Gillespie 2017).

A taxonomy of CBMs was developed by Urbinati et al. (2017) focusing on two dimensions. On the one hand, there is the customer value proposition and interface which ensures the implementation of the CBM by proposing circular value to customers. On the other hand, the value network is to be reconfigured to enable interactions with suppliers and to make adjustments to the own internal activities to facilitate the CBM (Urbinati et al. 2017).

Including the social perspective of CBMs is the following definition: “An integration of circular economy into a corporate business model aims to uncover new ways of providing value to stakeholders and systematically explore economic value throughout the product life cycle to increase the efficiency and effectiveness of resources.” (Goni et al. 2020, p. 6). This definition already indicates similarities to the concept of Sustainable Business Models (SBM) and Sustainable Development (SD) by directly incorporating stakeholders. These interrelations are dealt with in the paragraph devoted to SBMs below.

Circular Business Model Innovation

Previous paragraphs provide definitions for the different terms used in this thesis and guide through important areas of this research as topics of CE and business models are combined. This section adds the factor of innovation. Obviously, the traditional way of doing business cannot proceed in a linear manner but circular strategies are needed to be adopted. In general, the process of CBMI can include innovating existing business models by, for example, changing or reconfiguring components of the business model, or for establishing a new organisation, that can be associated with building a new business model for CE (Bocken et al. 2019).

This thesis includes start-ups and young ventures into the study focus. Transforming business models from linear to circular in incumbent firms and establishing a new CBM in a start-up, CBMI is needed. Both ways include an iterative CBMI process involving different levels of detail of CBM implementation in a company such as decisions at a conceptual and operational level (Bocken et al. 2019).

This definition of CBMI clearly points out and summarises CBMI for incumbents and start-ups: “Circular business model innovation can be defined as the conceptualisation and imple-

mentation of circular business models, which comprises the creation of circular start-ups, the diversification into circular business models, the acquisition of circular business models, or the transformation of a business model into a circular one. This can affect the entire business model or one or more of its elements, the interrelations between the elements, and the value network.” (Geissdoerfer et al. 2020, p. 8).

Another definition of CBMI differentiating between incumbents and start-ups is this one: “we define CBMI in incumbent companies as the process of reconfiguring an existing linear business model to include CBM components in the form of value recreation, redelivery and recapture and an extended value proposition, or the process of reconfiguring an existing circular business model to include more of, or better versions of, these CBM components. In start-ups, we define CBMI as the process of crafting a CBM based on those CBM components from the ground up.” (Guldmann and Huulgaard 2020, p. 3).

To summarise the definitions from above, it can be said that innovating a business model means to find a novel way of creating, delivering, and capturing value by changing one or multiple components in the existing business model (Antikainen and Valkokari 2016; Osterwalder and Pigneur 2010). In a process of CBMI multiple if not all business model components are affected. It all depends on strategic decisions of the company’s decision makers about ‘how circular’ the company is supposed to become. The business model and the different components are to be innovated in regard of circularity according to those strategic decisions (Mentink 2014).

With this, innovation in business models have a positive influence on product and service innovations as a new business model often includes new offers due to new value propositions as well. Generally speaking, business model innovation is a facilitator for innovation going beyond traditional thinking and tackling different levels such as system levels, consumer behaviour, operational issues etc. (Nußholz 2017). In this vein, there is the point of view that radical innovation and innovation on system level are needed to make the CE becoming mainstream (Antikainen and Valkokari 2016).

Business model innovation in industry is more on a practical level of implementing CE in operations and daily business. Doing this means that the company needs to implement new types of business models, needs to rethink its current value propositions and develop new value chains with feasible cost efficiency, production effectiveness and business performance (Geissdoerfer et al. 2020).

Small and medium enterprises

The European Commission defines SMEs according to the number of employees or to turnover or balance sheet total (European Commission). This thesis goes along with categorising organisations by their number of employees: micro firms employ up to ten persons, small ventures employ between ten and 50 persons and medium-sized enterprises have between 50 and 250 employees (European Commission). In general, it can be differentiated between “born circular” firms constituting young ventures which have been primarily created to deliver circular value and exploit CE opportunities, and the so-called “growing circular” firms constituting established firms which need to transform their business model to become circular (Zucchella 2019a).

Devoting a section to SMEs is of high importance as 99 percent of all companies in the European Union are SMEs (European Commission). The European Commission perceives SMEs to be the key for CE implementation in practice. They also point out specific challenges that SMEs face like access to funding and the difficulty of facilitating CE if it is not their core business (European Commission 2015). The Green Action Plan in 2014 ensures SMEs to be supported, to analyse barriers and thus to enable them to facilitate CE and encourage innovation and collaboration needed across sectors (European Commission 2015). In fact, the Green Action Plan was not the only important document to support SMEs to green their business but two more: the Europe 2020 Strategy setting clear targets so the EU economy becomes sustainable, and the Small Business Act focusing on helping SMEs to use green opportunities (Rizos et al. 2015). Despite these important policy papers and various policy instruments connected to that, various barriers for SMEs remain, even though SMEs seem to be aware of those benefits of closing loops and increasing resource efficiency to save material costs, access new market and create a competitive advantage (Rizos et al. 2016).

Circular start-ups

It has been coined out that a CE transition requires radical innovation, linear system disruptions and mindset changes of all actors in the economy. This represents an enormous opportunity for entrepreneurship which in turn leads to social, ecological and economic benefits (Veleva and Bodkin 2018). Lacy et al. (2014) found out that the initial market disruption for CE transition in CBMs was driven by start-ups. Only recently are large incumbents following in a serious manner (Lacy et al. 2014).

New business models are created in newly established ventures called start-ups. Circular start-ups incorporate strategies for CE implementation such as cycling, extending, intensifying, dematerialising resource loops by upgrading, repairing, refurbishing, remanufacturing etc. Circular start-ups are independent organisations with an own brand, resources, employees and hence capabilities (Geissdoerfer et al. 2020).

Hockerts and Wüstenhagen (2010) found that start-ups are more likely than incumbents to go after opportunities related to sustainability. This is because founders of sustainable start-ups are often led by idealists and are open for innovation (Hockerts and Wüstenhagen 2010). Sustainability start-ups differentiate from traditional start-ups by their value-based approach and social and/ or environmental benefits are core of their business model (Hockerts and Wüstenhagen 2010).

Start-ups and incumbents also differ a lot in terms of industrial mindset, because a big change in industrial mindset is required as CE offers great business opportunities to those organisations that collaborate, share data, spread best practice and invest in major innovation projects together in financial as well as knowledge terms (Preston 2012). It is common knowledge that start-ups are more open to sharing and collaborating than incumbents.

3.2 Theory of Circular Business Models

This subsection presents only a few but very knowledgeable theories and frameworks of CBMs.

Lewandowski (2016) recognise new CBMs as the core of a CE being the driving force behind a transition. New CBMs are often referred to as being the driver for a CE transition in business by contributing to slow, close or narrow resource loops (Bocken et al. 2019). To slow resource loops long lasting products are to be designed and reusage of products are to be ensured. To close resource loops residual wastes from by-products are to be captured and business model innovation can help to avoid a production of waste or by-products that are going to waste. To narrow resource loops products are to be designed to support circular use with an infinite life time and manufacturing has to be efficient without any waste production or energy loss (Bocken et al. 2019).

A concept to classify the ‘extend’ to which a company is circular is very helpful for this thesis. The so-called 4R framework was developed by Kirchherr et al. (2017). The four R’s are basic dimensions for a CE namely reduce, reuse, recycle and recover (Kirchherr et al. 2017).

Reducing includes refusing, rethinking, redesigning and minimising in product development and overall consumption to prevent unnecessary resource use and preserve natural capital. The reuse dimension includes closing loops strategies such as cycling, repairing or refurbishing of resources. Recycling incorporates remanufacturing, cycling and reuse of waste in for example industrial symbiosis collaborations between companies. The question still remains how to recover energy use (Kirchherr et al. 2017).

Another theory in CBM literature is the categorisation in CBM types which are generic configurations of business model elements to apply circular strategies in business and capitalise new circular value flows (Nußholz 2017). Examples for CBM types are circular supplies focusing on renewable energy and fully recyclable input materials, resource recovery which recovers useful materials and energy out of disposed products or by-products, product life extension by repairing, upgrading and reusing, sharing platforms to intensify the use phase of products, and product as a service offerings which allow free access to products and retain ownership to fully grasp benefits of circular resource productivity (Lacy et al. 2014). Related to that, Bocken et al. (2014) developed eight sustainable business model archetypes which describe the main types of business model innovation in the following categories: technological, social, and organisational oriented innovations. Technological business model archetypes are maximising material and energy efficiency, creating value from waste, and substituting harmful processes with renewable and natural ones. Social business model archetypes comprise of delivery of functionality rather than ownership, adoption of a stewardship role, and encouragement of sufficiency. Organisational business model archetypes tackle repurpose of society/ environment, and development of scale up solutions. Bocken et al. (2014) used the framework of analysing business models by Richardson (2008) and applied it on their sustainable business model archetypes.

An overview about conceptual frameworks, taxonomies and typologies of CBMs can be found in the study of Geissdoerfer et al (2020).

In general, it is found that in reality neither 100 percent circular nor 100 percent linear business models exist due to physical and practical reasons (Antikainen and Valkokari 2016). Additionally it is shown that all business model configurations or changes have to start with an overall vision for CE. Once the vision for a CE is clear to all members of the organisation, circular strategies can be developed and CBMs can be transformed, reconfigured or built up (Bocken et al. 2016).

3.3 Circular and Sustainable Business Models

Both literature streams are closely related and are subcategories of business model research (Antikainen and Valkokari 2016). As business models are useful to plan and accomplish system changes in organisations, they can do so for circular or sustainable company goals (Goni et al. 2020). Nevertheless it was found that “the relationship of sustainability and the circular economy is not clear in literature and still calls for theoretical consensus” (de Pádua Pieroni et al. 2018, p. 801). Furthermore, there is still a lack of a shared framework on how to conceptualise SBM and CBM as a way to solve ecological and social issues while aiming for economic benefits (Kristensen and Alberg Mosgaard 2020; Pieroni et al. 2019, p. 199). This is mainly due to the lack of social indicators to include in CE and CBM measurement (Kristensen and Alberg Mosgaard 2020). Some first studies focusing on theorising the relationship of those two literature streams are made by Geissdoerfer and co-authors. They developed an overview of traditional, sustainable and circular business models, its different characteristics and goals in this work (Geissdoerfer et al. 2018). There it says that CBMs are a more generic strategy for SBMs. By successfully operating a CBM with closing, slowing, narrowing, intensifying and dematerialising resource loops, the sustainability performance is automatically improved (Geissdoerfer et al. 2018).

However, Lüdeke-Freund et al. described the relationship this way: “[CBMs] can be considered a subset of the broader group of sustainable business models” (Lüdeke-Freund et al. 2019, p. 41). Hence, CBMs are considered to be one type of SBMs (Bocken et al. 2019; Guldmann and Huulgaard 2020). It is also found that CBM is one but not the only way to achieve sustainable outcome in industry (Pieroni et al. 2019). It rather requires changes on a systemic level so companies base their business foundation on sustainability to successfully transition to a CE (de Pádua Pieroni et al. 2018).

One difference between CBM and SBM is that in SBMs there is a clear focus on social issues as one of the three sustainability pillars (Pieroni et al. 2019). Therein, it is assumed that there is at least to some extent a lack of a social dimension in CE (Padilla-Rivera et al. 2020). On the contrary, there are opportunities for rather indirect and long term social impact because CBM requires long term thinking over immediate activities that often lead to environmental degradation which in turn leads to reduced income, increased poverty and disadvantages for local societies (Lüdeke-Freund et al. 2019). Additionally, CE implementation and CBM often

induce new employment opportunities which also supports the social dimension of sustainability.

When adding considerations of sustainable development it is pointed out that the CE has several positive impacts on SD, as all three dimensions of SD – environmental, economic and social – are tackled by the objectives of a CE (Korhonen et al. 2018). A CE is even considered as a way to achieve the Sustainable Development Goals wherein the CE can be applied as a tool to achieve certain goals (Saidani et al. 2018). Ghisellini et al. (2016) even find that the CE is expected to support SD and pave the way for a harmonious society (Ghisellini et al. 2016). It is doing so by supporting the understanding and implementation of radically new ways which help society increasing sustainability practices and wellbeing at low or no material, energy and environmental costs (Ghisellini et al. 2016).

To conclude this section, it becomes apparent that CE aspects should somehow be included into SBMs to provide all stakeholders with new value from CBM components which extract economic value from achieving ecological benefits (Goni et al. 2020).

