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# Circular business model innovation in consumer-facing corporations

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## ABSTRACT

Consumer-facing corporations have started setting ambitious circular economy goals. However, it is unclear what innovators in corporations do to help meet these targets. The literature on circular business model innovation (CBMI) has focused on business-to-business contexts, efficiency, and recycling, but lacks insight into the innovation activities within consumer-facing corporations to pursue higher strategies in the waste hierarchy such as repair and reuse. Because of the size and potential impact of such organizations, it is important to better understand these activities. The aim of this study is to investigate the essential activities innovators in consumer-facing corporations carry out as part of CBMI. We use a dynamic capabilities lens to review the literature on innovation activities according to the CBMI stages of visioning, sensing, seizing and transforming. The following research question is investigated: What practices and tools help corporations build dynamic capabilities during the CBMI process? We conduct in-depth interviews with key informants dealing with CBMI in three corporations (H&M, IKEA, and Philips), and use thematic analysis to analyze and map the data to the four stages. We thereby add a range of CBMI innovation activities to the current literature and provide additional guidance for practitioners in large corporations.

## 1. Introduction

The top five global business risks in 2020 have been environmental – including climate action failure, biodiversity loss and human-made environmental disasters (WEF, 2020). To mitigate them, several large corporations have formulated goals to move towards a circular economy, a concept bridging the precious use of resources and economic progress (Jabbour et al., 2019; Frishammar and Parida, 2019). A circular economy seeks to maximize the value of products, components, and materials over time, and to minimize resource use, emissions, waste, and pollution (Geissdoerfer et al., 2017b). Driven by ambitious circular economy goals, corporations have started experimenting with new circular business models. H&M, for instance, has experimented with clothing subscription models (H&M, 2019), IKEA with furniture as a service (IKEA Retail, 2019), Interface with a circular economy carpet tile lease model and Philips (now Signify) with a pay per lux business model allowing for reuse and recycling (Kramer et al., 2019).

Circular business model innovation (CBMI) creates significant positive, and significantly reduced negative impacts for the environment and society (Boons and Lüdeke-Freund, 2013; Lüdeke-Freund et al., 2019). It focuses on resource-preserving activities like reuse, refurbishment, remanufacturing, recycling, and regeneration. This is achieved through

changes in how an organization and its ecosystem create, deliver, and capture value (Bocken and Geradts, 2020; Boons and Lüdeke-Freund, 2013; Lüdeke-Freund et al., 2019). CBMI is complex, as it demands widespread and interdependent changes in the architecture of a business model and its underlying activities (Foss and Saebi, 2017; Kindström, 2010). For example, in the case of a circular service-based business model, the financial model and the way a corporation captures value change from a one-off sales transaction to low but recurring revenue (Tukker, 2015). This requires adapted accounting procedures and financial instruments (Bocken and Geradts, 2022). The activities around value creation change from linear supply and production to the need for reverse logistics, to get the products and components back and organize their reuse, refurbishment, remanufacturing or recycling (Lüdeke-Freund et al., 2019). And the value proposition changes from, for example, ownership to easy access, increased choice, reduced cost, and higher flexibility. How firms organize these complex changes is poorly understood and remains a pertinent research question for the business model innovation (BMI) process (Foss and Saebi, 2017, 2018).

Dynamic capabilities provide a useful lens for the CBMI process, as they explain how companies compete by integrating, building, and reconfiguring business models to adapt to rapidly changing environments (Teece et al., 1997). They are becoming increasingly important in

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a more volatile, uncertain, complex, and ambiguous (VUCA) world (Schoemaker et al., 2018).

This is also why dynamic capabilities have been useful to describe sustainable and circular business model innovation (Bocken and Geradts, 2020; Inigo et al., 2017; Santa-Maria et al., 2022) and the stages companies go through while innovating their business models for sustainability and a circular economy (Pieroni et al., 2019). Sensing, seizing, and reconfiguring are the main dynamic capabilities and stages driving BMI (Teece, 2007), also in the sustainability context (Bocken and Geradts, 2020; Inigo et al., 2017). While dynamic capabilities have been investigated on a high level (Teece, 2018), little is known to date about the microfoundations, the more granular practices that underlie these capabilities and stages, especially in the context of large consumer-facing corporations and their transition to a circular economy (Achtenhagen et al., 2013; Felin et al., 2012; Leih et al., 2015). Understanding the lower-level practices and routines will help to build strong dynamic capabilities needed for successful circular business model innovation and the long-term survival of the firm in a VUCA world (Leih et al., 2015; Teece, 2018; Santa-Maria et al., 2022). Shedding light on these practices is not only theoretically relevant — it can also help established firms open potential innovation pathways, in particular to challenge their existing business models to generate positive societal impact (Bocken and Snihur, 2020; Weissbrod and Bocken, 2017).

In this study, we focus on CBMI as a change process and investigate the following research question: What practices and tools help corporations build dynamic capabilities during the CBMI process?

Next, we discuss the theoretical background, followed by the research method, results and the discussion and conclusion on the lower-level practices and tools that support dynamic capabilities for CBMI.

## 2. Background: circular business model innovation

Circular business model innovation (CBMI) is a way for corporations to remain competitive and address sustainability issues. A typical example is the move towards providing products as a service, rather than selling them, such as pay-per-use, subscription, or rental models, with a focus on extending the lives of products, components, and materials and/or reducing the overall consumption of goods (Tukker, 2004, 2015). CBMI involves designed, novel and non-trivial changes to the architecture or set of interdependent activities and mechanisms of how a firm creates, delivers, and captures value (Teece, 2010; Foss and Saebi, 2018). These changes aim at minimizing waste, pollution, and emissions, and maximizing the value of products, components and materials over time (Geissdoerfer et al., 2017b), as well as nature regeneration by business (Konietzko et al., 2020b). New capabilities are often needed to tackle challenging topics such as reuse and repair, and regeneration of the natural environment as part of circular business models (Bocken and Geradts, 2022). In this section, we first review existing literature on CBMI, followed by the stages of visioning, sensing, seizing, and transforming; and finally, the research gap.

### 2.1. CBMI in the literature

Large corporations have started exploring circular business models in their efforts to implement a circular economy (Averina et al., 2022; Frishammar and Parida, 2019). Studies have been conducted on the barriers to implementing circular economy in existing firms (Galvão et al., 2022) and experimentation in specific sectors such as clothing (Weissbrod and Bocken, 2017), some with a focus on sufficiency marketing (Gossen and Kropfeld, 2022). Focusing on large, mainly Business-to-Business (B2B) manufacturing firms, Frishammar and Parida (2019) provide an overview of CBMI phases. They identify a broad range of CBMI activities, such as scanning trends, mapping the current business model, finding internal alignment, and finally testing and piloting, based on a divergent (largely B2B) sample of firms. Parida et al. (2019), also based on mainly B2B firms, identify a two-stage process of ecosystem

transformation, consisting of assessing ecosystem readiness, followed by orchestrating the ecosystem for a circular economy. Other studies have investigated SMEs (Antikainen et al., 2017; Ünal et al., 2019; Salvioni et al., 2021), startup pursuits of CBMI (Antikainen and Valkokari, 2016; Henry et al., 2020; Konietzko et al., 2020a) or a mix of these (Guldmann and Huulgaard, 2020; Santa-Maria et al., 2022). Further examples include collaborative CBMI endeavors in specific sectors such as fast-moving consumer goods (Bocken et al., 2022).

Adjacent literature on servitization has highlighted innovation activities and capabilities of manufacturers. While often separated from recent circular business model literature, there are obvious parallels, as most circular business models have a clear servitization component (Tukker, 2015). Baines et al. (2007), in their early state-of-the art review of product-service-systems (PSS), include cases such as a pay per use launderette and vehicle sharing, and note the environmental and customer benefits of product service systems (PSS), but also the need for a cultural shift for consumers to place value on accessing rather than owning a product. Tools and methods would need to be tested to support this shift (Baines et al., 2007). Story et al. (2017) in a case of servitization in UK manufacturing identified new capabilities for manufacturers such as the need to “*balance product and service innovation and developing customer-focused through-life service methodologies and having distinct, yet synergistic product and service cultures*” (Story et al., 2017, p. 54). A review by Marcon et al. (2022) highlighted the role of capability development of manufacturers, intermediaries, and customers in digitized PSS, albeit, like the work by Story et al. (2017), without a specific sustainability or circularity focus. In later studies on business-to-consumer (B2C) markets, PSS researchers explored the role of digitalization and found that digital confidence greatly influenced customer attitude towards the PSS, in this case, shared mobility (Tunn et al., 2020). Despite success cases in servitization research in the B2B context, the adoption in B2C markets is low perhaps because of the more heterogenous and complex group of customers compared to B2B (Tunn et al., 2020, 2021). Furthermore, many CBMI examples focus on efficiencies and recycling rather than the higher strategies in the waste hierarchy such as reuse and repair (Bocken et al., 2017; Ritala et al., 2018). Moreover, Tukker (2004, 2015) and Mont (2002) and later studies (Das et al., 2022; Kjaer et al., 2018, 2019) argue that PSS are not sustainable by default, and environmental benefits can only be achieved when designed the right way.

