

A research model for circular business models–Antecedents, moderators, and outcomes

Felicitas Pietrulla^{*}, Karolin Frankenberger

Institute of Management and Strategy, University of St. Gallen, Dufourstrasse 50, 9000 St. Gallen, Switzerland

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ABSTRACT

The concept of circular business models, defined as firm activities to create and capture value in a circular manner by, for example, extending or continuously reusing product materials, has received increasing attention in management research. The emerging literature, however, lacks theoretical underpinning and empirical findings are not cumulative. Therefore, this article analyzes existing and related research in much detail and presents a comprehensive research model on antecedents, moderators, and outcomes of circular business models. The theories and related research streams considered for the research framework include Institutional Theory, Managerial Cognition, Dynamic Capabilities, Corporate Social Responsibility, Business Model Innovation, and Ecosystems. Gaps within and across the respective research streams concerning circular business models are revealed, and relevant avenues for future research are suggested.

1. Introduction

The alternative to the rather unsustainable linear economy that fuels climate change through high emissions, waste, and resource depletion is the circular economy concept (CE hereafter). Interest in the concept has increased significantly in policymaking, industry, and academia [35, 175, 180]. Accordingly, the field of Circular Business Models (CBM hereafter) is entering the management literature with a growing number of publications (e.g., [18]). CBMs are considered a crucial enabler on the micro-level for organizational and environmental sustainability [110] and describe "how a company creates, captures, and delivers value with the value creation logic designed to improve resource efficiency through contributing to extending useful life of products and parts (e.g., through long-life design, repair and remanufacturing) and closing material loops" ([189]: 12). Thus far, the concept has been mainly researched from an industrial ecology perspective [72, 148, 171], but less so from an integrated management perspective [246]. Applying management theory to the concept of CBM can reveal promising pathways to transform a linear towards a CBM more effectively. Doing so also answers the call of many researchers asking for a more integrated view on CE to make it a reality [59, 118, 123].

Besides, we see the need to synthesize CBM related research streams for two academic reasons. Firstly, the still relatively young CBM concept has never been summarized in one holistic CBM-framework entailing

antecedents, moderators, and outcomes and has never been assessed for its paradigmatic status. While sustainable BM research has advanced significantly and contributed extremely valuable archetypes (e.g., [39]), this research focuses on typologies and a mostly "internal" view of sustainable business models. Thereby, this research only lightly touches upon influencing factors external to the actual CBM. We, therefore, want to contribute to the field by providing this holistic (external) perspective on CBMs in particular – to account for both the risen interest in the sustainable BM subfield of CBMs and to account for the elements that are specific to circular, but not necessarily sustainable BMs.

Secondly, previously unlinked legacy domains contributing to the CBM concept like Institutional Theory (IT), Managerial Cognition (MC), and Dynamic Capabilities (DC) as theoretic lenses, and Corporate Social Responsibility (CSR), Business Model Innovation (BMI), and Ecosystems (ES) as literature streams have not meaningfully been combined yet to move the CBM research field forward. As those streams primarily developed in isolation, the use of terms is often imprecise, and concept boundaries have become blurry [204, 214]. Like this, we reveal gaps within and across research streams and propose promising avenues for future research. With this integrative and generative approach for concept advancement (for a similar approach, see [203]), we firstly systematically organize the dynamic research field of CBM by elaborating on the evolution of the concept; and secondly, show how other management fields can contribute to the field moving forward.

^{*} Corresponding author.

E-mail address: felicitas.pietrulla@unisg.ch (F. Pietrulla).

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1.1. Evolution of circular business model research

Schwager and Moser [224] first mentioned the core idea of CBMs, i.e., circular value creation, in 2006 (see also, [109]). Along with other practitioner-oriented publications on CE (e.g., [91], studies on CBMs recently grew exponentially, finding inspiration from firstly, the sustainable BM literature (e.g., [135]), and secondly, the CE literature [110]. The sustainable BM literature promises a competitive advantage through sustainability-inspired innovation [187]. These sustainable BM address social and environmental challenges [79,179] and thereby create shared value [201], inclusive growth [3] and a larger value pie through stakeholder synergies [239]. Within this research stream, researchers showed that it pays to be sustainable [11,47,223,238], they developed various practical tools (e.g., [135]) and classifications of sustainable BMs [39,157,218], and they investigated the sustainable BM sub-stream of social BMs and social business model innovation [104, 172,177,208,261,261]. Besides those significant advances, authors of the field still search for practical approaches to transform organizations towards truly sustainable ones [37,65]. For example, while the sustainable BM archetypes by Bocken et al. [39] provide comprehensive insights into the different types of BM that are also relevant for CBMs, such as "Create value from waste," we want to contribute to this stream of literature by adding two elements: First, we provide a complementary external perspective on CBM analyzing external factors, such as antecedents, moderators, and outcomes that may influence such archetypes of CBMs, which in return represent a focused and "internal" view of CBMs. Second, we want to create a holistic framework for CBM using a CE lens. While our CBM framework can learn from these sustainable BM archetypes, the practice revealed that social and CBMs can be pretty different. Therefore, we hope that the specific focus on CBM and the external perspective brings more clarity to the field and brings our research community closer to finding meaningful ways to enable effective organizational transformations towards CBMs.

The second inspiring literature stream of CE is central to the CBM concept: CE is defined as "an industrial system that is restorative or regenerative by intention and design" [92] and is inspired by earlier concepts, such as closed-loop systems [41], or industrial economy loops [235] as described in more detail by Geisendorf and Pietrulla [107]. Connecting the CE field with business model research was essential to leaving the CE "niche" [143].

As the review of Geissdoerfer et al. [109] reveals, current CBM research primarily deals with typologies of CBMs, such as reuse, repair, and maintenance models ([36]; [33, 39]; [96]; [153,154]; [158,160, 209]). While some studies discussed CBMs' effectiveness in terms of (primarily environmental) performance outcomes (e.g., [33,108]) and propose first relevant antecedents (e.g., [76]) or other factors impacting CBM implementation [214], fewer scholars have empirically investigated more intricate associations of moderators [268]. Overall, CBM publications tend to focus on a specific context with limited generalizability and just one particular area of a typical research framework, i.e., antecedents, outcomes, moderators, or the concept of CBMs itself. An integrative research framework synthesizing accrued knowledge from adjacent domains into one framework of antecedents, moderators, and outcomes of CBMs is missing. We list dominant reviews and conceptualizations on CBMs in Table 1.

