Business Strategy and the Environment

WILEY

Business Strategy and the Environment

RESEARCH ARTICLE OPEN ACCESS

How Companies Move to Circularity: Internal Reorganizing and Adjustment of External Collaboration

Alexander Fliaster | Karolina Bähr

Chair of Innovation Management, Faculty of Social Sciences, Economics and Business Administration, University of Bamberg, Bamberg, Germany

Correspondence: Karolina Bähr (karolina.baehr@uni-bamberg.de)

Received: 18 January 2024 | **Revised:** 21 April 2025 | **Accepted:** 3 May 2025

Funding: The authors received no specific funding for this work.

Keywords: circular economy | collaboration | innovation | interorganizational relationships | reorganizing | sustainability

ABSTRACT

Firms in various industries strive to narrow, slow down, and close resource flows, moving toward a circular economy (CE). We theorize that the transformation of established companies toward CE includes two critical interconnected dimensions—adjustment of external collaboration relationships and internal reorganization. We conducted a qualitative study in the plastics industry to explore them empirically. Our analysis indicates that established firms adapt their external collaborations in four ways: companies modify the criteria of partner selection and the strength of dyadic relationships, add new partners and roles in the value chain, and consolidate the external collaboration network. These collaboration adjustments are accompanied by three key facets of internal transformation—reorganization of permanent and temporary organizational structures and processes. Finally, our study provides new insights into the interplay of the intra- and interorganizational dimensions of the shift toward the CE.

1 | Introduction

Grand challenges, particularly the Sustainable Development Goals of the United Nations, sparked a powerful need for change at various levels (George et al. 2016). Scholars as well as practitioners argue that an important way to promote sustainability is the circular economy (CE) (Ellen MacArthur Foundation 2020; Sharma et al. 2021). According to Geisendorf and Pietrulla (2018), the core of CE is maintaining the value of products and materials, avoiding waste, and keeping end-of-life products as resources within the economy. The "R-framework" describes the primary CE principles, for example, reduce, reuse, recycle, and recover (Kirchherr et al. 2017). From the management perspective, the CE reframes waste as a resource and redesigns material loops (Geissdoerfer et al. 2017). Today, there is still great potential in the implementation of the CE, as, for example, recycled secondary materials account for only 7.2% of material consumption across all sectors in the context of the global economy (Circle Economy 2023). Successful implementation of CE not only brings benefits to companies but also contributes to the sustainable development of our society and the environment. Therefore, a better understanding of how CE initiatives can be implemented gains crucial importance.

As the transformation toward CE is a relatively new phenomenon, knowledge on the "experiences and other struggles" of firms pioneering in CE implementation is still limited (Piila et al. 2022). In particular, previous studies argued that the shift toward CE makes interorganizational collaboration necessary (Aarikka-Stenroos et al. 2022; Gebhardt et al. 2022) and this collaboration has a positive effect on CE implementation (Schöggl et al. 2023). However, while research on CE is burgeoning (Kirchherr et al. 2023), much remains to be understood about the mechanisms of how industrial organizations can build new collaboration patterns toward achieving circularity.

Furthermore, while scholars stress that organizational structure can support or hinder CE implementation (Assmann et al. 2023) and established firms must "reconfigure" their activities to implement CE (Khan et al. 2020a), past research paid only limited

attention to exploring the actual reorganization of internal CE-related processes (Eisenreich et al. 2021) and organizational structures (Eikelenboom and de Jong 2022).

Moreover, while previous studies found that internal organizational processes and competences affect the characteristics of external collaboration networks (Reck et al. 2022), the links between firms' internal organizing toward CE and the external collaboration relationships are still underexplored (Aarikka-Stenroos et al. 2022; Suchek et al. 2021). Hence, our study theoretically and empirically addresses these three shortcomings: First, the insufficient understanding of measures by which firms build CE collaborations. Second, the missing knowledge on how companies reorganize their internal processes and structures as they move toward CE. Third, the dearth of knowledge on the links between external collaboration and internal reorganizing. Hence, our study explores the following research question: *How do established firms in the plastics industry reorganize internally and externally toward achieving circularity?*

We decided to look at the efforts of companies in this particular industry because plastics is among the most likely and most far-reaching industries impacted by CE initiatives (Ellen MacArthur Foundation 2020, n.d.). The European Commission attributes a high potential for the implementation of CE initiatives within this sector due to the high consumption of resources (European Commission 2020). In a similar vein, the United Nations Environment Programme (2023) also stresses a need for system change to implement CE in the plastics sector. Finally, other recent studies underline the importance of this sector (Barford and Ahmad 2023; Schultz et al. 2024). To address our research question, we collected qualitative data on 21 firms from Germany and France as they are two of the three countries with the biggest plastics industries in the European Union (Plastics Europe 2021). Our extensive qualitative database consists of 25 interviews and over 200 publicly accessible company documents. For the collection and analysis of these qualitative data, we follow the tenets of grounded theory, especially the Gioia methodology (Gioia et al. 2013).