### 2.2. CBMI as a change process

CBMI is a change process that moves through the stages of visioning, sensing, seizing and transforming (Foss and Saebi, 2017; Guldmann et al., 2019; Pieroni et al., 2019; Santa-Maria et al., 2022). Similar business model stages have been described in the literature (e.g., Frankenberger et al., 2013; Frishammar and Parida, 2019; Geissdoerfer et al., 2017a). We take a dynamic capabilities lens of sensing, seizing, and transforming here (Teece, 2018), because of its recent focus in sustainable and circular business model innovation literature (Bocken and Geradts, 2020; Inigo et al., 2017; Pieroni et al., 2019; Santa-Maria et al., 2022), and because it is widely recognized in mainstream business model literature as underpinning competitive advantage and business model innovation (Teece et al., 1997; Teece, 2018).

Sensing refers to scanning the market and identifying and assessing the market for unmet needs and new business opportunities (Teece, 2018). Seizing is about mobilizing organizational resources to seize new opportunities and develop their business case (Teece, 2018). Transforming is about the continuous renewal of the organization, to remain competitive in fast changing environments (Teece, 2018). In addition, CBMI research suggests that visioning is an important prelude to any circular innovation (Brown et al., 2021; Guldmann et al., 2019). One could argue that this is part of sensing or seizing, as prior research has argued as well (Santa-Maria et al., 2022). But we pose that it is a separate initial step where a deliberate choice for a circular economy

transition is made (Brown et al., 2021; Leising et al., 2018). This can also be seen in the case companies described later in this study who all set a circular vision and goals which acted as a necessary starting point before embarking on complex CBMI. In the following, we use these stages to review existing relevant literature on this topic.

### 2.2.1. Visioning

Visioning is about creating a joint starting point for innovation by creating a viewpoint about what the future should look like (Brown et al., 2019; Guldman et al., 2019). Visioning about the future is an important process in transition studies (Smith et al., 2005) and has also been identified as an essential starting point in any CBMI process (Brown et al., 2021; Leising et al., 2018). Visioning can help make the bridge between the ‘macro need’ for sustainability transitions and the practical level of innovation in firms (Boons et al., 2013). Visions help decide where to go (orientation) and what to do (guidance) (Quist et al., 2011).

Visioning, including with partners and the ecosystem, is thus an important starting point for CBMI (Leising et al., 2018). Whereas it has been discussed extensively in transitions and circular economy studies (Guldman et al., 2019), visioning has been largely absent from recent mainstream dynamic capabilities literature (e.g., Teece, 2018). At the same time, the purposeful setting of a sustainability vision and goals form a key part of sustainable and circular business model innovation (Stubbs and Cocklin, 2008; Brown et al., 2019). But while this stage is important, we do not know yet how exactly companies are developing visions for a circular economy, in terms of the more granular activities conducted and tools used.

### 2.2.2. Sensing

Sensing refers to scanning the market and identifying and assessing unmet needs and new business opportunities (Teece, 2018). Sensing usually starts with an initiation stage in which new and changing needs or demands of (future) customers and other organizations in the surrounding ecosystem are analyzed (Frankenberger et al., 2013; Pynnönen et al., 2012). This is used to form new ideas about future products and services to transform opportunities into concrete ideas (Frankenberger et al., 2013; Girotra and Netessine, 2014).

Sensing in the case of a circular economy might mean that companies become aware of emerging environmental issues and recognize them as potential business opportunities (McWilliams and Siegel, 2011). For CBMI, corporations mitigate environmental risk, and identify new opportunities, and new resources and required capabilities (Bocken and Geradts, 2020; Kristoffersen et al., 2021). Sensing for CBMI also means that innovators acknowledge the links among environmental, social, and economic value creation and that they adopt a lifecycle perspective (Hahn et al., 2010; Santa-Maria et al., 2022). Indeed, companies like Patagonia and Interface leverage environmental issues along the lifecycle of their products to sense new business opportunities (Chouinard and Stanley, 2013; Stubbs and Cocklin, 2008). Furthermore, sensing involves practices like understanding the needs of customers and key stakeholders, implementing environmental management tools, or being open to external expert support (Santa-Maria et al., 2022). Again, it is not clear what the more granular activities of this process are, or what tools are being used to facilitate it, especially in B2C markets.

### 2.2.3. Seizing

Seizing for CBMI requires firms to mobilize resources, to mitigate environmental risk through a clear business case (Hart and Milstein, 1999). Sometimes an immediate win-win situation can be identified (Hahn et al., 2010), but often advantages pay off later, when CBMI pushes corporations ahead of legislation and gradually helps to gain legitimacy and competitive advantage (Schaltegger et al., 2012). Seizing initiates gradual change in large corporations. A circular model often co-exists with a dominant linear model until the new model becomes more viable and dominant. Examples include car sharing (Schaltegger et al., 2016) and clothing rental and secondhand options (Weissbrod and

Bocken, 2017). In terms of resources, CBMI typically needs change and new capabilities across business functions, from finance to R&D, production, marketing, and digital technology (Awan et al., 2021). Managing these changes can be an important barrier, at least initially (Bocken and Geradts, 2020).

The literature has therefore pointed to experimentation as key in overcoming barriers during the seizing stage (Berends et al., 2016; Bojovic et al., 2020; Achtenhagen et al., 2013; Frishammar and Parida, 2019). Experimentation has also been heralded as a core practice in sustainability transitions (Caniëls and Romijn, 2008), and in relation to CBMI (Bocken et al., 2021; Engwall et al., 2021). It is about “purposeful actions to learn and validate: planning, designing, and executing relatively controlled situations to develop new knowledge” (Berends et al., 2016, p.191). It is a sort of ‘pre-stage’, where individuals start initiatives that eventually lead to actual changes in business models (Cavalcante, 2014). Experimentation comes in the form of purposeful interactions with experts, potential customers, and partners, or in the form of experimental projects, where a new offering is tested in a real-life setting.

The lower-level practices of seizing and experimenting have received little attention in the literature (Santa-Maria et al., 2022). In the context of SMEs, Achtenhagen et al. (2013) found that experimentation consists of practices like retrieving relevant information about changes in technology, markets, and competitors, providing freedom to employees to explore new ideas, and accepting failure and mistakes while experimenting. However, more research is needed to better understand how the practices and activities of experimentation produce learning and new knowledge that lead to changes in business models (Feldman and Orlikowski, 2011; Foss and Saebi, 2017).

### 2.2.4. Transforming

The final stage of CBMI is transforming, in which new business models are launched, run, adapted and implemented (Frankenberger et al., 2013; Geissdoerfer et al., 2017a). Transforming focuses on the deliberate and continued renewal of the organization's capabilities (Teece, 2018). In the case of CBMI, to transform towards circular business models and ultimately a circular business (Guldman et al., 2019; Pieroni et al., 2019). For BMI, the focus is on ensuring competitiveness and growing the business (Teece, 2010; Foss and Saebi, 2018). For CBMI, in addition, the focus is on mitigating environmental risk, by pursuing resource-preserving activities like recycling, refurbishment and regeneration (Lüdeke-Freund et al., 2019). Moreover, while transforming for CBMI, the positive impact on the environment can lead to more radical innovations over time.

The transforming stage seems least understood and mainly assessed at a high level (Frishammar and Parida, 2019; Santa-Maria et al., 2022), which is also reflected in the lack of tools and methods available on this stage (Pieroni et al., 2019).

## 2.3. Research gaps

Circular business model tools, concepts and processes have recently been reviewed (Bocken et al., 2019; Pieroni et al., 2019). Yet, we know little about if and how they are used in practice. Few studies have empirically investigated CBMI as a change process in large corporations at a more granular level, with a focus on consumer-facing companies, and the higher strategies in the waste hierarchy of reuse and repair. For example, Santa-Maria et al. pose that a sensing practice for CBMI is “understanding the needs of customers and key stakeholders” (Santa-Maria et al., 2022, p. 1315). But how exactly this has been done remains unclear. With this research, we intend to go a level deeper and provide a more granular understanding of what practitioners do during CBMI.

The business model innovation process has also been studied in terms of managerial tools to support it. According to various researchers (Bocken and Snihur, 2020; Chesbrough, 2010; Felin et al., 2020) companies often use tools based on the Lean Startup (Ries, 2011), Design Thinking (Brown, 2008), and the Business Model Canvas (Osterwalder

and Pigneur, 2010; Osterwalder et al., 2015). Lean Startup pushes innovators to conduct experiments that test the hypotheses about the future business model, to iterate the model continuously based on experiment results (Blank, 2013; Ries, 2011). Lean Startup type of methods have also been used to address sustainability issues (Bocken and Snihur, 2020; Schuit et al., 2017; Weissbrod and Bocken, 2017). The business model canvas has been used to describe business models for circular economy in combination with design thinking such as interviews and observation (Guldmann et al., 2019). Sustainability adaptations of the business model canvas include the triple bottom line canvas (Joyce and Paquin, 2016), Flourishing Canvas (Upward and Jones, 2016) and Circular Canvas (Guldmann et al., 2019).

For a circular economy, a range of other tools have been developed (Pieroni et al., 2019), including the Risk & Race serious game (Whalen, 2017), Circularity Deck (Konietzko et al., 2020b), Circular Collaboration Canvas (Brown et al., 2021) and Circular Business Model Pilot Canvas (Baldassarre et al., 2020). Pieroni et al. (2019) found that few CBMI tools take a dynamic, process perspective. Based on peer reviewed and grey literature, they map CBMI tools according to dynamic capabilities of sensing, seizing, or transforming. The few process tools they find originate from reports, grey literature (e.g., van Renswoude et al., 2015), or conferences (Evans and Bocken, 2014). Furthermore, the method of literature review did not allow for an analysis on the actual usage of any of these CBMI tools in practice. Moreover, tools and methods developed in academia have been tested in businesses only to a limited extent (Baumann et al., 2002; Bocken et al., 2019). For the tools that have been tested with companies, typically in workshop settings (e.g., Brown et al., 2021; Whalen, 2017), it is unknown whether they are being used routinely.

