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Research article

Framing and assessing the emergent field of business model innovation for the circular economy: A combined literature review and multiple case study approach

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ABSTRACT

Widespread adoption of sustainable and circular business models is required to accelerate the transition to a more sustainable society, however, the literature supporting the process of Business Model Innovation for the Circular Economy - or Circular Business Model Innovation (CBMI) - is currently emerging. Several publications on this field have been published since 2014, nevertheless, there is still a lack of understanding on the process of CBMI, particularly for incumbent firms; and, as most of the literature is theoretical, further empirical insights are required. Furthermore, there is a need for an updated and comprehensive review of this fast-paced field, and a need to further integrate the CBMI field with the conventional Business Model Innovation (BMI) domain. The present research aims to first, map and frame the field of CBMI, building upon the structure of the conventional BMI field; second, to assess the current state of research of the field, proposing a future research agenda; and third, to explore the most relevant elements of the CBMI process in the practice. The article uses a combined literature and multiple case study approach. It begins by synthesizing a BMI framework, which is then combined with the findings of a systematic literature review (n=84) on the emergent CBMI field, to propose an original framework that structures the field. The review includes an assessment per article on the state-of-research. The framework is then illustrated through a multiple case study on ten incumbent firms that have implemented a substantial CBMI, revealing which topics are more relevant from a practice perspective and offering valuable empirical insights. We suggest that future research should prioritize those topics that are *very important* from the practice and still *un- or under-researched* in the CBMI field (i.e. organizational culture and structure as moderators of the CBMI change process, sustainability strategy as an antecedent of CBMI and top management role as key elements of the CBMI process) and to those identified as *important* though *under-researched* (i.e. organizational change management as a key element of the CBMI process; organizational inertia, ambidexterity and CBMI uncertainties as moderators of the CBMI process; and systemic change as an effect of the CBMI). The literature on Sustainable BMI is integrated to propose contributions to the identified gaps. This research contributes by framing and assessing the field of CBMI, proposing a future research agenda, providing a detailed literature state-of-research assessment and by further integrating CBMI with the conventional BMI field.

1. Introduction

Unsustainable patterns of production and consumption are pushing the economy beyond natural planetary boundaries (Steffen et al., 2015) risking the ability of future generations to satisfy their needs. Thus, an urgent shift towards a sustainable trajectory is required. The key role of firms in this transition has been widely acknowledged, as they are the largest holders of resources and capabilities (Nidumolu et al., 2009; Porter and Kramer, 2011). Research has argued that the incremental improvements of products and processes are insufficient for the quick transition required (Abdelkafi and Täuscher, 2016; Short et al., 2014), thus firms need to look into significant ways of aligning their operations with long term sustainability, which might be found in the design and im-

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plementation of novel business models for sustainability, i.e. Sustainable Business Model Innovation (SBMI) (Bocken et al., 2014; Boons and Lüdeke-Freund, 2013; Geissdoerfer et al., 2018b)

Circular Business Model Innovation (CBMI) is a particular type of SBMI, one which aligns with the principles of Circular Economy (CE) (Geissdoerfer et al., 2018b; Guldmann and Huulgaard, 2019). In recent years, the CE has been promoted as an effective contributor to Sustainable Development (Geissdoerfer et al., 2017), as it offers guiding principles to decouple resource consumption and environmental impacts from economic growth, through the retention of value in products and materials for as long as possible (Ellen MacArthur Foundation, 2014; Ghisellini et al., 2016). Despite the widespread interest of the private sector in CE (Lewandowski, 2016), the implementation of Circular Business Models (CBM) by incumbent firms has been very low in the practice (Bocken et al., 2017; Laukkanen and Patala, 2014). CBMI is a complex innovation challenge (Bocken et al., 2018b; Guldmann and Huulgaard, 2019), which requires firms to enter an unknown terrain that involves changing the key building blocks of their business and to navigate against dominant business paradigms (Bocken et al., 2019b), a process under-explored in the literature (Evans et al., 2017; Frishammar and Parida, 2018; Govindan and Hasanagic, 2018; Urbinati et al., 2017).

Given the relevance of CBMI, a growing body of literature related to it has emerged in the last six years (Diaz Lopez et al., 2019; Pieroni et al., 2019a), building on the closely related field of SBMI and focusing on the CE particularities. However, to the best of the author's knowledge, there has not been a recent attempt to comprehensively map the current advancements of the emergent and fast-paced CBMI field. Hence, the main goal of this study is to frame it and assess its current state-of-research, proposing a theory-and-practice based CBMI framework and identifying relevant research gaps. Relevant CBMI topics that are being currently studied - and those that could be studied - will be identified through a combined systematic literature review and an explorative multiple case study on ten incumbent firms that have been through a CBMI process. Complementary, it has been argued that the CBMI field has not integrated the knowledge and practices of the traditional management BMI field (Pieroni et al., 2019a, 2019b), which has more than 20 years of academic discussion (Foss and Saebi, 2016), thus this study will also aim to build on the development of the BMI field. The three research questions to be answered are:

- RQ1: What is known about CBMI and where should further research go?
- RQ2: How can the emerging CBMI field build on the maturing field of BMI?
- RQ3: What are the most relevant elements of the CBMI process in incumbent firms?

Previous efforts have been done to map the emergent CBM and CBMI fields, and also to partly integrate the BMI field, however, many of them have interpreted CBMI as an outcome rather than a process, focusing on the resulting CBM types (Lüdeke-Freund et al., 2019; Rosa et al., 2019), CBM elements (Lahti et al., 2018; Lewandowski, 2016; Nußholz, 2017; Urbinati et al., 2017), its theoretical foundations (Hofmann, 2019) or doing a bibliometric analysis of the CBM field (Ferasso et al., 2020). Those reviews that have integrated a dynamic view of CBMI have done it focusing on topics within the field, namely innovation approaches (Bocken et al., 2019b; Fernandes et al., 2020; Pieroni et al., 2019b), conceptual definitions (Geissdoerfer et al., 2020), circular ecosystem innovation (Konietzko et al., 2020b), strategies and practices (Guzzo et al., 2019) or drivers and barriers (Govindan and Hasanagic, 2018). Taking a broader perspective, Salvador et al. (2020) described some of the main aspects of current concern of the CBMI field, and Centobelli et al. (2020) proposed a research agenda within four identified main topics. The present research distinguishes by (i) focusing on CBMI as an organizational change process; (ii) mapping the field more comprehensively, building on the structure of the conventional BMI field; and (iii) combining a systematic literature review with a multiple case study, thus providing a theory-and-practice supported framework of analysis, whereas previous reviews depended mostly on literature.

After this introduction, a literature background section synthesizes a BMI framework and reviews key CBM-related concepts; before moving into the methods section, where the seven research steps applied are explained. Later, in section 4, the results of the systematic literature review are presented, proposing a CBMI framework that maps present and future research of the field, and an assessment of the state-of-research of each topic included in the framework. In section 5, the results of the exploratory multiple case study are presented, illustrating the use of the framework and suggesting the relevance of its topics. In section 6, the discussion will contrast the literature review and the case study, identifying priority research gaps for future CBMI research, and will integrate the work of the closely related SBMI literature, to suggest contributions to the identified gaps. Research limitations are also exposed. Finally, in section 7, conclusions and final remarks are provided.

2. Literature background

This section briefly explores the need to further integrate the BMI and CBMI fields, presents the BMI framework that will provide the basic structure of the later proposed CBMI framework and describes key CBM concepts that will be used in the multiple case study.

2.1. Business Model Innovation

Even though research on CBMI builds upon conventional BMI research, some authors tend to highlight the differentiation from traditional streams, positioning themselves as niches (Nußholz, 2017; Pieroni et al., 2019a). Integration of the fields will avoid the risk of becoming academic silos and will maximize practical impact (Lüdeke-Freund and Dembek, 2017). The emerging CBMI field might borrow and merge elements from traditional fields, feeding back its results and contributing to synergistic developments.

A Business Model (BM) is a construct that synthesises what a firm does and for who (value proposition), how it does it (value creation and delivery) and why it does it (revenue model) (Osterwalder and Pigneur, 2010; Teece, 2010). Relatedly, a Business Model Innovation (BMI) refers to "designed, novel, and nontrivial changes to the key elements of a firm's BM and/or the architecture linking these elements" (Foss and Saebi, 2016, p. 17). A BMI can be the creation of a new BM as a start-up, the transformation of a current BM, the diversification into an additional BM or the acquisition of an existing BM (Geissdoerfer et al., 2018b).

After a comprehensive review of 15 years of BMI literature, Foss and Saebi (2016) identified 4 distinctive research streams: (i) Conceptualization and classification of BMI; (ii) BMI as a process; (iii) BMI as an outcome; and (iv) organizational performance implications of BMI. Relevant is the distinction between understanding BMI as an outcome (i.e. a BM configuration), or as a change process - which produces a BM -. Complementary to the former article, Schneider and Speith (2013), who understood BMI as a process, divided the BMI field into three streams, (i) antecedents, (ii) process and (iii) effects. More recently, Bashir and Verma (2019) included a fourth stream into this analysis: (iv) moderators of the BMI change process. Through a careful review of these three studies, combined with the findings of the academy-and-practice-based BMI literature

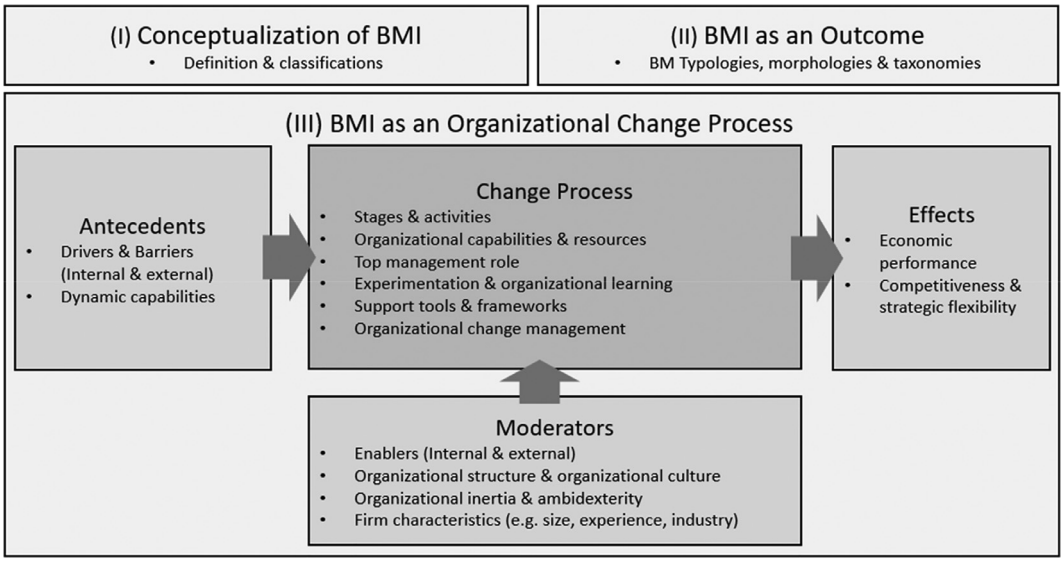

Fig. 1. Business Model Innovation framework, summarizing the main topics of past-and-current research on BMI (Based on Schneider and Spieth, 2013; Foss and Saebi, 2016; Wittig et al., 2017; Bashir and Verma, 2019).

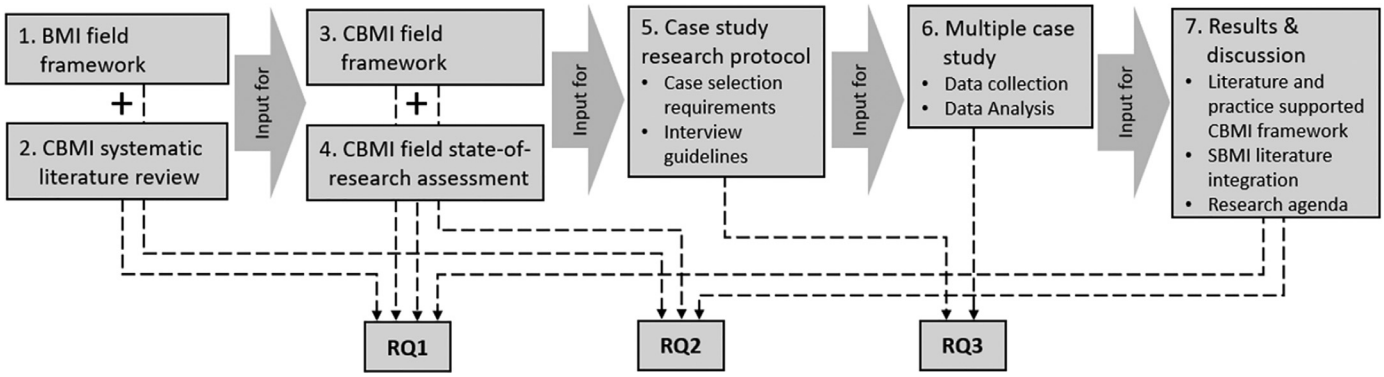

Fig. 2. Seven steps of research method process applied and connection to the research question(s).

review of Wittig et al. (2017), a framework that summarizes the main topics of past-and-current research on BMI is presented in Fig. 1.

2.2. Circular Business Models

A Circular Business Model (CBM) is a BM that follows the principles of the CE, incorporating elements that slow, narrow, or close the loop of resources, so that the resource input into the organisation and its value network is decreased and waste out of the system is minimized (Bocken et al., 2016; Geissdoerfer et al., 2018a). Acknowledging there are several classifications of CBM types (Lüdeke-Freund et al., 2019; Rosa et al., 2019), Lacy et al. (2014) typology has been selected for practical reasons, distinguishing between Circular Supplies, Product as a Service, Product life extension, Resource recovery, and Sharing platforms. Each CBM case can be also characterized according to the implemented "R" value retention strategies (Reike et al., 2018), differentiating between Refuse (R0), Reduce (R1), Reuse (R2), Repair (R4), Refurbish (R5), Remanufacture (R5), Repurpose (R6), Recycle (R7), Recover (R8) and Remine (R9).

3. Methods

To frame and assess the emergent CBMI field a stepwise approach combining a systematic literature review (n=84) and a multiple case study (n=13) is applied (Fig. 2). Building on the structure of the BMI field (Step 1) and a systematic literature review on the CBMI field (Step 2), a CBMI framework is proposed (Step 3) and its state-of-research assessed (Step 4). The framework is illustrated through an explorative multiple case study, whose design is informed by the literature review, and will allow identifying the relevance of CBMI elements from a practice perspective (Steps 5 and 6). Later, results of both methods are contrasted, resulting in nine CBMI topics that are *un-explored* or *under-researched* in the literature, however *important* or *very important* in the practice; before integrating the SBMI literature and proposing a research agenda (Step 7). A step-by-step description of the research process follows:

Step 1. BMI field framework: To propose a CBMI model that would build upon the knowledge of the BMI field, a framework that depicts the most relevant streams of research of the BMI field was synthesized (See Fig. 1 in section 2.1). The framework was developed by first, combining the results of the two most highly cited systematic literature reviews on BMI (Foss and Saebi, 2016; Schneider and Spieth, 2013), based on a SCOPUS search of the string ("business model innovation" AND "literature review") in the title, keywords and abstract done in March 2020; and then, updating the framework with key topics described in two more recent reviews (Bashir and Verma, 2019; Wittig et al., 2017), selected for their complementarity.