3.4 Barriers of Circular Business Model implementation

In general, it is challenging for humans to think outside the box and rethink a current system. In the case of CE, it is necessary to leave the prevailing linear mindset in economy and society to envision the new concept of a circular model (Lieder and Rashid 2016) and get it going (Heyes et al. 2018). Simply because there is a lack of firms acting as circular role models, there is a certain resistance of other firms to change their current linear way of doing business as it works out in short-term. There does not seem to be enough practical knowledge, experience and time in changing towards circularity (Charter and Keiller 2014; Rizos et al. 2016). Hence, an uptake of CE practices depends on business leaders mindsets: if they are more progressive, they will probably see opportunities in a CBM, rather than only seeing barriers and high risks of a change (Rizos et al. 2016). Risk perceptions of managers and company owners are different. In SMEs, the owner is often the manager as well and this leads to a more long-term view than for purely management led big incumbents (Ünal et al. 2019). Strong risk aversion can hinder CBM implementation and managers behaviour and decision-making can be influenced by negatively biased forecasts (Liu and Bai 2014).

In academic work, barriers to CBM implementation are usually categorised as regulatory, financial, technical, organisational, value chain and consumer barriers (Circular Economy Initiative Deutschland and Acatech 2020). It is found that in reality, barriers are less tangible and clear. It is more about mutual relationships between several entities such as providers like producers, suppliers and retailers, but also users and the product or service itself with specific designs and technologies. To tackle all these different entities, the Circular Economy Initiative Deutschland developed a framework with integrated solutions and suiting circular strategies (Circular Economy Initiative Deutschland and Acatech 2020).

In a similar vein, Sousa-Zomer et al. (2018) comprehensively illustrate different kinds of barriers to CBM implementation that may affect CBM implementation. They consider stakeholder relationships, internal processes, cultural aspects and risk as the main themes when it comes to CBM barriers (Sousa-Zomer et al. 2018). Chen (2020) developed a framework to analyse CBM barriers with the according roles. An example for a CBM barrier is a hesitant company culture which in turn is connected to high investment costs and perceived risk which constitutes for a major reason to not adopt a CBM (Chen 2020). Another study found additional barriers to be of importance when it comes to CBM barriers: company environmental culture, lack of capital, lack of government support/effective legislation, lack of information, administrative burden, lack of technical and technological know-how, and lack of support from the supply and demand network (Rizos et al. 2016).

To get an overview for this thesis, barriers for CBM adoption are separated between external barriers like capital support barrier, policy support barrier and information support barrier, and internal barriers such as tangible resources, intangible resources or capabilities (Araujo Galvão et al. 2018). In the following, the thesis will further elaborate on internal barriers of CBM adoption in small and young organisations.

3.4.1. Internal barriers to CBM implementation

In particular, internal barriers are perceived to be very high (Vermunt et al. 2019). There are these categories of internal barriers: financial, organisational, and knowledge and technology (Vermunt et al. 2019). Especially in the beginning, when the idea of a CBM is being raised, a lack of knowledge about CBM often hampers a positive decision towards it (Guldmann and Huulgaard 2020).

Many barriers are interlinked with each other or show a dependence of internal and external barriers (Vermunt et al. 2019). Other categories for internal barriers found are administrative burden by the new business model, a lack of technical know-how, a lack of information and the company's environmental culture (Rizos et al. 2016). The company's environmental culture refers mostly to its ethos, as well as habits and attitudes of managers and employees who implement a CBM (Liu and Bai 2014; Rizos et al. 2016). The barrier for internal company culture includes hesitant company culture which constituted the most pressing internal barrier (Kirchherr et al. 2018). Murillo-Luna et al. (2011) found the main internal barriers perceived by managers to undertake proactive environmental strategies to be budgetary and organisational limitations, aversion to innovation and technological change, limited motivation and preparation of the employees and operations. A related category covers social norms and rules such as societal values, habits and traditions that impact CBMs (Vermunt et al. 2019). Social barriers can include people who can be external or internal to the company. The informational, community and commitment to sustainable development barriers can apply to both (Araujo Galvão et al. 2018).

An extensive list of internal barriers for the adoption of proactive environmental strategies was compiled by Murillo-Luna et al. (2011). Considering circular strategies as part of proactive environmental strategies, it can be said that there is a likelihood for similar barriers for CBM implementation. The study of Murillo-Luna et al. (2011) has a deeper look beyond identifying different levels of barriers such as operational, management, financial, communicational, technological or employee level. Somehow related to internal dynamics as a topic for this thesis are the following ones. On operational level, different inertia such as short-term planning, poor communication channels and lack of proper research and development are reported. On managerial level, there is inadequate top management and leadership competence, lack of commitment from management and conflicts with managers' personal goals. Additionally, sustainability and environmental practices require top management commitment. This is partly due to the fact that the CEO has significant influence on resource allocation and the overall firm strategy setting. In general, existing literature refers to managerial support as the key for organisational development or a lack of it as a barrier the successful integration of environmental practices (Ünal et al. 2019). On an employee level, limited environmental motivation and preparation of employees as well as a lack of employee involvement was found to be reasons for internal barriers and negative internal dynamics (Murillo-Luna et al. 2011). It is also recorded that managers as well as employees develop moral involvement and follow companies values if they associate their business with a useful societal goal (Ünal et al. 2019).

In line with the study of Guldmann and Huulgaard (2020), most of the barriers are at the organisational level, followed by the value chain level, the employee level and the market and institutional level (Guldmann and Huulgaard 2020). They refer to a lack of knowledge on employee level when it comes to the CE and CBM. A reason for this could be a lack of management support. At an organisational level it is found that sustainability strategies followed oftentimes outdated sustainability paradigms and therefore has a narrow focus on a single environmental or social issue. This is again a managerial issue because competencies need to be brought into the organisation to align the sustainability strategy with a full circular strategy initiating a system transformation (Guldmann and Huulgaard 2020).

3.4.2 Internal barriers to CBM implementation for circular start-ups and SMEs

Some of the mentioned barriers from above do not stand for SMEs and start-ups because managers are oftentimes the owners and therefore have a more long-term view on the firms development. The other way around, this can also be a reason for a very high-risk perception as SME owners and managers tend to feel very responsible for their organisation, its employees and the long survival of their lifework. So for circular start-ups there is evidence that no barriers are perceived at the employee level, whereas all the incumbents do (Guldmann and Huulgaard 2020). With this it becomes clear that findings for large incumbents transforming their business model to become circular cannot be applied on the case for SMEs or circular start-ups. An explanation is that founders have actively incorporated a CBM as alternatives to linear business models from the beginning on and hence did not face any pre-existing organisational lock-in (Guldmann and Huulgaard 2020).

Another human related aspect in this sense is about cooperation and trust among partners in the whole value chain which is both necessary for a full working circular system (Golev et al. 2015). Oftentimes there is still the old perception of keeping secrets and not sharing knowledge increases the competitive advantage of SMEs. However, in some sectors information and knowledge sharing is more likely than in others. So, there is a barrier recorded for established SMEs to show a certain reluctance to information sharing (Rizos et al. 2015). For start-ups the findings can differ as they are perceived to be more open and willing to collaborate which is a necessary precondition to practically make a CE work out.

When starting up a business, external funding is of high importance. For the case of circular start-ups and SMEs it is found that the majority lacked the time and experience to successfully

apply for grants from governments, investors and other organisations (Charter and Keiller 2014). It is also found that especially SMEs suffer from higher financial barriers than larger companies to invest into CE and establish a CBM (Ghisetti and Montresor 2020). It is also reported that SMEs have therefore problems to perceive changes for CE as a business opportunity. Even at the contrary, it is often perceived as an additional or even unnecessary investment with unforeseen risks threatening the status quo including their established core business (Rizos et al. 2015).

3.4.3 Internal barriers concerning capabilities and competences

When analysing the second research question about capabilities needed inside a firm to implement a CBM, it is found that there are special organisational competences such as employee motivation, participation and environmental culture needed across organisational functions, business strategy and company structures (Bianchini et al. 2019).

Capabilities do not only include human aspects but technology as well. However, for technological barriers it is found that they are not prevalent (Kirchherr et al. 2018). This contradicts with other academic studies which argue that first technological issues need to be overcome to successfully initiate change towards circularity (Preston 2012). In this regard, Rizos et al. (2016) found that technical know-how cannot be seen as a stand-alone barrier because it is closely connected to other prerequisites such as lack of resources to acquire new technologies and time to gain new skills and knowledge about them. This means that SMEs have to train themselves new developments which can lead to a lack of understanding of technologies but business opportunities with a CBM as well (Rizos et al. 2016).

3.5 Favouring issues for Circular Business Model implementation

3.5.1 Enablers for CBM implementation

Rather few studies present several enablers for CBM implementation. One study was conducted by (Rizos et al. 2016) who identified enablers in this descending order of importance: company environmental culture, networking, support from the demand network, financial

attractiveness, (external) recognition, personal knowledge and government support (Rizos et al. 2016). Results of the FUSION project with participating SMEs also found networking with other SMEs and potential partners for collaboration to be one of the greatest outcomes from this project (Charter and Keiller 2014). This is especially beneficial for start-ups (Charter and Keiller 2014). As a new enabler to the former list is awareness of emerging trends and new business opportunities within CE topics to be the second most important outcome for participants (Charter and Keiller 2014). As a result, SMEs opted for customised support to perceive the CE as a real business opportunity (Charter and Keiller 2014).

Apart from that leadership is considered to be a very important factor when it comes to the actual implementation of a CBM (Hart et al. 2019; Rizos et al. 2016). The favouring leadership style supports CE and perceives CBM to be beneficial. If there is commitment to CE and unrestricted support for the CBM on managerial level, this leads to commitment on employee level (Ünal et al. 2019). Managerial commitment is also important to enforce circular business structures in the value network of the company and the customer value proposition (Ünal et al. 2019). It is found that at least in the short term, managers can face trade-offs between economic profitability and circular structures in the business. This is the reason why it is simply necessary that the manager believes in circular goals and values in the company and officially commits fully to internalize intended circular goals (Ünal et al. 2019). There are several issues supporting this leadership style for CE especially for SMEs such as capacity development, new skills and leadership training. Again, those communities of practice and collaboration is found to be important for a successful CBM implementation (Rizos et al. 2016).

Among cultural enablers are sustainability and environmental drivers, stimulation of demand through consultation of clients, value chain engagement activities, forming longer term relationships and partnerships and enhanced systems thinking (Hart et al. 2019).

Other enablers for CBM implementation are based on digital technologies. On the one hand they enable the operationalisation of circular structure such as circular material, component and product flows. On the other hand, they enable digital services such as smart repair service, smart reuse, remanufacturing and recycling options. Therefore, digital technologies can fill data and information gaps (Circular Economy Initiative Deutschland and Acatech 2020). It is about understanding revealing trends in hindsight which can be improved in terms of circular value flows bringing foresight value for the company (Circular Economy Initiative Deutschland and Acatech 2020).

A compilation of grouped challenges for a company to facilitate a new CBM and corresponding solutions is provided by Sousa-Zomer et al. (2018). In this work, there are cultural aspects, risk, stakeholder relationship and internal processes named as the greatest challenges to CBM adoption. The authors identified some solutions for the corresponding challenges. For example, and relevant for this thesis, are advices for a proper leadership style opting for CBM, specific training offers to develop new capabilities within the organisation, and for internal processes they advise to establish cross-functional capabilities and a full integration of all employees into all functions (Sousa-Zomer et al. 2018).

3.5.2 Drivers for CBM implementation

Literature remains scarce on drives for CBM adoption, so this section is rather short. Within their experimental setting, Heyes et al. (2018) identified five barriers and four solutions they call drivers. For instance, the participants of their study mentioned a marketing tool to be a relevant driver for CBM adoption, stronger supplier relationships, more security from policy-side, secure estimation of costs and risks, and finally a secure success measure of a product or service with a new circular value proposition and new revenue streams (Heyes et al. 2018).

The report of the Circular Economy Initiative Deutschland and Acatech (2020) goes in the same direction. It presents proactive strategies to adopt CBM to be an important driver – rather than reactive strategies. The six different drivers that are identified are cost and risk reduction, sales and profit margin, reputation and brand value, attractive employer and high degree of innovativeness in the organisation (Circular Economy Initiative Deutschland and Acatech 2020).

Both works show a certain request of security that the managers want to have to establish a CBM which is reasonable as they have the full responsibility for the organisation and its employees. That is why this thesis goes deeper into this domain as a major gap of research is identified here.

3.5.3 Capabilities for CBM implementation

Capabilities needed for a CBM adoption is not abundantly represented in literature, but more studies focused on this topic compared to the topic of drivers. A full list of capabilities within

the different functions of a company is provided by Sousa-Zomer et al. (2018). Taking this as an overview, other studies elaborated further on single capabilities.