The present study aims to contribute to the understanding of routinely used tools and practices that support CBMI. Adjacent literature in PSS has identified key capabilities and processes but without a circularity focus (e.g., Marcon et al., 2022; Story et al., 2017). The framework of dynamic capabilities (e.g., Pieroni et al., 2019; Teece, 2018; Santa-Maria et al., 2022) is used to help us understand CBMI and ultimately the circular economy transition in business.

### 3. Method

Given the early stages of empirical data on the process and practices of CBMI, qualitative research methods are suitable to explore this emerging topic. Looking at processes and practices, we chose thematic analysis to process our data (Bryman and Bell, 2015; Ryan and Bernard, 2003; Laasch and Pinkse, 2020). Thematic analysis is a key analytical technique that can provide for a rich and deep picture of a set of data (Braun and Clarke, 2006). We employ a realist approach to thematic analysis, in which we investigate CBMI practices – the things people do on a regular basis, the objects people use, as well as the background understandings and emotions that drive what people do (Braun and Clarke, 2006). Semi-structured interviews were conducted with circular economy business model innovators in corporations.

#### 3.1. Recruitment and data collection

This study focuses on large corporations that have set ambitious circular economy goals and that have pursued CBMI. The rationale is that the impact could be high if such large corporations transform their current business model to a circular one.

The sampling took place via the [Ellen MacArthur Foundation \(2021, 2022\)](#) website to identify companies that seek to accelerate the circular economy in corporations. We looked for multinational corporations with consumer facing products that had pursued CBMI for at least 5 years—to ensure sufficient evidence—and that had openly articulated circular service business model pilots, as well as circular economy goals and visions (see [Appendix A](#)). We looked for different types of organizations (in terms of sectors) that had experience with multiple forms of

CBMI. Moreover, we selected organizations that also displayed more ambitious forms of CBMI, focused on the higher “R” strategies in the waste hierarchy (Lansink, 2018), thus not only focusing on recycling but also reuse of products. Based on these criteria, the selected sample includes the corporations H&M, IKEA, and Philips. See for a full list of strategic partners considered [Appendix A](#). Selected interviewees had to be directly involved in the CBMI process. Interviewees received a project brief that explained what CBMI is, to establish a common understanding. See [Appendix B](#) for the analyzed CBMI initiatives that were discussed during the interviews.

#### 3.1.1. H&M Group: fashion

H&M Group is a global fashion company founded in Sweden in 1947. It includes the brands COS, Monki, Weekday, & Other Stories, H&M Home, ARKET and Afound. The H&M Group (H&M here after) has around 5000 physical stores in 73 countries and employs approximately 153,000 people. H&M has set out a vision to become 100 % circular. Its circularity vision was announced in 2016 as part of its strategic plans, shortly after the company started a strategic partnership with the Ellen MacArthur Foundation (H&M, 2017). The vision includes short-, mid- and long-term goals: by 2030, it aims to use only recycled or sustainable sourced materials, and by 2040 it aims for a ‘climate positive value chain’ that creates an overall positive impact on the climate (H&M, 2021). The company aims at clean, closed and effective circular life cycles for textiles (H&M, 2020). As part of these ambitions, H&M has implemented a voluntary Extended Producer Responsibility (EPR) system for product take-back post initial use (H&M, 2020) and has announced actions to ensure that all packaging will be reusable, recyclable, or composted (H&M, 2021).

#### 3.1.2. IKEA: furniture

IKEA was founded in Sweden in 1943 by Ingvar Kamprad, selling household items. The first IKEA catalogue was created in 1951 and the premise was to offer good design and functionality at low prices (IKEA, 2021b). Realizing the difficulty and price of shipping bulky furniture it started to sell self-assembly flat-packed furniture in the 1950s. IKEA now operates around 422 stores in more than 50 markets using a franchise model: franchisees pay an annual fee of 3 % over their net sales and in return, they can market and sell the IKEA product range (Forbes, 2020; IKEA, 2021a). IKEA's ambition is to be ‘100% circular by 2030’ and to design all its products to be 100 % circular from the beginning (IKEA, 2021c). This ambition is part of its strategic plans and was publicized when announcing its strategic partnership with the Ellen MacArthur Foundation in 2020 (Edie, 2020). Examples include products made from 100 % recycled wood or plastic, but also modular and upgradable products, so consumers can adapt them according to changing needs (IKEA, 2021c).

#### 3.1.3. Philips: health technology

Royal Philips (Philips in short) was founded in the Netherlands in 1891 and started off as a business selling incandescent light bulbs. It spun off its lighting business in 2016 and describes itself as a ‘health technology company focused on improving people's health and enabling better outcomes across the health continuum from healthy living and prevention, to diagnosis, treatment and home care’ (Philips, 2020). Philips employs around 80,000 employees with sales and services in over 100 countries (Philips, 2020). After its original ‘Healthy people, Sustainable planet’ 2016–2020 program, Philips made further Environmental, Social and Corporate Governance (ESG) commitments. The company aims to improve the lives of 2 billion by 2025 and 2.5 billion by 2030 with a focus on underserved communities (Philips, 2021a). Environmentally, Philips has committed to 100 % eco-design, increased energy efficiency, expanded renewable energy sourcing, and circular economy solutions. Philips set various ambitious 2025 circular economy goals: to generate 25 % of its revenue from circular products, services, and solutions, close the loop for all professional equipment, to embed

circular practices at its sites and send zero waste to landfill (Philips, 2021b). While circular innovations like refurbishment date back to the late 1980s, circular economy was put more highly onto the agenda when Philips announced its strategic partnership with the Ellen MacArthur Foundation in 2013 (EMF, 2022).

3.1.4. Interviewees

Table 1 provides an overview of the interviewees. The sample consisted of a unique set of interviewees operating at the forefront of CBMI in their organizations. Only those with a role in the CBMI process and therefore an understanding of the processes and practices were included. Specific circular business models with a focus on the higher “R-strategies” (reuse, repair) were taken as a starting point for each interview to identify typically used practices, tools, and methods for CBMI. A snowballing technique was used to identify further interviewees involved in the circular business model innovation process, starting with key informants from the three companies (H&M, Philips and IKEA), selected through personal contacts, LinkedIn and (corporate) websites on CBMI, to identify the right interviewees. Interviews took place via video-calls (Zoom, Skype for Business, MS Teams etcetera) between March 2020 and March 2021 and took 30–70 min. Compared to phone interviews, video interviews better mimic the face-to-face experience and experiences are broadly positive (Archibald et al., 2019; Deakin and Wakefield, 2014). Obvious advantages are cost savings, convenience as well as safety of those involved (Archibald et al., 2019; Bryman and Bell, 2015) which was a concern during the COVID-19 pandemic when these interviews took place.

Table 1 Interviewees.

Company	#	Interviewee role	Duration
H&M	H.1	Sustainable business development, including circular economy	1 h10 m
	H.2a, b	Circular business development (2 interviews)	1 h11 m 30 m
	H.3	Global sustainability & Innovation & incubation (joint interview)	1 h
	H.4	Innovation & incubation	45 m
	H.5	Sustainability controller	47 m
	H.6	Project Manager, Global Sustainability	35 m
	H.7	Sustainability project manager	47 m
	H.8	Business developer – sustainable and circular business models	52 m
	H.9	Circular business innovation lab	45 m
Philips	P.1	Programme manager Circular Economy	1 h
	P.2	Senior Designer, Circular Economy	35 m
	P.3	Start-up venturing lead	50 m
	P.4	Design Business Partner	45 m
	P.5	Service designer	52 m
	P.6	Venture leader	50 m
	P.7	Legal business partner, supporting new business model innovations	45 m
	P.8	Subscription accelerator leader & Group Sustainability – Innovation and Strategy (joint interview)	55 m
	P.9	Senior Director Sustainability	55 m
IKEA	I.1a, b, c	Global Business Leader, Circular Economy Innovation (1); Head of Circular business development (2); Communication Manager Circular Economy (3)	3 exchanges with 3 experts to answer interview questions
	I.2	Circular Supply Chain Project Leader	48 m
	I.3	Circular business designer	48 m
	I.4	Circular product design and assessment lead	41 m
	I.5	Circular business designer	49 m
	I.6	Sustainability developer	54 m

The semi-structured interviews discussed the following aspects:

1. Types of business models the interviewees have experimented with and piloted
2. Practices and processes (activities, objects, know-how)
3. Any outcomes achieved and whether the circular business model had scaled up

3.2. Data analysis and interpretation

To analyze and interpret the data, the typical steps of thematic analysis (Braun and Clarke, 2006) were followed: (1) Familiarizing with the (qualitative) data (2) Assigning preliminary codes to the data to describe the content (3) Searching for themes in the codes across the interviews (4) Reviewing themes (5) Defining and naming themes (6) Producing final outcomes. This was followed with a seventh step: validating final outcomes with the company to identify and correct any misinterpretations of the process and practices (7).