1.2. Literature streams related to circular business models

Domains that are closely related to the field of CBMs [110,189] can further inform the discussion of CBMs. Due to space constraints in this paper, we focus on the most relevant theoretical lenses and management concepts and explain what they can contribute to CBM concept research. We identified IT, MC, and DC as the most relevant theoretical lenses by screening the twenty most relevant management theories of BM research [106]. We identified those theories as most relevant for our study for the following criteria: Firstly, the theory at hand has strongly influenced the

Table 1

Reviews and selected conceptual studies on circular business models.

Publication	Focus
Geissdoerfer et al. [109]	Systematic review of CBMs concerning history, definitions, and conceptualization of new frameworks
Bocken et al. [35]	Presentation of CBM innovation techniques
Lüdeke-Freund et al. [158]	Analysis of current (29) CBMs and synthesis of major BM design options and BM patterns
Pieroni et al. [199]	Review and comparison of approaches for sustainability and CBM innovation through a dynamic capability view
Lewandowski et al. [153]	Analysis of existing CBM and extension of typologies and introduction of the triple-fit-challenge as enabler for CE transition
Reim, Parida, & Sjödin [207]	Review of CBM literature concerning bio-economy barriers and in the forestry context
De Pádua Pieroni, Pigosso, & McAloone [200]	Review of CBMs and identification of sustainability qualifying criteria per BM type
Antikainen & Valkokari [16]	Conceptualization of CBM innovation framework including barriers and ES ideas based on case study approach
Rosa et al. [210]	Review of CBM approaches and classification of most prominent archetypes, challenges, and decision criteria
Nußholz [189]	Review of CBM literature based on a resource efficiency lens
Salvador et al. [214]	Literature review summarizing CBM implementation aspects and identification of research gaps

debate on other sustainability phenomena (e.g., CSR, see Aguinis & Glavas [9]). Secondly, the theoretical perspective has already been applied to the CE or CBM concept - even when not in much detail. However, as third criteria, we dismissed those theories whose value for CBM has already been assessed in much detail elsewhere (e.g., for stakeholder theory and resource-based-view applications to CE, see Chiappetta Jabbour et al. [59]). Regarding other phenomena and management concepts, we decided to focus on CSR, BMI, and ES research for the following reasons: CSR is somewhat similar to CBM as part of its goals is corporate environmental sustainability (besides the social and long-term profit goal). At the same time, CSR is much more advanced than CBM research, thereby providing an excellent opportunity for CBM research to learn from this phenomenon's state of knowledge. We chose BMI as a relevant phenomenon as it provides the relevant process and activity perspective on the transformational aspect required to make CBM a reality. At the same time, this research field is also far more advanced than the relatively small subfield of CBM and promises a great learning opportunity. Lastly, we chose ecosystems as a highly relevant phenomenon due to the nature and required structure of CBMs. Indeed most scholars argue that an ecosystem set-up for CBM is required as various partners need to collaborate to circulate materials fully.

Hence, this section first reviews IT, MC, and DC as the most relevant theoretical lenses. Secondly, we review the value of CSR, BMI, and ES as adjacent literature streams of CBM research. This analysis allows us to identify the relevant factors for the integrated research model of CBMs consisting of antecedents, moderators, and outcomes.

1.2.1. Institutional theory

IT is a well-established theory in management research that has also informed various work on other sustainability-related corporate phenomena such as corporate social responsibility [168,169]. IT explains how institutions affect the characteristics of organizational structures [226] through, e.g., authoritative guidelines and how institutional processes (e.g., [83]) relate to organizational change and strategic response [192]. Institutions that represent specific rules, norms, and routines contribute to an accepted standard within an industry. Therefore, it is often difficult for organizations to break out of this usual

operating model. As the switch from a linear to a CBM typically requires institutional change, CBM authors used IT to explain the institutional challenges and path dependencies from a systemic perspective. The IT lens proves especially helpful to explain when firms struggle to achieve their social mission, environmental stewardship, and economic goals [97,256] or when facing institutional barriers to CE as a whole [205]. Some papers also review specific contexts, such as the fashion industry [236] or battery recycling [151], to present institutional drivers. However, the theoretical lens of IT has not been applied in much depth yet. The comparably older research field of CSR (which we will also present in more detail below) benefited substantially from applying the institutional theory lens (e.g., [9]).

1.2.2. Managerial cognition

The 'cognitive view' implies that managerial cognition, e.g., managers' beliefs, sensemaking processes, and interpretations, drives strategic action in organizations [67,183]. This view complements the rational 'economic view,' implying that industry structure defines strategic outcomes, such as strategy formulation and implementation [184]. MC theory deploys several concepts such as sense giving [159], sensemaking [24], and attention [191]. It also deploys several themes such as schemata [225] and dominant logics [202], i.e., cognitive structures to navigate challenges, as well as boundary objects [152,237] that ensure common comprehension in different contexts. Scholars identified cognitive barriers towards CBMs in the EV batteries industry context, such as managerial disbelief in the value behind second-life BMs or a lack of interest in such solutions that are in direct competition with co-existing (linear) BMs [193]. These barriers more broadly represent a relevant factor in the transformation of the BM towards a circular one [101,163]. To summarize, only very few papers take a detailed view of cognitive managerial factors influencing CBMs.

1.2.3. Dynamic capabilities

Some scholars argue that the DC view of the firm is a more dynamic version of the resource-based view of the firm [29], as it explains how resources or capabilities are developed or renewed [31,253,258]. Hence, dynamic capabilities are the "ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" ([243]: 1018). The DC view has already been broadly applied in corporate sustainability studies [136], in business model studies ([12][240]), and more recently, with a focus on sustainable business models [37]. Overall, the DC view has been scarcely applied in environmental sustainability [66]. However, a few studies on the role of DC for CBM specifically exist: Developing CBMs as DC represents the organizational strategic flexibility to respond to the changing environmental demand that asks for more sustainability in BMs (e.g., [20]). Scholars find that sensing, seizing, and reconfiguring dynamic capabilities [139,140], collaborating with partners/suppliers to innovate products [15], managing the environmental systems [216], as well as establishing basic competences, standards and information [98] are critical micro-foundations of the needed DCs. Furthermore, Bocken et al. [37] explain how the right organizational design for sustainability largely nurtures the development of the needed DC.