When establishing or transforming towards a CBM, existing and new capabilities need to be reconfigured to function optimally in this new setting (Lacy et al. 2014). Naturally, a qualified workforce with specific skills is needed in order to find new job opportunities in a CE. This is tackled by the New Skills Agenda for Europe (European Commission 2015). New capabilities for CBM implementation is not limited to technological skills but also comprise human behaviour towards CE which can be a hindering factor to adopt a CBM as well (Lacy et al. 2014). It is also to be stressed that those capabilities have to be seen as they are: dynamic and not static as the whole process of resource flows and business activities indicates (Pieroni et al. 2019). A concrete example is the shifting focus of innovation and product development in a CBM as products are newly designed for many life cycles and optimising ecological footprints. The revenue system might also be innovated as there are different new options to charge for service in a CE (Lacy et al. 2014). The same goes for sourcing and manufacturing which is more reliant on stakeholders at the back-end such as suppliers but also on designers who might be external as well (Lacy et al. 2014). It becomes clear that new and deeper stakeholder relationships are needed to fully establish a circle of material and resources. For example, the use phase of materials needs to get extended by reverse logistics and take-back systems. A key capability is a quality of control and understanding stakeholders to closely collaborate and optimise reprocessing chains (Lacy et al. 2014). It is even said that the highest degree of circularity is reached if circularity of an organisation is communicated to and understood by all stakeholders (Centobelli et al. 2020). In this regard, Bianchini et al. (2019) advise to build a network of information and feedback to exploit new opportunities and existing relationships to optimally collaborate for a competitive advantage in a CE.

To implement these advices from literature, the study of Burger et al. (2019) elaborates on important skills to achieve this. According to them, basic skills are needed to develop necessary capacities, facilitate learning and a rapid knowledge acquisition. Helpful are active learning strategies and the encouragement of critical thinking in organisations. Hard skills such as mathematics and technological skills are required as well (Burger et al. 2019), whereas complex problem solving skills are required to develop new problems and a complex business setting. Therefore, resource management skills, management of financial and personnel resources are a prerequisite (Burger et al. 2019). Social skills are the top notch building capacities to properly work with people and collaborate to achieve goals for a CE. Herein,

skills for coordination, negotiation, persuasion, service orientation and social perceptiveness are of utmost importance to make the CBM a success (Burger et al. 2019). System skills are necessary to improve the socio-technical system the organisation is embedded in. For this, skills for system analysis are important as well as proper judgement and decision making (Burger et al. 2019). Last but not least, technical skills are needed to be able to apply machines and software to make the circular production and value system work. This is about hard skills in manufacturing but also incorporates specific design skills and troubleshooting capabilities to improve on the system and correct errors as soon as they occur (Burger et al. 2019).

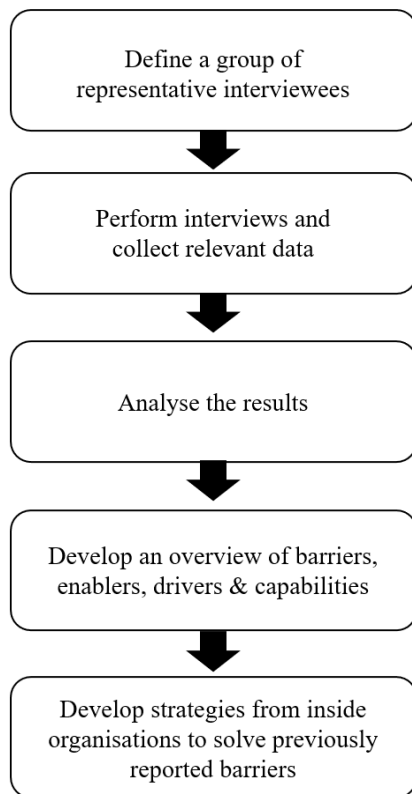
4. Methodology

This section presents the research design of the conducted empirical study with its undertaken literature review, the conducted semi-structured interviews and methods of analysis. The second subsection presents the selected companies and organisations which are part of the sample. The last subsection describes the interviewed persons from those organisations.

4.1 Research design

This empirical study is designed to explore internal dynamics in CBM implementation based on multiple cases. Firstly, a desk research and literature screening are undertaken to get an overview of the topic and to develop a suitable research study set up according to research gaps. Secondly and as a next natural step, interview guidelines are developed, interviews are conducted and data collected. Thirdly, this data is analysed with different methods. Lastly, these analyses are interpreted and formulated as findings of this thesis. From this, strategies, enablers, drivers and capabilities are derived from barriers faced by SMEs. Figure 2 illustrates the structure of this research set up.

Figure 2: Flow chart of procedures for Master Thesis (adapted from Golev et al., 2015)



To begin with the literature review, the selected databases for academic literature are Web of Science and Business Source Complete. After having a good amount of high quality academic articles from the literature review, a snowballing method is applied to get the established and related articles through cross-references (de Pádua Pieroni et al. 2018). In parallel, a wider search in Google Scholar is undertaken to add important reports and grey literature to the list of publications. Finally, a limited number of influential non peer-reviewed publications from non-profits organisations such as Circular Economy Initiative Deutschland and Acatech or knowledge platforms on CE such as the Ellen MacArthur Foundation are also included (de Pádua Pieroni et al. 2018).

Additional desk research is undertaken on whom to interview and which organisations should ideally be part of the study. This step also includes gathering most important information about organisations of interest and start collecting data from websites, reports and articles. Afterwards, representatives of those organisations are contacted by Email or direct LinkedIn messages. After having agreed on appointments, interviews are undertaken via telephone, Zoom or Google Meet. This is mostly due to the restrictions during the Covid-19 pandemic. That is why only one interview is conducted in person. All interviews are recorded and notes

are already taken during the interviews (Antikainen and Valkokari 2016). Afterwards a transcription protocol for each interview is conducted based on the notes and recordings (Franco 2017).

Drawing conclusions from multiple cases is said to constitute a solid base allowing for more general findings to some extent (Franco 2017). Additionally, the topic of CE and especially CBM is new to academic research and therefore explanatory studies based on multiple cases and semi-structured interviews with decision-makers make up a solid research design for answering research questions (Ghisellini et al. 2016). Furthermore, conducting interviews with SME owners and decision makers is an efficient and solid method to collect a great set of data (Rizos et al. 2016).

When developing the semi-structured interview guideline, attention is paid to formulate questions “to be as open as necessary and as structured as possible” (Hofmann and Jaeger-Erben 2020, p. 2774). To establish a certain structure and to make interviews comparable among each other, four broader topic clusters are developed which are partly based on the study of Vermunt et al. (2019) asking for (1) an explanation of the CBM of the organisation, (2) a description of particularly internal barriers faced, and (3) a description of how barriers are overcome internally. The last point is further elaborated by asking specifically for organisational capabilities and competencies (Hofmann and Jaeger-Erben 2020). The interview guideline is modified only for the introductory question: it is asked for the personal drivers and motivations to pursue a CBM in the business.

Overall, it can be said that most of the interview questions consisted of open-ended questions. There is one closed question in each topic cluster about an estimation between one and five. This makes the interviewee think in perceived estimations like thinking whether rather internal or external barriers are perceived as obstacles. After asking for a personal estimation in form of a closed one to five question in the beginning of each topic cluster only open questions are asked. Particularly difficult topics such as barriers encountered, solutional strategies developed or special capabilities needed, are given some predefined factors to the interviewee so he or she can reflect on a broad range of possible answers (Vermunt et al. 2019). At all stages, interviewees are free to choose categories and elaborate on topics they perceived as most important. Nevertheless, interviewees are always asked to explain in greater detail on the topics they find important (Vermunt et al. 2019). Those explanations also include practical examples to make the generic statements more tangible and fully understand the argument made by the interviewee (Geissdoerfer et al. 2018).

The guideline for the semi-structured interviews is in the appendix.

By following this research approach, barriers, enablers, drivers and capabilities for CBM implementation in young SMEs can be identified and related to those of the literature review section (Rizos et al. 2016). Besides interviewing twelve owners of young CE ventures, this thesis stands out by not only discussing encountered barriers but also other aspects which have been mostly disregarded by previous literature such as strategies to overcome barriers and personal motivation as a driver. So, this thesis is not only covering internal dynamics of organisations but adds an important but uncovered aspect to the CBM literature and this is the human aspect. Questions are asked for perceptions, motivations, drivers and how internal dynamics come together to make a CBM work in a fast-changing business environment.

4.2 Sample analysis of selected SMEs

The companies and organisations are selected to be part of this sample because they proved to have built an economically sustainable business model addressing several circular aspects (Table 1). Every organisation of the sample started with circularity ideas and formed a business model around it, so circular considerations were part of the business model from day one of the foundation. Additionally, it is shown that all business model configurations or changes have to start with an overall vision for CE. Once the vision for CE is clear to all members of the organisation, circular strategies can be developed and CBMs can be transformed, reconfigured or built up (Bocken et al. 2016). This is called a “born circular” organisation constituting organisations which have been primarily created to deliver circular value and exploit CE opportunities (Zucchella 2019a). The range of so-called circularity aspects is wide: from products based on circular loops to production processes designed to create a circle by for example zero waste production methods or education for consumer behaviour. Therefore, companies and organisations need to prove an innovative and agile mindset to create new value propositions but also developing new means of value creation, delivery and value capture. It can be said that the CBMs of the sample are very innovative by the new means and new ends they are creating with their unique CBMs. Table 1 provides an overview of the organisations of the sample.

Most of the sample firms consider themselves to be in the implementation phase of a CBM as they argue that this is never a finished process. Some of them classified to be in a constant revision phase of the CBM because there are still many goals to be achieved such as develop-

ing new policies to make all company actions scalable (Company D) or a constant process of optimisation on many fronts (Company B).

The sectors covered in this sample are diverse. Sectors range from consumer goods to fashion, furniture and construction. Several business models are based on digital offerings such as digital marketplaces, platforms or consulting based on software to stimulate circular behaviour of their customers and enable them to conduct their business in a circular way. This accounts for business-to-business (B2B) target groups but also business-to-customer (B2C) offerings include ways to stimulate circular behaviour of their customers by for example proper communication and convenience to behave in a circular way. This is done for instance by take-back systems so that customers are enabled to reuse products by sharing on a digital platform (Company K). There are six firms in this sample targeting private customers. Two of them include both B2B and B2C target markets. Three firms of the sample firms focus on B2B target markets only.

Legal status of the sample organisations is somewhat diverse too. The majority of the sample firms are enterprises with limited liability. There is one Cooperative (C) and two registered associations (F and I) represented in the sample. One association is offering consulting projects, education and community building to implement CE principles in the city of Berlin and the other one produces baby diapers which are compostable to gain fertile soil. These two examples show the uniqueness of CBMs including diverse value propositions, creation, delivery and capture. To describe the sample, it can be said that all organisations which took part in the study considered an economically sustainable business model and creating profits as a necessity to achieve good impact for the planet and its people in the long run. In other words, profit is generated as a means to an end but the focus does clearly not lay on profit maximisation (Stubbs 2017).

Table 1 also shows that the sample organisations are relatively young with the oldest ones being founded in 2009 and the youngest being founded in 2020. The age average of the sample firms is close to four years constituting a sample of start-ups or former start-ups with a CBM. The size of the organisations of the sample is rather small with one to ten full-time employees accounting for most of them. The two firms in the category from eleven to fifty employees are more mature, so they were able to establish their business in the market and managed to scale up. As presented above, the European Commission defines organisations with a size of up to ten employees micro business and up to fifty employees small-sized. So, the sample of this study includes micro and small-sized organisations. Important to add is the fact

that nowadays in the digital era, micro businesses with ‘only’ ten employees can have a great impact and a high turnover.