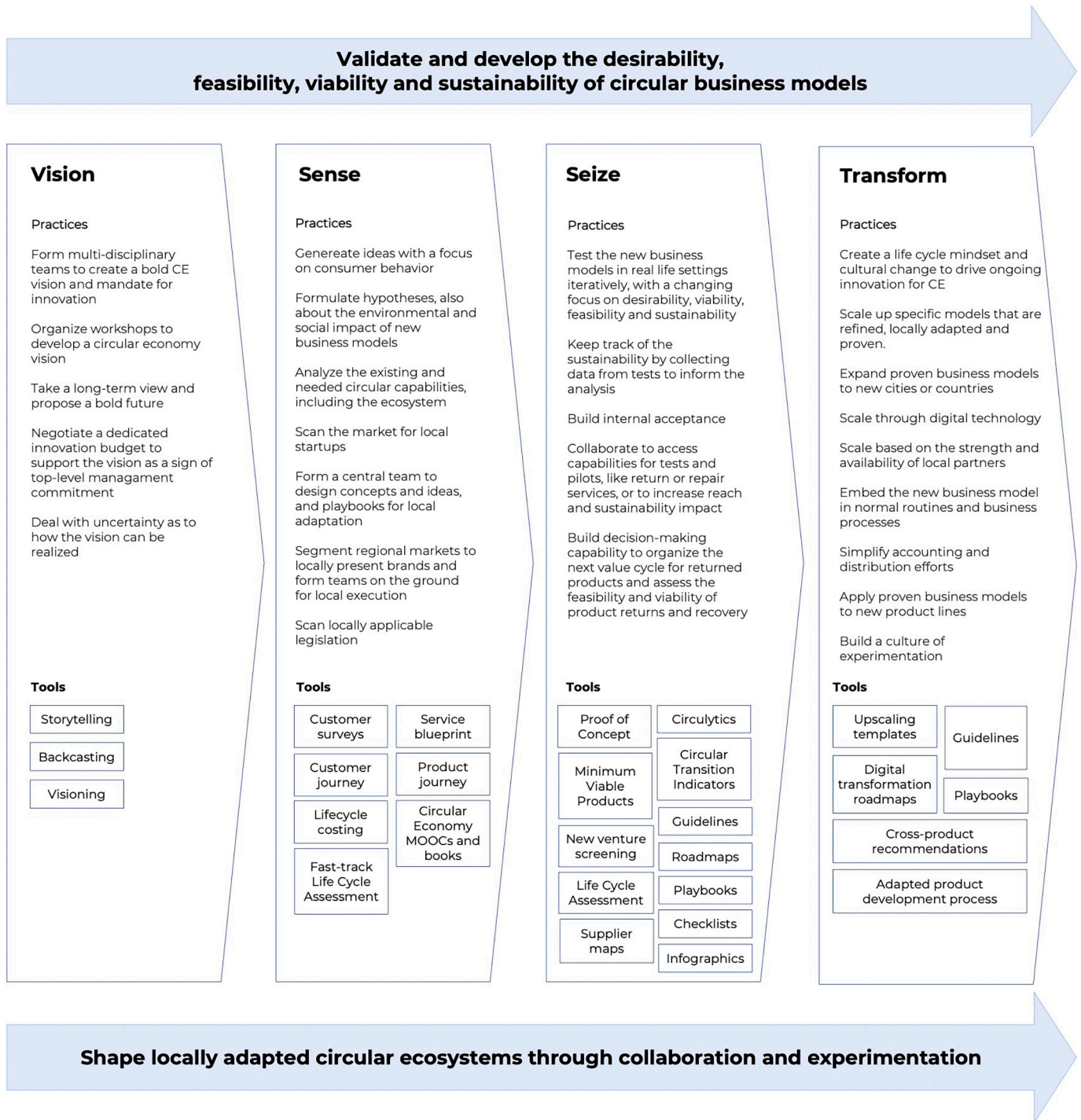
Interview data were iteratively coded by the authors using the software Atlas.ti.

For Steps 1–3, both authors coded the interviews, first independently, and then discussed and resolved differences in interpretation. The analyses were first done per company to get familiar with the data and the circular business model innovations and processes per company (Step 1). High-level themes supported the coding starting with the types of circular business models, processes, practices, tools and methods, and evidence on scalability (Step 2). Authors thus specifically coded using themes such as “type of business model”, “processes”, “tools and methods” and “scalability”. As a next step, the authors evaluated whether these fitted stages of visioning, sensing, seizing or transforming and started to understand what type of commonalities could already be found across the interviewees and companies (Step 3). For Steps 4 and 5, as recommended by Ryan and Bernard (2003), we identified repeated topics between the three companies, and similarities and differences between the responses during the thematic coding process to arrive at the main practices, processes and tools. Again, there were multiple iterations of independent followed by joint coding between the authors to agree upon the final themes (6). The final version of the analyzed data as summarized in Fig. 1 and the text in Section 4, was presented back to key informants in each of the companies to check for confidential issues that needed removing, obvious errors, misrepresentations, or omissions of key practices or processes (7). The final validation step did not change the coded practices and processes but led to minor corrections to the naming of specific initiatives and activities (e.g., refurbishment). These steps thus led to the identification of an overall CBMI process, as well as lower-level practices and tools.

The corporations were found to experiment with the following types of circular business models: repair and maintenance, reuse and redistribution, refurbishment and remanufacturing and recycling, including subscription, rental, buy-back and secondhand offerings. Appendix B contains a complete overview of the identified business models categorized according to the circular business models in Lüdeke-Freund et al. (2019).

4. Results: CBMI practices and tools

Fig. 1 summarizes the identified CBMI practices and tools, classified according to the high-level stages and dynamic capabilities of visioning, sensing, seizing, and transforming. Throughout these stages, and as confirmed through prior research (see background), the process has two goals. First, it serves to validate and develop the desirability, feasibility, viability and sustainability of circular business models. Desirability refers to how desirable the intended customer finds the value proposition. Feasibility is about the value creation and delivery mechanisms, like needed innovations in materials and product designs, or operations. Viability is about the financial business case; and sustainability is about



**Fig. 1.** Circular business model innovation (CBMI) practices and tools during visioning, sensing, seizing and transforming. Note. CE refers to ‘circular economy’.

the environmental and social impacts of current and new business models. Second, it seeks to develop locally adapted circular ecosystems through collaboration. Within each stage, the corporations perform and use various practices and tools to achieve these goals, which we describe for each step (see [Appendix D](#) for an explanation of the tools).

**4.1. Visioning**

Circular business model innovation starts with an ambitious and systemic circular economy vision and bold goals that move beyond

financial performance. The companies have used distinct tools like backcasting to develop these visions, where a company imagines a desired future and then defines the steps back to the present to identify needed changes. The companies created teams with representatives from multiple departments to make the visioning process participatory and inclusive, and to create a mandate for CBMI.

Part of the visioning phase is an explicit focus on the long term and bold goals and ambitions, for which the companies organized storytelling sessions that helped imagine alternative future scenarios and to define the company's purpose in a world defined by rapid environmental

change. Part of the visioning stage is also the negotiation of a dedicated innovation budget to support the transition.

To illustrate, IKEA has developed the vision to become a circular business by 2030, H&M includes circular economy goals until 2030 and climate goals until 2040, and Philips has circular economy goals for the next five years, and more social goals related to access to affordable healthcare until 2030. As the interviewees put it: “*circular economy (...)* has evolved into one of the big change drivers for sustainability in IKEA” (I6). “[The vision] defined the core strategy for the company — sustainability and circularity — everything is integrated in the core of the company, that’s the main driver for this” (I2).

In the three cases, the circular economy vision is supported by top-level management. This gives others in the organization the mandate to act upon the circular economy target: “[Circular economy] is one of Frans Van Houten’s [CEO] spearpoints and he has been a very effective leader in making sure this trickles down” (P3). Interviewees repeatedly highlight how important this is to provide a clear sense of direction for their actions.

Yet, there is high uncertainty as to how these visions can be achieved, which results in the need for CBMI: “The strategy is so bold that it’s almost scary – climate positive, committed to the public” (H1). Without CBMI, it will be hard to achieve any progress towards the ambitious goals. As the interviewees pointed out:

“To meet our own bold goals, we need circular business models! This is an important part of the solution. Decoupling is needed to allow for a growing population and economic growth”.

(H2)

“The main driver is the need to accelerate the transformation to reach the 2030 goal of becoming a circular business. That is a very short time to transform what today is a very efficient linear operation”.

(I1)

“Our own goals span for about 10 years so we need to try and do whatever we can to speed things up. We need targeted tests and pilots.”

(H9)

An important source of this uncertainty relates to the need for significant behavior change among customers, which has become part of the interviewees’ day-to-day jobs: “So my role is both about the contents and the mindsets (...), for example: How do you change the mindsets? What tools can one use?” (P1). This is both seen as a challenge, and as something that the interviewees need to learn: “it is hard to change customer behavior; change how they buy clothes and prolonging the life” (H4). As one interviewee described:

“And if you know that [we as IKEA] have a vision. We want to create a better everyday life for the many people and we were thinking about: What does that mean for us? And where are people when it comes to circularity? So instead of going directly and [implementing the solution] we decided to go out and talk to people”.

(I3)

#### 4.2. Sensing

Sensing is about identifying and assessing new ideas and opportunities. The interviewees in this phase perform diverse practices to gain customer insight and understand the potential desirability of new business models. This is often with a focus on analyzing and better understanding consumer behavior, because circular business models require lots of changes in how consumers behave, as they need to treat products differently, bring them back, engage in service relationships, etc. Based on this better understanding, the innovators generate ideas

for new circular business models and formulate hypotheses and research questions about them. The sustainability impact is validated early on by questioning if the new business model idea has a higher environmental performance than the current business model:

“What we see is that sometimes, of course, it doesn’t make sense from a climate point of view, to take back a local appliance refurbishing to repair it and then resell it to a customer because in the end, there’s so much happening in the appliance industry and it’s continuously having more energy efficiency upgrades. [...] If we were to take back maybe an eight-year old appliance and then repair to resell it, then it would be worse than actually producing a new one or selling it to a customer because it would be so much more energy efficient”.