1.2.4. Corporate social responsibility

CSR occurs when firms engage in social good activities beyond their interests and legal requirements [168,169]. The debate on CSR definitions [134] led to the widely cited publication of the "triple bottom line" framework [90,232] that differentiated the three Ps, namely People, Planet, and Profit of a sustainability strategy. While CBMs are mainly associated with the planet dimension [75], followed by the economic and, lastly, social dimensions [171], the CSR debate historically focused on the economic pay-offs [11,47,63,167].

Ingulfsavann [125] identifies sustainable production information as a circular element of CSR brand communication in an outdoor industry case study. Besides, deeper investigations between CSR and CBMs are

scarce. While CSR often takes a firm perspective and often addresses the perception of the firm (e.g., [77]), the CBM concept is broader: It takes a complete product value chain perspective [125], i.e., investigating a unit of analysis that may span across firm boundaries [109]. Nevertheless, the two concepts are similar in their goals: Contributing to financial stability while making a positive environmental contribution. Given the advanced level of CSR research compared to the CBM field, understanding the factors influencing the success of (environmental) CSR initiatives can inform the CBM research field to expand its hypothesized relationships.

1.2.5. Business model innovation

Research on BMI has increased significantly over the last years (see for a recent review: [165]) and attracted scholars' interest from strategic management (e.g., [51]), entrepreneurship (e.g., [13]), technology management (e.g., [19,57]) and most recently, sustainability [82,96,108,217]. A BM refers to the firm architecture of value creation, delivery, and capture (e.g., [57,105,195,241,265,266,242]). BMI explains how firms can develop an architecture that "complements the traditional subjects of process, product, and organizational innovation" ([267]: 1032). BMI scholars have shown increasing interest in how BMI can help companies achieve triple-bottom-line results (e.g., [39,44,219]). BMI for circularity means that BMs will create economic and environmental value for various stakeholders [38,158]. However, BMs for sustainability differ from traditional BMs and require re-thinking the nature of the value proposition towards economic, environmental, and social value for various stakeholders [38,158]. The literature also discusses managing multiple BMs in a portfolio to, e.g., avoid cannibalization [249] or other trade-offs. Active portfolio management of different BMs is exceptionally informative for the success of a CBM when a firm complements its product portfolio with a circular offering addressing the same market as the traditional (linear) product.

1.2.6. Ecosystems

Defined as "the alignment structure of the multilateral set of partners that need to interact in order for a focal value proposition to materialize" ([4]: 40), an ES view on strategy adds value by effectively managing multilateral dependencies [126]. ES actors are typically complementary and dependent on each other to create value in a systems-level architecture [6,137,138] – an understanding that is also typical for CBMs. Indeed for CBM research, ESs are deemed quite relevant [109]: ES approaches promise a solution to manage the CBM inherent coordination challenge along the supply circle [34,170] by, e.g., optimizing transaction cost, revenue sharing contracts among ES actors, and joint innovation [115,117] for competitive advantage [62]. Scholars agree on the importance of ES for CE and sustainability research ([28,62,175,199]). However, except for the specific studies on eco-industrial parks (e.g., [230,262]), we know relatively little about how a circular ES works. Hence, the CBM concept learns from the two perspectives of ES research: Firstly, the actor-centric view of "ecosystems as affiliation," i.e., all stakeholders along the material flow chain, must be considered to make circularity a reality. Secondly, the activity-centric interdependencies or "ecosystem as structure" view, i.e., each stakeholder's interdependent activities [4], such as the recollection of materials at the end of a product's lifecycle, must be coordinated effectively.

2. Methodology

We conducted a thorough literature review, as displayed in Fig. 1. The three-step approach of data search, analysis, and reporting [71,80] follows a standard used by other CE researchers (e.g., [109]).

We followed other management authors' approaches of data search (e.g., [203]). We identified the top influential studies for each research field (CBM, IT, MC, DC, CSR, BM(I), ES), also considering articles referring to the same fundamental ideas, but using slightly different

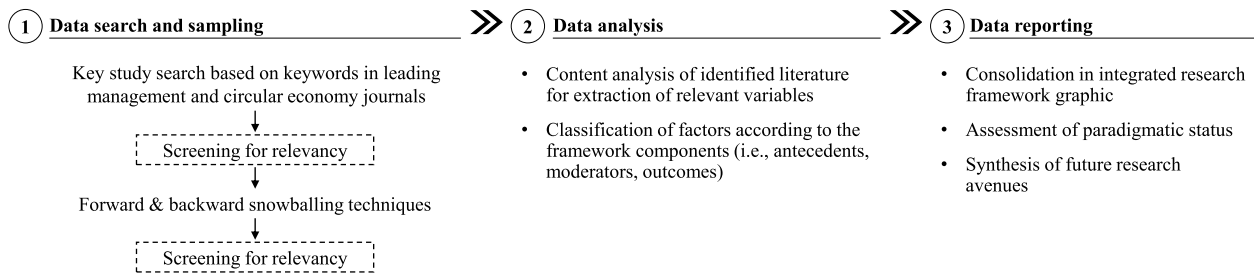


Fig. 1. Methodology of literature review.

terms such as *Circular Economy Business Models* instead of *Circular Business Model*. We searched in premier management journals (e.g., Academy of Management Journal, Academy of Management Review, Administrative Science Quarterly, Journal of Management, Journal of Management Studies, Organization Science, and Strategic Management Journal) or in leading CE journals (e.g., Journal of Cleaner Production, Journal of Industrial Ecology, Sustainability, Sustainable production and consumption, Resources Conservation and Recycling, Waste management, Environmental Quality Management, Business Strategy and the Environment).

We then screened these publications' titles and abstracts for two relevancy criteria [127]: Firstly, studies must essentially address the respective concept, i.e., no other concept should be more prominent than the search string used. Secondly, studies must entail conceptual contributions regarding the research framework, informing about related variables of the respective concept. Next, we considered publications resulting from backward- and forward snowballing techniques [260] and repeated the screening for relevancy. The content analysis followed the literature search to develop our CBM framework integrating antecedents, outcomes, moderators, and environmental factors, as displayed in Fig. 2.