Table 1: Sample analysis

Company	Legal Form	Sector	Target market	Size	Age	CBM introduction*	Current CBM phase**	Circularity aspects***
A	Limited	Digital market place	B2B	1-10	2019	In the beginning	Implementation phase	<ul style="list-style-type: none"> All services designed for circularity Communication to customers about CBM
B	Limited	Packaging	B2B & B2C	11-50	2009	In the beginning	Constant revision and optimisation phase	<ul style="list-style-type: none"> All products designed for circularity “100% closed loops in company processes are impossible”
C	Cooperative	Retail	B2C	1-10	2020	In the beginning	Implementation phase	<ul style="list-style-type: none"> All products and processes designed for circularity Local focus and zero waste Community aspect is strong- like communication to all stakeholders
D	Limited	E-commerce	B2C	1-10	2020	In the beginning	Implementation phase and setting up new policies to make all actions scalable	<ul style="list-style-type: none"> All products and services designed for circularity Delivery with re-usable boxes and carbon-neutral delivery is outsourced Partners are organic, local & zero-waste Communication with suppliers and customers about circularity
E	Limited	Consumer Goods	B2B & B2C	11-50	2013	In the beginning	Implementation phase	<ul style="list-style-type: none"> All products and processes designed for circularity Communication to customers and suppliers in developing countries about sustainable circular standards
F	Association	Consultancy	B2B	11-50	2018	In the beginning	Non-profit NGO with own operational model and revenue streams	<ul style="list-style-type: none"> Consultancy projects, education projects, community building, events Communication to partners to foster collaborations for circularity
G	Limited	Food & beverage	B2B & B2C	1-10	2018	In the beginning	Implementation phase with constant optimisation of processes	<ul style="list-style-type: none"> All products and processes designed for circularity Sourcing from circular suppliers including takeback system, active customer and supplier communication, and collaboration
H	Limited	Furniture	B2C	1-10	2013	In the beginning	Business Model builds on existing circular materials and infrastructure	<ul style="list-style-type: none"> All products and processes designed for circularity Making use of the public takeback system of corrugated cardboard as the main material
I	Association	Consumer Goods	B2C	1-10	2015	In the beginning	Implementation phase	<ul style="list-style-type: none"> All products and processes designed for circularity Communication to suppliers and customers about circularity
J	Limited	E-commerce	B2C	1-10	2020	In the beginning	Implementation phase	<ul style="list-style-type: none"> All products and services designed for circularity Package-free and climate neutral delivery by using re-usable boxes and electronic vehicles powered with green electricity Communication with suppliers and customers about circularity as they are both at the same time
K	Limited	Fashion	B2C	1-10	2020	In the beginning	Implementation phase	<ul style="list-style-type: none"> All services are designed for circularity Communication with suppliers and customers about circularity as they are both at the same time
L	Limited	Construction	B2B	1-10	2020	In the beginning	Revision and implementation	<ul style="list-style-type: none"> All processes are based on circularity It is planned to calculate the ecological

* CBM introduction: indicates when the CBM was initially introduced

** Current CBM phase: indicates the phase of CBM adoption the organisation is currently in

*** Circularity aspects comprise aspects inside and outside of the organisation

4.3 Description of interviewed persons

All interviewees of the sample firms or organisations are co-founders or founders. All of them are Chief Executive Officers (CEOs) in the case of companies and executive board members in the case of the two registered associations/ non-profit organisations and the one cooperative. Half of the interviewed persons in this study are female and the other half is male. For this sample holds true that relatively young people between twenty and thirty-five years initially founded the companies and organisations. This indicates that selection criteria focused on ensuring representatives of the sample firms have a high level of knowledge, interest and experience on CBM (Hofmann and Jaeger-Erben 2020). For this study, it is important to conduct interviews with the initial founders and today's managers to get to know the full story. In particular, internal barriers, enablers, capabilities and drivers are addressed in the interviews and the interviewees are able to tell the whole story from the beginning till today. The focus lays on internal dynamics and closely connected to that is human behaviour. It is important to talk to the heads and decision makers of the circular organisations who guided the organisation and its people through the whole journey of CBM implementation till today. By this approach lots of valuable insights can be collected.

Not all interviewees are German citizens, but all firms were founded in Germany and one in Austria but operates in Germany.

5. Findings

This section is devoted to present findings of the interviews. All relevant statements of the interviewees are summarised in tables of the corresponding subsections. The names of the interviewees and their organisations are anonymised. When referring to particular statements from interviews, abbreviations of the particular company or organisation are always indicated such as for example 'Company A' or 'Organisation I'. The findings are presented in five subsections. Section 5.1 evaluates on the personal motivation and inner drivers of the interview-

ees. The second subsection is devoted to business model analysis. Therefore, a business model analysis is undertaken following the model of Richardson (2008). Additionally, the question is elaborated whether the business model changed over time and which circular aspects are included. Section 5.3 covers required capabilities that organisations need to successfully operate a CBM. Section 5.4 presents findings for perceived internal barriers by the interviewees which hampered the CBM implementation in the company. Lastly, section 5.5 presents internal enablers that helped organisations to successfully implement the CBM.

5.1 Evaluation of personal motivation

Personal motivation and the inner drive of people to create and implement a CBM is further framed as drivers for CBM implementation. This chapter is to explore drivers of the interviewed persons to build a CBM.

First contact with the Circular Economy

Interviewees got to know about the CE concept within very different situations and times in their lives. Those situations occurred for example in their studies at university, in their former jobs or during side projects. Many interviewees pointed out their private interest, conversations with friends, family members or colleagues about CE-related topics. The Ellen MacArthur Foundation is the mostly used source of information. However, all interviewees agree on having the motivation to create a business with a special purpose – one that is sustainable in all business activities, and does neither harm the natural environment nor the people.

Information sources for the Circular Economy

The same applies to sources of information about the CE: interviewees inform themselves with very different levels of private interest and sources of information. Sources range from social media contributions, newsletters and blogs about CE, to professional courses from the Ellen MacArthur Foundation. Two of the interviewed founders attended professional courses at the Ellen MacArthur Foundation and the Blue Economy Summer School by Gunter Pauli to gain more knowledge in the topics of circularity combined with economic skills around founding and establishing companies.

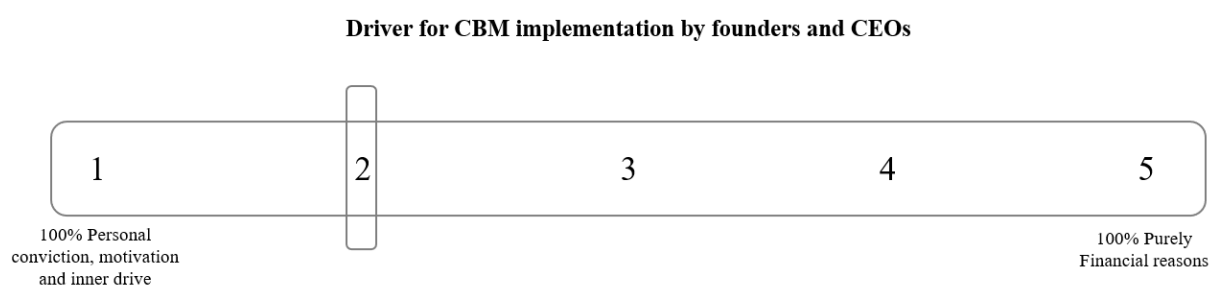
The majority of interviewed people indicates that they rather inform themselves from and about practical issues instead of science. Academic research is found to be unrealistic, as models simplify reality but those ventures have to exist and survive in a complex reality. Hence, they rather receive their information from the professional network, private talks, fairs, meetups, events, awards, books and literature, but also from external consulting companies or NGO's such as the CRCLR House in Berlin, or simply searching for special issues on the internet. Among social media, LinkedIn stands out as a source of information. On institutional level, some founders also inform themselves about CE by reports from the EU such as reports about the Green Deal or Plastics Europe.

All interviewees stress that information about the CE is scarce and it is even harder to collect information in a structured way for different sectors, types of business model etc. This need is identified by Organisation F which tries to do exactly that and combining it with a community and networking approach.

Motivation for implementing a Circular Business Model

A set of indicators from one to five is applied to measure the extend of inner motivational and financial intention of interviewees when founding their organisation. So, three is the middle and the interviewee has the opportunity to indicate a balanced view in the middle. In the range of one till five – the value of one is indicating 100 percent CBM implementation out of personal conviction and motivation, and the value of five is indicating 100 percent CBM implementation out of financial benefits, the average of two shows a strong belief into the CE and a strong personal motivation to implement a CBM of the interviewees as they consider CBM as the right thing to do (Figure 3).

Figure 3: Driver for CBM implementation by founders and CEOs



Most of them mention the financial point of view because they initially founded a company or organisation to make a living. This indicates that the sample firms are supposed to make profits to ensure the long-term survival of the company and to build a sustainable impact not only on the external environment but also to ensure stability for inside the firm. An example for internal stability is the ability to pay salaries punctually and to invest in new business opportunities. This is important because establishing a CBM is expensive – from a monetary as well as human-power perspective. Skilled people are needed as well as new procedures, new ways of manufacturing and establishing a new customer base for circular products or services. Therefore, special capabilities are necessary to be acquired by organisations but which in turn are expensive.

Most common ideas for organisations and businesses stem from initial personal problems or needs that the entrepreneurs were facing. They built the company or organisation to solve a specific issue in the CE and sustainability domain. For example, the co-founder of Company K loves fashion since she was a child because it is her way of expressing herself. For her, fashion is fun, cool and a form of art. She did not want to feel guilty for buying new fancy clothes but she also had a strong desire to regularly wear different combinations of new fashion items. So, she founded Company K which enables consumers to share high quality fashion items on a platform which also includes CO₂ neutral delivery and ecological laundry services. The founder of Company E had similar struggles because he wanted a career without destroying nature. Especially as a product designer it was difficult to create a product without directly or indirectly harming humans, animals, or the environment. For his career he wanted to use his skills as a product designer in consumer industry to establish a company that changes consumption practices for the good. To add on this example, the co-founder of Company G is a chef and loves food. She combined this passion with science and her studies in Biology. At both areas in her life, she experienced the damaging food system. She also loves learning and wanted to make a reconnection of these fields happen and create a different form of value. So, she decided to found her own company and to produce food preserves from rescued food to prevent food waste in the system and enhance upcycling of food. She also points out that there is a need to make business and to be profitable as it keeps the company and its positive impact alive on the long-term. This is a prerequisite for CBM implementation that all the founders have in common: to make their dream and vision for a CE become real.

Certainly not all entrepreneurs started with a personal need. Others also started with a social or ecological problem that they aimed to solve with their organisation or company. For example, the co-founder of Organisation I is passionate about soil and saw the problem of waste caused by baby diapers implicating resource use for production, waste by a one-time usage and a short life cycle. So, she combined her desire to make fertile soil with this ecological problem which is also deeply embedded in societal behaviour. To add on this, the main motivation to found a circular business of co-founder of Company J was the absurdity of linear consumption. According to him,

**“if the whole world starts consuming the same amounts as in the western world,
we would need three times the resources of one Earth.”**

He also stressed that this way of living is unsustainable and will cause more and more problems in the future. So, he wanted to invest early and saw a way of doing so by founding a business with a CBM. On a personal side, he realised that the better he was performing at his former job, international trade would be increased. This implies the fact that more products are produced, shipped around the world and get wasted which leads to senseless resource consumption, carbon emissions and waste on landfills. There he also realised the consumers' focus on convenience, especially regarding e-commerce. This is where he started to develop ideas on possible solutions which would bring convenience into the e-commerce of second hand and sustainable products. He states:

**“As a society, we already produced enough things to have a good life but somehow we
are not able to distribute those things properly and re-use them.”**

That is why Company J offers a convenient service to share products with a handy platform to distribute things so someone else can re-use the items to keep all materials and products in use.

However, there were also entrepreneurs who started with an economic opportunity and shaped the business to get a circular outcome by establishing circular structures. For example, the founding team of Company L saw the problem that always construction material is left on

construction sites which is not reused but wasted leading to unnecessary costs. They realised the business opportunity of selling these unused materials and indirectly tackled CE issues but it took a few years for them to recognise the concept of CE by operating their business. After recognising the concept of a CE the personal conviction of the interviewee to tackle the problem of wasted construction materials in the sake for sustainability developed.

Adding to this, addressing CE is simply perceived as a necessity by the founder of Company A. The aim is to empty landfills and this also leads to an opportunity to earn money with a business, creating a market niche and automatically advance the CE by doing business. In the former job at another company, he experienced inefficiencies of the market when it came to secondary materials and the so-called waste materials as this market is non-transparent and regionally restricted in terms of value chain und value flows. There he realised the necessity to act and decided to exploit this economic opportunity while facilitating the CE (Founder of Company A).

5.2 Business model analysis

The subsection 5.2 of this thesis covers the business model analysis of all companies and organisations of the sample to get an overview of the participants in this study. The method of business model analysis of Richardson (2008) is applied in the next subsection. The following subsection describes the change of business models over time. The last subsection is about the manifold circular aspects in the business models of the participating organisations.

5.2.1 Business model analysis by Richardson

Business Models of the organisations that are part of the sample are analysed with the integrative framework for strategy execution of business models by Richardson (2008). The general business model framework by Richardson (2008) was already used to analyse sustainable business models (Bocken et al. 2014) and circular business models (Ranta et al. 2018). Taken these works as a reference, the three business model components value proposition, value creation and delivery, and value capture are used as an analysis framework in this thesis (Figure 4). According to Richardson (2008), this concept of value reflects the logic of strategic thinking of companies to create the highest amount of value for customers and to capture the

highest amount of value as well as gaining competitive advantage over competitors (Richardson 2008).

Figure 4: Conceptual business model framework from Bocken et al. (2014)



By describing the value proposition of each firm of the sample, it becomes clear which value a firm aims to deliver to its customers, what is the unique offering and who are their target customers. The basic strategy of each firm to win customers is described in this category as well as how they gain competitive advantage (Richardson 2008). The value creation and delivery system is to find out the source of the competitive advantage of each firm. This category is about internal capabilities and procedures. Internal capabilities are separately covered in chapter 5.3 as they are of special importance of this thesis. This category describes how firms of the sample work internally. It is a description of their value chain, activity system, and business processes. If applicable, the position in the value network of the firms are described with connections to suppliers, partners, and customers (Richardson 2008). The category of value capture elaborates on how the firms generate revenue and/ or profit (Richardson 2008).