Step 2. CBMI systematic literature review: A systematic review (Grant and Booth, 2009) of the emergent CBMI literature was

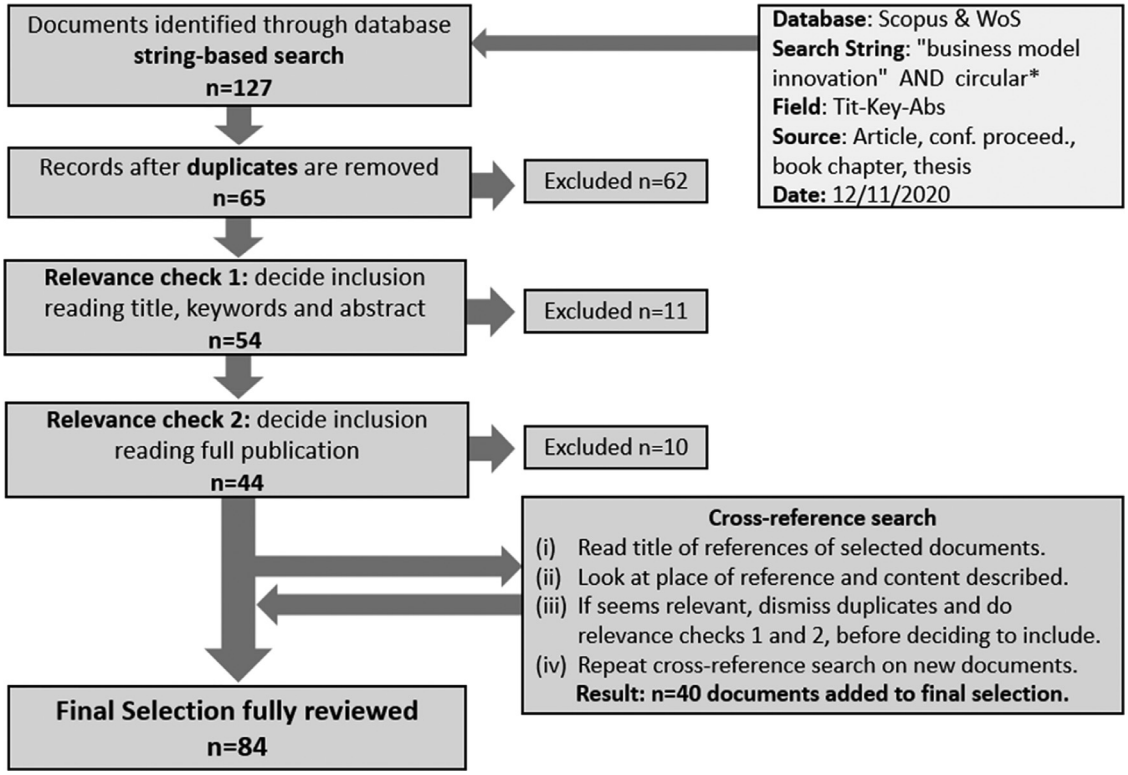

Fig. 3. Systematic CBMI literature review process, adapted from (Geissdoerfer et al., 2018b; Pieroni et al., 2019b).

performed (See review process on Fig. 3), adapting the guidelines of two recent SBMI literature reviews (Geissdoerfer et al., 2018b; Pieroni et al., 2019b). It started with a string-based search of SCOPUS and Web of Science, two widely used scientific databases. The string ("business model innovation" AND circular*) was searched on the title, keywords and abstracts of English written literature, including peer-reviewed articles, book chapters, conference papers and theses, last updated on November 12th, 2020. After removing duplicates, two relevance check steps were done, first reading the title, keywords and abstract, and second, reading the full article. Selected documents were required to explicitly address CBMI, thus not only dealing with CBMs but with the innovation process to some extent. 43 publications were initially selected, and a snowballing cross-reference search was done - following Geissdoerfer et al, 2018b procedure -, which, after the two relevance checks, contributed 40 additional publications. A total of 84 publications were fully reviewed, considered as inputs for steps 3 and 4.

Step 3. CBMI field framework: Titles, abstracts and keywords of the 84 selected documents were read, categorizing them through a simple coding exercise to identify key topics addressed in the CBMI field. The codes were combined with the BMI field framework developed in step 1 - partly answering RQ2 -, resulting in a proposition of a CBMI field framework (See figure 5 in section 4). It offers an updated and forward-looking frame of the CBMI field, particularly form a change process perspective, identifying the main topics that are being currently studied and those that could be relevant to study when considering the conventional BMI field as a reference.

Step 4. CBMI field state-of-research assessment: To answer RQ1 an evaluation of the state-of-research of the field was done, reading documents in full and assessing how in-depth each topic included in the CBMI field framework has been researched in the document. To do this, for each topic each of the 84 publications was assigned a 1 to 3 grade, where "1" indicates the topic was *mentioned* in the document, "2", that it was *discussed* throughout the document, though not being the central theme, and "3", that it was a central focus of discussion in the document, thus *discussed in-depth*. If grading was left in blank, the topic was not identified in the publication. Topics with four or more articles graded "3" were considered here as *researched*, those with three or fewer articles graded "3" were identified as *under-researched* and those with no articles graded "3" as *un-researched*. The literature is reviewed in section 4, and the detailed evaluation per article can be found in Figs. 6 and 7. To test validity and reliability of assessment a set of 15 randomly selected documents were independently evaluated by three researchers, resulting in a 61,3% of inter-rater agreement on nominal data (Goodwin, 2001; Watkins and Pacheco, 2000), which can be considered as substantial, taking Cohen's Kappa strength of agreement level as a reference (Landis and Koch, 1977).

Step 5. Case study protocol: Informed by steps 3 and 4 the case study protocol was defined. To address RQ3 and gap described in the introduction, cases were required to be incumbent firms that have implemented a CBMI change process. Considering the four types of CBMI (Geissdoerfer et al., 2018b, 2020) cases had to be a BM change or a BM diversification, though not a start-up or a BM acquisition (due we are focusing on incumbents change process). Following the recommendation of Frishammar and Parida (2018) the innovation had to be substantial (i.e. affecting at least 2 out of 4 value dimensions of a BM - value proposition, value creation, value delivery and value capture -); and to be already implemented in the market, to do a retrospective analysis of how the CBMI process unfolded. To increase the validity of findings and avoid biases, case selection aimed to have a mix of CBM types (Lacy et al., 2014), implementing a variety of "R" value retention strategies (Reike et al., 2018), and also to represent a mix of industries, different company sizes and at least two countries (Austria and the Netherlands were chosen for practical and budget reasons, to allow in-person interviews). Considering differences have been found in cases with "linear" backgrounds

(Guldmann and Huulgaard, 2019), it was also decided to purposefully include them. The interview protocol and questions were designed following the structure and topics of the CBMI framework, focusing on the "CBMI Process" section. Questions were mostly open-ended, and the interview protocol (See Appendix A) served as a reminder of topics instead of a structured set of questions, guiding the explorative conversation.

Step 6. Multiple case study: The purpose of the explorative multiple case study (Yin, 2014) was twofold, first, to illustrate the use of the proposed CBMI framework (Step 3, Fig. 1), guiding the exploration of the CBMI processes in incumbent firms in a comprehensive way. And second, to suggest which topics of the CBMI framework should be prioritized from a practitioner perspective, indirectly identifying how relevant was each topic to each of the firms' CBMI processes. Therefore, answering RQ3 and improving the relevance and validity of the answer to RQ1. Potential case studies were sought based on desk research and recommendations from the authors' network. Firms fulfilling protocol criteria were selected and contacted. Data collection was carried out on ten firms, exploring thirteen cases of CBMI (three firms offered two cases) through sixteen semi-structured face-to-face interviews (1.023 minutes), publicly available document review (e.g. websites and company reports) and on-site observation in facilities (See Table 2 in section 5 for the description of cases). The interview structure was flexible, intending to obtain the narrative behind the innovation journey and reveal the most relevant topics of each case. For the data analysis process, interviews were verbatim transcribed, and along with field notes and documents, the qualitative data was deductively coded into the specific CBMI topics (1.307 codes, supported by MAXQDA software). The relevance of each topic was evaluated for each firm, differentiating between *very important, important, less important, not important* and *not identifiable* (i.e. it could be important or not), based on how in-depth the interviewee decided to talk about it or if the interviewee explicitly talked about its importance when discussing the different aspects of the CBMI process (See Table 3 in section 5 for relevance evaluation). The overall topic relevance was defined according to the percentage of cases in which the topic was identified at least as *less important* (i.e. $\geq$70% = very important; 70%>x$\geq$50% = important; <50% = less important). To test validity and reliability of assessment the data of 6 out of 10 firms were independently evaluated by three researchers, resulting in a 63,9% of inter-rater agreement on nominal data (Goodwin, 2001; Watkins and Pacheco, 2000), which can be considered as substantial, taking Cohen's Kappa strength of agreement level as a reference (Landis and Koch, 1977).

Step 7. Results and discussion: To support the theoretical framework developed in step 3, the state-of-research assessment of step 4 is contrasted with the suggested relevance of topics of the multiple case study of step 6. The contrast of literature and practice also allowed to identify the topics that should be prioritized in future research, though acknowledging the close relation of CBMI with SBMI and conventional BMI, in the discussion section we reflect on how the SBMI and BMI literature could aid in closing the initially identified CBMI research gaps, refining the research agenda proposal.

4. Literature review results

The field of CBMI has recently emerged, still yet to be consolidated. The first articles explicitly addressing CBMI were published in 2014 (Mentink, 2014; Roos, 2014) and is growing at a fast pace (see Fig. 4).

Following a review and classification of the content of the 84 selected articles, and guided by the structure of the traditional BMI field (Fig. 1), the present research organizes the literature on CBMI as three complementary streams of research (Fig. 5):

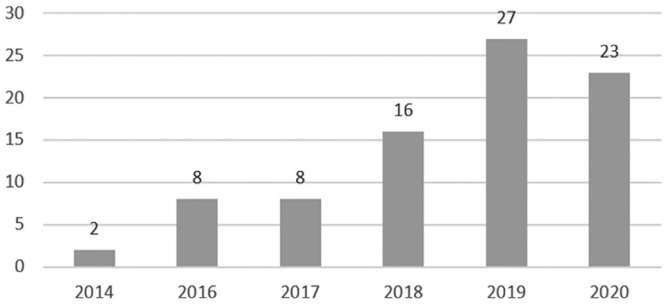

Fig. 4. The number of CBMI publications per year, according to the systematic literature review, published until 12.11.2020 (n=84). Account includes two publications considered for 2021 journal volumes, though available online in 2020.

- (I) the conceptualization of CBMI, which focuses on describing, defining and analysing the concept of CBMI,
- (II) the understanding of CBMI as an outcome, which describes and studies the results of the innovation process (i.e. the resulting CBMs),
- (III) the understanding of CBMI as an organizational change process. This third research stream can be subdivided into the change process itself, its antecedents, its moderators and the effects of the process (i.e. performance implications).

The proposed CBMI field framework (Fig. 5) summarizes the streams that are currently being researched and those that have proven to be of high relevance in the BMI literature, although have not been sufficiently studied in the CBMI field, thus pointing avenues of valuable future research. Fig. 6 and 7 detail the state-of-research assessment per publication per topic. The CBMI framework transposes topics from the BMI framework into the CE-realm, and considers six topics that based on the review, emerged as relevant distinctive themes of the CBMI literature (See in bold in Fig. 5). The next sections briefly describe each research stream and topics, mentioning key articles that address them in higher detail.

4.1. Conceptualization of CBMI

This stream focuses on the CBMI phenomenon itself, providing, first, **definitions** of the concept. The five identified definitions of CBMI are listed in Table 1. Secondly, this stream also analyses the possible **types or dimensions** of CBMI, particularly if it is a start-up (i.e. BM design from scratch), a BM transformation, a BM diversification, or a BM acquisition (Geissdoerfer et al., 2018b, 2020); the BMI degree of radicalness (i.e. incremental versus radical), scope of change (i.e. from a BM component to the whole system) (Diaz Lopez et al., 2019), degree of novelty and degree of linear detachment (Hofmann et al., 2020); the BMI degree of resource efficiency improvement and degree of value creation and capture improvement (Ranta et al., 2021); if it was internal, hybrid or systemic CBMI (Guldmann and Huulgaard, 2019); and if the change process was upstream, downstream or fully circular (Urbinati et al., 2017).

4.2. CBMI understood as an outcome

The second stream is highly descriptive and analyses the result of the organizational change process: the new or adapted CBM itself. 38 of the 84 papers reviewed (See Fig. 6 and 7) contribute to this research domain, which includes propositions of archetypes, typologies, morphologies, taxonomies or strategies for CBMs. These include from (Bocken and Short, 2016) highly cited classification

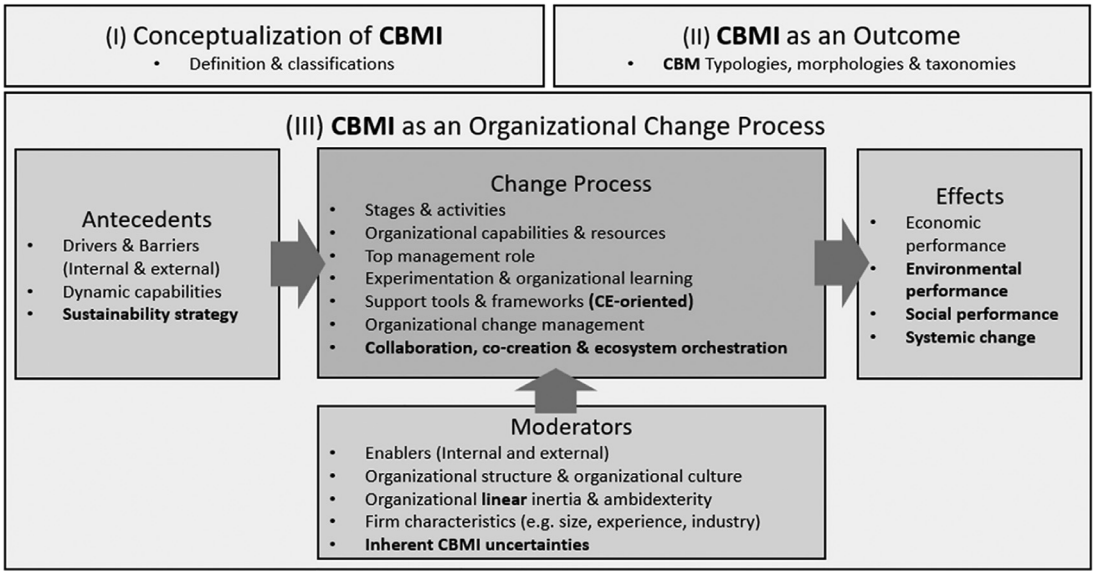

Fig. 5. Circular Business Model Innovation framework, summarizing the main topics of present-and-future research on CBMI. Based on BMI research by Schneider and Spieth, 2013; Foss and Saebi, 2016; Wittig, 2017; Bashir and Verma, 2019 and a systematic review on the CBMI field. Differences of CBMI framework to BMI framework (Fig. 3) are in bold.