3. Results—a comprehensive research framework

Most articles present structural or process-related antecedents and discuss outcomes, such as firm performance and contributions beyond the firm, inspired mainly by the discussed IT, MC, and DC theories. Complementing existing CBM literature, these articles provide promising propositions of how firms can build adequate CBMs [109,199].

Insights on more complex environmental or other moderating factors are relatively scarce. Hence, our research framework informs scholars on potential relationships and highlights gaps in the literature. We used the theoretic lenses (i.e., IT, MC, DC) to cluster the individual factors. Besides the framework (Fig. 2), we summarize selected and important articles informing CBM literature in Table 2.

3.1. Research on organizational antecedents of circular business models

Which conditions can corporations influence internally to enhance CBM development? Scholars have identified various barriers for CBMs, such as high investment cost or mindset issues [112,119,209,245,250]. Its catalysts can be summarized through (1) cognitive drivers such as top management attention and values, (2) through DC drivers such as processes and features; and (3) through other drivers such as structures, organizational design, and stakeholder involvement. Other direct effects outside of the organization will be discussed in the section on environmental factors.

3.1.1. Cognitive drivers

The literature agrees that *top management attention*, communicated through a clear vision focusing on "circularity" and reducing "sustainability pressures," positively affects the creation of CBMs (e.g., [33]). Visionary leadership (e.g., [74]) and a strong commitment of supervisors to sustainability matters [182] should align with the firm mission [25,161] and should manifest in setting concrete goals, such as developing circular designs and challenging planned obsolescence, and thereby contribute to managerial sensemaking [221]. Also, freeing adequate resources for a CBM transformation, e.g., for the setup of new

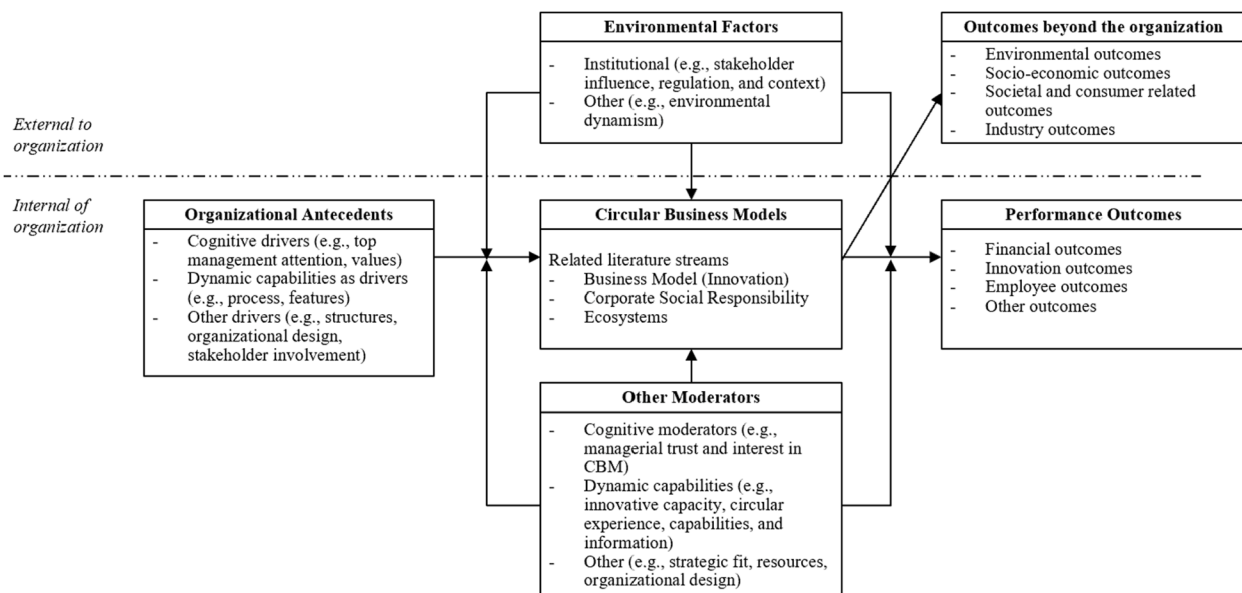


Fig. 2. A research framework to understand circular business models.

Table 2
Summary of selected influential articles for CBM research.

Studies (Year)	Research focus	Domain & method	Key findings
DiMaggio & Powell [83]	Antecedents, outcomes, moderators, environ. factors	IT, conceptual	Conceptual paper introducing institutional isomorphism to organizational theory to explain similarity amongst organizations, differentiating between coercive, normative, and mimetic forces of isomorphism
Scott [226]	Antecedents, outcomes, moderators, environ. factors	IT, review/ conceptual	Literature review about theoretical and empirical contributions towards IT, exploration of the relationship between institutions and interests showing how institutional features of organizational environments shape both the goals and means of actors
Daft & Weick [67]	Antecedents, outcomes, moderators, environ. factors	MC, conceptual	Proposition of a comparative model of organizations as interpretation system, including four interpretation modes (enacting, discovering, undirected viewing, conditioned viewing) and their determinants (managerial beliefs regarding the environment, organizational intrusiveness)
Nadkarni & Barr [183]	Antecedents, outcomes, moderators, environ. factors	MC, quant., conceptual	Comparison and connection of economic and cognitive view, hypothesis testing, and development of an integrated model to explain the interrelation of cognitive views and economic industry views on strategic action
Teece et al. [243]	Antecedents, outcomes, moderators, environ. factors	DC, conceptual	Presentation of the DC framework explaining the mechanisms for private wealth creation in times of technological change through firm internal factors like technological, organizational, and managerial processes
Barreto [31]	Antecedents, outcomes, moderators, environ. factors	DC, review	Literature review on DC view considering diverse research streams on DC, identification of main limitations and challenges, proposition of a new conceptualization of DC as an aggregate multidimensional construct, suggestion for future research
Aguinis & Glavas [9]	Antecedents, outcomes, moderators, environ. factors	CSR, review/ conceptual	Literature review about existing CSR publications and integration into a multi-

Table 2 (continued)