In Table 2, the analysis of the CBMs of the companies and organisations of the sample through the framework of Richardson (2008) is presented in detail. There, the differences and similarities become apparent of the manifold CBMs with their very different value propositions, value capture and delivery schemes, and their revenue models.

Table 2: Business model analysis for the sample adopted by Richardson (2008)

Company	Value proposition	Value creation and delivery	Value capture
A	Producers are able to sell their by-products and so-called waste materials. Others can buy these materials for their own production. A comparison of prices for primary materials and secondary materials is offered on the marketplace. So, savings in prices by switching to secondary materials are made transparent to all participants.	Company A is an online marketplace operator for the exchange of secondary materials. It brings together different parties to exchange materials. By their price comparison calculator, savings are made transparent for customers using secondary materials via A's marketplace. Often, direct contact by people to all parties is needed to make a deal. The extension towards a platform with educational aspects for all stakeholders is planned.	A provision for each transaction on the marketplace is earned.
B	Production of high-quality packaging solutions from recycled or renewable raw materials and with environmentally friendly finishing processes. This involves the entire manufacturing process - from design and production to the use and disposal of the products.	Production/ manufacturing of packaging solutions according to individual orders. High standards for suppliers and active communication about sustainability/ circularity measures. The sustainability impact is also communicated to customers and is nowadays a competitive advantage.	Packages are produced based on contract work leading to individual packaging solutions for every customer. B2B market is more attractive as packaging in larger charges is ordered.
C	The business model is created to enhance participation of all members, community sense, co-determination, better communication, and education. Cooperative C is at the same time a social platform, zero waste supermarket with highly reduced food waste due to precisely estimated demand, a bigger warehouse at the market to ensure better cooling and special preserving food techniques.	Operating the supermarket and warehouse logistics are major tasks. Hence, logistics and ordering from local suppliers around Berlin are constantly an issue. Planning to create even more circular structures on site such as a café that sells bakeries and cooked food which is expiring soon. Active working groups are engaged with further circularity projects such as composing the food that has gone to waste at a farm to become fertile soil.	Membership fee is paid and products are sold in the supermarket. Products are exclusively sold to members of the cooperative. Set up of pick-up stations around Berlin are planned.
D	Company D created a platform for local, organic and zero waste online shopping. Boxes for zero emission deliveries are always reused. It ensures ordering of local, organic and zero waste foods by selecting partners accordingly.	Company D owns the boxes for deliveries but the delivery itself is outsourced. It's ensured that the delivery is always carried out by emission free cargo bikes. There is a constant work on running the platform and on strengthening collaborations with shops or local organic food providers.	Users pay a yearly membership fee which is paid monthly and contains unlimited free deliveries. Another possibility: delivery fee per order.
E	Products of Company E are tableware and dishes that are made out of naturally fallen leaves from areca palm trees which constitutes a by-product. All CO2 emissions of company processes are compensated. This is transparently visible on the website.	In India, naturally fallen areca palm tree leaves get collected and processed at the manufacturing site to the end products tableware and dishes. Close relationships to manufacturers are held to ensure social and environmental standards. CO2 emissions from shipping and all other company processes are compensated. Packaging is biodegradable.	Selling products to wholesale, and directly to customers via online shop.
F	Organisation F offers workshops, research projects, consulting projects, networking & community events, an open source platform for companies to connect and exchange on topics of CE. It is an enabler for collaboration between individuals and companies who are striving for Circular Economy implementation in Berlin.	Around 20 people are working on projects in the NGO and are paid on honorary basis.	Organisation F is a non-profit NGO but has different streams of income: donations, funding from third-party projects and education memberships.

G	Company G is an authentic, hand-crafted, and zero-waste food company that aims to reconnect people with food. Community, education, information and transparency are fundamental. A community hub is planned. Through culinary innovation new products and processes are created that help in designing “waste” out of the food system. Rescued food is upcycled into delicious products. Own processes are designed to avoid any waste.	Company G is in the middle of the value chain in the food system. It gets supplies with rescued and fresh foods to upcycle it and produce products, mostly preserves, in their professional kitchen. There is always the need to be flexible in production, because supply is not stable and there is a broad range of product offering, so production processes need to be agile. Delivery is outsourced but collaboration with a provider ensuring zero waste packaging and delivering by bike courier.	Products are sold in the online store and at the weekly market stand. When selling products, customer education and community creation are supported.
H	Stylish and functional furniture out of corrugated cardboard is offered to private customers. Customer education as a lobby work and conviction of people to use corrugated cardboard for furniture construction goes along.	Corrugated cardboard is a circular material by nature and in Germany a takeback infrastructure is already established. This was the initial idea and enabling factor to build the business and use existing takeback systems for cardboard. Production is in Germany to minimise transportation, use the established systems and have certain standards set for suppliers. Selection of suppliers by certifications of materials.	Furniture products are sold to customers via online shop and in a showroom.
I	A new circular baby diaper system is offered to parents who are looking for biodegradable diapers to avoid waste and want organic materials for natural skin care for their babies. Bottom-up community approach to reach parents and have collection points to minimise transport.	Responsibility for the 100% biodegradable diaper production, the collection system and the conversion into fertile humus. Operations start in year 2021. Local system: baby diaper production in Berlin, community / Kindergarten in Berlin where diapers are distributed and collected, composting company is in Brandenburg and fertile soil is sold in Berlin again.	Two major revenue streams: (1) subscription fee for parents to receive diapers and get the used ones collected; (2) selling the produced hygienic and fertile humus called ‘Terra Preta’.
J	Company J is the provider of an online marketplace in Berlin and a packaging-free and climate-neutral delivery service in one. The website allows people to buy and sell used products. So, customers are suppliers at the same time and the other way around. Company J takes care of the collection and delivery of the products, as well as the payment and, if necessary, communication between the customers.	Company J connects customers and suppliers via their website / online marketplace. Its activities are managing the logistics system and delivery to make the business work in a climate-neutral and package-free way. By making customers to suppliers at the same time, Company J is right in the middle of the value chain with its marketplace and logistics system.	Revenue generated from transporting boxes of different sizes and prices. The bigger the box, the higher the price. Many other revenue models are possible on top of that. Planned for the near future is the second hand as a service model: capturing 50% of the selling price by offering highest convenience for customer.
K	Proposition: high quality sharing fashion items among users of the platform: a standard service at which the user is using the platform and can rent or borrow fashion items, and a concierge service at which Company K ensures all services like cleaning the clothes, taking pictures, delivering and managing the rental. Additionally, a network and community among users is created that focuses on sustainability and circularity awareness for fashion. Target	To make the business running smoothly, partners needed to be acquired who execute the services offered by the platform in Vienna and Berlin. There was also a need to make sure all necessary capabilities are in place to successfully operate. For example, a co-founder and CTO was hired for creating the platform, the website and booking system. All internal operations were divided among the two co-founders in retrospect of their skills and suitable partners for outsourcing were found. The business was launched in March 2020- one week before the first Covid lockdown. As	Two revenue streams: (1) standard service at which a transaction fee of 20% from the rental price is taken. (2) concierge service: a 50% transaction from the rental price fee is charged but Company K covers all costs of the process such as cleaning the clothes and delivery.

	customers are especially women who are fashion and sustainability affine. By using this platform users get the chance to rent expensive designer clothes and accessoires for a modest price.	people usually borrow fashion items for events, the whole business was endangered. One key principle of the founder is agility. So, they changed some steps and started with community building and creating a network among users about circular and sustainable fashion behaviour.	
L	Offering: consulting service based on video assessment for buildings of their clients to create sustainability building-passports considering materials and emissions of the construction and reusability. Target customers are business clients in the construction industry who either aim for sustainability and circularity for their new or existing buildings or want to save money by selling construction materials that are leftover.	Company L focuses on digital assessments and design solutions for clients in the construction industry. They work on software solutions to assess circular opportunities and how each building can potentially close the loop. It is planned to collect all data to calculate an ecological footprint for Company L. In the future when the operations scaled up and big amounts of construction materials are reused and recycled, they aim to become a net-negative emission contributor.	Company L is investor supported now. Two revenue streams: consulting service to attract business clients, and software solutions on their platform to issue building passports. Monthly fee of 150€ to use the platform. Additional services are to be paid extra.

5.2.2 Change of business models over time

All interviewees state that their initial business model changed over time but to a different extent. Supporting this statement, the founder of Company J states that business models are always changing as a natural process.

The founder of Company A simply states that he expected establishing a company that tackles a market need of trading unused secondary material to be easier. He did not expect that experts from the construction sector would be so hesitant in selling their secondary material but also buying it. He says that in reality, barriers occur on the human level. As a result, he needed to adapt to the hesitance of a rather traditional sector by actively approaching experts in construction and convince them. Hence, success is not guaranteed by simply making an online marketplace available. Another example for major changes in business model were undertaken by Company D. It changed completely from offering consumer goods in sustainable beauty and hygiene products to an e-commerce and retail business model. So, the whole operational and financial model changed.

Oftentimes the Covid-19 pandemic led to major changes for the business and especially for the rather new start-ups and young organisations. A very concrete example is given by the co-founder of Company K. They received grants in 2020 to kick off the business and two weeks later there was the first lockdown due to the Covid-19 pandemic. So, she needed to be flexible

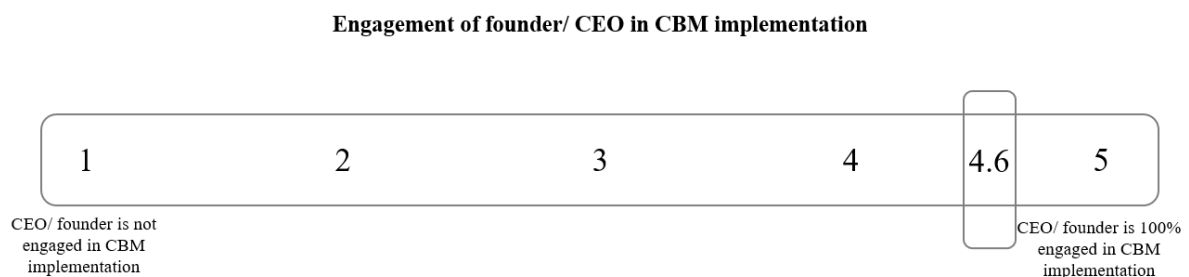
and did pivots: she analysed what happened at the market and how she could react on unforeseen changes. Therefore, being flexible is very important to be able to react quickly and adapt to new situations. That is why Company K follows a lean start-up approach on top of the CBM. Others changed the business model over time to adapt to new developments and exploit better opportunities. It happened to the founder of Company H that in the beginning he thought he could offer the products for a very much lower price because the material of cardboard is not expensive but producing in Germany is expensive per se due to high salaries, marketing costs, office personnel costs, rent, expensive green electricity, etc.

Cultural aspects are addressed by the founder of Company E: new people constantly joined the company, so also the culture changes, as team members and also the founder get new roles, or roles in the company are changing completely or new ones are added. But overall, the mindset and values of the team remain the same, as everyone believes in the mission and everyone are conviction offenders to CE. In the end, CE implementation is the job for the CEO at Company E, because it always incorporates important decisions.

5.2.3 Circular aspects of the business models

In a range from one till five, one indicating no engagement in circularity issues of the firm and 5 indicating 100 percent engagement into CBM implementation, an average of 4,6 shows a clear tendency to bring circularity in the business is the chief issue (Figure 5).

Figure 5: Engagement of founder/ CEO in CBM implementation



Some interviewees highlight the importance of circularity to their business and circularity being a key component of their business model. This is often connected to important decisions which are taken by the firm's CEO anyway. In the case of Company E, CBM implementation is always the job for the CEO, because it always incorporates important decisions to make. So, one could say that the implementation of CBMs in the real business is conducted by the

leaders of an organisation because it requires important decision making, adequate management and allocation of resources.

“Yet, in reality neither 100% circular business models nor 100% linear business models exist due to physical and practical reasons.” (Antikainen and Valkokari 2016, p. 8). Actually, this statement can be confirmed by the findings of this thesis. This quote is supported by the founder of Company B, saying that:

“100 percent circular flows are simply an impossible stage to be reached.”

It is true that those firms applying a CBM aim for a 100 percent circularity within their business activities and beyond. However, there are several issues out of hand for a single company. The founder of Company B gives this example: just by using the company lavatories, the circular flows of the companies’ activities are not circular anymore. But the wastewater management system of the city cannot be addressed by the business model of Company B. Company B established a niche of sustainable packaging and printing almost ten years ago. They produce high-quality packaging solutions from recycled or renewable raw materials and with environmentally friendly finishing processes. This involves the entire manufacturing process - from design and production to the use and disposal of the products. But as the founder of Company B said, it can certainly not account for every single activity.