Table 1
CBMI definitions identified in the systematic literature review.

Source	Definition
(Bocken et al., 2019b, p. 3)	"The process of CBMI in this paper is understood as innovating the business model (i.e., updating the elements of an existing business model, or establishing a new organization and associated business model) to embed, implement and capitalize on circular economy practices".
(Guldmann and Huulgaard, 2019, p. 81)	"CBMI is concerned with the incorporation of circular services and product design in an existing or a new business model and commands a reconfiguration of multiple, if not all, business model elements, potentially affecting every part of how the company operates, its existing structures, procedures, values, beliefs, etc."
(Pieroni et al., 2019b, p. 201)	"CE-oriented BMI incorporates principles or practices from CE as guidelines for BM design. It aims at boosting resource efficiency and effectiveness (by narrowing or slowing energy and resource loops) and ultimately closing energy and resource flows by changing the way economic value and the interpretation of products are approached"
(Guldmann and Huulgaard, 2020, p. 3)	"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"
(Geissdoerfer et al., 2020)	"CBMI can be defined as the conceptualisation and implementation 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."

of six CBMs to the detailed morphological analysis of 26 CBMs of Lüdeke-Freund et al. (2019), up to the review on CBM classification frameworks of Rosa et al. (2019) and the contextualized proposal of sectorial CBM patterns of Pieroni et al. (2020a)

4.3. CBMI understood as an organizational change process

The third research stream explores CBMI as a dynamic organizational change process, and it can be subdivided into the process itself, its antecedents, its moderators and its effects.

4.3.1. Antecedents of CBMI change process

The theme of **drivers and barriers** for firms to develop CBMs have been widely studied, with 33 of the 84 articles reviewed contributing to the area (e.g. Govindan and Hasanagic, 2018; Guldmann and Huulgaard, 2020; Mentink, 2014; Rizos et al., 2016; Vermunt et al., 2019). These can be internal or external to the firm, and can be classified into environmental, economic, social, institutional, technological, supply chain or organizational (Tura et al., 2019).

The strength of a company's **dynamic capabilities** helps to shape its proficiency at BMI (Teece, 2018), by (i) sensing and shaping opportunities and threats, (ii) seizing opportunities and (iii) transforming the enterprise assets to remain competitive (Teece, 2007). This construct has only recently started to be studied in the context of CBMs, exemplary in the identification of specific dynamic capabilities useful for CBMI by Prieto-Sandoval et al. (2019) or Khan et al. (2020), and the CBMI process framework proposed by Pieroni et al. (2019b, 2019d), which is structured based on three stages: sense, seize and transform. Dynamic capabilities on CBMI cases have also been studied in combination with other cases of SBMI in the works of Inigo et al. (2017) and Bocken and Geradts (2019).

Formulating a **sustainability strategy** (Adams et al., 2016; Baumgartner and Ebner, 2010) has been identified as a key antecedent of CBMI (Khan et al., 2020). Furthermore, it determines the type of CBMI process to be undertaken (i.e. *internal, hybrid* or *systemic*), as Guldmann and Huulgaard (2019) concluded after a multiple case study. However, these are the only articles included in our review that have explicitly researched the relationship between a firm's sustainability strategy and the process of CBMI. Comparably, traditional BMI literature has explored how a shift in a firm's strategy requires a change in its BM (Foss and Saebi, 2016).

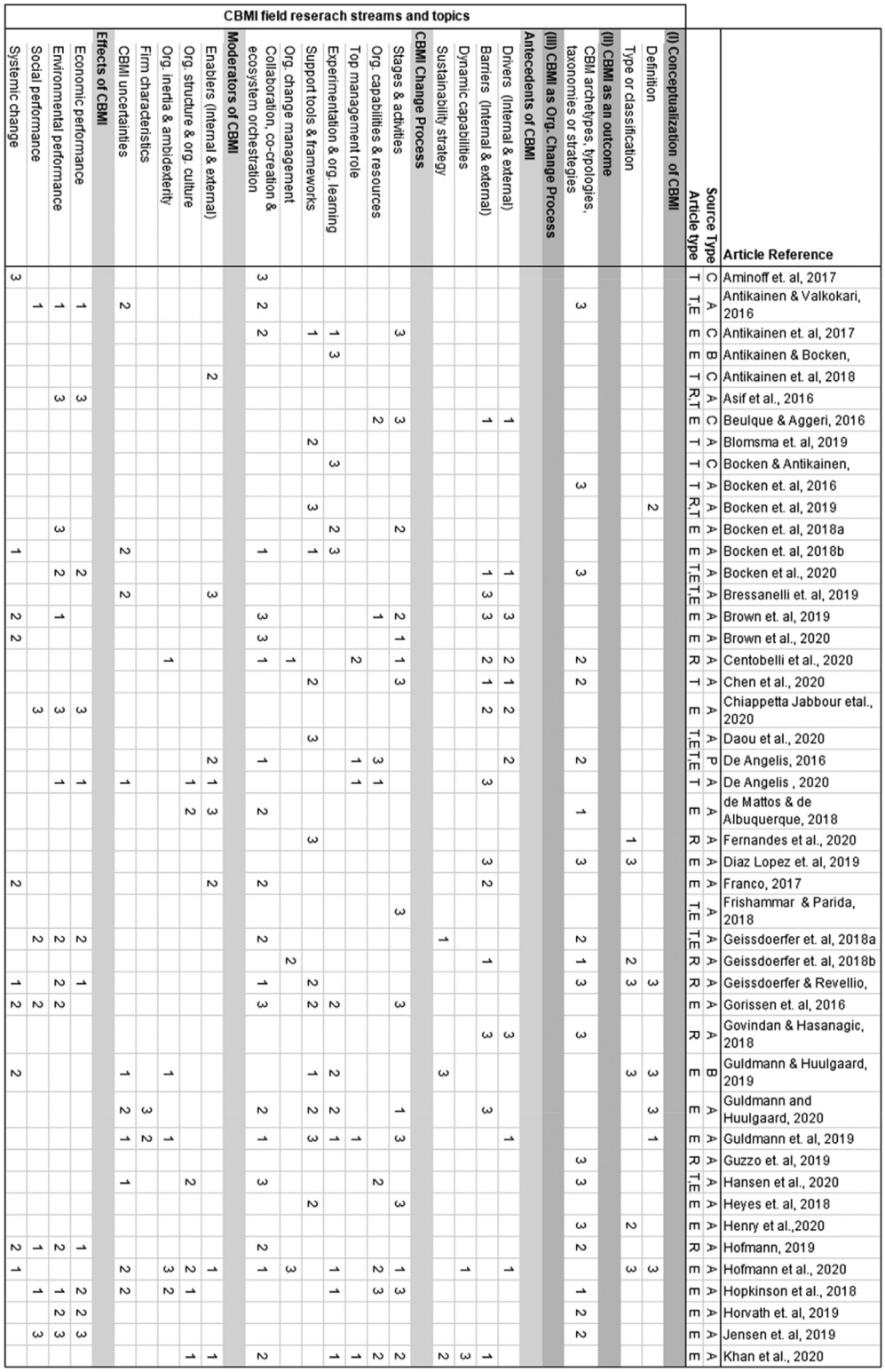

Fig. 6. CBMI field state-of-research assessment (1/2). Grading per document: 1 = topic is mentioned; 2 = topic is discussed, though not being the central theme; 3 = topic is a central focus of discussion in the document, thus discussed in-depth. Overall assessment: Topics with four or more articles discussing topic in-depth are considered here as researched, with three or fewer articles discussing topic in-depth are identified as under-researched and with no articles discussing topic in-depth as un-researched. Source types: A = Academic Journal Article; C = Conference Proceedings; B = Book chapter; P = PhD Thesis; M = Master Thesis. Article type: T = Theoretical; E = Empirical; R = Review. Abbreviation: Org. = Organizational. (See refs. Pieroni et al., 2020b; Pieroni et al., 2020c; Planing, 2015; Beulque and Aggeri, 2016; Blomsma et al., 2019; Franco, 2017; Antikainen and Bocken, 2018; Henry et al., 2020; Heyes et al., 2018; Antikainen et al., 2018; Horvath et al., 2019; Nußholz, 2018).

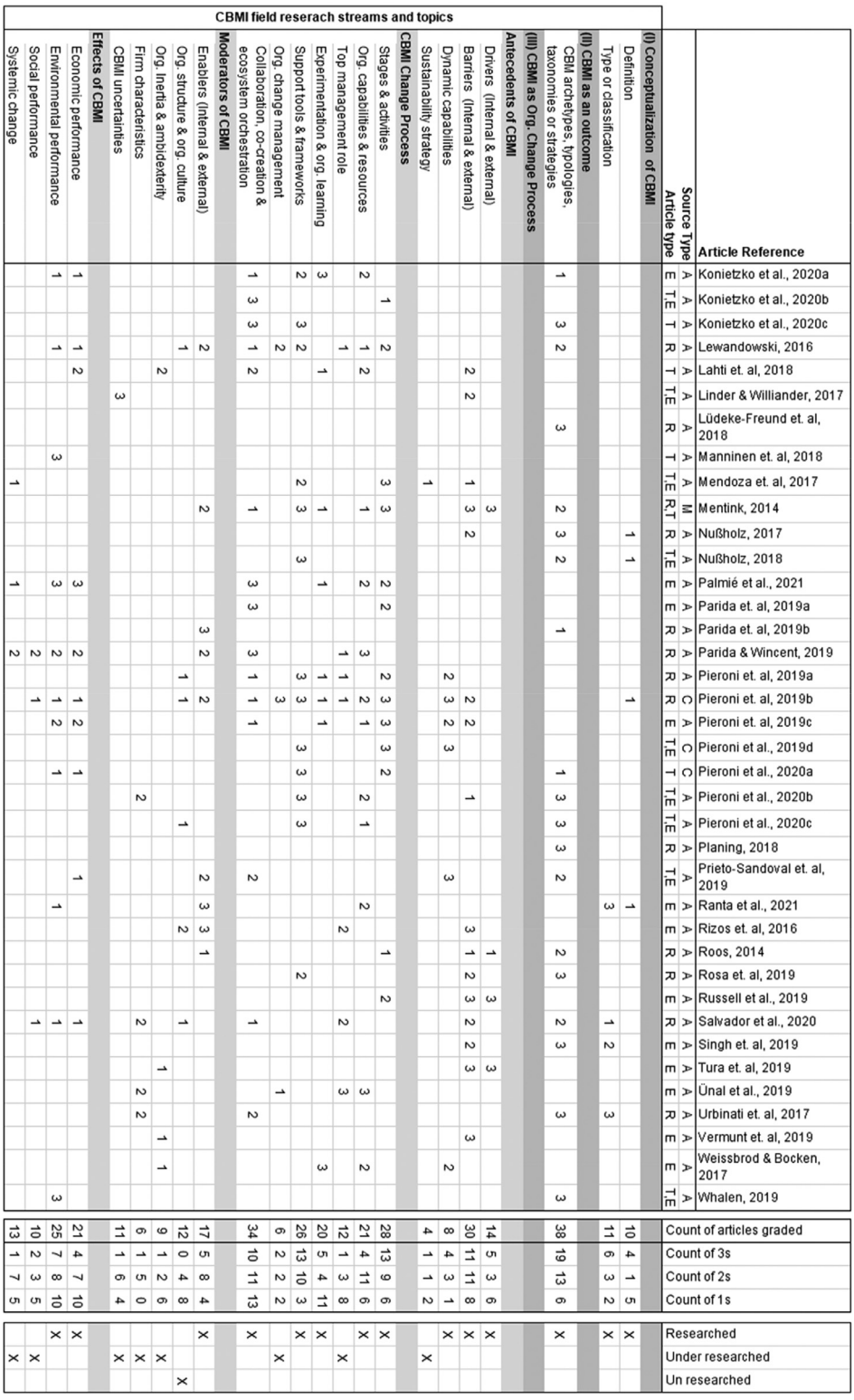

Fig. 7. CBMI field state-of-research assessment (2/2).

4.3.2. CBMI change process

The change process of CBMI has been described as complex, dynamic, iterative, characterized by experimentation and involvement of multiple stakeholders (Antikainen and Valkokari, 2016; Bocken et al., 2018b; Frishammar and Parida, 2018; Guldmann and Huulgaard, 2019; Pieroni et al., 2019c). Given its characteristics, several authors have explored the different **stages and activities** of the innovation process, some have analysed it as external spectators (Frishammar and Parida, 2018; Hopkinson et al., 2018a), others as involved actors (Antikainen et al., 2017; Bocken et al., 2018; Guldmann and Huulgaard, 2019) and others have developed theoretical propositions (Chen et al., 2020; Mendoza et al., 2017;

Mentink, 2014; Pieroni et al., 2019b, 2019a, 2019d). Though different in detail, all the referenced processes could be roughly framed under Frankenberger et al. (2013) four iterative phases of BMI: initiation, ideation, integration and implementation.

From a resource-based view of the firm (Barney, 1991) circular economy business practices require a specific set of **organizational resources and capabilities** to be managed or developed throughout the innovation process, from supply chain wide knowledge and collaborations, to systemic and anticipatory thinking, ability to manage complex and dynamic factors or balance between linear and circular systems (De Angelis, 2016; Hopkinson et al., 2018a; Parida and Wincent, 2019). Focus on these aspects is growing, though with only four publications dealing with them in-depth.

The commitment and **role of top management** have been identified as a key enabler in the CBMI process (Rizos et al., 2016; Salvador et al., 2020), due to its capacity to align resources with the company objectives, and the moderating role between the value creation and value capture in the value network and customer interfaces (Centobelli et al., 2020; Ünal et al., 2019). Nevertheless, only one case study research has looked into this aspect in depth (Ünal et al., 2019).

CBMI processes are usually developed in dynamic or complex contexts, subject to the inherent uncertainties of the CBMs (Guldmann and Huulgaard, 2019; Linder and Williander, 2017). To cope with this challenges firms are increasingly engaging in processes of **experimentation and organizational learning** involving stakeholders, testing the CBM assumptions and adapting the CBM concepts, which also results in the creation of internal and external engagement to start sustainability transitions (Bocken et al., 2018b; Gorissen et al., 2016). Experimentation has been described as the most relevant innovation capability to succeed in radical innovation (Weissbrod and Bocken, 2017), thus the topic of CBM experimentation has seen increasing attention in recent years (Bocken and Antikainen, 2019; Konietzko et al., 2020a).

Due to its challenging characteristics and the increasing interest of firms to engage in the CE, recent years have seen a great number of CBMI **support tools and frameworks** being developed, as have been reviewed in recent articles (Bocken et al., 2019b; Fernandes et al., 2020; Pieroni et al., 2019b, 2019a). The most extensive review to date (Pieroni et al., 2019a) included 92 approaches that can support different phases of the CBMI process - or all of them -, including conceptual frameworks, methods and tools.