Studies (Year)	Research focus	Domain & method	Key findings
McWilliams et al. [169]	Outcomes, environ. factors	CSR, conceptual	level and multifactor framework, summarizing predictors, moderators, mediators, and outcomes of CSR
Liang & Renneboog [155]	Outcomes, environ. factors	CSR, quant.	Conceptualization and summary of strategic implications for firm performance when deploying CSR in firm strategy making
Flammer [99]	Outcomes, environ. factors	CSR, quant.	Analysis of global CSR ratings from various countries revealing interdependencies, such as between CSR rating and legal origin of country
Vishwanathan, van Oosterhout, Heugens, Duran, & Essen [251]	Outcomes, environ. factors, moderators	CSR, meta-analysis	Analysis of shareholder reaction to CSR initiatives and boundary conditions
Massa et al. [165]	Antecedents, outcomes, environ. factors	BM, review/ conceptual	Meta-analytic analysis identifying four mechanisms on how CSR positively affects financial performance (reputation, stakeholder reciprocation, less firm risk, innovation capacity)
Foss & Saebi [100]	Antecedents, outcomes, environ. factors, moderators	BMI, review	Literature review and categorization into three BM lenses and discussion of BM concept value for strategy literature through value capture on the demand and supply-side
Wirtz, Pistoia, Ullrich, & Göttel [259]	Antecedents, outcomes, environ. factors, moderators	BM, review, qualitative	Literature review on BMI research, revealing gaps regarding construct clarity, antecedent conditions, contingencies, and outcomes
Zhang et al. [263]	Antecedents, outcomes, environ. factors	BMI, meta-analysis	Literature review and identification of four foci (innovation, change & evolution, performance & controlling and design); synthesis of expert interviews for three research avenues (innovation, change, and evolution, design)
Evans et al. [96]	Antecedents, outcomes, environ. factors	BM, conceptual	Meta-analysis confirming a positive BMI-performance association, a moderating effect of environ. uncertainty and impact of both internal and external antecedents

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Table 2 (continued)

Studies (Year)	Research focus	Domain & method	Key findings
Adner [4]	Environ. factors	ES, conceptual	alternative BMs for sustainable firms Structuralist conceptualization of ES and an ES strategy; comparison of ES to other concepts (e.g., BMs, platforms, networks, and alliances)
Jacobides et al. [126]	Antecedents, outcome, environ. factors	ES, conceptual	Theoretical analysis of ES emergence and characteristics, e.g., modularity and complementarity of interdependences
Kapoor [137]	Antecedents, environ. factors, moderators	ES, conceptual/review	Comparison of ES to other similar concepts (e.g., networks) and outline of implications for value creation and organizational design
Granstrand & Holgersson [117]	Outcome, environ. factors, moderators	ES, review/conceptual	Literature review on innovation ES; proposition of a new definition and illustration based on empirical cases
Hannah & Eisenhardt [121]	Environ. factors	ES, qualitative	Case study analysis of five US firms and induction of a theoretical framework explaining firm behavior over time and the role of competition and cooperation

delivery models for CBMs, is crucial [244], and an entrepreneurial mentorship culture influences subordinates to develop "radical service innovation" for CBMs [244]. To summarize, without adequate top management attention, a firm risks running "decoupled CSR initiatives" [254] – which also applies to CBMs.

Furthermore, *values* are fundamental. "Contributing to the CE" as a shared responsibility feeling among employees is a key motivator and antecedent for CBM [110]. According to the CSR review of Aguinis and Glavas [9], normative values such as a sense of responsibility and duty [26,228], adhering to higher-order or morals [8] and a sense of stewardship [162] are driving sustainability from within the organization. Indeed, the existence of such employee values [181] and their congruence with organizational values together can drive CBMs [25]. Hence, explicitly setting CSR or CE orientation as a social norm from a human resource perspective may enhance CBMs [229].

3.1.2. Dynamic capabilities

The dynamic capability to respond to changes in the environment [267], such as the increased climate risk [124], is antecedent to the creation of CBMs. For this purpose, several processes and features are essential: A holistic innovation process and practitioner tools allow employees to generate creative ideas [95]. For example, the theory of inventive problem solving (TRIZ) process [141] helps to design products, testing processes and ensures feedback loops [244]. Learning how to set up multi-disciplinary teams that include CE experts in the design phase [33] and building the capability to design for modularity or non-generic complementarities [126] is critical: It enables a "collaborative arrangement [or ES] through which firms combine their individual offerings into a coherent, customer-facing solution" or CBM [5]. With these cross-organizational processes, companies can cooperate according to their competencies and modules [244] while still owning enough autonomy over their respective module to avoid coordination

struggles [23,126]. Complementary modularity with customers enables indirect network effects [197], increasing overall ES effectiveness and co-specialization for mutual dependency [240].

3.1.3. Other drivers

A CBM requires specific organizational *structures*. These structures may often mirror the CBM's *servitization* [196]: cross-functional structures aiming at short response times and repair facilities near clients [21]. Also, as the new CBM might require organizational changes, organizational *design flexibility* allows acceptance of new CBM innovations [37,100]. Furthermore, a more open design of corporate governance practices may positively influence CSR initiatives or CBMs as more *stakeholders* get a say [7,9,131].

3.2. Research on outcomes

Firstly, we present performance outcomes that refer to the organization. Secondly, we discuss outcomes beyond the organizational boundaries. These effects cover all three Ps of the triple bottom line framework [90].

3.2.1. Research on performance outcomes within the organization

One can broadly differentiate between financial, innovation, employee, and other outcomes. First, scholars expect a positive business case for corporations engaging in the CE [110]. This finding mirrors CSR research, where 59% of studies report a positive CSR-financial outcomes relationship [194,198,251]. This positive relation can derive from firstly, the revenue side, when value is created from "waste" itself [33]) or through classical BM innovation by suggesting new value propositions to customers, such as "high-quality" products [33]), for which customers are willing to pay more [22,220] or "new repair and service markets" that are typical for long life and sufficiency encouragement CBMs [33]). These high-margin BMs may translate into higher market equity value [1]. Second, on the cost side, efficiencies through less material usage, more efficient processes, or even shared communal services such as cleaning in new collaborative CBM networks can decrease cost [33]). However, most likely, setting up a new CBM occurs upfront investment cost in the short term – which represents an essential barrier to CBM implementation [143,164]. In the long-term, though, CBMs are expected to increase firm competitiveness [10] and pay off through "new revenues, resource productivity, and business continuity benefits" ([122]: 71). In the meantime, environmental subsidies, such as the German Renewables Energy Act [102], may contribute to the business case.