None of the SMEs of this sample aim for profit maximisation but their business models are aimed at profitable income to be financially self-sustaining and ensuring a survival of the business and its positive impacts in the long-term. The co-founder of Cooperative C put it like that: The values of the organisation was extremely important to her and the founding team. That is why they decided for a cooperative as a legal form and basis for their business model. Cooperative C was founded with a special focus on values and this business model out of personal motivation for CE. However, the chairwoman of Cooperative C also underlined the importance of creating an economically viable business model to ensure the long-term success.

Implemented CBMs in the firms of this sample are manifold. Already the legal status can be different, as there is one cooperative and two registered associations in the sample next to the limited liability firms (Table 1). Similarly, industries where the organisations operate in are very different as well. All this results in very different CBMs, with differing operating models and circular aspects of the business activities.

For example, Cooperative C is a zero-waste supermarket with highly reduced food waste due to precisely estimated demand, a bigger warehouse at the market to ensure better cooling and preserving food techniques than usual supermarkets at the same time. They plan to create even more circular structures on site such as opening a small café in the supermarket that sells bakeries and cooked food from the market which is expiring and otherwise would have gone to waste. They also have active working groups that are engaged with further circularity projects.

Company D is a platform for local, organic and zero waste online shopping. The problem they aim to tackle is single used plastics in consumer goods industry and Company D solves it by a reuse strategy and implementing the four R framework reduce, reuse, recycle and recover (Kirchherr et al. 2017). It is also a business model for a Sharing Economy, as boxes for deliveries are always reused. Company D owns the boxes for deliveries but the delivery itself is outsourced. It ensures that the delivery is always carried out by emission free cargo bikes. Another platform and service solution are offered by companies J and K. The founder of Company J states that:

“Our mission is to make the exchange of second-hand, upcycled and other sustainable local products easy and climate neutral.”

Similarly, but for high quality fashion items, Company K aims for keeping fashion items in the cycle by enabling consumers to borrow their clothes and accessories to each other. Company K offers different services to make operations as sustainable as possible, for example by offering zero emission deliveries and sustainable laundry service. More as a consulting service does Organisation F offer workshops, research projects, consulting projects, networking and community events, an open source platform for companies to connect and exchange on topics of CE. Hence, it acts as an enabler for collaboration between individuals and companies who are striving for CE implementation in Berlin. Company A and L provide a platform specialised on the construction industry but with special services. For example, the aim of Company L is to bring new and existing concepts about circularity in the construction industry together and develop B2B solutions. It is planned to collect all data to calculate an ecological footprint for Company L. In the future when the operations scaled up and big amounts of construction materials are reused and recycled, they aim to become a net-negative emission contributor by operating this CBM. In turn, Company A has concrete plans for the future to

extend the marketplace for construction materials towards a platform which offers education, workshops and further training opportunities for Industrial Circular Economy and resource exchange.

Those companies and organisations which are in production are also in very different sectors and apply different CBMs. Therefore, Company E aims to abandon single used plastics and substitute it with a product that is untreated and compostable in the garden or organic waste bin. Their products are tableware and dishes that are made out of naturally fallen leaves from areca palm trees in India which constitute a by-product. This is a practically applied lending principle from nature and promotes a cycle á la cradle-to-cradle. This business idea automatically solves the resource, production, use and end-of-life phase of the product's life cycle. All the other business activities such as packaging and transportation are solved by creating sustainable packaging and offsetting the emissions from shipment and transport. The founder of Company G even states that:

“There is no such thing as waste.”

The processes and business ideas are aimed for closing loops and fully implemented circularity within the firm and its outside streams. When cooking and manufacturing the products in their professional kitchen, there is the focus on efficient processes, zero-waste and upcycling food. Rescued food gets upcycled and made into new products. When preparing the products, food waste is avoided. There is always the need to be flexible in production, because supply is not stable and there is a broad range of product offering, so production processes need to be innovative and new products get created to fully use all foods and so avoid any food waste. They also try to educate people at home to not see old food as waste and also teach them in an online blog to use food differently and get ideas on how to prepare it to upcycle it.

Other examples for production companies are Company H and Organisation I in which founders are not directly aiming to address CE implementation but they rather automatically implement it. Company H works with corrugated cardboard as the main material to build furniture. This material is circular and sustainable by nature and in Germany infrastructure for takeback is already established. This was the initial idea and enabling factor to build the business as it is: circular by nature. Beyond that, everything is produced in Germany to minimise transportation, to use the established systems of takeback of corrugated cardboard and have certain standards set for suppliers. But the founder made clear that circularity was only one

reason out of many for the current business model and being circular was not an active decision. The goal was to build sustainable products but it was not an active decision to use corrugated cardboard to become circular. Instead, this material was chosen due to various other advantages of the material. Company H does not advertise itself for being circular, because circularity is automatically reached by doing this business. It is a human-centred company in which regular hand- and footprint evaluations by external consultancy are undertaken to also give attention to social aspects (next to circular, ecological or sustainability considerations). Organisation I is neither officially positioned to implement CE even though it aims to create a circle. Nature is seen to be regenerative and so is their business idea. Organisation I invented a fundamentally new way of how baby diapers are produced, used and upcycled, when they are no longer a waste but a nutrient for plants and transformed into fertile soil. In the end, with founding Organisation I, the co-founders try to change the system. It is difficult to break the linear system which is very stable. Instead, they try to start a new systemic flow by creating communities living in the same neighbourhood, meeting regularly at the diapers distribution and collection points, planting fruit trees together and living their lives in a more connected way.

5.3 Analysis of internal capabilities

Tables 3 and 4 below present capabilities and competences needed by the companies and organisations of the sample. Capabilities are described in detail and classified into soft, skills-based, tech-based and mixed competencies in Table 3. This table also shows quantitative occurrence of these clustered capabilities. Detailed explanations of the interviewees concerning required capabilities can be found in Table 4.

Skills and knowledge-based capabilities include among others: knowledge or skills gain by hiring new employees with a specific profile to do tasks for circularity implementation, education of employees to acquire special skills to accomplish CE tasks, education of managers about CBM, or hiring external consultants to get in external knowledge. Tech-based capabilities include for example skills in IT or software to facilitate circularity in the firm, or skills in innovative ‘circular’ manufacturing technologies. Soft skills comprise different aspects which were mainly brought up by the interviewees themselves. The same accounts for the perceived need of mixed competencies to be the key to success operating a CBM.

Partly in line with the findings of Burger et al. (2019), tech-based skills are not perceived to be the most important capabilities (Table 3). Instead, the focus lays on skills- and knowledge-based competencies aiming for system thinking and the willingness to gain new knowledge and to act engaged in the field of the specific CBM (Table 3). Not all founders were experts in the field before founding but they and their teams have the strong willingness and the inner drive to make the CBM work out (Table 4). This finding is in so far novel as it shows the importance of human aspects in this field. It underlines the importance of personal drivers for the CBM. The skills needed to facilitate the CBM can be acquired by different techniques such as education, hiring new employees or external consultants but the precondition is the strong willingness of people to do so (Table 4).

Table 3: Required capabilities by organisations of the sample

Company Capabilities	A	B	C	D	E	F	G	H	I	J	K	L
Mix of competences	X										X	X
Soft skills		X				X		X	X	X	X	X
Skills- & knowledge-based			X	X	X	X	X	X	X	X	X	X
Tech-based			X	X	X	X			X	X	X	X

Table 4: Description of capabilities

Classification	Order	Capabilities
Mix of competences	Combinations of capabilities	Overarching competencies: a combination of material knowledge, business sense, systemic thinking and technical, engineering capabilities
		Mix of business know-how and methodology skills, technological skills and soft skills
		Mix of interdisciplinary competences in the founding team: engineering and digital competences
Soft skills	Behavioural traits	Commitment and self-organisation of all working members are highly required and are a pre-condition to work there
		Engagement, flexibility, interdisciplinary is needed from every team member
		Having the mentality of openness towards collaboration, sharing information and knowledge with the community as this helps a lot instead of 'fighting alone'
		Being flexible, agile and committed: to be able to quickly adapt to new situations
		Being able to convince people from the idea, inspire them and sell the vision
		Mentality: How to deal with challenges? How do you overcome Covid lockdowns? Counted as methodology skills.
	Mission alignment	It is a mix of ideology/ belief in CE and economy/ making business
	Sustainability and circularity are in the company's mission, vision and values, so there are often informal discussions, actives questioning of the status quo to be in a constant and natural process of optimisation towards circularity. These	

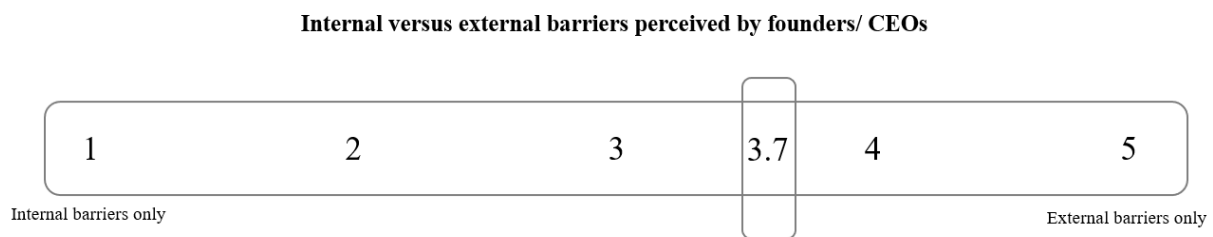
		informal enquiries about circularity in combination with professional external consultancy and workshops are preferred than having skills workshops on circularity.
	Team composition	Finding the right team members with the same vision and mission is decisive- especially in the beginning of founding a business
	Agile approach	Dependence on the situation: a start-up has always a lack of money. Therefore, always a cost benefit analysis has to be done whether a training for internal people is useful or whether freelancers should be hired to do the job. This is a financial consideration on the basis of work hours: are the work hours of the CEO well invested to learn specific programmes or is it more cost efficient to hire someone from extern?
Skills- and knowledge-based	Hiring	Knowledge or skills gain by hiring new employees with a specific sustainability profile to do tasks for CBM implementation
		Skills gain by hiring digitisation and engineering experts
		When hiring there is always the flexibility to also do a different job- this depends on what the person wants to do and with whom the person likes to work with
		By hiring new people there is high innovation potential and new team constellations
		Job interviews conducted with team members: who fits the best into the team?
		The recruitment process cannot be planned beforehand
	Education	Learning by doing for the founding team and creative hands-on skills are important
		Education of founding team, administrative and strategic stuff by externals like volunteers and mentors
		Learning abilities and being open to new things and approaches
		Knowledge or skills gain by training and educating employees and managers is always needed
		Founding teams' education about circularity and technology: e.g. co-founder is a CE expert and brings knowledge for combining the natural environment with business. This is important for making the right decisions in terms of circularity and being consistent decision making for circularity.
		Skills workshops by external funding agencies, incubators and accelerators
	(External) consultancy	External help by e.g. collaborations and mutual help with other and NGOs for Circular Economy such as the CRCLR House in Berlin
		Hiring external consultants: is planned to trace the impact professionally and create a tracking of every use/ process which is very complicated in the food industry.
		Hiring external consultants as a means for novel approaches
		Hiring external people for marketing tasks
	Skills as a precondition	Skills on managerial level decisive: here it is the combination of science and cooking
		Combination of all skills of the team lead to novel solutions
	Open network	Other: tools for the community with blog and mutual exchanges with community members, customers, suppliers, etc.
	Strategy	Strategic focus: learn from data and adapt revenue streams, facilitate testing, change product or business model if its needed
Marketing	Marketing skills, finance skills, circularity knowledge, among other	
Tech-based	IT and software	IT/ software to facilitate the ordering system inhouse
		IT/ software to facilitate circularity in the firm in form of IT warehouse and logistics management to ensure the best cooling and usage of the food (as demand can be calculated due to a constant number of members)
		Software was surprisingly a big hurdle – you need to teach it yourself and learning by doing mentality
		IT: due to a complicated backend
		Invent a low-tech and semi-automated production line to produce biodegradable diaper
		IT and website programming
		IT/ software to facilitate circularity in the firm is needed early on when founding

	All-around	Tech-based capabilities: “everything you need in a tech-based start-up”
	Infrastructure	Innovative technologies such as logistics infrastructure and learning system for data analysis
	Outsourcing	Outsourcing technically advanced circularity measures: carbon measurement and offsetting, plastic saving measurement, and operations with deliveries

5.4 Evaluation of internal barriers

In this sample, the internal barriers are perceived to be not very high with an average of 3.7 between internal (one) and external (five) barriers (Figure 6).

Figure 6: Internal versus external barriers perceived by founders/ CEOs



One explanation is that the sample consists of younger firms, start-ups and innovative organisations and most of them expressed their entrepreneurial mindset with the desire to change their industry to the better. This can cause a lot of headwind from industry and incumbents. The organisational structure is flexible and agile which often differs to organisational structures and mindsets of incumbents. For older companies of the sample such as Company B or Organisation F, this question is answered in sight of initially founding which was already a few years ago. Perceptions on this changed because when a company gets more established in the market, perceived threats from outside seem less overwhelming but inner structures are getting more and more complex. Hence, the findings of this study can be explained by the fact that young organisations are part of the sample with less complex inner structures. To make this question comparable among the whole sample, all interviewees answered this question in sight of the first years when they founded the company or organisation. It is obvious that their perceptions might change in the coming years since this is a rapidly growing and changing

environment. So, this is necessary to statistically gather data correctly and to be able to make comparisons between statements of interviewees.