The remainder of this paper is structured as follows. First, we briefly summarize the theoretical background and previous empirical findings on circular oriented collaboration and internal organization. Then, we describe our data collection and analysis. The findings section consists of four parts. Initially, we show the plurality of observed CE strategies and CE-related innovation challenges. Subsequently, the internal reorganizing activities and adjustment of external collaboration are presented in detail. The last part of the findings' section focuses on the interplay of internal reorganizing and adjustments of external collaboration. In sum, our paper provides several contributions to current research on organizational transformation and collaboration toward CE: We augment the literature on intra- and inter-organizational dimensions of CE transformation. Furthermore, we enhance research by identifying interdependencies of internal reorganizing and external collaboration.

2 | Theoretical Background

CE transformation refers to firms that move away from a linear economy and implement circular initiatives in their business activities (Asgari and Asgari 2021; Uhrenholt et al. 2022). Scholars argue that "the transition from linear models to the CE supported by innovation is a complex issue, especially because it comprises a large number of different actors, networks, connections and organizational structures" (Sehnem et al. 2022, p, 245). For firms, this transformation entails two major change arenas—intraorganizational adaptation and the adjustment of interorganizational collaboration activities (Frishammar and Parida 2019). On the one hand, companies have to introduce modifications internally, adapting their organizational structure, processes, and capabilities (Assmann et al. 2023; Bocken and Geradts 2020). Organizational transformation is generally defined as "intraorganizational change that leaves the organization better able to compete effectively in its competitive milieu" (Newman 2000, 603). In their recent systematic review, Graessler et al. (2024) characterized organizational change toward CE as radical, holistic, iterative, and systematic. Hence, organizational CE transformation can be understood as a gradual process "where companies progressively integrate the array of environmental activities [recycling or reusing materials, reducing consumption, saving energy, and developing sustainable products or services] until achieving the integration of the CE" (Arranz et al. 2024, 3). Such transformations are also referred to as second-order change, as they affect the core of an organization in a particularly radical way and are associated with major uncertainties and risks (Newman 2000).

Recent CE studies have addressed several internal aspects of the organizational shift toward CE and, more broadly, sustainability. In particular, scholars investigated circular strategy and culture (Bertassini et al. 2021; Blomsma et al. 2019), organizational design and dynamic capabilities (Bocken and Geradts 2020; Khan et al. 2020b; Köhler et al. 2022), and corporate activities related to CE opportunities and circular business model transformation (Frishammar and Parida 2019; Khan et al. 2020a). In the following, we focus on one of the core factors that essentially affects almost all aspects of organizational life—the internal organizing. In doing so, we draw on recent works that have already made efforts to bring internal organizing into connection with the CE transformation. For example, Bocken and Geradts (2020) described the involvement of top management, the introduction of autonomous and separated units, and the tailored innovation processes as enablers of sustainable business model innovation. Furthermore, Khan et al. (2020a) recommend that "firms that want to pursue CE business opportunities should include CE in the organizational structure" (p. 1491).

On the other hand, in addition to internal reorganization, companies have to strategically develop and adjust collaborative relationships with other actors (e.g., business ecosystem partners) within their external environment (Kuhlmann et al. 2023). This challenge has been discussed in the literature as "CE collaboration" (Aarikka-Stenroos et al. 2022; Gebhardt et al. 2022). In general, from the organizational theory perspective, companies can choose between four coordination mechanisms to promote the shift toward CE: make, ally, buy, or do nothing (Hansen and Revellio 2020; Tuladhar et al. 2024). Ally refers to hybrid transactions that are neither simple market exchanges (buy) nor activities integrated internally within organizational hierarchies (make) due to high complexity, the requirement in specific investments and the general incompleteness of contracts (e.g., Williamson 1991). Collaboration, that is, the "ally" mode, refers

to interorganizational relationships (IOR) aimed at "voluntarily helping others to attain a common [...] or a private goal" (Castañer and Oliveira 2020, 994). Interorganizational collaboration has been found to have a significant positive effect on the implementation of CE strategies (Schöggl et al. 2023). *CE collaboration* is defined as voluntarily working together with others to implement CE strategies inside the own organization, in partner organizations, or the whole system while considering the whole lifecycle. Organizational and sustainability scholars advocated that there are several reasons why collaboration plays a crucial role in CE (Gebhardt et al. 2022). In particular, firms usually initiate CE collaboration to enable resource flows among business partners (Aarikka-Stenroos et al. 2022) and develop or improve services and products (Faems et al. 2005; Fluchs et al. 2022; Lichtenthäler and Neligan 2023). With regard to resource flows, it should be emphasized that in the context of CE, not only the availability and access to external resources are a motive for collaboration but also recycling, reuse, processing, and disposal are becoming increasingly relevant to enable further utilization of resources to reduce waste at the end-of-life (Tuladhar et al. 2024). In addition, CE collaboration can be differentiated according to the stages of the product lifecycle. This leads to transdisciplinary collaboration at the circular design stage to access new knowledge, intensified collaboration at the circular product and service stage to create and capture value, and collaboration at the upscaling circular resource recovery stage to grow networks (Danvers et al. 2023).