(I4)

Initially, this is done by using rules of thumb or fast-track Life Cycle Assessment (LCA) (see e.g., Böckin et al., 2022) to model possible scenarios.

During sensing, innovators already seek significant interaction with the customer to gauge interest and identify the right value proposition, i. e., the customer specific offering. But new business models (i.e., also including the value creation, delivery and capture aspects) are not yet tested in practice. Interviewees use several tools and methods to learn more about the desirability of product take-back schemes, used products, or subscriptions. Several interviewees refer to this phase as ‘Design thinking’ (e.g., H8, P2, I5, I6). The way up to the value proposition is “less structured [...] but that is fine!”, because “if you structure the front end of innovation, it becomes less innovative” (P1).

This is supported by key questions and hypotheses, with a focus on the consumer value and desirability, followed by financial viability, feasibility, and sustainability. Part of this happens via “in-depth analyses, market analyses, deep dives, and surveys” (P3). A further interviewee “went to five cities around Europe to talk to people on the streets” (I3). Another set of practices relates to the use of service design tools, like customer empathy maps or service blueprints, to understand the customer and product journeys:

“We work with service design methodology. The starting point is the collection of in-depth consumer insights gathered by conducting for example one-on-one conversations with individuals. This enables us to start pinpointing the problems we want to solve”.

(I1)

“We did some research first in Poland, where we have tested the first ideas on people, then we complemented with the research in the UK, where we were quite surprised actually how uninterested end-consumers were in leasing”.

(I4)

These practices help to better understand the customer needs and ‘jobs to be done’ of new business models, and to understand where experiments and pilots make most sense. Interviews and surveys are done both at the homes of the customers, as well as in stores, on the street, online and via phone, sometimes with an external supporting research agency. As part of the customer interviews, some of the interviewees designed a conversation guide that included themes like the willingness of customers to buy back used products, to sign up for a subscription service, to get insight on possible ways of returning products, and to understand how customers value the products, and how they integrate them in their everyday lives.

Next to learning about the desirability of the new business models, the interviewees stressed the need to validate the viability, i.e., establish a clear financial business case and to understand if there “are there any profits to be gained” (P8). This is to “have a really solid business case” because “it needs to take back, it needs to show that it’s profitable” (I4). This happens in the form of profit and loss accounting, as well as life cycle costing, to understand the cost of the service model over its entire



lifecycle. It also includes surveys to better understand the customers' willingness to pay for a service, to enable initial decisions on pricing. But interviewees note the need to test the new business model in practice, rather than asking customers in surveys, because they *"see that customers say that they're interested in something and then once [they] actually offer that, the interest is gone"* (I4).

The sensing phase also includes an analysis of capabilities needed for circular business models, for example in terms of reverse logistics or circular product design. Often these come from external sources. Interviewees noted that circular business models require ecosystem changes and not only changes in one individual company: *"We need an ecosystems approach. You can see that with all the external people we needed to involve"* (P2) and that *"circular business models are really ecosystem innovations"* (H5). This also drives them to scan the market for new circular startups in the industry and segment regional markets to locally present brands. This confirms the goal to develop locally adapted circular ecosystems.

The eco-systemic nature of CBMI also determines how innovators collaborate internally. They form a central team, to design central concepts and ideas, and write playbooks for local execution. Then local teams are formed that tailor the centrally proposed ideas to their contexts. Local teams know how to tailor the business model according to local needs and can develop the business model further in their own context. This happens while the central team *"give[s] the support, guidance and platform"* and leaves it *"up to the store to identify what's most important in the communities – what are the most important social issues"* (H7).

During sensing, legal teams also validate the operational and legal feasibility of new business models in different contexts. One interviewee stressed that the refurbishment of products is *"going to be much more local, not more than 100 kilometers"* because *"logistics is a barrier"* which is why they chose to conduct pilots *"where suppliers are located"* (I2). Legal teams analyze the national legal requirements for repairing, refurbishing, or recycling, and take care of the research per country, which then informs which country to focus on for innovation:

*"Spare parts is also being pushed by legislation. For refurbishment [we have] limited set-ups in different markets depending on regulation, capability and infrastructure. You can do something. Also, customer desirability should exist. And the cost. We identified markets like India, China Russia. Labour cost are less but at the same time there is also an established market for secondhand etc. So is there value we go and add? Or are there other countries to focus on? So there are different things to focus on. So mainly the [spare] parts and the services like refurbishment where the legal parts are lesser"*.

(I2)

#### 4.3. Seizing

Seizing is about defining and validating new business models by experimenting and piloting. This phase is the most iterative and focuses on organizing actual tests, to validate the desirability and viability of new value propositions with real customers (in stores or digitally), and the feasibility of the activities and resources required to deliver the new value propositions:

*"The consumer-focused tests were conducted following an innovation process with changing focus on desirability, feasibility, and viability. Iteration was continuous until the right solution for reaching many people was identified. The method was also qualified for scalability and business viability"*.

(I1)

*"Our approach to a test: first we are using a lean approach: is the customer really wanting that? So customer desirability comes first. So we see whether it's desirable for customers in a market. We try*

*feasibility: is it feasible for IKEA to do? Last, we try viability: is it a viable business model? Then we come into cost. Is it viable doing it for us a business? Not necessarily very profitable [in first instance] but at least: is it not making a loss? At least the goal [is] for break-even. So, desirability, viability, feasibility"*.

(I2)

The interviewees also continuously keep track of environmental sustainability. They ask themselves if customers *"really use the products for longer"* and notice that they *"need to learn whether it's better for the environment"* and that *"perhaps more is known when the second iteration takes place"* (H8). The point is to use the experiments and pilots to reconcile different interests and make it work for the customer, the business, and for sustainability:

*"Company interest, so economic viability and then with the environment and all of this needs to come together, you need to have a positive impact on CO<sub>2</sub> or other topics as well, you need to have a service that is, you know, wanted from the customer and that you make money, all of this... is tricky of course, and needs to be sort of tested"*.

(I6)

The conducted tests may be collaborative, depending on the needed and existing capabilities. Tools used during this process include Lean Startup (e.g., minimum viable products, mock-ups, A/B split tests), customer surveys, guidelines, checklists, infographics, project plans and playbooks, design thinking tools, roadmaps, supplier maps and the corporate venturing process that screens for new start-ups. A Minimum Viable Product (MVP) is a low-cost version of a product, often without an existing backbone of the actual business model. In an A/B split test, two or more different advertisements or (draft/mock) websites are put online to test parts of the business model.

While the interviewees still use design thinking in the seizing phase, they emphasize the use of the Lean Startup approach, and the need to *"get out of the building"* and test ideas with customers. This is because *"cost will go down through experimentation, success will go up, and budget will go down (...)"* and because *"Lean startup is super quick to test the riskiest assumptions: Who is the customer? What is the price?"* (P9). The process is a mix of *"experts and lean startup values, tool sets – digital, surveys, MVPs, new business models, and sustainability aspects"* (P3). The Lean Startup has been adopted by many big companies who *"gave it their own twist"* (P3). In the case of one of the interview companies, this twist consists of *"Co-creation, Design thinking and Lean start-up"*, noticing that *"when [they] speak to others [corporations], [they] notice that 80% of the processes are similar processes"* (P3). The purpose is to *"check desirability first, then the business case, and then going for a scalable solution [using] lean and agile"*, to *"learn every day new things and adjust the plan accordingly"* (I2).

In this phase, interviewees either innovate alone or collaborate to organize joint experiments and pilots with key partners. The decision to do it alone or in collaboration depends on the internal availability of the needed capabilities, and if these can (or should) be developed alone or with external partners. The interviewees realize that they *"cannot do it alone"* but also that *"in reality, [we] want to do a lot alone"* (P6). Initially, capabilities may come from partners, like the logistics of product return services, but *"when it got bigger everything was changed to do-it-yourself"* (P6). The decision to collaborate or not also depends on the scalability of processes: *"With things like H&M Take Care we do more inhouse, but with COS and The Renewal Workshop (H&M) we could scale up more quickly [through collaboration]"* (H2). In general, it appears that companies *"need both internal capability building and partnerships"* (H2).

To elaborate on partnerships, the interviewees worked, for example, with a *"subscription company, logistics company, and a return process"* while stressing that *"for the user it's a seamless experience"* (P5). In other cases, interviewees explain that they had partners from which they wanted to learn how their model works in the physical locations, so they

partnered for a “*plug and play solution*” (I4). Collaborations may also take place with different actors such as NGOs with shared sustainability motives or to make the proposition even stronger from a social sustainability perspective (e.g., inclusion of refugees, skills building).

Seizing also involves detailed tests on the feasibility of the required innovations in materials and product design and the needed adaptations in operational procedures. This includes, for example, “*questions around the feasibility of take back of models*” (P4), where the interviewees notice they have to “*evaluate every individual product and decide where it should go*”, whether “*it can be sold as re-packaged and sold on the shelf or if it needs to be sold in the as-is corner*” (I3). The interviewees keep track of the viability of these operations and notice that they tend to “*take a lot of time [and are] not so feasible in large scale*” and notice that “*customers are still willing to pay for secondhand*” but that they need to understand the willingness to pay, to match it with the cost of value creation and delivery (I3). Some of the feasibility tests also happen independently of the cost considerations, just to understand the operational challenges:

“We tested 20 sofas, we refurbished them. We did not focus on cost. We mainly looked at: can we refurbish them? How good can it be? Then we also did it in China. Took all sofas back from China. Mainly the ones damaged for example in transit. We took them back, cleaned them, refurbished them”.