The Covid-19 pandemic is also a reason why interviewees and especially founders of young ventures tend to be biased by external barriers (e.g. Company K). Some of them founded in 2020 and started operating when the first lockdown in March 2020 happened (Company K). Obviously, this had huge impacts on the market and influenced all companies a lot. It also had impact on the motivation of founders who just right by the time were trying to make their business running and establish circular structures. So, it would be interesting to do the same study in a few years and a post-Covid economy to evaluate whether perceptions are still the same.

Detailed information on the barriers perceived by founders and CEO of each organisation of the sample can be found in Table 5. There is no ranking of importance of the barriers. It is a structured order which does not reflect the importance of each barrier. Several entrepreneurs state risk aversion to be a main barrier (Zucchella and Previtali 2019b). This is accounted for organisations and people who rely on their customers or suppliers. Without them, their business is simply not possible. Oftentimes, at this point explanations come down to discuss human aspects. The founder of Company D summarises that as followed:

“It is all about human aspects. Whether it is internally or externally. There are internally many discussions on the product and specialities, there is ambiguity and trade-offs in every decision.”

Others state that there can be barriers on managerial level when it comes to set and establish values for the culture of the organisation. This is in line with the findings underlining that managers or employees who associate their business with a useful societal goal, have a strong moral involvement that reinforces the internalisation of the values of the company (Ünal et al. 2019). So, the cultural dimension and setting of values are of importance too when it comes to finding solutions in for barriers of a CBM. This contrasts the findings of Guldmann and Huulgaard (2020) who found that for circular start-ups there are no barriers perceived at the employee level. For example, the founder of Company L explained that fail-hires can cause internal disturbance especially in such a small company where personal relationships among people tend to be close. Hence, this study finds that there can be internal barriers on employee level.

In literature, it was found that at least in the short term, managers can face trade-offs between economic profitability and circular structures in the business (Ünal et al. 2019). In this thesis, also decision-making pressure can be added to this, like the founder of Company J mentioned:

**“Internally, there is the responsibility to make consistently
the right decisions on circularity and the business.”**

There are also many operational and organisational barriers faced by the sample firms. Some of them framed those also as problems when founding an organisation because those difficulties tend to appear in young ventures. In terms of capabilities, it is oftentimes recorded that there can be problems on employee level as well as on technological level. In the end, innovation does not only need skilled people and good technology, it also needs time. Organisation I mentioned a lack of time to build their novel manufacturing facility. Sufficient funding could be a solution for many of these organisations to pay for exactly these three things: people, technology and time. Many sample firms refer to a lack of funding when it comes to CBM implementation. This has several reasons. For example, sustainably produced and reusable materials are oftentimes much more expensive than the more harmful ones (Company B). Another reason is that a CBM does not qualify for classical funds, grants or investor conditions which accounts for many start-ups of this sample.

Table 5: Barriers faced by organisations of the sample

Identified internal CBM barrier	Explanation of identified internal barrier	Source
Risk aversion	Fear of decision making in usually bigger companies which are customers of Company A. Nobody wants to make the decision to use or sell the secondary material and rather decide for going the comfortable linear way as usual which means ordering primary raw material and send waste materials and by-products to landfill. Company culture in those incumbents show an aversion to change: One reason is that there is no incentive system that ensures benefits for employees when they decide in favour for circular streams and exchanges or using a marketplace.	A
	There is a perceived uncertainty of founding in general but also in changing current/ working businesses. The topic of change is not only due to CE, it accounts for all innovations and new ways of doing business.	D
	Aversion to change towards CE and CE practices in general which is based on human mindsets outside of the firm.	H
Motivation	Motivation for himself as the founder and manager of a sustainable company who does not get any funding and no advantages for doing business sustainably. It's a dilemma between ideology and monetary reasons and a constant weighing up.	B

	There was a lack of motivation and a feeling of resignation due to external circumstances with Covid 19 lockdowns.	K
Financial barrier	For example, normal chemical glue costs 3 EUR/ kilogram and ecological glue costs 25 EUR/ kilogram and there are no options in between. This is a huge financial obligation if you need a lot of glue for your core business and when money is scarce when founding.	B
	Financial barrier as a lack of budget and difficulties due to an unconventional business model.	C
	Financial hurdles and lack of funding is always a topic for an eco-start-up. Now it's getting better due to the size of the company, they are well known and have a regular ordering of wholesale.	E
	Lack of funding caused a financial limitation which was even more evident as Organisation F grew rapidly and needed more money in this scaling up phase. This led to a limitation on operations in the scaling phase.	F
	The financial plan and business model does not strive for exponential growth, hence investors or donors are hesitant.	G
	Lack of budget but it is not explicitly due to circularity as circularity is automatically ensured by using carboard as main material.	H
	Investors are not educated about CE and do not like invest in production lines which takes time to invent and will not be used to maximise profits. Investors need to be educated about CE to also understand the business models. Exceptions are impact investors.	I
	There are several funds and grants that are not available for start-ups in general.	K
Founding barrier	Internally there was a high uncertainty in the beginning of founding with kind of a discovery phase and bigger internal challenges like discussing basic values.	C
	Establish a structure to be capable to act but this is like founding every start-up with the specific details of the business model. Operationally, it is about finding the right solutions for the specifics of this CBM.	J
	One issue when founding was that she founded alone and she knew the technological capabilities were missing back at the time. It was not easy to find a co-founder who has the same cultural background and vision.	K
	Difficulties on managerial level in terms of decision making of values and visions of the organisation as well as establishing decision paths.	C
Human aspects	It is all about human aspects. Whether its internally or externally. There are internally many discussions on the product and specialities, there is ambiguity and trade-offs in every decision.	D
	It is always a challenge to work with people and one of the biggest challenges is working closely with employees and making customers happy. A high degree of perseverance is needed.	H
Employee level	In the beginning, only lower salaries could be paid to the employees but great people with skills and experience usually get a high salary. So, the CEO needed to find other ways on how to motivate people to work for Company E with e.g. company stocks.	E
	While working together with humans: Failed hires cost time and can lead to internal difficulties within the teams and individuals. The bond between employees of a small company tends to be tighter and especially in Company L he perceives a strong team spirit. If there is someone not meeting the goals, this can cause internal difficulties and in the end it also costs time and money.	L
Operational / organisational barrier	Organisation F grew very fast and operations got more and more complicated which was additionally a reason for struggles on organisational level. Internal barriers became more apparent when the organisation got older and bigger. It became well known in	F

are often led by ideals and this inner drive, mission, vision and motivation enable them to overcome barriers (Hockerts and Wüstenhagen 2010; Lagerstedt Wadin et al. 2017). When they clearly show this commitment to their employees and other stakeholders, they can have a big impact on circular flows on system level. For example, the co-founder of Organisation I states:

“Managerial commitment of the co-founders is of essential importance.”

Or as the founder of Company E puts it:

“Internally, everything can be solved.”

This already indicated that cultural issues are of importance too. Another way was found by the founder of Company H who recommends to create a product you want to work on for years. So, motivation comes from working not only with this bunch of people but on this product or service. There are also special behavioural traits, such as openness, honesty and hands-on mentality, like the founder of Company L reveals:

“Solutions appeared internally: when a problem was identified, automatically people are looking for a solution.”

Knowledge sharing is also considered to be of mutual advantage. A reason for this could be the fact that start-ups are more open to sharing and collaborating than incumbents (Charter and Keiller 2014). This thesis finds that start-ups are very willing to collaborate to establish a CE.

Apart from that, clear and transparent information and communication is also necessary to not only to communicate with external stakeholders but also to internal ones such as employees. Prior experience in the entrepreneurial field of a specific industry is also beneficial (Company L). This can also account for technological enablers and capabilities. These enablers are mentioned frequently. A whole overview of capabilities can be found in chapter 5.3. The founder of Organisation F brought up that there is a timely shift in internal dynamics when founding an organisation and when running it over several years. She mentions that especially in the

beginning internal factors are decisive such as the interdisciplinary team with its combination of different qualities and strengths.

Interestingly, two founders also mention funding as an enabler and not only a lack of funding as a barrier. For Company L, the first approval of funding from an investor was a real motivational boost. However, the founder of Company J perceives a major trend to sustainability in society and hence consumers. He states that this development is also reflected by increased funding opportunities and investors' interest in ventures with a CBM and SBM.

Table 6: Solutions, enablers and drivers from inside the organisations from the sample

Identified internal CBM enabler	Explanation of identified internal enabler	Source
Managerial commitment	It is important to convince the decision makers of the customer companies. All stakeholders are important. That is why an advisory board was created at Company A that is represented by competent persons from all branches and with different skills about processes which are needed to develop new value chains.	A
	The CEO is the ethical compass for the employees and the company acts also as the role for others as well- from suppliers, customers, competitors, etc.	B
	Employee and managerial commitment get supplemented by members commitment of the cooperative.	C
	Team of co-founders with their own knowledge and commitment is decisive as well as support from customers.	D
	Team and commitment by everyone creating a certain drive or company culture. The leader must be committed, otherwise it does not work.	E
	Founding a company in general is a complex issue and in the end it is all up to the founder and the team striving for success.	H
	High level of managerial commitment of the co-founders is a strong enabler.	I, J
	In the end, the vision for a Circular Economy connects people and by founding Company L the founding team saw an opportunity to establish a successful business and reconfigure the construction sector by using the huge potential as the value chain of Company L is comparable to the industry's value chain but they offer a unique solution for Circular Economy in the construction sector.	L
Mission alignment	It is a mix of managerial and employee commitment which leads to a great team with aligned values, the same mission and learning which creates an internal drive and by this marks up the flourishing and supporting organisational culture in Company G. The co-founders of Company G bet on collaboration and by the 'just do it' and 'keep on going' mentality while scaling up and growing company's business.	G

	The belief that this works out: the belief that the team works well together, the belief that they want to bring forward the vision of the company and it is important to have meaningful purpose of the company. Managerial commitment and belief in the vision, mission and values.	K
Information and communication	All solutions, projects and processes are made publicly available in the trade press. Another important factor: the longer Company A is on the market, the better accepted it is in such a traditional sector.	A
Inner drive and motivation	Sustainability and circularity were in the company's DNA from the beginning. So, the commitment in the beginning was also part of the self-motivation to stick with those values over the time.	B
	Without the positive resonance from outside, it would have killed the inner motivation. The active network building, talking to people and getting feedback was very valuable to keep the internal dynamics positive and running.	K
Culture	Supportive organisational culture: members support each other and company decisions due to an intrinsic motivation and belief in the same mission.	C
	Organisational culture on the level of values: constant mutual motivation within the team.	K
Capabilities	Co-founders help her with their skills and work experience but from external there are plenty of resources too, including mentors who are helping out with knowledge, concepts and solutions from other people and companies.	D
	A big enabler is simply a well working team. The mixture of interdisciplinary people who are committed and bring together their strengths and have a specific management approach with the focus on flexibility. The new management approach helped to implement the working culture and flawless operations in a fast growing environment.	F
	Mix of capabilities: The co-founder of Company G is a very creative person which helps a lot in product design, establishing new processes and being flexible in what supplies they get for production.	G
	Team members and recruitment of international volunteers who are students and interns to create citizen science, a big network and a community which e.g. already produced more than 3000 diapers by hand.	I
	Recruitment is an enabler because many people seemingly want to work for a business with purpose and so it is easy to hire good people for open positions.	J
Organisational	In the beginning of the founding process, internal factors were decisive such as the interdisciplinary team with its combination of different qualities and strengths. They also had a different management approach that helped. In the beginning, operations needed to get established. Once the organisation works, external enablers can be used. Now, Organisation F got well known and gets more support from outside like mentors, more third-party projects, etc.	F
Product	Create a product with interesting features and one you want to work on for	H

	years. Constantly involve customer feedback which adds to product improvement, new perspectives and new motivation can be gained by that too.	
Technology and innovation	Technology, innovative drive and technological know-how are important for success.	I
	Technology and technological know-how about building the online infrastructure of the platform and logistics.	J
Funding	A major trend to sustainability can also be seen in funding, because many banks, VC's, fonds, etc. are building a green fond and therefore it is a benefit to meet these criteria but it is definitely not a guarantee to get funding because in the end company evaluations are the same to normal business models.	J
	The first investment was very important because it led to motivation to continue working and remain open and innovative as there is someone believing in and trusting you. But they applied for this fund and experienced a success by receiving the grants.	K
Knowledge sharing	It is important to be open for sharing knowledge with others from the ecosystem. Especially, Berlin is a great ecosystem and strong community for circular and sustainable business and he experienced open exchange with others in initiatives, meetups on circularity and personal talks about qualitative knowledge exchanges. "It is much more collaborative than competitive". For newcomers it is important to embrace the openness, share information and knowledge and use this special ecosystem and community of founding in Berlin.	J
Behavioural trait	The greatest enabler when founding and if some know-how is missing: "Ask what you wouldn't ask otherwise".	K
	Solutions appeared internally: when a problem was identified, automatically people are looking for a solution. This can be pursued in different ways: problems can be tackled in teams but a solution can also lead to a re-configuration of goals, or work processes. In the first place, solutions have to be found in the team but confirmation and support from outside are also important for motivational reasons, e.g. to see a success from a work you have done.	L
Experience	Experience from operating this marketplace for several years was also very beneficial as this made them trustworthy for potential clients but in the first place they gained a lot of experience and this helps a lot to establish the follow-up company in many regards.	L

6. Internal strategies to overcome Circular Business Model barriers

This section presents four strategies based on best-practice solutions from interviews to overcome barriers that might hamper CBM implementation in companies and organisations. This is not a guide or roadmap to find a solution to every threat or barrier but these strategies explain mechanisms that can be of practical use when establishing a CBM. So, this section seeks to create an understanding of how to overcome certain barriers of CBM adoption. The strategies account for start-ups, young and innovative SMEs but rather not for older and bigger firms. The strategies are formulated as best-practice solutions stemming from companies and organisations of the sample which faced commonly acknowledged barriers when starting up a circular business.