A successful CBMI process requires **organizational change management**, dealing with the effective implementation of planned changes (Cummings and Worley, 2009). This is commonly done through preparing, managing and reinforcing the change, focusing on the "people side" of change (Cameron and Green, 2019). Although being recognized of relevance, these concepts are scarcely found in the CBMI literature (Centobelli et al., 2020; Lewandowski, 2016; Pieroni et al., 2019b; Ünal et al., 2019). Exceptionally, this theme has been considered in the conceptual CBMI process model of Pieroni et al. (2019a), in the review of Lewandowski (2016) and, more in-depth, in the conceptual model of Hofmann et al. (2020), which provides a foundation to understand CBM transition management.

CBMs are, by definition, networked, requiring the development of systems thinking, understanding the BM beyond the organizational boundaries, engaging with external stakeholders, **collaborating** throughout the value chain, **co-creating** and/or **orchestrating the ecosystem**. These distinctive aspects have been of great interest to CBMI academic researchers (Antikainen and Valkokari, 2016; Brown et al., 2020, 2019; Hansen and Revellio, 2020; Konietzko et al., 2020b, 2020c; Parida et al., 2019a; Parida and Wincent, 2019).

4.3.3. Moderators of CBMI change process

Moderators are third variables that affect the relationship between two variables (Bashir and Verma, 2019). In this context, it refers to factors that affect the impact of the CBMI antecedents to the CBMI change process and aspects that impact the strength of the effects of the CBMI process.

The most explored moderators are the **enablers** - internal and external - of the CBMI process, which are understood as solutions to existing CBMI barriers (e.g. take-back incentives to address return flow uncertainties (Bressanelli et al., 2019)), as favourable conditions to develop a CBMI (e.g. local government support (de Mattos and de Albuquerque, 2018)), or either of them (Rizos et al., 2016). Enablers have been generally addressed collectively (de Mattos and de Albuquerque, 2018; Rizos et al., 2016), though there are also studies focusing on specific enablers, prominently on digitalization (Parida et al., 2019b; Parida and Wincent, 2019; Ranta et al., 2021).

The proposed CBMI framework gives a distinctive position to **organizational culture**, as it has been empirically identified as the most relevant enabler (Rizos et al., 2016), and the present review did not find any article researching this aspect in depth. Organizational culture is understood as the shared values and beliefs that underpin the behavioural norms of an organization (Bashir and Verma, 2019). Similarly, the **organizational structure** has been researched as a key moderator of BMI, but it is an aspect that has not been addressed in depth in the CBMI literature. Organizational structure refers to task allocation, coordination and supervision towards organizational goals, and essentially, the more complex and hierarchical the structure is, the more difficult the BMI is (Bashir and Verma, 2019; Foss and Saebi, 2016).

Incumbent companies are subject to two relevant and under-explored related moderators: First, to **organizational inertia**, the inability of firms to adapt to changes in their environment and innovate their BMs, generating strong internal resistance to change (Bashir and Verma, 2019; Zott et al., 2011). In the CE context, this could be referred to as organizational *linear* inertia. And second, to **organizational ambidexterity**, the ability to manage the current BM - a *linear* BM in this context - while exploring and developing a new BM - a CBM in this context -, a challenge that generates internal tensions and possible cannibalization of the established model (Foss and Saebi, 2016; Wittig et al., 2017). These aspects have been mentioned as relevant moderators of CBMI (Centobelli et al., 2020; Guldmann et al., 2019; Hopkinson et al., 2018b), and contingency theory has been proposed as an avenue to explore them (Lahti et al., 2018), however, have only been in-depth studied in the conceptual model of Hofmann et al. (2020), which provides a theoretical foundation to further explore both topics.

Exogenous **firms' characteristics**, such as size, the industry, the geography, and the age of a company, have contradictory evidence on its impact on the CBMI process, its challenges and its effects. While Urbinati et al. (2017) find no evidence on these aspects determining the type of CBMI, and Guldmann and Huulgaard, (2019) finding that firm size and customer segment do not impact the CBMI process, Ünal et al. (2019) findings suggest size, age, industry and geography do have an impact, and Salvador et al. (2020) describe the size as a limiting factor. More empirical research is needed to clarify this, of which we provide some insights later.

Finally, a distinctive - and under-explored - moderator are the many **inherent CBMI uncertainties** (Antikainen and Valkokari, 2016; Linder and Williander, 2017), such as doubts in the quality, quantity and timing of product returns in reverse logistics, uncertainties in customer perceptions on used or remanufactured products, uncertainties associated about safety and risks of these circular products (Bocken et al., 2018b), unknown residual

product value or the impact of future legislation (Guldmann and Huulgaard, 2020). These uncertainties exist due to the longer lifespan of CBM when compared to linear BMs (Linder and Williander, 2017), and due to the dynamic contextual factors of CBMs (e.g. rapid technological shifts and market volatility (Hopkinson et al., 2018b)).

4.3.4. Effects of CBMI change process

Management literature has explored the organizational performance implications of BMI, either linking the innovation process to firm outcomes (e.g. innovativeness, competitiveness, strategic flexibility) or examining the financial performance of different types of BMs (Bashir and Verma, 2019; Foss and Saebi, 2016). An implemented CBMI could generate positive **economics, environmental and social outcomes** (Geissdoerfer et al., 2017; Ghisellini et al., 2016), moving beyond the narrow focus on the economic performance. Additionally, due to its networked nature and its potential support to sustainability transitions, it can also contribute to **systemic changes** (Aminoff et al., 2017; Gorissen et al., 2016). The subset of the literature focusing on measuring the outcomes of CBMI is currently emerging, and even though several articles highlight the relevance of measuring the final sustainability and/or systemic change CBMI effects (Antikainen and Valkokari, 2016; Geissdoerfer et al., 2018a; Gorissen et al., 2016; Hofmann, 2019; Parida and Wincent, 2019; Salvador et al., 2020), our review only identified two publications assessing economic, environmental and social outcomes in multiple cases (Chiappetta Jabbour et al., 2020; Jensen et al., 2019), two assessing both economic and environmental of alternative CBMI strategies (Asif et al., 2016; Palmié et al., 2021), three articles evaluating the environmental performance of a CBMI (Bocken et al., 2018a; Manninen et al., 2018; Whalen, 2019) and only one publication conceptually developing the effect on systemic change (Aminoff et al., 2017).

5. Multiple case study results

The purpose of the explorative multiple case study was first, to illustrate the use of the proposed CBMI framework (Fig. 5), and second, to suggest which topics of the CBMI framework should be prioritized from a practitioner perspective. Table 2 describes the ten firms and thirteen CBMI cases analysed. Table 3 summarizes the results of the analysis to the ten firms, indicating how relevant each of the topics was to the CBMI process from a practice perspective.

All topics were identified as very important by at least one firm - except for dynamic capabilities, a case that is explained in the next section -, though, according to our method, of the other 19 topics, ten were identified as *very important*, six as *important*, and only three as *less important* (i.e. organizational capabilities and resources, firm characteristics, and social performance). A table with exemplary quotes per CBMI topic can be found in Appendix B, reflecting the topic importance of each case.

The next sections provide an overview of how firms related to each of the CBMI framework topics, including some key examples and exploratory insights that could serve future research, which due to scope of this paper were not further discussed.

5.1. Antecedents of CBMI change process

Drivers and barriers of the CBMI were extensively discussed in most interviews, highlighting its importance. These factors were diverse, had different implications and were generally combined. The most prevalent drivers throughout cases were social/market (e.g. changing customer preferences), economic (e.g. access to new markets) and environmental (e.g. corporate sustainability strategy). The most dominant barriers were institutional (e.g. lack of legislative support) and social/market (e.g. lack of demand).

The theme of **dynamic capabilities** was not explicitly asked or discussed in any interview, as it was incorporated in the CBMI framework after the first set of interviews, though this does not mean they are not present or relevant to the cases. It was decided not to deductively identify the relevance of dynamic capabilities from interview data, as it would have been incomplete or potentially biased.

Sustainability strategy was found to be a critical factor that preceded the case(s) of CBMI in those companies that had a clear sustainability orientation. Findings suggest that the more embedded the sustainability strategy was to the core of the organization, and to the corporate business strategy, the more ambitious and radical was the CBMI. Exemplary is the case of Carpets. Ltd., who implemented an ambitious long-term industry-first CBM transformation, where interviewee claimed that *"sustainability is, therefore, our business strategy"* (Head of Sustainable Development, Carpets Ltd.).

5.2. CBMI Change Process

Every CBMI process analysed went through several **stages and activities**, which differed in their length, specificities, stakeholders involved and challenges. Nevertheless, they were comparable and their different stages could be roughly framed under Frankenberger et al. (2013) four iterative BMI phases of initiation, ideation, integration and implementation. In terms of duration of the CBMI process, the CBM diversifications took between 1.5 and 3 years from idea to market (not including scaling up), considerably less time than the two CBM transformations studied, which took them 12 and 25 years to fulfil their initial ambitions.

The topic of **resources and capabilities** was identified as at least less relevant in less than half of cases, however, Machinery Ltd. and Electronics Ltd. described how their BMI where based on previous core firm capabilities and existing infrastructure and, Paper Ltd. and Packaging Ltd. mentioned the need to develop specific value chain and CE knowledge within the organization for the successful development of the innovation.

The commitment of **top management** was explicitly mentioned as a critical factor for the success of the CBMI process in four of the studied firms: *"the only person you need is the CEO, if the CEO is on board, you are there!"* (Director Sustainability, Carpets 2 Ltd.). However not present in all cases, it was described as both an enabler, and when missing, a key barrier.

Activities of **experimentation and organizational learning** were identified as critical success factors in six of the ten analysed firms, illustrated in the following quote:

> *"I think very important is the lean kind-off start-up mentality. We would advise to any other organization. Start small, pilot, and fail quick. We do a lot of small pilots. The change towards circular business models is so messy and so disruptive that is also impossible to detail everything into a business model"* (Senior Director Sustainability, Electronics Ltd.)

The increasing literature on specifically designed CBMI **support tools and frameworks** was not reflected in applications throughout the cases, probably because the tools have been recently developed. Nevertheless, strategic sustainability supporting frameworks as Cradle-to-Cradle (McDonough and Braungart, 2010), the Natural Step (Robèrt et al., 1997), the "Doughnut"(Raworth, 2017) and the Planetary boundaries (Steffen et al., 2015) were mentioned as guidance in three cases. Widespread environmental management tools as LCA, ecological footprints and ISO 14001 (Robèrt et al., 2002) were applied to some extent in most cases, but surprisingly absent in the case of Machinery Ltd.

Table 2
Description of the ten firms and thirteen cases analyzed.

N°	Ficticious company name	Country	Size	N° of Interviews	Total interview time	Position(s) Interviewed	Case	CBMI Case brief description	CBM Type (Lacy et al., 2014)	Value retention options ("Rs") (Reike et al., 2018)	*Linear* past	CBMI Type (Geissdoerfer et al., 2020)	B2B or B2C
1	Recycling Ltd	AT	Large	1	49 min	Managing Director (of Corporate Spin-off)	**A**	Creation of an app-based waste disposal platform, connecting construction companies with waste disposal firms, optimizing logistics and idle capacity.	Sharing platform, Resource recovery	R1:Reduce, R7:Recycle	No	Diversif.	B2B, B2C
2	Furniture Ltd	AT	Large	1	82 min	Country Sustainability Manager	**B**	Implementation of a take-back, re-furbish and re-sell service for furniture and appliances.	Product life extension	R2:Reuse, R3:Repair, R4:Refurbish	Yes	Diversif.	B2C
3	Textiles Ltd.	AT	Large	2	85 min	Senior Manager Sustainability Integration, Head of Product Management	**C**	Introduction of a textile fiber that incorporates renewable bio-materials and recycled cotton scraps.	Circular supplies	R7:Recycle, R1:Reduce	Yes	Diversif.	B2B
4	Packaging Ltd.	AT	Large	1	105 min	VP Group Sustainability	**D**	Introduction of a fully recyclable packaging product line.	Resource recovery	R7:Recycle	Yes	Diversif.	B2B
5	Machinery Ltd.	AT	Medium	1	61 min	Head of Product Management	**E**	Introduction of a machine-as-a-service rental scheme, where the firm retains ownership and charges based on daily fee and hour use.	Product as a service, Product life extension	R2:Reuse, R3:Repair	No	Diversif.	B2B
							F	Introduction of a certified used machine line. The business model includes active take-back, repair, refurbishment and resell.	Product life extension	R3:Repair, R4:Refurbish, R1:Reduce	No	Diversif.	B2B
6	Electronics Ltd.	NL	Large	2	116 min	Senior Director Sustainability, Business partner for Sustainability and Circular economy strategy	**G**	Development of a life extending program financially assisted, that incorporates upgrading, repairing, take back, refurbishment and resell.	Product life extension	R3:Repair, R4:Refurbish, R5:Remanufacture	Yes	Diversif.	B2B
							H	Introduction of a system solution based on product-as-a-service contracts. Producer retains ownership, client is charged based on consumption. Training, upgrading and access to latest technology included.	Product as a service, Product life extension	R2:Reuse, R3:Repair	Yes	Diversif.	B2B
7	Carpets Ltd.	NL	Large	1	103 min	Head of Sustainable Development	**I**	25-year journey to become carbon neutral, developing recyclable products with 100% recycled content, with a take-back scheme, focusing on servicing (maintenance & repair)	Circular Supplies, Product life extension, Resource recovery	R1:Reduce, R2:Reuse, R3:Repair, R7:Recycle	Yes	Transform.	B2B
8	Carpets 2 Ltd.	NL	Large	1	137 min	Director Sustainability	**J**	Journey to transform linear and carbon intensive production into 90% Cradle-to-Cradle certified offer.	Circular Supplies, Resource recovery	R0:Refuse, R1:Reduce, R2:Reuse, R7:Recycle	Yes	Transform.	B2B
9	Paper Ltd.	NL	Small	1	70 min	Innovation & Business Intelligence Manager	**K**	Introduction of a locally closed loop model to recycle a firm's waste to source another product to the same firm. Cradle-to-Cradle certified.	Circular Supplies, Resource recovery	R7:Recycle, R1:Reduce; R0:Refuse	No	Diversif.	B2B
10	Logistics Ltd.	NL	Large	5	215 min	Director Strategy & Sustainability, Sustainability Intern, Specialist R&D Engineer, R&D Engineer	**L**	Introduction of a re-designed logistic solution with high recycled content, recyclable, feasible to be remanufactured and Cradle-to-Cradle certified.	Circular Supplies, Product life extension, Resource recovery	R3:Repair, R4:Refurbish, R5:Remanufacture, R7:Recycle	Yes	Diversif.	B2B
							M	Introduction of a radical technological innovation, offered through 4 alternative product-as-a-service contracts. Individual machines can be reused in different applications, are designed for easy maintenance, repair, refurbishment and recycling.	Circular Supplies, Product as a service, Product life extension, Resource recovery	R2:Reuse, R3:Repair, R4:Refurbish, R5:Remanufacture, R7:Recycle	Yes	Diversif.	B2B

Table 3
Indication of how relevant a topic was to each firm's CBMI case(s) and overall relevance from practice. Notes on grading system: 3=very important, 2=important, 1=less important, 0=not important, "Blank" =not identifiable. Overall topic relevance is defined according to percentage of cases in which the topic is identified at least as less important (i.e. ≥70% = very important; 70%>x≥50% = important; <50% = less important; ? = topic not considered in evaluation). Abbreviation: org.=organizational.