(I2)

#### 4.4. Transforming

Transforming is about the interviewees' practices to scale up validated opportunities in different contexts and implement the required changes in organizational structures and routines. Transforming involves significant work in changing the mindsets of staff and partners from a sales-oriented to a life cycle mindset that takes into account the journey of products from first life to multiple lifecycles through processes like repair, refurbishing and remanufacturing. This transformation and scaling take different forms. Interviewees scale up specific models (e.g., subscription; second-hand trial), implement them in more cities or countries, and seek opportunities to extend the offering to other product categories or business units. For scaling, it is important to “*leave it open*” for local stores, because they “*know best [and we] did not want to limit them*” (H7). Digital technology helps scale up certain business models, because the “*digital environment is global – physical stores not*” (H7). Digital technology, together with partnerships, are mentioned as ways to scale up:

“[The process] depends on the level of maturity: the business, proposition, and availability of partners [the latter would improve the ability to scale]. The use of digital technology is one way to scale up”.

(P1)

Furthermore, the interviewees implement the required changes in organizational structures and routines (i.e., transforming), to ensure the business model gets adopted in ‘normal’ business practices. According to the interviewees, “*a key success factor when scaling up [is] to get it in to the regular information streams*” (H1), to consider “*how we make accounting less complicated, how we reduce transport*” (H2), and how to adjust “*the internal set up, and how we book the cost and track new sales*” (H8). The ability to scale also relates to adapting the product development process across the entire product range:

“We’re now looking to our entire range to understand what we can and can’t do for the future product development because ... that will help us immensely when it comes to scaling up these initiatives”.

(I4)

Finally, the transforming phase also includes learning about how experimentation can help build new business models and continuously

transform the organization. The experimentation with one business segment “*generates a lot of interest in trialing other businesses*” (P4). Key is to build a culture for experimentation, where the people inside the organization have “*the energy [...] to move forward*” (I1). By involving key stakeholders in the business early on, the interviewees created a “*multi-functional team that keeps on experimenting*” (P4). Indeed, the CBMI process leads to a cultural transformation in the organizations towards more experimentation and life cycle thinking, and challenging of other product categories:

“The buyback solution [is] a good example of a non-digital solution that is spreading in the organization. And then at one point they reached some kind of tipping point and it becomes an official push for all markets to do it”.

(I3)

Few of the new circular business models have so far been scaled up. Therefore, the transforming stage is the least mature, both in terms of the current status quo among practitioners, as well as in the theoretical understanding of how to navigate this process. Nonetheless, the insights gained from the interviews are important to further study how corporations can transform their organization for continuous experimentation and change, to adapt to new business environments shaped by global environmental risk.

## 5. Discussion

This study enriches theory of dynamic capabilities and adds knowledge on the purpose of their development in the context of circular business model innovation (CBMI). First and most importantly, we identify the lower-level practices and tools of CBMI that underlie the dynamic capabilities. Second, we add the important stage of visioning as an antecedent of the dynamic capabilities of sensing, seizing and transforming. Third, we confirm prior research that the CBMI process has two purposes, the validation of the new business model, and the shaping of locally adapted circular ecosystems.

The first contribution of this study is to the theory of dynamic capabilities, and the micro-foundations or lower-level practices which lack an empirical base in CBMI research. We identify a range of lower-level practices that correspond to the visioning, sensing, seizing and transforming, extending the capabilities as proposed by Teece (2010, 2018) and more recently with a focus on CBMI, by Santa-Maria et al. (2022). We thereby enrich earlier research on the lower-level practices of CBMI. Achtenhagen et al. (2013) investigated lower-level business model innovation practices within SMEs, while Retamal (2019) and Svennevik (2021) investigated them in the context of the sharing economy. Our detailed account of lower-level practices as identified from the interviewees concretizes the underlying practices of the high-order dynamic capabilities, a call that has been made repeatedly in the research on dynamic capabilities (Leih et al., 2015; Santa-Maria et al., 2022; Wenzel et al., 2021).

As for visioning, we found that companies require many interactions to put this bold vision into action, like forming multi-disciplinary teams to create a bold CE vision and mandate for innovation, organizing workshops to develop a circular economy vision, taking a long-term view and proposing a bold future.

Building on an ambitious vision, the sensing phase consists of practices to gain customer insight, generate ideas, formulate hypotheses and research questions, as similarly proposed by Camuffo et al. (2020) and Ries (2011), as well as to analyze the existing and needed capabilities to create and deliver new business models. The environmental impact is already considered during the ideation and hypothesis formulation and motivates decisions to start formulating propositions around remanufacturing, secondhand and take-back systems. The query of how to make a positive sustainability case is investigated early on and forms part of the sensing practices.

The seizing phase of CBMI is underpinned by practices to test new business models in reality, building internal acceptance and capabilities, and collaborating with others to access complementary capabilities similar to BMI (e.g., Marcon et al., 2022; Teece, 2018). CBMI requires the need to keep track of the sustainability performance throughout, the potential need to adapt the product design to allow for easy repair or refurbishing and conduct feasibility tests focused on take-back and refurbishment. Furthermore, collaboration with NGOs or scale-ups might be needed, for instance for their unique networks that allow for new activities needed in the CBMI (e.g., regional repair networks involving immigrant workers who previously were unemployed, or emerging secondhand platforms).

The transforming phase of CBMI was found to be the least developed stage in CBMI. Transforming consists of practices to find different ways of scaling up (in parallel), embed the new business model in normal routines, as well as to create cultural change to drive ongoing experimentation for organizational change. Circular economy is an ongoing driver for business model innovation and gradually transforms business practices towards higher circularity. Capabilities and infrastructures are increasingly geared towards circular economy (e.g., take back, refurbishment). Collaborators may support the scale up due to a temporary lack of capabilities, networks, or infrastructures. Transformation seems to be a balancing act to understand what capabilities to keep, change or source via others.

As part of this first contribution, we also identify managerial concepts, tools and methods for business model innovation and scaling up in the context of large B2C corporations and applied to CBMI (see Fig. 1 and Appendix C, further explained in Appendix D). Lean Start-up and Design thinking were mentioned by the interviewees as the most common methods, as well as their adaptation to the context of a corporation, which echoes studies by Felin et al. (2020) and Bocken and Snihur (2020). Knowledge is shared through guidelines, checklists and infographics (e.g., on the legal requirements). Many of the tools are similar to those identified in BMI literature like design thinking tools. In addition, we found a range of CBMI specific practices such as defining a positive sustainability case, sustainability checks, product adaptations (for reuse, recycling), product take-back operations, or using formerly discarded materials as inputs.

Still, there is a lack of tools, and methods to validate the innovators' assumptions about the circularity or sustainability of new business models, confirming earlier research (Konietzko et al., 2020a, 2020b). While tools like life cycle assessment and carbon footprints are used to measure sustainability baselines, there is significant uncertainty when trying to forecast the impact of the new business models in practice. This uncertainty has to do with two factors. First, it is unclear how a new business model will play out in practice, including the processes around reverse logistics and other additional activities, and what their impacts are. Second, customer behavior is difficult to predict: will consumers buy less 'new' when buying second hand? Or, will they buy more 'new', because they also buy second hand? Will they treat the products with care and how long will the products eventually last? To address these open questions, customer education, but also collaborative learning, are important to identify effective ways for circular business models to have a truly reduced impact on the environment (Brown et al., 2019). Based on this first contribution, we make the following propositions.

**Proposition 1.** In the sensing phase of CBMI, environmental concern is an explicit part of hypothesis development to co-create circular business models that are not only attractive to the customer but also resolve environmental problems.

**Proposition 2.** The seizing phase of CBMI requires continuous and increasingly detailed environmental and social impact assessment, based on primary data from operations and the use phase, to trace whether the circular business model performs as initially assumed.

**Proposition 3.** The transforming phase of CBMI is perhaps the most

uncertain and underdeveloped because of the ongoing challenge to weigh which capabilities to keep, change, or source via others to transition from a dominant linear to a circular business model.

**Proposition 4.** The sustainability impact of CBMI is hard to predict, because of uncertain operational requirements and consumer behavior and requires unique tools and capabilities, as well as a deep understanding of customers and their usage of a circular business model in practice to achieve the greatest impact.

Hence, there is a need for tools and methods to forecast the sustainability impacts of CBMI. These tools need to be developed and tested in a real business environment. They should be flexible and adaptive, to allow for changes in the emerging business model, and to support prospective users in the sustainable use of products. By researching the practices of pioneering corporations in the field of circular economy, we illuminated the practices and tools (summarized in Fig. 1; see also Appendix C) used during the CBMI and identified gaps and needs. This is valuable information for any business that wants to embark on a transformation towards new circular business models.

As part of the second contribution, we find that CBMI is motivated by an ambitious, long-term, time-bound and quantitative vision. This finding adds to the stages of the BMI process, as the visioning stage has so far been neglected or implicitly assumed in the literature on BMI (Frankenberger et al., 2013; Girotra and Netessine, 2014; Pynnönen et al., 2012). Such a vision creates the momentum to get internal and external commitment and buy-in in for the non-trivial changes to the architecture of a corporation's business model. It also allows for the communication to customers who might better understand the rationale for emerging new circular business models in practice. Contrary to prior research that has argued that visioning is part of seizing activities, we argue that visioning is an antecedent stage of sensing, seizing and transforming (Santa-Maria et al., 2022). We therefore make the following proposition.