Establish human-centeredness

The findings from above show that founders face more internal enablers and look inside their organisations for solutions to occurring barriers. They rely on the capabilities of their organisations as well as on their entrepreneurial spirit and the inner drive, mission and values of all organisational members to come up with a solution to work on it together. It was found that not only capabilities of the team are decisive to overcome barriers, but it is the willingness of people with aligned visions to make the project a success. So, the first and most often mentioned argument is that the whole CBM implementation takes place on a human level. This even goes beyond soft skills, it is more an attitude towards the shared mission and towards work. These people not only go the extra mile but take on additional work and risk to make their business model as circular as possible while fighting linear industry standards and business-as-usual. There are also decisions against economic profits because individual missions are prioritised over profit maximisation. This leads to a slower scalability for these companies and especially for those in manufacturing. For those concentrating on digital solutions, scalability is also hampered because potential clients need to get familiar with the circular approach and oftentimes it is needed to convince them which also takes place on a human level and the success depends on personally perceived opportunities. This leads to the next finding: even though human-level is stated as an internal enabler, outside of the organisation it is possibly a barrier. This is due to the fact that CE products, concepts and business models are widely unknown and that firms operating a CBM have the problem to convince traditional

companies to collaborate or to acquire customers from industries where the circular concepts are still new.

Always show high commitment for circularity on managerial level

Nearly all start-up founders and CEOs of companies refer to managerial commitment to be the key for the success of a CBM. Without the founder and responsible person standing behind and prioritising circularity in all their decisions, a successful implementation of a CBM is impossible. This holds true across industries, across different ages of organisations and organisational types. This goes beyond a shared mission and vision but incorporates a binding rule for decision-making so stakeholders and especially employees know exactly the prioritisation of circularity to practically implement it in daily business. The CEO does not only set up the CBM strategically but also acts as a role model for the implementation of circular structures.

Create skills and capabilities in the organisation

The majority of interviewees referred to a mix of competencies to be important for CBM implementation but also in regard of building up young organisations. So, all capabilities analysed above are necessary for both: successfully setting up a business which is based on a CBM. This is the reason why some capabilities can also be found in entrepreneurship literature. With a mix of competencies, interviewees mostly referred to a mix of hard and soft skills. Both are important and necessary. Interestingly, soft skills are quantitatively seen to be more important: all interviewees mention soft skills or knowledge-based skills but not all of them consider technical capabilities to be necessary. The tenor is more that if you have skilled people with an aligned mission, inner drive and soft skills, everybody can learn from each other or knows someone else to learn technicalities from. In this sense, hard skills are technical know-how for special machines or IT skills to set up a platform. This might be due to the agile organisational set up in start-ups and small size of the organisations in the sample.

Incorporate cultural aspects inside and outside of the organisation

Building on the arguments from above, the findings of this thesis conclude that with all the aspects of human-centeredness, CEO commitment and importance of soft and knowledge-

based skills in young and small ventures, a special culture is created which comprises openness, sharing and mutual learning. This does not only account for internal dynamics but can also be wider seen from an ecosystem perspective. Many of the interviewees referred to enablers outside the organisation with networking and collaboration. The start-up scene in Berlin stands out in terms of openness, perception of sharing and collaboration as a benefit. In hindsight, this thesis with twelve interviewees was possible because of this very open and helpful atmosphere among people from start-ups with a purpose. People know each other and are not afraid but happy to enter collaborations, help each other out and communicate openly about their mission and even their success factors of their CBM which was very beneficial for conducting this thesis.

7. Conclusion

This thesis presents findings of twelve semi-structured interviews with founders and CEOs of circular organisations, and elaborates on barriers of CBM adoption, enablers, drivers and necessary capabilities for a successful CBM implementation. Building on these findings, strategies for small organisations are developed coping internal aspects of CBM implementation. This is of special importance because during the interviews it becomes apparent that firms deal with more external barriers to CBM adoption but tend to overcome them by internal strengths. The strategies point out possible ways to cope with barriers from inside the organisation. For example, inner drivers of founders and CEOs is reported to be decisive because especially the leaders of the organisation need to stay motivated to work on the CBM to achieve success. This is because founders and CEOs of this sample have a mission and vision which they want to work on in the first place and arranged their business model based on circularity to make their vision real. Proving this, the majority of interviewees state they are running their business out of personal motivation to reach a higher goal. They chose a CBM to reach this goal. Profits made by operating the CBM are seen as a way to let the business succeed in the long run to be able to create as much positive impact as possible.

This master thesis contributes to the growth of academic knowledge in scientific literature about CBM adoption and simultaneously provides practical guidance for a successful set up of a circular business or organisation with circular structures. From an academic point of view, there has been significantly growing interest in the field of CE in general with an increased number of publications by ten times within the last ten years (Geissdoerfer et al.

2017; Ünal et al. 2019). Even more recently since 2015, there has been a significant exponential growth of publications about the concept of CBM (Bocken et al. 2019) with high citation counts considering the small time range (Geissdoerfer et al. 2020). This development shows a recent but high academic interest in the topics of CE and CBM which is also supported by politics. For example, the EU released policy guidelines and actions plans such as the Green Action Plan in 2014 supporting CE in SMEs.

In order to serve practitioners interest in CBM adoption, internal barriers and enablers are listed and linked to capabilities and strategies that are needed in an organisation to successfully implement a CBM. This helps to open the black box of internal company dynamics of CBM implementation in a dynamic environment. By shedding light on experience with the adoption of CBMs in different industries, fears are addressed and reduced that a CBM adoption could be too risky or impossible to do because of internal company dynamics such as lack of information, motivation, knowledge, leadership, technology or capabilities etc.

The thesis answers the first research question by providing a list of internal barriers perceived by CEOs and founders of organisations in this sample. The reported barriers mostly correspond with literature in the field. Novel in this regard is the focus on human aspects which was a big topic for almost all interviewees. Other influencing factors are the entrepreneurial setting of the rather young and small organisations in the sample, and also the Covid-19 pandemic influenced some of the interviewees as an overarching external barrier. Certainly not all CBMs were affected by the pandemic but some businesses really suffered from lockdowns. To answer the second research question, internal enablers, drivers and capabilities make up a significant part of the interviews. Findings consider personal motivation and drivers of the entrepreneurs but also enablers for their organisations and what they perceived to be helpful in terms of capabilities. For these findings, strategies are developed to give an impression of what particularly helped them and what they considered to be important when implementing a CBM. The findings and strategies can help others who plan to found an organisation – no matter the industry or legal form – and aim for an implementation of circular structures with a CBM.

There are several boundaries which define and shape this research project. Firstly, there is the narrow geographic focus as only companies located in Germany and mostly in the region of Berlin are part of the sample. The master thesis deals with relatively young and small SME's and other organisational forms. The selected companies and organisations are active across all sectors and a CBM is not bound to a specific legal form. They all share one similarity: a suc-

successful implemented CBM and hence the motivation of founders and CEOs to facilitate a new circular way of doing business.

Secondly, the topic of CBM implementation has been narrowed down to only focus on internal barriers and enablers. The thesis does not cover external barriers like market or governmental barriers. Internal barriers are supplemented by internal enablers and capabilities. As this thesis is concerned with human aspects in internal dynamics of organisations, personal motivation and drivers of the entrepreneurs themselves is an important figure to get an overall image.

The thesis does not provide an all-in-one solution with strategies to overcome every possible barrier of CBM adoption. This thesis rather presents experience of SMEs which did not go through the process of change towards circularity but started with circularity considerations right in the beginning of founding. They intentionally built their capabilities around the CBM. Hence, their strategies to overcome external or internal problems are different to those of older and bigger incumbents which have to undergo a whole process of change. The findings of this thesis are valid for young and innovative SMEs but rather not for older and bigger firms. Of course, they can be from the same industry, but each company has an individual approach, culture and leadership style and thus have different approaches to react on barriers than those reported in the thesis. Hence, the proposed capabilities and strategies to overcome barriers do not always apply in every situation but they provide insights to people who think about starting up a business focusing on CE and its implementation in the business model. This thesis finds what is needed in terms of capabilities and what is needed as a leader to step in this mindset and change the industry towards circularity.

Further empirical research in other countries is needed to be able to compare internal requirements and dynamics to establish a CE and create a sustainable system change. Only if internal dynamics and motivations are completely understood, collaborations across company and national borders can be established to make a CE work. As this thesis only targets young SMEs and organisations, future research about internal dynamics in established incumbents is needed. This comprises hesitance to transform from linear to circular structures and resistance to change by decision makers of incumbents. Again, motivations and drivers have to be understood to bring in the right enablers and develop needed capabilities to manage the change towards CBM adoption with confidence.

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Appendix

Semi-structured interview guideline for the (co-) founders and CEOs of the companies and organisations of the sample

Formalities

Regarding the companies and organisations:

- name, age, size, legal form, sector and market strategy (B2B or B2C), point of time of CBM introduction, current implementation CBM phase

Regarding the interviewees:

- position in the company or organisation, estimated personal involvement in CBM activities of the company or organisation between 1 and 5 (1- not involved at all and 5- 100 percent involved)

First block: Personal attitude towards and motivation for Circular Economy.

1. How did you get to know about the concept of Circular Economy?
2. What is your source of information about the Circular Economy and Circular Business Models for the company?
3. What was your main motivation behind your decision for a CBM?
4. Was there a special cause or incident that influenced your decision?
5. If you needed to take a position between your personal conviction of Circular Economy or 'doing for good' motivation, and financial reasons: where would be your position?
From 1 (your personal conviction/ motivation for CE) till 5 (only financial reasons of CE)

Second block: Explain the organisation of the Circular Business Model in your company.

6. Please explain the Circular Business Model you implemented/ are implementing.
 - a. What is the circular aspect in the business model?
7. What capabilities are needed to implement and sustain a Circular Business Model?

Note: Capabilities can be:

- a. Skills or knowledge-based capabilities
 - i. Knowledge or skills gain by hiring new employees with a specific profile to do tasks for circularity implementation
 - ii. Education of workers, e.g. skills workshop about CE
 - iii. Education of managers
 - iv. Hiring external consultants

- b. Technological capabilities
 - i. IT/ software to facilitate circularity in the firm
 - ii. innovative 'circular' / remanufacturing technologies
- c. Other

8. Is the implemented Circular Business Model in your company as you envisioned?
- a. Why yes?
 - b. OR why not? Why is it different?

Note: Reasons can be: culture, financial, operational, managerial or technological, etc.

Third block: Describe the barriers encountered with the Circular Business Model.

9. Were the perceived barriers rather internal or external?
- a. Please rank: 1 (internal barriers only) till 5 (external barriers only)
10. Which internal barriers did you face when implementing the Circular Business Model?

Note: Internal barriers can be:

- a. Difficulties on organisational level
- b. Difficulties on employee level (motivation, knowledge, etc.)
- c. Difficulties on managerial level (motivation, knowledge, etc.)
- d. Financial barrier as a lack of budget
- e. Lack of knowledge, innovation and technology
- f. Company culture: aversion to change
- g. Lack of information/ communication
- h. Conflict of interest within company (such as company goals etc.)
- i. Other

Fourth block: Describe how you managed to overcome the internal barriers.

11. Were enablers rather firm internal or external?
- a. Please rank: 1 (internal enablers only) till 5 (external enablers only)
12. Which internal enablers did you face when implementing the Circular Business Model?

Note: Internal enablers can be:

- a. Employee commitment
- b. Managerial commitment
- c. Organisational culture
- d. Technology and technological know-how
- e. Other