	Case-specific relevance grade										Overall relevance from practice		
	Recycling Ltd	Furniture Ltd	Textiles Ltd.	Packaging Ltd.	Machinery Ltd.	Electronics Ltd.	Carpets Ltd.	Carpets 2 Ltd.	Paper Ltd.	Logistics Ltd.	Very Important	Important	Less Important
(III) CBMI as Org. Change Process													
Antecedents of CBMI													
Drivers (Internal & external)	3	3	3	3	3	3	3	3	3	3	X		
Barriers (Internal & external)	3	3	3	3		3	3	3	3	3	X		
Dynamic capabilities											?	?	?
Sustainability strategy	1	2	3	3		3	3			1	X		
CBMI Change Process													
Stages & activities	3	3	3	3	2	3	3	3	3	3	X		
Org. capabilities & resources				2	2	3			1				X
Top management role	2	1	1	2		3	3	3	2		X		
Experimentation & org. learning	3	3	1			3	2		3	3	X		
Support tools & frameworks		1		2	0	3	3		3			X	
Org. change management		1		3	2		3			1		X	
Collaboration, co-creation & ecosystem orchestration	2		3	3		3	3	3	3	3	X		
Moderators of CBMI													
Enablers (Internal & external)		3	3				2	3	1			X	
Org. structure & org. culture	3		3	3		3	3	3		3	X		
Org. inertia & ambidexterity	3	2		2		3		2		2		X	
Firm characteristics			3			2		2		1			X
CBMI uncertainties			3	2	1	3		2				X	
Effects of CBMI													
Economic performance	2	1	2	1	2	2	3	2	2	1	X		
Environmental performance	2	2	3	3	1	2	3	3	3		X		
Social performance		2					3	2					X
Systemic change		2		3			3	3		1		X	

The social behaviour challenges of **organizational change management** were identified as relevant in half of the firms, however, dealt with in different ways throughout cases. For clarification, two examples follow. In the case of Packaging Ltd. it was discussed how they carefully planned the internal cultural transformation through the education of their internal – and external – stakeholders, and in Carpets Ltd. how they combined both top-down and bottom-up initiatives to stimulate organization-wide support to their sustainability transition.

The involvement of both internal and external stakeholders through **collaboration, co-creation and ecosystem orchestration** was found to be essential for the realization of the CBMI in seven of ten firms, reflecting the networked nature of CBMs and the complexity of this type of innovation process. Exceptionally, two firms relied mostly on internal only collaboration to develop and implement their CBMs, as they had the required resources and capabilities. This indicates the need to contextualize collaboration strategies.

5.3. Moderators of CBMI change process

Enablers, understood as conditions that facilitated the CBMI process or solutions to overcome challenges, where described by interviewees and identified by evaluators in half of the cases. Enablers differed from being critical to the success of the CBMI, - as support from latest legislations in cases A and B -, down to only supportive - as the vibrant start-up scene in case C or high social media attention in case B -. Most common enabler throughout cases was the assistant of external support to the CBMI projects e.g. Cradle-to-Cradle experts.

Organizational culture and organizational structure were factors that strongly moderated the CBMI processes either positively or negatively - in seven of the ten cases. A positive case is exemplified by the following quote:

"We have a sustainability team, people from different levels, different departments. We work with sharing platforms and all kind of tools that make it easier and quicker to collaborate. To make cross-pollination quicker. And we have the ambassador's program. So, we have formal structures and informal structures, and you need them both" (Head of Sustainable Development, Carpets Ltd.)

Six out of ten cases described challenges related to **organizational (linear) inertia and organizational ambidexterity**, mentioning the (linear) path dependency of a successful legacy business model, intra-organizational opposition to change or the challenge of competing in a linearly efficient industry, thus the complexities and risks of breaking in with new models or mindsets. Some identified practices to deal with these challenges were through alignment of incentives between internal company divisions (Case G), modification of responsibilities between company divisions (Case E and F), intra-organizational education (Case D), emphasising the distinctive value propositions of the legacy business and the innovation (Case C) and by developing the new CBM as a corporate start-up or spin-off (Cases A and M).

Based on our findings, **firm characteristics** had different kind of influences on the CBMI process. The type of industry did not suggest producing differences in the CBMI process. The country/geography was suggested to have an impact on the organizational culture in three cases, thus indirectly on the innovation process. The age of the firm, considered a proxy of the firm experience in the industry, was not clearly suggested as improving or deteriorating the firm innovativeness. And the firm size was suggested as a negative moderator in the initiation phase, though a positive moderator once entering the implementation phase (See exemplary quote on Appendix B).

The inherent **CBMI uncertainties** were in half of the firms identified as being relevant moderators of the innovation process, referring to additional challenges of CBMI processes compared to conventional BMI. These were related for example to uncertain return

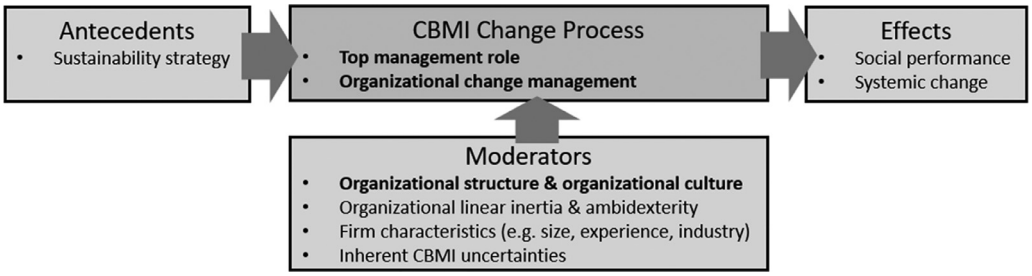

Fig. 8. Priority topics for future CBMI research, including topics identified as under- or un-researched in the literature. In bold are those identified as particularly relevant from a practitioner perspective.

volume of products (Case E), heterogeneity and lack of standards of secondary raw material (Cases C and D) and potential challenges that could emerge during the longer lifespan of products (Case M). The main strategy identified to deal with these aspects was early experimentation and learning.

5.4. Effects of CBMI change process

Regarding the relevance of the four considered types of outcomes of the CBMI cases, the focus was clearly on **economic and environmental performance**, identified in ten and nine firms respectively, in detriment of the focus on **social performance and systemic change**, identified in three and five firms correspondingly**.** However, in three out of ten firms it was possible to identify effects in all four categories, illustrating the potentially holistic impacts of the circular economy.

6. Discussion

Broader implementation of sustainable and circular business models is necessary for the transition towards a sustainable future, however, the literature on CBMI has recently emerged. To map and frame the field a CBMI framework (Fig. 5) is synthesized, and through a state-of-research analysis, a prioritization of topics to be further studied is proposed (Fig. 6 and 7), which is here contrasted with the findings of an explorative multiple case study (Table 3). Acknowledging the close relation of CBMI and SBMI, the discussion section also includes a revision of research suggestions against the SBMI literature, to provide more accurate direction to future research.

6.1. Combining CBMI literature and practice

The use of the proposed CBMI framework was illustrated, guiding an explorative multiple case study, which provided insights to the complex and underexplored CBMI change process. Complementary, the case study analysis suggests that all topics included on the CBMI framework derived from literature are relevant in the practice - though some were identified as less important than others -, including the six distinctive CBMI topics that were added to the BMI framework structure (i.e. sustainability strategy as an antecedent of CBMI; collaboration as a key element of the CBMI change process; inherent CBM uncertainties as moderator of CBMI; environmental performance, social performance and systemic change as effects of CBMI). The outcomes of the case study serve as an initial validation of the proposed framework. We encourage future research to adopt it, adapt it and further test it (Fig. 8).

The CBMI literature review allowed to identify nine topics with three or fewer documents discussing them in-depth, thus defined as *under* or *un-researched*. We suggest future research should focus on them, however, this does not mean that there are no unanswered questions on the other 14 topics of this young field, only lack of research on the selected topics. The combination with the empirical findings (see Fig. 8 for summary and Appendix C for a detailed combination table), allows suggesting research priorities from a practitioner perspective. First, priority should be given to topics identified as *very important* but *un-researched* (i.e. organisational culture and structure as moderators of the CBMI process) or *very important* but *under-researched* (i.e sustainability strategy as an antecedent of CBMI and top management role as key elements of the CBMI process). And as a second priority, those identified as *important* but *under-researched* (i.e. organizational change management as a key element of the CBMI process; organizational inertia, ambidexterity and CBMI uncertainties as moderators of the CBMI process; and systemic change as an effect of the CBMI) or *less important* but *under-researched* (i.e. firm characteristics as moderators of the CBMI process and social performance as an effect of the CBMI).

6.2. SBMI field integration

The scope of this manuscript has been the literature specifically addressing CBMI, however, at this step it is necessary to acknowledge the close relation of CBMI with SBMI and the legacy of conventional BMI field. Future research should consider two aspects before addressing the previously identified gaps as they are. First, the scope should be widened and explore if aforementioned CBMI literature gaps are plausible to be filled integrating SBMI related literature (i.e. BMI research related to corporate sustainability, CSR, sustainability strategy and sustainability-oriented-innovation). And second, if a topic identified as a gap in the CBMI literature and not addressed in the SBMI field, though researched in the traditional BMI literature, could be transposed from the BMI to the CBMI sphere. The first consideration is explored in the following paragraphs, proposing the integration of notorious SBMI contributions and providing guidance for future research. The second consideration falls out of the scope of this article, though some hints are provided.

Starting by topics identified as *very important* but *un-researched:* The role of **organizational culture** has been explored in the SBMI literature, exemplary by Pedersen et al. (2018), who based on a survey to 492 managers, concluded that both BMI and corporate sustainability are highly moderated by the fundamental values of the organization, and by Globocnik et al. (2020), who empirically described how certain types of culture had better impacts on sustainability-oriented innovation. Research on corporate sustainability strategy implementation has also identified culture as a key moderator of the innovation process (Baumgartner, 2009; Linnenluecke and Griffiths, 2010). In contrast, it seems that the role of **organizational structure** in SBMI has not been explored in-

depth, though it has been identified as relevant by various authors (Carayannis et al., 2015; Engert and Baumgartner, 2016).

Continuing with topics classified as *very important* but *under-researched:* The relation between **sustainability strategy** and the process of SBMI has been studied by several authors (Adams et al., 2016), notably by Schaltegger et al. (2012) who conceptually explained how a given sustainability strategy must be accompanied by particular degrees of SBMI. Their conclusions are aligned with the work on CBMI of Guldmann and Huulgaard (2019) explored in section 4.3.1, corroborating that findings from SBMI can be transposed to CBMI. The **role of top management** and leadership within the SBMI process has been identified as highly relevant by several authors (Adams et al., 2016; Rauter et al., 2017; Roome and Louche, 2016; Schaltegger et al., 2012), and was found to be explored in-depth on a few contributions of the SBMI and strategic sustainability research (Baumgartner, 2009; Kurucz et al., 2017).

Regarding *important* but *under-researched topics:* The organizational development and **change management** level of SBMI has been explored in-depth in the empirical work of Roome and Louche (2016), and included conceptually in the SBMI review of Geissdoerfer et al. (2018b), though both publications acknowledge the need to further understand this complex innovation challenge. The wider corporate sustainability literature has also been exploring change management aspects that could provide a theoretical base (e.g. Benn et al., 2006; Kiesnere and Baumgartner, 2019). The impact of **organizational inertia** in SBMI also remains underexplored, except for Sarasani and Linder (2018), who elucidate sources of inertia for SBMI. Organizational **ambidexterity** has been documented as a key enabler of SBMI, both conceptually and empirically (Carayannis et al., 2015; Minatogawa et al., 2020). Regarding the inherent **CBMI uncertainties**, this topic should build on available CBMI literature (Linder and Williander, 2017) as it is field-specific. On the subject of **systemic change** as an effect of the process, SBMI literature has explored this topic conceptually (Bocken et al., 2019a; Bocken and Short, 2016; Boons and Lüdeke-Freund, 2013), however, we did not identify empirical research on the topic.

On the matter of *less important* but *under-researched* topics: The role of **firm characteristics** as moderators has been looked in detail in the SBMI literature, particularly the influence of firm size (Aguilar-Fernández and Otegi-Olaso, 2018), the type of industry (Nosratabadi et al., 2019) and the type of country (Rosca et al., 2017). Regarding **social performance** as an effect of the change process, the SBMI literature has explored the topic conceptually (Evans et al., 2017; Schaltegger et al., 2012) and analysed a few empirical cases (Morioka et al., 2016), however, we were not able to identify a large scale empirical analysis.

As suggested in the previous paragraphs, gaps identified in CBMI topics *sustainability strategy, top management role, organizational culture and ambidexterity* are partially answered if the SBMI field findings are integrated, which is an assumption that should be further explored. Future research on the *organizational change management, organizational structure, organizational inertia, CBMI uncertainties, social performance and systemic change*, is suggested to build upon the base of conventional BMI field, the extant though not substantive SBMI literature -including related corporate sustainability fields- and the emergent CBMI literature identified in this review.

As a final reflection in light of the broader corporate sustainability literature, is relevant to consider that even though all the elements of the CBMI framework proposed in this article were found relevant in the practice, there is no *silver bullet* to a successful CBMI, but rather context dependant best practices that should be adapted through time (Weerts et al., 2018).

6.3. Research limitations

The present study is subject to method limitations. First, the systematic review results depended on our string-based search criteria (e.g. search terms) and our selection requirements (e.g. explicitly dealing with CBMI). This was aimed to be balanced through a cross-reference search including papers from other streams if identified as relevant, which duplicated the final document selection. Future research could broaden the selection from the beginning, including more search terms related to CE, sustainability, SBMI and BMI. Second, the state-of-research assessment on literature and the degree of relevance of topics by case could be judged as being subjective and researcher-biased. This was aimed to be solved choosing a numerical evaluation method, which provides more objectivity under a replicable method, and by involving three researchers and doing an inter-rater reliability test on a sample of the full data. Further research could increase the rigour of method by evaluating the full data set and demanding a higher level of agreement before moving forward. Third, the review is limited to November of 2020, and in this fast-paced field, recent contributions could modify our assessments and recommendations, an aspect that should carefully be taken into consideration by the reader. Fourth, the interviews of the multiple case study included several topics, and time restrictions limited in-depth focus on all of them on every case. This was attempted to be solved by using a flexible approach during interviews, allowing the interviewee to focus on the topics he/she considered more relevant. This decision might have affected comparability between cases and implied bias towards the interest of interviewee, however, it fulfilled our exploratory purposes. Fifth, case selection required CBMI to be implemented in the market, which implies a survivor-bias in case representation. Further research should explore cases of failure. Sixth, case studies where limited to two European countries, which could have also led to biases. Seventh, it is relevant to remark that results of the case studies are explorative -providing insights for future research and contrast to extant literature-, although not generalizable theories. And finally, it also important to highlight that the integration of SBMI literature of the discussion section is also explorative, and not comprehensive, which is an exercise recommended for future research.