Secondly, regarding innovation outcomes, CBMs represent a great differentiation opportunity [148,244]. Accordingly, Tukker ([244]: 85) summarizes that "PSS [Product-Service-Systems, that are similar to CBMs] typically lead to higher client loyalty," and make the product "more appealing to certain customers (...) with a "green" interest" ([33]: 314). Hence, new customer group acquisitions seem possible based on consumer choice of company/product [9,17]. With this "long-term customer loyalty" [33]) and improved customer relationship [233] comes the opportunity to build "more dedicated and unique knowledge about clients and consequently, greater potential to innovate" ([244]: 85), hence increasing innovation performance for novelty-centered BM [266], and overall innovation capacity for future growth [251]. CBMs are lastly expected to improve the offering's reputation [194,251] and the firm's reputation as a whole [9,42].

Thirdly, similar to CSR, CBMs may affect both internal and external employee-related outcomes: Internally, CSR contributes to increased organizational identification and pride [50,133], employee engagement [174], organizational citizenship behavior [133,186], in-role performance [149], employee satisfaction [27], and retention [40]. Externally, these initiatives can help attract future employees that care about the environment [146,255].

Lastly, other effects may be achieved through CBM: For example,

CBM firms may have access to further funds: More and more private impact investors are looking for sustainable investments and several institutional funds, for example, the Norwegian pension fund, tie their investments to sustainability standards [46]. Besides, circularity and local loops in supply chains can decrease dependence on suppliers and input materials and, thus, decrease risk deriving from complicated supply chains and scarce resources [73].

3.2.2. Research on outcomes beyond the organization

These outcomes refer to (1) environmental, (2) socioeconomic, (3) consumer, and (4) industry-related effects. Firstly, improved environmental quality [144,178,213], less resource depletion, reduced toxicity, and pollution [110,212], and sustainable development towards the CE [144] are the positive effects of CBMs. Potential adverse consequences derive from consumers' rebound effects [88,264] as using a sustainable product "may trigger customers [to] spend their cost savings on other "polluting activities" ([33]: 315).

Secondly, socioeconomic prosperity is an outcome for the CBM-firm itself, the partnering firms contributing to the circular loop [247], and the macro-economic system [144]. The growth induced by CBMs is inclusive [234]: It, for example, increases employment [64], which could potentially balance the job losses caused by automation trends [222]. As CBMs diversify the economic setup, it also contributes to economic resilience [94].

Thirdly, both tangible and intangible consumer benefits derive from CBMs: Economic benefits such as lower prices of service-driven offerings [48] or the opportunity to stretch spending for the utility over time, in case of a subscription [244] appeal to the utilitarian consumer perspective. Doing so induces intangible values, such as access to goods that otherwise might have been too expensive to pay for upfront. One main benefit for them is the positive feeling that derives from participating in "creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations" ([144]: 225).

Fourthly, if one industry player changes the industry standards towards a circular business logic, this might induce mimetic forces and a new institutional isomorphism towards the industry's new operating model [83,192]. If the CBM is successful, a virtuous sustainability cycle may likely start within the industry as competitors are afraid to miss the next wave of (circular) innovations.

3.3. Research on environmental factors

Environmental factors are considered vital influencing variables in management theory with environmental dynamism and regulatory dynamics as most commonly used factors [54,114,205,211]. We differentiate direct effects on CBMs, moderating or mediating effects on the CBM-performance, or antecedents-CBM relationship.

3.3.1. Direct effects of environmental factors on CBM

Especially the institutional theory lens allows us to identify direct effects on CBMs stemming from environmental dynamism and uncertainty [263]. Pressure from various stakeholders may drive the development of sustainable offerings: e.g., from shareholders [70,206]; large funds owners [185]; third party evaluators, e.g., for environmental ratings [55,84]; external activist groups [78]; local communities [162], or from responsible consumers with increasingly sustainable customer needs [144]. Accordingly, if monitoring through customers [61] and firm visibility are high [60], CBM development seems more likely.

Industry-specific factors as a broader firm context (e.g., [128]) can also influence CBMs (Brammer and Pavelin, 2006; [9,43]). For example, if the level of differentiation within the industry is low, a CBM will stand out and hence promise increased performance (Hull and Rothenberg, 2008). According to this view, CBM innovation might occur as a response to, for example, competitive pressure [87,130] and induce mimetic forces of sustainable industry behaviors [188].

Besides, scholars agree that CE regulation plays an essential role for CSR initiatives, CBMs, and the CE as a whole [49,110,143,166,173, 231]. Accordingly, trade policy-related sustainability standards [182] or other sustainable certification requirements [61] positively influence CBM development. Furthermore, the context of the firm matters: country-specific aspects of organizational culture [43], corporate governance requirements, politics, financial, labor, and education systems and practices [7,9] may drive or hinder CBM development.

3.3.2. Moderation and mediation of the CBM-performance relationship

Environmental dynamism, defined as the degree of instability [93] and "change in technologies, variations in customer preferences, and fluctuations in product demand or supply of materials" in the external firm environment ([129]: 1664), has a positive moderating effect on the relationship between green product innovation and firm performance, both in terms of profitability and cost efficiency [54]. Furthermore, specific awards and other third-party praise/attention [145], institutional pressure for sustainable supply chains [262], or subsidies [56] can strengthen positive organizational performance outcomes.

Consumers' role in this constellation is especially critical: If consumers' sustainability preferences or at least acceptance for reused products grows [111,144,244], or if the customer-organization-fit is large [227], this can positively moderate the CBM-outcome linkage. As mediators, customer satisfaction mediates the philanthropy-outcome linkage concerning sales [150]; consumer trust mediates the CSR attribution and recommendation-intention linkage [252]; and reputation mediates the corporate social performance-outcome association [194]. These relationships could thus be similar for the CBM-outcome linkage.

3.3.3. Moderation through environmental factors of the antecedent-CBM relationship

While various CBM studies mention the importance of boundary conditions, referring to the importance of ESs collaboration [109] or the influence of legislative measures [86], we have not identified studies that meaningfully investigated external factors' effect on the antecedent-CBM relationship. For example, one could hypothesize that solid innovation processes will lead to CBMs when environmental dynamism moderator is high, as a changing environment increases the need for innovation. However, there is no empirical evidence or study on this topic to the best of our knowledge. This represents a research gap.