**Proposition 5.** The CBMI process starts with an ambitious, long-term, time-bound and quantitative vision for a desired future circular economy.

As part of our third contribution, we confirm prior research that the CBMI process serves two purposes (e.g., Pieroni et al., 2019; Santa-Maria et al., 2022; Frishammar and Parida, 2019). First, to validate and develop the desirability, feasibility, viability and sustainability of circular business models. Second, to shape locally adapted circular ecosystems through collaboration and experimentation. Locally adapted ecosystems are seen as a way to innovate more quickly. As earlier research has noted, the CBMI process is a form of 'ecosystem innovation' (see also Boldrini and Antheaume, 2021; Parida et al., 2019; Konietzko et al., 2020c), in which several complementary actors need to be involved to solve the systemic challenges of a circular economy. These include reverse logistics, the recycling process, or the tracing of products, components, and materials throughout their life cycles.

We also note that the transformation and scaling of these new circular business models depend to a large extent on the regulatory context. A real shift in the uptake of these new business models will come, for example, when the externalized cost of business-as-usual practices on societies and the environment become internalized, i.e., when product prices start reflecting their true cost. And this is a political question. Once that happens, barriers to scale will be overcome as circular business models become increasingly viable.

### 5.1. Limitations

The validity of our study is limited by its method. An interview study serves to let key innovators talk about their practices, but it does not allow to observe the practices over time in their real-life business setting. Future research is needed to build on this initial study, to follow the actual practices of innovators in corporations to drive change towards

sustainability and a circular economy. The COVID-19 pandemic made observatory methods difficult, many innovators worked from home. Therefore, an interview study was deemed appropriate to investigate the phenomenon of experimentation. The video conferencing method was found to be useful. Technical hiccups or no shows are some of the disadvantages compared to face-to-face interviews, but these are outweighed by benefits of convenience and, most important, safety during the pandemic (Bryman and Bell, 2015). Another limitation is in the number of involved companies. While we selected three different corporations, a bigger sample can help to broaden our insights and check the validity of our results.

## 5.2. Future outlook

This study identified emerging CBMI practicing in consumer-facing corporations based on a study of three corporations. We suggest five areas for future research and practice: (1) deeply understanding customer behavior in relation to environmental impact, (2) methods to support environmental assessment and (3) the transforming phase, (4) quantifying impacts of CBMI, and (5) CBMI for sufficiency and regeneration.

First, previous research found that a business model's impact is determined by its design (Kjaer et al., 2018, 2019; Tukker, 2015), and still negative rebound effects may emerge due to customer behavior (Das et al., 2022; Whalen et al., 2022). This study highlighted the uncertainty associated with how customers use circular business models in B2C companies, a group with a more heterogenous customer base than in former studies on B2B markets (e.g., Frishammar and Parida, 2019; Parida et al., 2019). There is a twin-challenge of making circular business models not only desirable, viable and feasible common in BMI, but also sustainable in practice. This requires a deep understanding of the customer during the iterative experimentation phase. Some studies measured a circular business model's sustainability in practice (e.g., Bocken et al., 2018 on an existing pay per use business model). Yet, most studies are hypothetical about business models that still need to be rolled out (e.g., Böckin et al., 2022). Furthermore, research and practice can benefit from bridging between theories and disciplines such as social practice theory to understand the user practices in relation to business models to not only make them more desirable but also more sustainable (Ritala et al., 2018; Whalen et al., 2022).

Second, and related to this, tools are needed to support environmental assessment during usage. These might be iterative building on life cycle thinking rather than a full lifecycle analysis (Böckin et al., 2022). There is also a big opportunity to leverage data science and digital technology more generally to automate life cycle assessment (LCA) and enable the scaling up of granular, primary and high-quality environmental impact data. This data can then be used to simulate and measure progress that comes from CBMI more dynamically.

Third, of all CBMI stages, the transforming stage is least developed in corporations, as it is yet unclear what an ideal "circular business" will look like for them in the future, despite the bold and ambitious corporate visions. While experimenting and deciding upon scaling up, companies need to make difficult decisions on what capabilities to keep, develop, or source via others in the short and long term, despite the uncertainty. This work could be enriched by bridging studies from former research, e.g., on how companies successfully exploit new opportunities and challenge their existing business models (McGrath, 2010) with theories prevalent in sustainability, such as those on embedding heterogenous logics in business models, combining commercial and societal logics (Ritala et al., 2021; Laasch, 2018).

Fourth, future research can also benefit from looking for ways of improving and quantifying the CBMI process. This will be needed to establish a robust link between experimentation and innovation outcomes. So far, knowledge about the effect of experimentation in corporations is anecdotal. Recent research on startups has shown a positive link between experimentation and innovation success (Camuffo et al.,

2020). Similar studies are needed to investigate the link between experimentation and sustainability outcomes, especially in the context of corporations. To increase the robustness of experiments, research could support companies through action research setting up (quasi-) experiments making use of control groups. For instance, in the case of food waste reduction at UK retailer Asda, information interventions were used to help customers reduce food waste, and those who did not see a certain advertisement were used as a 'control group' (Young et al., 2017).

Fifth and finally, we investigated companies that are pursuing higher R-strategies such as reuse and repair. This requires an adaptive approach because circular offerings focused on reuse, repair and secondhand might be seen quite differently (by customers and legally) in varying country contexts. Going a step further, researchers have also discussed sufficiency in a business context indicating one should be able to do with less (e.g., Gossen and Kropfeld, 2022; Niessen and Bocken, 2021; Wells, 2018). Researchers should continue this research line but also focused on CBMI to investigate how this offering can be made attractive and financially viable. Another R-strategy, regeneration of biodiversity and the natural environment (Hawken, 2021) adopted in the circular economy context (Konietzko et al., 2020b), requires companies to develop entirely new capabilities (e.g., nature conservation) or new collaborations with NGOs or conservationists, which could be a source of further investigation.

## 6. Conclusions

In this study, we investigate what process and practices corporations follow to innovate their business models for a circular economy. As our main contribution, we identify many granular practices and tools of circular business model innovation (CBMI) in the context of consumer-facing corporations, and thereby add to the theory of dynamic capabilities in this context. We also find that corporations start the CBMI process with an ambitious, long-term, time-bound and quantitative vision sustainability and circular economy vision. Corporations pursue often complex CBMI to meet such an ambitious vision. We also confirm earlier research that CBMI has two purposes. First, to reduce uncertainty and investigate key strategic properties of new circular business models: their desirability, feasibility, viability and sustainability. Each of these properties needs to be validated for a new business model to be scaled up. Second, the process serves to shape locally adapted circular ecosystems through collaboration and experimentation. Finally, to innovators, this paper provides a pathway for CBMI with typical practices, for inspiration and as input to organize the process. Developing a strong vision, locally adapting circular ecosystems, as well as tracing the sustainability impacts during sensing, seizing and transforming are important themes for innovators seeking to develop novel circular business models.

### CRedit authorship contribution statement

**Nancy Bocken:** Conceptualization; Investigation; Data collection; Formal analysis; Funding acquisition; Methodology; Project administration; Writing - original draft; Writing - review & editing.

**Jan Konietzko:** Conceptualization; Formal analysis; Methodology; Writing - original draft; Writing - review & editing; Visualization.

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**Data availability**

The authors do not have permission to share data.

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**Appendix A**

**Table A**

Choice of sample. Based on Strategic partners [EMF \(2022\)](#).

Corporates with B2C focus	At least a 5-year focus on CBMI with higher “R strategies” according to corporate and/or EMF websites? (in 2020)	Data access	Sample
Danone	No	N/A	
Groupe Renault	No	N/A	
H&M Group	Yes	Yes	X
IKEA	Yes	Yes	X
Philips	Yes	Yes	X
Solvay	No	N/A	
Unilever	No	N/A	

**Appendix B**

**Table B1**

Types of business models. Note. types following circular business model archetypes in [Lüdeke-Freund et al. \(2019\)](#).

	Philips	H&M	IKEA
Repair & maintenance	Philips Lumea (IPL device) subscription	Take care initiative	Spare parts and repair platform
Reuse & redistribution	Philips Lumea subscription Pay-per-use air purifier	Rental trial (e.g., short term occasional) Re-commerce	Cleaning as a service Secondhand store Buy-back programmes Furniture as a service for small businesses Furniture-as-a-service for rental apartments Furniture-as-a-service package for expat students
Refurbishment & remanufacturing	Philips Lumea subscription Medical equipment refurbishing	Refurbishment of clothing	Buy-back programmes Refurbishment as a service Furniture as a service
Recycling	Recycled material content	Recycling initiatives (e.g., Loop in store)	Buy-back programmes

**Appendix C. Overview of CBMI practices and tools identified in the interviews. Note. An asterisk notes CBMI specific practices (compared to BMI)**

	Practices	Examples	Tools
Visioning	Translate vision into strategies	Early conversations with customers and stakeholders internal and external to the firm Gain commitment from top management Visioning workshops Forming teams Setting circular business model priorities	Clearly articulated and bold long-term circular economy vision* Design thinking Backcasting*
Sensing	Gain customer insight	Customer interviews, surveys Focus groups, Online panels Ethnographic studies Market studies Target and define new segments Decide on brands and markets to focus on Customer engagement, make the customer an active participant	Design thinking tools Customer surveys Service design tools: service blueprint, customer journey, product journey Educational material (MOOCs, courses, books)
	Generate ideas	Workshops Discussions with colleagues and stakeholders Storytelling Consider the environmental impact during ideation* Think openly and creatively to solve problems*	
	Formulate hypotheses and research questions	Start with assumptions/theory Identify the most important assumptions Assumptions on consumer value (desirability) Assumptions on “How to make it financially viable”	