7. Conclusion

Wider adoption of sustainable and circular business models is necessary for the transition towards a sustainable future, nevertheless the literature on CBMI has recently emerged. To move the nascent field forward and answer to *what is known about CBMI and where should further research go?* and to *how can the emerging CBMI field build on the maturing field of BMI?* the present research aimed at framing the field of CBMI and, assessing its current state-of-research, thus identifying valuable research gaps. Building upon the structure of the BMI field and a systematic literature review on the CBMI field (n=84), a comprehensive CBMI framework of 23 elements is proposed. It summarizes the three main streams of study: (i) CBMI conceptualization, (ii) CBMI as an outcome and (iii) CBM as an organizational change process - which is subdivided in the change process itself, its antecedents, its moderators and its effects -. The framework contains topics where research is currently focusing and others that have proven to be of relevance for the BMI field but have not been researched in-depth in the CBMI field. Six distinctive CBMI topics were identified and added to the conventional BMI framework structure (i.e. sustainability strategy as an antecedent of CBMI; collaboration as a key element of the CBMI change process; inherent CBM uncertainties as moderator; environmental performance, social performance and systemic change

as effects of CBMI). To propose a prioritization on future CBMI research topics from a practice perspective, the research also aimed to answer *What are the most relevant elements of the CBMI process in incumbent firms?* Through an explorative multiple case study in ten firms that have implemented a CBMI, we have illustrated the use of the framework and identified which topics are more relevant in the practice, thus prioritizing future research. Combining the results allows identifying nine CBMI topics that are important in the practice and still un- or under-explored in the literature. Finally, acknowledging the close relation of CBMI and SBMI the literature on the latter is integrated, identifying research that could significantly contribute to four of the nine identified priority gaps (i.e. sustainability strategy as an antecedent of the CBMI process; the role of top management role in the CBMI process; organizational culture and ambidexterity as moderators of the CBMI). The remaining CBMI gaps identified are suggested to be answered building on the BMI field and the emerging SBMI and CBMI literature on them (i.e. organizational change management within the CBMI process; organizational structure, organizational inertia and CBMI uncertainties as moderators of the CBMI; social performance and systemic change as effects of the CBMI). As the CBMI field is currently emerging, it is recommended that it does not work in isolation, but rather integrate the closely related field of SBMI – including other sustainability innovation related fields -, and to build on the foundations of conventional BMI literature.

The present article has contributed to the literature on CBMI by first, framing it comprehensively, providing a structure that will aid future research. Secondly, by identifying six characteristic topics of CBMI, when being compared to traditional BMI (Remains to be clarified to which extent these topics are distinctive to SBMI). Third, by providing a state-of-research review of 84 CBMI articles on 23 topics, supplying a comprehensive resource to future researchers. Fourth, it has contributed to the integration of the conventional management field of BMI with the emergent sustainability-related fields of CBMI and SBMI. Fifth, by delivering empirical insights from ten firms and thirteen CBMI cases to a predominantly theoretical field. And sixth, by identifying nine CBMI research gaps that should be prioritized, providing hints on where to continue their research. This research will also aid practitioners interested in innovation for the CE, by identifying the most relevant topics of the CBMI process, providing a structuring CBMI framework and guiding their literature research.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A

Interview Guidelines

Questions in this guide served to guide the conversation through the CBMI topics. They were not always formulated as they are presented here nor where asked in the same order.

Abbreviations:

- BM: Business Model
- BMI: Business Model Innovation
- CBMI: Circular Business Model Innovation (or BMI for the Circular Economy)
- CE: Circular Economy

1 Introduction
2 Initiative description:
   a Please provide a general description of the CBMI initiative and how it is aligned with the principles of CE.
   b What is your role in the firm and what was your particular role in the innovation process?
3 Process phases and activities:
   a How was the process of BMI? Where there different stages/activities you could identify? Please characterize.
   b Do you consider this CBMI process was different to other BMI process in the company? Why?
4 Drivers & barriers of initiative (Internal and/or external factors):
   a What are the antecedents/drivers of the BMI initiative?
   b What barriers affected the BMI initiative and how were they overcome?
5 Moderators/context of the initiative:
   a Is the organizational structure or the organizational culture supportive to BMI?
   b What role played leadership in the process of BMI?
   c Was the process driven by staff or management level?
   d Was there organizational "linear" inertia preventing the CBMI?
   e Does the firm have a "linear" or "circular" background?
   f Is sustainability embedded in the corporate strategy? How?
   g Was the innovation process planned/purposeful or emergent/unintentional?
   h What share of revenue does the new BM represent for the company?
   i Is the BMI new to the firm or the industry?
6 Stakeholder Involvement/Ecosystem creation:
   a Who was involved at the different stages of the innovation process?
   b Does the new BM support or depends on the creation of a business ecosystem?
7 Multiple BM.:
   a Are there any challenges related to the simultaneous management of the traditional BM and the new BM? Any conflict of interests between the two BM for example.
8 Effects:
   a How does the new BM affect the performance of the firm (economically, environmentally, and socially)?
   b Does the new BM provide a competitive advantage?
9 Do you know other interesting cases of BMI for the CE in incumbent firms we could interview?

Appendix B

Table B.1
Exemplary quotes indicating the relevance of each CBMI topic.

CBMI Topic	Exemplary quote
Drivers	"There is this desire to be a sustainable company, which is a big driver. We have a big ambition to become a circular or sustainable company. But also, there are clear economic factors. I have explained the value around refurbishment, its customer retention and penetration into a new market, which are clear benefits." (Senior Director Sustainability, Electronics Ltd.)
Barriers	"We are making a product that is clean enough to make the nutrition in the biological circle, but legislation prevents society to do so. (…)But the biggest challenge is the fact that we don't have a CEO that goes with everything he has in that specific direction." (Innovation & Business Intelligence Manager, Paper Ltd.)
Sustainability strategy	"Our sustainability strategy has been summarized very practically on seven fronts that we are working on at the same time: (…) our journey to sustainability consists of climbing these seven slopes. (…) sustainability is, therefore, our business strategy." (Head of Sustainable Development, Carpets Ltd.)
Stages and activities	"In 2015 I did the research, in 2016 we had the business case in place and 4 months later we took it to the market....so maybe one and a half year from research until implementation." (Country Sustainability Manager, Furniture Ltd.)
Resources and capabilities	"That's important learning. Whatever you do, it must meet with what you do well as an organization. There are hundreds of ways to make money in a circular economy, but there are maybe only ten that fit with what you do well as an organization." (Senior Director Sustainability, Electronics Ltd.)
Top management role	"By continuously challenging the system, with a strong CEO push, it pushed the whole Cradle-to-Cradle mindset through the company. (…) the only person you need is the CEO, if the CEO is on board, you are there!" (Director Sustainability, Carpets 2 Ltd.)
Experimentation and organizational learning	"I think very important is the lean kind-off start-up mentality. We would advise to any other organization. Start small, pilot, and fail quick. We do a lot of small pilots. The change towards circular business models is so messy and so disruptive that is also impossible to detail everything into a business model." (Senior Director Sustainability, Electronics Ltd.)
Support tools and frameworks	"(…) and then together with the people of the Natural Step, you might have heard of Karl Henrik Robert and the FSSD. OK, so how can we work within the Planetary Boundaries? Which is nowadays the thinking behind the Doughnut (…)." (Head of Sustainable Development, Carpets Ltd.)
Change management	"(..) some people [within the firm] were irritated, because it is a change, and it is very complex to understand. So, we set educational platforms where we had lessons to educate them. But some old foxes are not so interested in this…but they can't keep going like these, they are facing internal pressures (…)." (VP Group Sustainability, Packaging Ltd.)
Collaboration, co-creation and ecosystem orchestration	"You can't do it on your own...you need everybody in your company, so you need to engage there, but also with your supply chain, your suppliers, your customers. And we found out that you need to work out with other sectors too, sensitizing stakeholders, just like in nature where everything is connected. And it will lead to cooperation and new business models at the same time." (Head of Sustainable Development, Carpets Ltd.)
Enablers	"You need to have a strong vision, you need to have simple rules, but above all a very clear roadmap. And the roadmap should give you the vision for the future, this is where we want to go, and it should be bold." (Director Sustainability, Carpets 2 Ltd.)
Organizational culture and organizational structure	"We have a sustainability team, people from different levels, different departments. We work with sharing platforms and all kind of tools that make it easier and quicker to collaborate. To make cross-pollination quicker. And we have the ambassador's program. So, we have formal structures and informal structures, and you need them both." (Head of Sustainable Development, Carpets Ltd.)
Organizational (linear) inertia and ambidexterity	"We have done all kind of initiatives around the circular economy and we noticed that the company and industry have optimized their way of working in the linear world. To change that and to make it circular is very difficult, but if you can start from scratch, it's a new opportunity that you can create." (Director Strategy & Sustainability, Logistics Ltd.)
Firm characteristics	"It's like moving an elephant. It's not so easy to make an elephant moving, but when he moves, he has much more power to make things happen. Being a large company, we have the contacts to the really important guys, (…) the know-how, the experience, and we have the structures to do so. (…) If you are a smaller company, you would have been faster in the beginning." (Senior Manager Sustainability Integration, Textile Ltd.)
CBMI uncertainties	"(…) are you designing something that looks fifteen or ten-year perspective? So not only the "challenges that you are having today at t=0, but what are the other challenges that we can already look down the road, and take into account the lifecycle, that long term perspective." (Director Strategy & Sustainability, Logistics Ltd.)
Economic performance	"We are a stock listed company, and if we can do it, everybody can, if everybody can, anybody can. There is no contradiction, we are a successful company, we have better results than any comparable company. Hart and Millstein have been proving it scientifically, we have been proving it in practice." (Head of Sustainable Development, Carpets Ltd.)
Environmental performance	"There is the philosophy here that we don't want to invent, to develop new things that are from a sustainability point of view worse than we did before. It should always be an improvement." (Senior Manager Sustainability Integration, Textiles Ltd.)
Social performance	"And regarding the social side, we have created new jobs with the CE. If there would be stronger frameworks from the government, there would be a push for the economy in Europe." (Country Sustainability Manager, Furniture Ltd.)
Systemic change	"From a multilevel perspective, it helps to explain. You have the niche level, the regime level, and the landscape level. (…) If you come up with a solution, an innovation, [*CBMI case name*] is a technology innovation, and a business model innovation, the product-as-a-service. With this innovation, the idea is that you have to develop it in a little bit secure, safe environment, and somewhere you have to get it into the regime, and the regime is just the current industry." (Director Strategy & Sustainability, Logistics Ltd.)

Appendix C

Table C.1
Combination of state-of-research assessment (Fig. 6 and 7) and overall relevance from practice (Table 3). The table also identifies topics transposed from BMI framework (Fig. 1) and those added as distinctive CBMI topics. Abbreviation: Org.=Organizational.

	State-of-research assessment				Overall relevance from practice			
	Researched	Under-researched	Un-researched	Very Important	Important	Less Important	Topic transposed from BMI framework	Topic added on CBMI framework
(I) Conceptualization of CBMI								
Definition	X						X	
Type or classification	X						X	
(II) CBMI as an outcome								
CBM typologies, morphologies & taxonomies or strategies	X						X	
(III) CBMI as Org. Change Process								
Antecedents of CBMI								
Drivers (Internal & external)	X			X			X	
Barriers (Internal & external)	X			X			X	
Dynamic capabilities	X			?	?	?	X	
Sustainability strategy		X		X				X
CBMI Change Process								
Stages & activities	X			X			X	
Org. capabilities & resources	X					X	X	
Top management role		X		X			X	
Experimentation & org. learning	X			X			X	
Support tools & frameworks	X				X		X	
Org. change management		X			X		X	
Collaboration, co-creation & ecosystem orchestration	X			X				X
Moderators of CBMI								
Enablers (Internal & external)	X				X		X	
Org. structure & org. culture			X	X			X	
Org. inertia & ambidexterity			X		X		X	
Firm characteristics		X				X	X	
CBMI uncertainties		X			X			X
Effects of CBMI								
Economic performance		X		X			X	
Environmental performance	X			X				X
Social performance		X				X		X
Systemic change		X			X			X

References

Abdelkafi, N., Täuscher, K., 2016. Business Models for Sustainability From a System Dynamics Perspective. Organ. Environ. 29, 74–96. doi:10.1177/1086026615592930.

Adams, R., Jeanrenaud, S., Bessant, J., Denyer, D., Overy, P., 2016. Sustainability-oriented Innovation: A Systematic Review. Int. J. Manag. Rev. 18, 180–205. doi:10.1111/ijmr.12068.

Aguilar-Fernández, M.E., Otegi-Olaso, J.R., 2018. Firm size and the business model for sustainable innovation. Sustain 10. doi:10.3390/su10124785.

Aminoff, A., Valkokari, K., Antikainen, M., Kettunen, O., 2017. Exploring Disruptive Business Model Innovation for the Circular Economy. In: Campana, G., Howlett, R., Setchi, R., Cimatti, B. (Eds.), Sustainable Design and Manufacturing 2017. Springer, Cham, Switzerland, pp. 525–536.

Antikainen, M., Aminoff, A., Kettunen, O., Sundqvist-Andberg, H., Paloheimo, H., 2017. Circular Economy Business Model Innovation Process – Case Study. In: Campana, G., Howlett, R., Setchi, R., Cimatti, B. (Eds.), Sustainable Design and Manufacturing 2017. Springer, Cham, Switzerland, pp. 546–555. doi:10.1007/978-3-319-57078-5.

Antikainen, M., Bocken, Nancy, 2018. Experimenting with Circular Business Models—A Process-Oriented Approach. In: Bocken, N., Ritala, P., Albareda, L., Verburg, R. (Eds.), Innovation for Sustainability. Business Transformations towards a Better World. Palgrave Macmillan doi:10.1002/jsc.2237.

Antikainen, M., Uusitalo, T., Kivikytö-Reponen, P., 2018. Digitalisation as an Enabler of Circular Economy. In: Procedia CIRP, pp. 45–49. doi:10.1016/j.procir.2018.04.027.

Antikainen, M., Valkokari, K., 2016. A Framework for Sustainable Circular Business Model Innovation. Technol. Innov. Manag. Rev. 6, 1–65.

Asif, F.M.A., Lieder, M., Rashid, A., 2016. Multi-method simulation based tool to evaluate economic and environmental performance of circular product systems. J. Clean. Prod. 139, 1261–1281. doi:10.1016/j.jclepro.2016.08.122.

Barney, J., 1991. Firm Resources and Sustained Competitive Advantage On behalf of: Southern Management Association can be found at: Journal of Management Additional services and information for. J. Manage. doi:10.1177/014920639101700108.

Bashir, M., Verma, R., 2019. Internal factors & consequences of business model innovation. Manag. Decis. 57, 262–290. doi:10.1108/MD-11-2016-0784.

Baumgartner, R.J., 2009. Organizational culture and leadership: Preconditions for the development of sustainable corporation. Sustain. Dev. 17, 102–113. doi:10.1002/sd.405.

Baumgartner, R.J., Ebner, D., 2010. Corporate sustainability strategies: Sustainability profiles and maturity levels. Sustain. Dev. 18, 76–89. doi:10.1002/sd.447.