3.4. Research on other moderating factors

Both barriers to the CE and potential organizational catalysts have been identified [142,215]. However, the literature on organizational moderators is still scarce – especially in its empirical evidence. Nevertheless, we hypothesize and enrich the CBM knowledge deriving insights from existing research streams, summarizing the most prominent factors, once again clustering the factors into three categories: MC, DC, and other moderators like strategic fit and resources.

3.4.1. Cognitive moderators

Managerial willingness to try disruptively new (circular) business logic and a general interest in CBMs can positively moderate the antecedent-CBM linkage. This often requires trust in the idea and value of CBMs and those individual employees managing the CBM initiative [101,163,193]. As listed above (e.g., high top management attention and strong sustainability values), cognitive antecedents may also represent moderators for the antecedent-CBM linkage: Strong innovation processes are more likely to lead to CBMs (instead of linear BMs) when sustainability is central to employee values.

3.4.2. Dynamic capabilities moderators

As CBMs may need to be implemented in an ES, firms with the right organizational design for sustainability [37] develop needed dynamic capabilities, such as open innovation and effective collaboration with

partners and suppliers [15]. A high level of technological innovation or other creative, *innovative capacity*, e.g., the use of big data to create additional value through, e.g., product innovation [15] and process improvements, can positively moderate the CBM-outcome relationship [76]. Technological innovation, e.g., concerning recycling know-how or waste management, is also critical to reaching environmental sustainability [110] and hence should also positively moderate the antecedent-CBM linkage. [37,37,15,15]. Those factors, in return hence positively moderate the CBM-outcome link in an ES setup [32]. Likewise, a solid buyer-seller relationship positively moderates the CBM-outcome linkage in a B2B context [45] as firms learn to commercialize external resources in an ES [57,58].

Besides that, *capabilities* to manage the change inherent to the BMI process [2] to identify the strategically best fitting BM design enhances firm performance of the CBM [100,265]. For this purpose, scholars expect experimentation and learning capabilities to moderate the antecedent-CBM linkage positively [14,52,53,120]. Overall, DC, such as sensing, seizing, and reconfiguring capabilities at the micro foundation, is essential [139,140]. More operationally, practical capabilities such as environmental management systems [216], as well as competencies, standards, and information [98], or strong marketing capabilities for radically new CBM offerings [244] positively affect the CBM-outcome linkage. Given the often performance-based services of a CBM, the operational delivery benefits from deep experience in customer-service provision [69] and a strong service culture [45,132].

3.4.3. Other moderators

Firstly, the *strategic fit* to the overall firm strategy [100] of a CBM will positively moderate the CBM-performance linkage. For example, a novel CBM will be more successful if the new product portfolio constellation avoids internal cannibalization and if both tangible and intangible consumer benefits, such as price advantages or brand value, are provided [244].

Secondly, the availability of slack *resources* in the organization [25] positively moderates both the antecedent-CBM linkage and the CBM-performance linkage. In other words, with more organizational resources, antecedents like top management attention can more likely lead to the development of CBMs as top management decides to cover initial investment costs. Furthermore, as running CBMs might need ad-hoc financial support to be effective, slack resources also positively influence the CBM-performance linkage. Therefore firm size, often related to larger budgets and slack resources for experimentation [68], affects CSR or CBM antecedent and performance outcome linkages [113].

4. Synthesis of circular business model research

Hence, to reach paradigmatic status, the CBM concept needs to develop further: According to Kuhn [147], a paradigm, being understood as a theoretical framework of a scientific discipline, must produce generalizable insights, theories, and methods to test these. Following the approach taken by previous management authors to assess the paradigmatic status of a concept (e.g., [203]), we use the four conditions defined by Fry and Smith [103]. We thereby show that the CBM is still at the conceptual (pre-paradigmatic) level of development but also on a valid path to eventually reach the paradigmatic stage (see also [89]). We suggest avenues for future research by listing the main insights deriving from the four conditions on variables of interest, congruence, boundaries, and contingency effects. We also exemplify relevant research questions based on this assessment of the four conditions in Table 3.

4.1. Variables of interest

4.1.1. Multi-level analysis

CBM scholars mostly take an organizational or business model perspective (e.g., [33,82,257]), while CE studies consider structures

Table 3

Suggested avenues for future research for CBM literature based on the paradigmatic assessment according to Fry and Smith [103].

Paradigmatic category	Suggested avenues for future research with exemplary research questions
Variables of interest	1) Multi-level analysis: – How can CBMs be implemented best in an ES, e.g., in cooperation or alliance with other stakeholders? What kind of different circular ESs exist, and which context requests which kind of circular ES setup to optimize value co-creation? – What are the micro-foundations on the individual employee level that contribute to the success of CBMs? – How do (project) team dynamics play into the concept of CBM implementation? – What are micro-foundations, behavioral mechanisms, or heuristics on the consumer side that need to be incorporated to design effective CBMs? – How do circular activities on these respective levels contribute to systemic institutional change towards a complete CE?
Congruence	2) CBM concept: – How can further strategic management insights enrich the concept of CBM itself? – How can the concept be enriched or more clearly differentiated to other ideas such as non-profit orientation or shared value ideas? 3) Interrelation of antecedents: – How do various antecedents interrelate with each other, and what is their respective weight in contributing to CBMs? – To which extent can antecedents also moderate another antecedent-CBM relationship? 4) Effects on performance: – How do CBMs influence both tangible and intangible outcomes? – What kind of empirical evidence can we find for current propositions on value creation, and what are managerial implications?
Boundaries	5) Granular view on boundaries: – What are mediating and moderating factors concerning CBMs in varying contexts? – What are boundary objects in the field of CBMs that ensure a common understanding of CBMs in varying groups? 6) Impact of culture: – How does culture influence the implementation of CBMs? – How does culture influence the outcome and performance dimensions of a CBM?
Contingency	– What are further contingency factors of CBMs? – What can the CBM literature learn by deploying other theoretic lenses, such as path dependency theory, transaction cost, and stakeholder theory? – Do these contingency hypotheses prove valid in empirical tests?

from a macro or institutional lens [116,143] and ES literature deal with meso-level implications of CBMs [126]. As scholars looked at these levels in isolation, CBM research would benefit from multi-level studies examining their interrelations: Challenges on one level are solvable on another level. For example, a firm might struggle to organize the collection service of a *reuse* CBM. However, managing the collection in an ES might solve this dilemma as firms coordinate to collect materials at scale. Also, an extensive research gap represents CBM studies on the individual or team level. Neither topics such as CBM specific leadership behavior, employee attitude, nor team dynamics have been examined yet. While it is typical for a research field to start from a macro or institutional perspective and only develop its micro-foundations later (e.g., see the development of CSR research outlined by Aguinis & Glavas [9]), we expect a significant benefit in cumulating knowledge on the micro-level.