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	Practices	Examples	Tools
	Analyze the existing and needed capabilities	Assumptions on “Is it feasible?” How to make a positive sustainability case?*	
Seizing	Test the desirability of new business models	Understand your own capabilities Investigate capabilities to build, or access through collaboration Assess who is most suitable to test this together with	Lean Startup (e.g. Minimum viable products or MVPs, Mock-ups models/proofs of concept, A/B split tests) Customer surveys LCA, Circulytics Guidelines, checklists, infographics, playbooks Design thinking tools Roadmaps Supplier maps Corporate venturing process
	Build internal acceptance and capabilities	Conduct A/B tests (Online tests via Landing pages, websites, or social media channels) ‘Fake it until you make it’ Get staff on board Define internal functions and involve staff Build cross functional teams (e.g., legal, finance) Use pilots to create and test the needed infrastructure for the business models	
	Test alone/without partners	Use existing capabilities, infrastructure (e.g., space in store) or platforms (e.g., a website) Build new platforms and capabilities Test in one store or one market Digital test Test offering in store, in different locations	
	Collaborate to access complementary capabilities (NGOs*, customers, suppliers, consultancies, service providers)	Use pilots to create and test the needed infrastructure for the business models	
	Test the feasibility/operational changes (logistics, etc.) of the new business models	Build new platforms and capabilities Test in one store or one market Digital test Test offering in store, in different locations	
	Keep track of the sustainability during the testing*	Use a web application – led by partner Test with a partner (e.g., on their platform or in their channels). Organize the take-back process* Testing of refurbishment possibilities* Testing individual products Sustainability checks* Scrutinize assumptions about the impact difference of new change initiatives* Make the product ready for reuse* Make the product ready for refurbishing and repair*	
	Adapt the product design*	Internal assessment of the business case, potential profits, and costs Determine timing and location of the pilots Define outcomes for pilots Develop external incubators Equity investment in prototype Build an entrepreneurial ecosystem	
	Investigate the viability of emerging new business models (the business case) Plan the pilots	Scale from one market to more Scale up from one store to many Online scale-up before going store-to-store, country-by-country Collaborators (e.g., NGOs*) who enable the scale up Explore several routes to market simultaneously Combine local and global roll-outs Digital and physical setup and learning in parallel Value proposition the same but with local adaptation	
	Engage in corporate incubator activities	Implementation within normal operations Make sure that each pilot adds in more points of reality in terms of Desirability; Feasibility; Viability & Sustainability* Use existing materials (otherwise discarded)* Do replicability checks	
	Transforming	Use different ways of scaling up (in parallel)	
Embed the new business models in organizational routines			
Drive cultural change			

**Appendix D. CBMI practices and their meaning in literature and practice**

	Tools	Meanings	Sources
Visioning	Vision	Joint starting point for innovation by creating a viewpoint about what the future should look like.	Brown et al. (2019) and Guldmann et al. (2019) describe visioning for CBMI
	Design thinking	An iterative experimental approach to develop innovations that are desirable to customers, financially viable and technically	Brown (2008) Bocken et al. (2023)

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	Tools	Meanings	Sources
		feasible for organizations that want to implement these innovations.	
	Backcasting	Imagining a desired future and then defining the steps back to the present to identify needed changes.	Quist et al. (2011) The sustainability charity The Natural Step (Canada) uses and explains backcasting: <a href="https://www.naturalstep.ca/backcasting">https://www.naturalstep.ca/backcasting</a>
Sensing	Design thinking tools	Tools and methods such as interviews and focus groups to test the future desirability, viability and feasibility of new offerings. In the sensing phase, design thinking tools are used to identify emerging interests in the market.	Resources such as The Delft Design Guide (Van Boeijen et al., 2020) Bocken et al. (2023)
	Customer surveys	An example of a design thinking approach by doing online or face-to-face surveys with customers to explore emerging needs in the market.	Osterwalder et al. (2015) Bocken et al. (2023)
	Service design tools	Service blueprints: a visual schematic overview of the order of actions that are necessary for a service offering to be delivered. These can help in identifying service touchpoints and ways to improve the offering and sustainability of the offering. Customer journey: mapping the different steps a potential customer could go through up and until becoming a customer. In a user journey map, the user experience of using the product/service is mapped. Product journey: this is similar to customer mapping but with a focus on the product; to map the life cycle of a product.	Bocken et al. (2023) Prendeville and Bocken (2017) Stickdorn et al. (2011) Van Boeijen et al. (2020)
	Educational material (MOOCs, courses, books)	MOOC = Massive Open Online Course. These are often delivered freely online with a nominal fee for a certificate and are often offered by universities. Interviewees mentioned attending MOOCs on topics like circular economy and innovation.	Examples of MOOC platforms are: <a href="https://www.coursera.org/">https://www.coursera.org/</a> <a href="https://www.edx.org">https://www.edx.org</a>
Seizing	Lean Startup	An iterative approach to developing and testing new value propositions which makes use of different tools such as the ones below. Mock-ups models: Early versions of a circular business model. Prototype: a business model with more functionality than the mockup. Minimum viable products or MVPs: an early version of a business model with sufficient functions ready to function and be tested with customers, but not all facets are ready to save cost. A/B split tests: two different ads or websites (A & B) are put online to test assumptions about the business model.	Blank (2013) Ries (2011) Leanstartup.com Osterwalder et al. (2015) Bocken and Snihur (2020) Schuit et al. (2017)
	Customer surveys	Interviews with customers to test emerging circular business model ideas with them.	Bocken et al. (2023) Resources such as the Delft Design Guide (Van Boeijen et al., 2020)
	LCA	LCA = Life Cycle Assessment, or lifecycle analysis, which measures the environmental impacts (e.g., carbon emissions) linked to the lifecycle of a product, process, or service: extraction of materials, production, the customer use phase, logistics, and post (–initial) use phase (reuse, recycle). After mapping each of these phases, the environmental impacts of each of these phases is calculated.	Böckin et al. (2022) LCA consultancies, e.g.: <a href="https://pre-sustainability.com/articles/life-cycle-assessment-lca-basics/">https://pre-sustainability.com/articles/life-cycle-assessment-lca-basics/</a>
	Circulytics	A quick circularity assessment tool developed by the Ellen MacArthur Foundation	Ellen MacArthur website: <a href="https://ellenmacarthurfoundation.org/resources/circulytics/overview">https://ellenmacarthurfoundation.org/resources/circulytics/overview</a>
	Guidelines, checklists, playbooks, Infographics.	Guidelines and checklists: provide the details or points or steps to consider in the CBMI process. A playbook may specifically include workflows, procedures, and values that shape a consistent response: “the play” which is the CBMI process in this case. A playbook reflects a plan, approach, or strategy. Infographic: A visual, often structured overview to inform the reader about complex information at a glance, e.g., about important steps to take in CBMI.	Pieroni et al. (2019) See e.g.: <a href="https://sterlingwoods.com/blog/business-playbook/">https://sterlingwoods.com/blog/business-playbook/</a> See e.g.: <a href="https://www.visme.co/videos/what-makes-a-good-infographic/">https://www.visme.co/videos/what-makes-a-good-infographic/</a>
	Design thinking tools	Tools and methods such as interviews and focus groups to test the future desirability, viability and feasibility of new offerings. In the seizing phase, design thinking tools are used to test circular business models with customers.	Tools and methods such as interviews and focus groups to test the future desirability, viability and feasibility of new offerings. In the sensing phase, this is a way to identify emerging interests in the market.
	Roadmaps	A visual and flexible technique to support strategic and long-range planning. It helps to explore and communicate connections between future trends and requirements in markets, products, services, business models and technologies to implement a desired business model and scale it up.	Phaal et al. (2004) See e.g.: <a href="https://www.cambridgeroadmapping.net/roadmapping">https://www.cambridgeroadmapping.net/roadmapping</a>
	Supplier maps	An overview of the location and characteristics of your suppliers. Creating such an overview can enable transparency and sustainable sourcing.	See e.g.: <a href="https://www.sedex.com/mapping-your-supply-chain-how-to-get-started/">https://www.sedex.com/mapping-your-supply-chain-how-to-get-started/</a> An example: <a href="https://www.fairphone.com/en/impact/source-map-transparency/">https://www.fairphone.com/en/impact/source-map-transparency/</a>
	Corporate venturing process	A process for companies to develop new ventures (in this case with a circular economy focus), with typical phases such as concept, seed, alpha, beta, and market calibration (the Bell Mason Group approach).	See e.g.: <a href="https://www.bellmasongroup.com/approach">https://www.bellmasongroup.com/approach</a>

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	Tools	Meanings	Sources
Transforming	Template for scaling up	An overview of the steps to be taken or procedures to be taken to scale up, e.g., in the form of a checklist on whether criteria for desirability, feasibility and viability are met.	See e.g., Osterwalder et al. (2015) for examples
	Guidelines and recommendations	Guides for upscaling circular business models in other parts of the business.	Pieroni et al. (2019)
	Playbooks	Rules and procedures for the further roll-out of circular business models in the business.	See e.g.: <a href="https://sterlingwoods.com/blog/business-playbook/">https://sterlingwoods.com/blog/business-playbook/</a>

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