Benn, S., Dunphy, D., Griffiths, A., 2006. Enabling Change for Corporate Sustainability: An Integrated Perspective. Australas. J. Environ. Manag. 13, 156–165. doi:10.1080/14486563.2006.10648683.

Beulque, R., Aggeri, F., 2016. Circular Business Model Innovation: Key Patterns and Challenges to unleash recycling value creation potential. Egos Confernce doi:10.1002/aic.

Blomsma, F., Pieroni, M., Kravchenko, M., Pigosso, D.C.A., Hildenbrand, J., Kristinsdottir, A.R., Kristoffersen, E., Shabazi, S., Nielsen, K.D., Jönbrink, A.K., Li, J., Wiik, C., McAloone, T.C., 2019. Developing a circular strategies framework for manufacturing companies to support circular economy-oriented innovation. J. Clean. Prod. 241, 118271. doi:10.1016/j.jclepro.2019.118271.

Bocken, N., Antikainen, M., 2019. Circular Business Model Experimentation: Concept and Approaches. 5th International Conference on Sustainable Design and Manufacturing (KES-SDM-18). p. January doi:10.1007/978-3-030-04290-5_25.

Bocken, N., Boons, F., Baldassarre, B., 2019a. Sustainable business model experimentation by understanding ecologies of business models. J. Clean. Prod. 208, 1498–1512. doi:10.1016/j.jclepro.2018.10.159.

Bocken, N., de Pauw, I., Bakker, C., van der Grinten, B., 2016. Product design and business model strategies for a circular economy. J. Ind. Prod. Eng. 33, 308–320. doi:10.1080/21681015.2016.1172124.
Bocken, N., Geradts, T., 2019. Barriers and drivers to sustainable business model innovation: Organization design and dynamic capabilities. Long Range Plann, 101950 doi:10.1016/j.lrp.2019.101950.
Bocken, N., Mugge, R., Bom, C.A., Lemstra, H.J., 2018a. Pay-per-use business models as a driver for sustainable consumption: Evidence from the case of HOMIE. J. Clean. Prod. 198, 498–510. doi:10.1016/j.jclepro.2018.07.043.
Bocken, N., Ritala, P., Huotari, P., 2017. The Circular Economy: Exploring the Introduction of the Concept Among S&P 500 Firms. J. Ind. Ecol. 21, 487–490. doi:10.1111/jiec.12605.
Bocken, N., Schuit, C.S.C., Kraaijenhagen, C., 2018b. Experimenting with a circular business model: Lessons from eight cases. Environ. Innov. Soc. Transitions 28, 79–95. doi:10.1016/j.eist.2018.02.001.
Bocken, N., Short, S., Rana, P., Evans, S., 2014. A literature and practice review to develop sustainable business model archetypes. J. Clean. Prod. 65, 42–56. doi:10.1016/j.jclepro.2013.11.039.
Bocken, N., Short, S.W., 2016. Towards a sufficiency-driven business model: Experiences and opportunities. Environ. Innov. Soc. Transitions 18, 41–61. doi:10.1016/j.eist.2015.07.010.
Bocken, N., Strupeit, L., Whalen, K., Nußholz, J., 2019b. A Review and Evaluation of Circular Business Model Innovation Tools. Sustainability 11, 2210. doi:10.3390/su11082210.
Boons, F., Lüdeke-Freund, F., 2013. Business models for sustainable innovation: State-of-the-art and steps towards a research agenda. J. Clean. Prod. 45, 9–19. doi:10.1016/j.jclepro.2012.07.007.
Bressanelli, G., Perona, M., Saccani, N., 2019. Challenges in supply chain redesign for the Circular Economy: a literature review and a multiple case study. Int. J. Prod. Res. 57, 7395–7422. doi:10.1080/00207543.2018.1542176.
Brown, P., Bocken, N., Balkenende, R., 2020. How Do Companies Collaborate for Circular Oriented Innovation? Sustainability 12, 1648. doi:10.3390/su12041648.
Brown, P., Bocken, N., Balkenende, R., 2019. Why Do Companies Pursue Collaborative Circular Oriented Innovation? Sustainability 11, 635. doi:10.3390/su11030635.
Cameron, E., Green, M., 2019. Making sense of change management: A complete guide to the models, tools and techniques of organizational change. Kogan Page Publishers.
Carayannis, E.G., Sindakis, S., Walter, C., 2015. Business Model Innovation as Lever of Organizational Sustainability. J. Technol. Transf. 40, 85–104. doi:10.1007/s10961-013-9330-y.
Centobelli, P., Cerchione, R., Chiaroni, D., Vecchio, P.Del, Urbinati, A., 2020. Designing business models in circular economy : A systematic literature review and research agenda. Bus. Strateg. Environ. 1–16. doi:10.1002/bse.2466.
Chen, L.H., Hung, P., Ma, H., wen, 2020. Integrating circular business models and development tools in the circular economy transition process: A firm-level framework. Bus. Strateg. Environ. 29, 1887–1898. doi:10.1002/bse.2477.
Chiappetta Jabbour, C.J., Seuring, S., Lopes de Sousa Jabbour, A.B., Jugend, D., De Camargo Fiorini, P., Latan, H., Izeppi, W.C., 2020. Stakeholders, innovative business models for the circular economy and sustainable performance of firms in an emerging economy facing institutional voids. J. Environ. Manage. 264, 110416. doi:10.1016/j.jenvman.2020.110416.
Cummings, T.G., Worley, C.G., 2009. In: Katalog, BPS (Ed.), 9th ed.. South-Western, Mason, OH doi:10.1007/s13398-014-0173-7.2.
De Angelis, R., 2016. A Conceptualisation of Circular Business Models and Explanation of Their Adoption: Evidence From Four In-Depth Case Studies. University of Exeter.
de Mattos, C.A., de Albuquerque, T.L.M., 2018. Enabling factors and strategies for the transition toward a circular economy (CE). Sustain 10. doi:10.3390/su10124628.
Diaz Lopez, F.J., Bastein, T., Tukker, A., 2019. Business Model Innovation for Resource-efficiency, Circularity and Cleaner Production: What 143 Cases Tell Us. Ecol. Econ. 155, 20–35. doi:10.1016/j.ecolecon.2018.03.009.
Ellen MacArthur Foundation, 2014. Towards the Circular Economy Vol.3: Accelerating the scale-up across global supply chains. Ellen MacArthur Foundation. Isle of Wight doi:10.1162/108819806775545321.
Engert, S., Baumgartner, R.J., 2016. Corporate sustainability strategy - Bridging the gap between formulation and implementation. J. Clean. Prod. 113, 822–834. doi:10.1016/j.jclepro.2015.11.094.
Evans, S., Vladimirova, D., Holgado, M., Van Fossen, K., Yang, M., Silva, E.A., Barlow, C.Y., 2017. Business Model Innovation for Sustainability: Towards a Unified Perspective for Creation of Sustainable Business Models. Bus. Strateg. Environ. 26, 597–608. doi:10.1002/bse.1939.
Ferasso, M., Beliaeva, T., Kraus, S., Clauss, T., Ribeiro-Soriano, D., 2020. Circular economy business models: The state of research and avenues ahead. Bus. Strateg. Environ. bse. 2554. doi:10.1002/bse.2554.
Fernandes, S., da, C., Pigosso, D., McAloone, T., Rozenfeld, H., 2020. Towards product-service system oriented to circular economy: A systematic review of value proposition design approaches. J. Clean. Prod. 257. doi:10.1016/j.jclepro.2020.120507.
Foss, N.J., Saebi, T., 2016. Fifteen Years of Research on Business Model Innovation: How Far Have We Come, and Where Should We Go? J. Manage. 43, 200–227. doi:10.1177/0149206316675927.
Franco, M.A., 2017. Circular economy at the micro level: A dynamic view of incumbents' struggles and challenges in the textile industry. J. Clean. Prod. 168, 833–845. doi:10.1016/j.jclepro.2017.09.056.
Frankenberger, K., Weiblen, T., Csik, M., Gassmann, O., 2013. The 4I-framework of business model innovation: A structured view on process phases and challenges. Int. J. Prod. Dev. 18, 249–273. doi:10.1504/IJPD.2013.055012.
Frishammar, J., Parida, V., 2018. Circular Business Model Transformation: A Roadmap for Incumbent Firms. Calif. Manage. Rev. 61, 5–29. doi:10.1177/0008125618811926.
Geissdoerfer, M., Morioka, S.N., de Carvalho, M.M., Evans, S., 2018a. Business models and supply chains for the circular economy. J. Clean. Prod. 190, 712–721. doi:10.1016/j.jclepro.2018.04.159.
Geissdoerfer, M., Pieroni, M., Pigosso, D.C.A., Soufani, K., 2020. Circular business models: A review. J. Clean. Prod. 277. doi:10.1016/j.jclepro.2020.123741.
Geissdoerfer, M., Savaget, P., Bocken, N., Hultink, E.J., 2017. The Circular Economy – A new sustainability paradigm? J. Clean. Prod. 143, 757–768. doi:10.1016/j.jclepro.2016.12.048.
Geissdoerfer, M., Vladimirova, D., Evans, S., 2018b. Sustainable business model innovation: A review. J. Clean. Prod. 198, 401–416. doi:10.1016/j.jclepro.2018.06.240.
Ghisellini, P., Cialani, C., Ulgiati, S., 2016. A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems. J. Clean. Prod. 114, 11–32. doi:10.1016/j.jclepro.2015.09.007.
Globocnik, D., Rauter, R., Baumgartner, R.J., 2020. Synergy or conflict? the relationships among organisational culture, sustainability-related innovation performance, and economic innovation performance. Int. J. Innov. Manag. 24, 2050004. doi:10.1142/S1363919620500048.
Goodwin, L.D., 2001. Interrater agreement and reliability. Meas. Phys. Educ. Exerc. Sci. 5, 13–34. doi:10.1207/S15327841MPEE0501_2.
Gorissen, L., Vrancken, K., Manshoven, S., 2016. Transition thinking and business model innovation-towards a transformative business model and new role for the reuse centers of Limburg. Belgium. Sustain. 8. doi:10.3390/su8020112.
Govindan, K., Hasanagic, M., 2018. A systematic review on drivers, barriers, and practices towards circular economy: a supply chain perspective. Int. J. Prod. Res. 56, 278–311. doi:10.1080/00207543.2017.1402141.
Grant, M.J., Booth, A., 2009. A typology of reviews: An analysis of 14 review types and associated methodologies. Health Info. Libr. J. 26, 91–108. doi:10.1111/j.1471-1842.2009.00848.x.
Guldmann, E., Bocken, N., Brezet, H., 2019. A Design Thinking Framework for Circular Business Model Innovation. J. Bus. Model. 7, 39–70. doi:10.5278/ojs.jbm.v7i1.2122.
Guldmann, E., Huulgaard, R.D., 2020. Barriers to circular business model innovation: A multiple-case study. J. Clean. Prod. 243, 118160. doi:10.1016/j.jclepro.2019.118160.
Guldmann, E., Huulgaard, R.D., 2019. Circular Business Model Innovation for Sustainable Development. In: Innovation for Sustainability. Business Transformations towards a Better World. Palgrave Macmillan, Cham, pp. 77–95. doi:10.1007/978-3-319-97385-2_5.
Guzzo, D., Trevisan, A.H., Echeveste, M., Costa, J.M.H., 2019. Circular innovation framework: Verifying conceptual to practical decisions in sustainability-oriented product-service system cases. Sustain 11. doi:10.3390/su11123248.
Hansen, E.G., Revellio, F., 2020. Circular Value Creation Architectures : Make, ally, buy, or laissez-faire. J. Ind. Ecol. 1–24. doi:10.1111/jiec.13016.
Henry, M., Bauwens, T., Hekkert, M., Kirchherr, J., 2020. A Typology of Circular Start-Ups – An Analysis of 128 Circular Business Models. J. Clean. Prod. 245, 118528. doi:10.1016/j.jclepro.2019.118528.
Heyes, G., Sharmina, M., Mendoza, J.M.F., Gallego-Schmid, A., Azapagic, A., 2018. Developing and implementing circular economy business models in service-oriented technology companies. J. Clean. Prod. 177, 621–632. doi:10.1016/j.jclepro.2017.12.168.
Hofmann, F., 2019. Circular business models: Business approach as driver or obstructer of sustainability transitions? J. Clean. Prod. 224, 361–374. doi:10.1016/j.jclepro.2019.03.115.
Hofmann, F., Jaeger-Erben, M., Jaeger-Erben, M., 2020. Organizational transition management of circular business model innovations. Bus. Strateg. Environ. 29, 2770–2788. doi:10.1002/bse.2542.
Hopkinson, P., Zils, M., Hawkins, P., Roper, S., 2018a. Managing a Complex Global Circular Economy Business Model: Opportunities and Challenges. Calif. Manage. Rev. 60, 71–94. doi:10.1177/0008125618764692.
Hopkinson, P., Zils, M., Hawkins, P., Roper, S., 2018b. Managing a Complex Global Circular Economy Business Model: Opportunities and Challenges. Calif. Manage. Rev. 60, 71–94. doi:10.1177/0008125618764692.
Horvath, B., Khazami, N., Ymeri, P., Fogarassy, C., 2019. Investigating the current business model innovation trends in the biotechnology industry. J. Bus. Econ. Manag. 20, 63–85. doi:10.3846/jbem.2019.6880.
Inigo, E.A., Albareda, L., Ritala, P., 2017. Business model innovation for sustainability: exploring evolutionary and radical approaches through dynamic capabilities. Ind. Innov. 24, 515–542. doi:10.1080/13662716.2017.1310034.
Jensen, J.P., Prendeville, S.M., Bocken, N., Peck, D., 2019. Creating sustainable value through remanufacturing: Three industry cases. J. Clean. Prod. 218, 304–314. doi:10.1016/j.jclepro.2019.01.301.
Khan, O., Daddi, T., Iraldo, F., 2020. Microfoundations of dynamic capabilities: Insights from circular economy business cases. Bus. Strateg. Environ. 29, 1479–1493. doi:10.1002/bse.2447.
Kiesnere, A., Baumgartner, R., 2019. Sustainability Management in Practice: Organizational Change for Sustainability in Smaller Large-Sized Companies in Austria. Sustainability 11, 572. doi:10.3390/su11030572.
Konietzko, J., Baldassarre, B., Brown, P., Bocken, N., Hultink, E.J.E.J., 2020a. Circular business model experimentation: Demystifying assumptions. J. Clean. Prod. 277, 122596. doi:10.1016/j.jclepro.2020.122596.