4.1.2. CBM concept

Despite the vast growth of CBM literature in the last few years, it has not meaningfully incorporated strategic management and strategy

literature ideas. Scholars discuss CBM primarily in sustainability-related journals [143]. However, extending the CBM concept for further strategic facets beyond the BMI literature will help gather further ideas on the concept and allow a broader discussion of sustainability in strategy literature, increasing the CBM concept's impact.

4.2. Congruence

To reach congruence, cumulative theorizing should be proved empirically by identifying causal relationships. So at least antecedents and consequences of the phenomenon and propositions about their cause-effect relationships must be formulated [103]. The CBM literature has started to suggest relationships, however, with limited empirical evidence. By learning from CBM related research streams, we proposed relationships between antecedents, moderators, and outcomes of CBMs. Besides this synthesis, a research gap remains regarding the interrelation of antecedents, different effects on performance, and the complexity of CBMs.

4.2.1. Interrelation of antecedents

The CBM literature has hypothesized antecedents and discussed barriers to CBM implementation (e.g., [119,245,250]). However, there has not been an investigation of antecedents' interrelation and their respective weight in contributing to CBMs. Most of the current studies just hypothesize antecedents or analyze them ex-post through case studies. Conversely, future research could theoretically develop and empirically test propositions on how different antecedents interact and complement each other. Doing so could potentially generate insights for the multi-level CBM setup, as described in the previous section.

4.2.2. Effects on performance

As the expected environmental benefit through the CE [109] is the initial motivation of the CBM domain, the literature on CBM specific organizational performance outcomes is still scarce. Nevertheless, understanding the effects on various firm performance indicators is crucial for two reasons: Firstly, it brings the concept closer to paradigmatic status [103], and secondly, it represents a strong motivation for firm adoption in practice. While the literature recognizes that CBMs can increase revenues by addressing new markets and customers, and reduce cost through fewer material needs [190,204], different non-financial outcomes such as higher employee satisfaction, also need further investigation. Simultaneously, scholars must explore potential adverse outcomes to inform the mitigation of underlying harmful mechanisms in practice – even if this is difficult due to various uncertainties and complexity of variables [156].

4.3. Boundaries

The CBM concept mostly understands its boundaries tied to a company [109]. However, it is critical to understand better broader boundary conditions as CBMs might have different effects in different firms or environments. To clarify boundaries, we suggest how a differentiated view of boundary conditions could help understand the various contexts and how culture's impact could influence the concept and its implementation.

4.3.1. Granular view on boundaries

While various CBM and CE scholars ask for a systems-level approach in the field [33,81,248], understanding the concept of CBM in a smaller context may be just as insightful to generate new insights: Companies' ability to develop and implement CBMs might be influenced by other factors depending on whether it is, for example, an incumbent or startup firm.

Besides, variables described as boundary conditions may occur in different functions and may vary over time, calling for a more active investigation of CBMs: For example, *regulation* can be an antecedent if a

new directive prescribes recycling standards but can also positively moderate the CBM-outcome linkage if the regulation comes in the form of a subsidy, e.g., a reduced revenue tax burden for circular offerings. Besides this granular view on and specification of antecedents and moderators as boundary conditions, it will become crucial to differentiate between their moderating or mediating effects [30]. For example, customer satisfaction may mediate the CBM-outcome relationship for highly competitive markets and moderate the linkage for less competitive markets. The available literature on moderators and mediators is still thin in CBM research. This calls for more qualitative research in case studies or interviews to propose further relationships.

4.3.2. Impact of culture

Best to our knowledge, no CBM specific study to this date assesses the cultural impact on CBM. However, as we see in the related literature streams, the various dimensions and levels of culture, e.g., international country culture, industry culture, organizational culture, personality styles or consumer culture, and more play a significant role (for CSR, see Mohamed Adnan, Hay, & van Staden [176]). Future studies should investigate cultural antecedents for CBMs and enrich the CBM knowledge for individual-level evidence from various stakeholder groups, such as consumers, managers, or policymakers.

4.4. Contingency

To reach paradigmatic status, scholars must formulate contingency hypotheses. These hypotheses promise the generalizability of relationships in a pre-defined model [85]. Thus, exciting avenues for future research are to validate the current propositions related to CBM by testing those in various organization types and testing these propositions with different CBM types. We suggest doing so both through empirical qualitative and quantitative studies. To formulate further contingency hypotheses deploying other established organizational theories (e.g., transaction cost theory) could prove beneficial. With the integrated research framework of this article, CBM scholars hopefully find a) an insightful starting point to guide their efforts of testing proposed relationships; or b) further inspiration to propose new hypotheses.

5. Conclusion

Despite the general trend to conduct relatively narrow and specialized studies in sustainability and management research, this review provides a bigger picture of the CBM concept. To summarize, this paper generates three novel insights and contributions to the field: First, it links relevant, but thus far, not meaningfully connected research streams to the CBM research field: By highlighting the influences of CE, CSR, BMI, and ESs, we provide an integrated research framework for CBM. Second, we show how not just one single management theory can enlighten the progress of CBMs research and thereby highlight the need for a more integrated debate of systemic challenges as addressed by CBMs, such as climate change. Third, we systematically showcase that the CBM concept, despite its recent surge of publications, still has various challenges to overcome before reaching a paradigmatic status.

With this paper, we hope to spark more extensive discussions and inspiration for future research on the CBM concept without the need to reinvent the wheel. Thereby, we want to encourage a more systematic knowledge accumulation and hope to move the young and emergent concept of CBM to a paradigmatic level faster.

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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