Konietzko, J., Bocken, N., Hultink, E.J., 2020b. Circular ecosystem innovation: An initial set of principles. J. Clean. Prod. 253. doi:10.1016/j.jclepro.2019.119942.
Konietzko, J., Bocken, N., Hultink, E.J., 2020c. A Tool to Analyze, Ideate and Develop Circular Innovation Ecosystems. Sustainability 12, 417. doi:10.3390/su12010417.
Kurucz, E.C., Colbert, B.A., Lüdeke-Freund, F., Upward, A., Willard, B., 2017. Relational leadership for strategic sustainability: practices and capabilities to advance the design and assessment of sustainable business models. J. Clean. Prod. 140, 189–204. doi:10.1016/j.jclepro.2016.03.087.
Lacy, P., Keeble, J., McNamara, R., 2014. Circular Advantage: Innovative Business Models and Technologies to Create Value in a World without Limits to Growth. Accenture Strategy.
Lahti, T., Wincent, J., Parida, V., 2018. A definition and theoretical review of the circular economy, value creation, and sustainable business models: Where are we now and where should research move in the future? Sustain 10. doi:10.3390/su10082799.
Landis, J.R., Koch, G.G., 1977. The Measurement of Observer Agreement for Categorical Data. Biometrics 33, 159. doi:10.2307/2529310.
Laukkanen, M., Patala, S., 2014. Analysing Barriers To Sustainable Business Model Innovations: Innovation Systems Approach. Int. J. Innov. Manag. 18, 21. doi:10.1142/S1363919614400106.
Lewandowski, M., 2016. Designing the business models for circular economy-towards the conceptual framework. Sustain 8, 1–28. doi:10.3390/su8010043.
Linder, M., Williander, M., 2017. Circular Business Model Innovation: Inherent Uncertainties. Bus. Strateg. Environ. 26, 182–196. doi:10.1002/bse.1906.
Linnenluecke, M.K., Griffiths, A., 2010. Corporate sustainability and organizational culture. J. World Bus. 45, 357–366. doi:10.1016/j.jwb.2009.08.006.
Lüdeke-Freund, F., Dembek, K., 2017. Sustainable business model research and practice: Emerging field or passing fancy? J. Clean. Prod. 168, 1668–1678. doi:10.1016/j.jclepro.2017.08.093.
Lüdeke-Freund, F., Gold, S., Bocken, N., 2019. A Review and Typology of Circular Economy Business Model Patterns. J. Ind. Ecol. 23, 36–61. doi:10.1111/jiec.12763.
Manninen, K., Koskela, S., Antikainen, R., Bocken, N., Dahlbo, H., Aminoff, A., 2018. Do circular economy business models capture intended environmental value propositions? J. Clean. Prod. 171, 413–422. doi:10.1016/j.jclepro.2017.10.003.
McDonough, W., Braungart, M., 2010. Cradle to cradle: Remaking the way we make things. North point press.
Mendoza, J.M.F., Sharmina, M., Gallego-Schmid, A., Heyes, G., Azapagic, A., 2017. Integrating Backcasting and Eco-Design for the Circular Economy: The BECE Framework. J. Ind. Ecol. 21, 526–544. doi:10.1111/jiec.12590.
Mentink, B., 2014. Circular Business Model Innovation: A process framework and a tool for business model innovation in a circular economy. Delft University of Technology.
Minatogawa, V., Franco, M., Durán, O., Quadros, R., Holgado, M., Batocchio, A., 2020. Carving out new business models in a small company through contextual ambidexterity: The case of a sustainable company. Sustain 12. doi:10.3390/su12062337.
Morioka, S.N., Evans, S., De Carvalho, M.M., 2016. Sustainable Business Model Innovation: Exploring Evidences in Sustainability Reporting. In: Procedia CIRP, pp. 659–667. doi:10.1016/j.procir.2016.01.151.
Nidumolu, R., Prahalad, C.K., Rangaswami, M.R., 2009. Why Sustainability is Now the Key Driver of Innovation. Harv. Bus. Rev. 57–64.
Nosratabadi, S., Mosavi, A., Shamshirband, S., Zavadskas, E.K., Rakotonirainy, A., Chau, K.W., 2019. Sustainable business models: A. review. Sustain. 11, 1–30. doi:10.3390/su11061663.
Nußholz, J., 2018. A circular business model mapping tool for creating value from prolonged product lifetime and closed material loops. J. Clean. Prod. 197, 185–194. doi:10.1016/j.jclepro.2018.06.112.
Nußholz, J., 2017. Circular business models: Defining a concept and framing an emerging research field. Sustain 9, 14–17. doi:10.3390/su9101810.
Osterwalder, A., Pigneur, Y., 2010. Business Model Generation A Handbook for Visionaries, Game Changers, and Challengers. John Wiley and Sona, Hoboken, NJ, USA doi:10.1523/JNEUROSCI.0307-10.2010.
Palmié, M., Boehm, J., Lekkas, C.-K.K., Parida, V., Wincent, J., Gassmann, O., 2021. Circular business model implementation: Design choices, orchestration strategies, and transition pathways for resource-sharing solutions. J. Clean. Prod. 280, 124399. doi:10.1016/j.jclepro.2020.124399.
Parida, V., Burström, T., Visnjic, I., Wincent, J., 2019a. Orchestrating industrial ecosystem in circular economy: A two-stage transformation model for large manufacturing companies. J. Bus. Res. 101, 715–725. doi:10.1016/j.jbusres.2019.01.006.
Parida, V., Sjödin, D., Reim, W., 2019b. Reviewing literature on digitalization, business model innovation, and sustainable industry: Past achievements and future promises. Sustain 11. doi:10.3390/su11020391.
Parida, V., Wincent, J., 2019. Why and how to compete through sustainability: a review and outline of trends influencing firm and network-level transformation. Int. Entrep. Manag. J. 15, 1–19. doi:10.1007/s11365-019-00558-9.
Pedersen, E.R.G., Gwozdz, W., Hvass, K.K., 2018. Exploring the Relationship Between Business Model Innovation, Corporate Sustainability, and Organisational Values within the Fashion Industry. J. Bus. Ethics 149, 267–284. doi:10.1007/s10551-016-3044-7.
Pieroni, M., McAloone, T., Pigosso, D., 2019a. Business model innovation for circular economy and sustainability: A review of approaches. J. Clean. Prod. 215, 198–216. doi:10.1016/J.JCLEPRO.2019.01.036.
Pieroni, M., McAloone, T., Pigosso, D., 2019b. Business model innovation for circular economy: Integrating literature and practice into a conceptual process model. In: Proceedings of the International Conference on Engineering Design, ICED. Cambridge University Press, pp. 2517–2526. doi:10.1017/dsi.2019.258.
Pieroni, M., McAloone, T.C., Pigosso, D., 2019c. Configuring New Business Models for Circular Economy through Product–Service Systems. Sustainability 11, 3727. doi:10.3390/su11133727.
Pieroni, M., McAloone, T.C., Pigosso, D.C.A., 2020a. From theory to practice: systematising and testing business model archetypes for circular economy. Resour. Conserv. Recycl. 162. doi:10.1016/j.resconrec.2020.105029.
Pieroni, M., McAloone, T.C., Pigosso, D.C.A., 2020b. Defining the requirements for a tool to support circular economy business model innovation within manufacturing companies. Proc. Des. Soc. Des. Conf. 1, e1. doi:10.1017/dsd.2020.339.
Pieroni, M., McAloone, T.C., Pigosso, D.C.A., 2020c. Circular Economy business model innovation: sectorial patterns within manufacturing companies. J. Clean. Prod. (under Rev. 124921 doi:10.1016/j.jclepro.2020.124921.
Pieroni, M., McAloone, T.C., Pigosso, D.C.A., 2019d. Configuring new business models for circular economy: from patterns and design options to action. 4th International Conference on New Business Models.
Planing, P., 2015. Business Model Innovation in a Circular Economy Reasons for Non - Acceptance of Circular Business Models. Open J. Bus. Model Innov. 1–11. doi:10.1016/0092-640X(77)90036-5.
Porter, M.E., Kramer, M.R., 2011. Creating shared value. Harv. Bus. Rev. 89, 62–77. doi:10.1108/09600039410055963.
Prieto-Sandoval, V., Jaca, C., Santos, J., Baumgartner, R.J., Ormazabal, M., 2019. Key strategies, resources, and capabilities for implementing circular economy in industrial small and medium enterprises. Corp. Soc. Responsib. Environ. Manag. 1–12. doi:10.1002/csr.1761.
Ranta, V., Aarikka-Stenroos, L., Väisänen, J.-M.M., 2021. Digital technologies catalyzing business model innovation for circular economy—Multiple case study. Resour. Conserv. Recycl. 164, 105155. doi:10.1016/j.resconrec.2020.105155.
Rauter, R., Jonker, J., Baumgartner, R.J., 2017. Going one's own way: drivers in developing business models for sustainability. J. Clean. Prod. 140, 144–154. doi:10.1016/j.jclepro.2015.04.104.
Raworth, K., 2017. Doughnut economics : seven ways to think like a 21st-century economist. London.
Reike, D., Vermeulen, W.J.V., Witjes, S., 2018. The circular economy: New or Refurbished as CE 3.0? — Exploring Controversies in the Conceptualization of the Circular Economy through a Focus on History and Resource Value Retention Options. Resour. Conserv. Recycl. 135, 246–264. doi:10.1016/j.resconrec.2017.08.027.
Rizos, V., Behrens, A., van der Gaast, W., Hofman, E., Ioannou, A., Kafyeke, T., Flamos, A., Rinaldi, R., Papadelis, S., Hirschnitz-Garbers, M., Topi, C., 2016. Implementation of circular economy business models by small and medium-sized enterprises (SMEs): Barriers and enablers. Sustain. 8. doi:10.3390/su8111212.
Robèrt, K.H., Daly, H., Hawken, P., Robèrt, K.H., Holmberg, J., 1997. A compass for sustainable development. Int. J. Sustain. Dev. World Ecol. 4, 79–92. doi:10.1080/13504509709469945.
Robèrt, K.H., Schmidt-Bleek, B., Aloisi De Larderel, J., Basile, G., Jansen, J.L., Kuehr, R., Price Thomas, P., Suzuki, M., Hawken, P., Wackernagel, M., 2002. Strategic sustainable development - Selection, design and synergies of applied tools. J. Clean. Prod. 10, 197–214. doi:10.1016/S0959-6526(01)00061-0.
Roome, N., Louche, C., 2016. Journeying Toward Business Models for Sustainability: A Conceptual Model Found Inside the Black Box of Organisational Transformation. Organ. Environ. 29, 11–35. doi:10.1177/1086026615595084.
Roos, G., 2014. Business Model Innovation to Create and Capture Resource Value in Future Circular Material Chains. Resources 3, 248–274. doi:10.3390/resources3010248.
Rosa, P., Sassanelli, C., Terzi, S., 2019. Towards Circular Business Models: A systematic literature review on classification frameworks and archetypes. J. Clean. Prod. 236. doi:10.1016/j.jclepro.2019.117696.
Rosca, E., Arnold, M., Bendul, J.C., 2017. Business models for sustainable innovation – an empirical analysis of frugal products and services. J. Clean. Prod. 162, S133–S145. doi:10.1016/j.jclepro.2016.02.050.
Salvador, R., Barros, M.V., da Luz, L.M., Piekarski, C.M., de Francisco, A.C., 2020. Circular business models: Current aspects that influence implementation and unaddressed subjects. J. Clean. Prod. doi:10.1016/j.jclepro.2019.119555.
Sarasini, S., Linder, M., 2018. Integrating a business model perspective into transition theory: The example of new mobility services. Environ. Innov. Soc. Transitions 27, 16–31. doi:10.1016/j.eist.2017.09.004.
Schaltegger, S., Lüdeke-Freund, F., Hansen, E.G., 2012. Business cases for sustainability: the role of business model innovation for corporate sustainability. Int. J. Innov. Sustain. Dev. 6, 95. doi:10.1504/IJISD.2012.046944.
Schneider, S., Spieth, P., 2013. Business Model Innovation: Towards an Integrated Future Research Agenda. Int. J. Innov. Manag. 17, 1340001. doi:10.1142/S136391961340001X.
Short, S., Bocken, N., Barlow, C.Y., Chertow, M., 2014. From refining sugar to growing tomatoes: Industrial ecology and business model evolution. J. Ind. Ecol. 18, 603–618. doi:10.1111/jiec.12171.
Steffen, W., Richardson, K., Rockström, J., Cornell, S.E., Fetzer, I., Bennett, E.M., Biggs, R., Carpenter, S.R., De Vries, W., De Wit, C.A., Folke, C., Gerten, D., Heinke, J., Mace, G.M., Persson, L.M., Ramanathan, V., Reyers, B., Sörlin, S., 2015. Planetary boundaries: Guiding human development on a changing planet.. Science (80-.) 347, 1259855. doi:10.1126/science.1259855.
Teece, D.J., 2018. Business models and dynamic capabilities. Long Range Plann 51, 40–49. doi:10.1016/j.lrp.2017.06.007.
Teece, D.J., 2010. Business models, business strategy and innovation. Long Range Plann 43, 172–194. doi:10.1016/j.lrp.2009.07.003.

Teece, D.J., 2007. Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. Strateg. Manag. J. 28, 1319–1350. doi:10.1002/smj.640.

Tura, N., Hanski, J., Ahola, T., Ståhle, M., Piiparinen, S., Valkokari, P., 2019. Unlocking circular business: A framework of barriers and drivers. J. Clean. Prod. 212, 90–98. doi:10.1016/j.jclepro.2018.11.202.

Ünal, E., Urbinati, A., Chiaroni, D., 2019. Managerial practices for designing circular economy business models: The case of an Italian SME in the office supply industry. J. Manuf. Technol. Manag. 30, 561–589. doi:10.1108/JMTM-02-2018-0061.

Urbinati, A., Chiaroni, D., Chiesa, V., 2017. Towards a new taxonomy of circular economy business models. J. Clean. Prod. 168, 487–498. doi:10.1016/j.jclepro.2017.09.047.

Vermunt, D.A., Negro, S.O., Verweij, P.A., Kuppens, D.V., Hekkert, M.P., 2019. Exploring barriers to implementing different circular business models. J. Clean. Prod. 222, 891–902. doi:10.1016/j.jclepro.2019.03.052.

Watkins, M.W., Pacheco, M., 2000. Interobserver agreement in behavioral research: Importance and calculation. J. Behav. Educ. 10, 205–212. doi:10.1023/A:1012295615144.

Weerts, K., Vermeulen, W., Witjes, S., 2018. On corporate sustainability integration research: Analysing corporate leaders' experiences and academic learnings from an organisational culture perspective. J. Clean. Prod. 203, 1201–1215. doi:10.1016/j.jclepro.2018.07.173.

Weissbrod, I., Bocken, N., 2017. Developing sustainable business experimentation capability – A case study. J. Clean. Prod. 142, 2663–2676. doi:10.1016/j.jclepro.2016.11.009.

Whalen, K.A., 2019. Three types of circular business models that extend product value and their contribution to resource efficiency. J. Clean. Prod. doi:10.1016/j.jclepro.2019.03.128.

Wittig, A., Kulins, C., Weber, C., 2017. Toward a best practice framework in business model innovation. In: 2017 IEEE Technol. Eng. Manag. Soc. Conf. TEMSCON 2017, pp. 86–93. doi:10.1109/TEMSCON.2017.7998359.

Yin, R.K., 2014. Case Study Research: Design and Methods, Fifth Ed. SAGE Publication, Inc., Thousand Oaks, CA.

Zott, C., Amit, R., Massa, L., 2011. The business model: Recent developments and future research. J. Manage. 37, 1019–1042. doi:10.1177/0149206311406265.