In contrast to previous research, which often treated these two big arenas of organizational transformation as isolated from one another (Zollo et al. 2013), we argue that for the shift toward, both of them—internal reorganizing *and* adjustment of external collaboration—are likely to be necessary and thus have to be performed by organizations in a coordinated manner.

CE studies revealed that limited internal capabilities and resources increase the need for collaboration, and flexible internal structures have been found to facilitate collaboration (Brown et al. 2018). Further research also revealed other facilitators of interfirm CE collaboration, such as sustainability-oriented internal decision models, collaborative skills, industry-related CE expertise, the ability to bear uncertainty and complexity (Kleine Jäger and Piscicelli 2021), and dynamic capabilities (Khan et al. 2020b; Köhler et al. 2022). Therefore, firms have to recognize their needs regarding CE collaborations (Brown, Baldassarre, et al. 2021; Brown, Von Daniels, et al. 2021) to select partners and align with them (Pedersen et al. 2023; Tuladhar et al. 2024). Furthermore, classical supply chain differentiation of upstream and downstream partners becomes obsolete due to the shift toward CE, resulting in the need to design more complex networks (Sudusinghe and Seuring 2022).

Some studies focus on a better understanding of collaboration with individual stakeholder groups in the CE context. For example, current studies highlight that firms with environmental product designs were able to achieve cost performance through collaboration with suppliers (Chavez et al. 2023). Moreover, collaborations with entrepreneurial companies introduce innovative business models and open up new market opportunities for established corporations (Veleva and Bodkin 2018). Finally, recent research shows that civil society organizations such as nongovernmental organizations, nonprofit organizations, and social movements engage in boundary work that enables circular design and circular innovations through collaboration and mutual learning (Ho et al. 2022).

Previous works on innovation also inform our line of reasoning regarding possible links between internal and external perspectives. Tidd (2001) has argued, for instance, that an organizational response to uncertainty and complexity consists of the combination of internal organization and external relationships, also known as the contingency view of innovation management. Especially for small and medium-sized companies, the access to external resources is frequently of crucial importance for the design of internal innovation processes due to resource constraints (Dossou-Yovo and Keen 2021).

In sum, despite the burgeoning work on organizational transformation toward CE, there is still a dearth of research on the interplay of internal reorganizing (internal reconfiguring) and adjustment of external collaborations (external reconfiguring). Previous works advocated, for instance, that "the journey toward CE starts with (re)designing the product, which leads to the transformation around which all other changes in the organization and supply chain collaborations are then arranged" (Aarikka-Stenroos et al. 2022, 332), but fall short in addressing those organizational changes in more detail. Our findings, analysis, and discussion in the remaining sections deepen and augment the previous insights regarding organizational transformation toward CE.

3 | Qualitative Research Design

3.1 | Data Collection

The empirical setting of this study includes companies that face challenges related to the circularity of plastics. We used the theoretical sampling approach (Foley et al. 2021; Glaser and Strauss 1967), which means that the selection of cases follows theoretical considerations in order to control variance and ultimately support inductive theorizing (Charmaz and Thornberg 2021; Eisenhardt 1989; Glaser and Strauss 1967). Our theoretical sampling was guided by three initial selection criteria, namely regional focus, company age, and observable and acknowledged progress in CE implementation: We collected data on 21 *firms from Germany and France* as they are two of the three countries with the biggest plastics industries in the European Union (Plastics Europe 2021). As we focus on transformation, we addressed *incumbent companies with at least 10 years of existence* since we assumed those incumbents to experience a need to adapt existing collaboration patterns and well-established internal routines to make the move toward circularity (Steiber and Alänge 2021; Tuladhar et al. 2024). Additionally, we considered empirical insights from previous works to inform our selection criteria. Studies found that individual German companies have very different levels of CE transformation (Fluchs et al. 2022; Lichtenthäler and Neligan 2023). This suggest that not all companies are implementing CE at the same time and at the same pace. Rather, there are pioneer companies that are of particular interest to our study. Hence, we focused on *companies that are already making innovative contributions to the CE in plastics or plastic packaging*. To find them, we have checked publicly

available information on CE innovation initiatives. Most sampled companies have received awards or certificates for their efforts (e.g., D51, D187, and D210). In the process of theoretical sampling, early interviews provide insights to question assumptions and concepts or give hints on how to understand emergent concepts better that guide the further data collection (Charmaz and Thornberg 2021; Foley et al. 2021). Hence, we engaged in simultaneously conducting collection, coding, and analysis of data so that the developed themes and dimensions guided us to decide "what data to collect next and where to find them, in order to develop ... theory as it emerges" (Glaser and Strauss 1967, 45). For example, initial interviews signaled the need to collect additional enriching views from recycling companies and industry consultants.

Eighty-five interview requests were sent out in two waves. In the first wave, we contacted 31 companies and conducted 11 interviews between June and August 2022. The second interview period ran from February to October 2023. Fifty-four companies were contacted, of which 15 requests were successful. In sum, we conducted 25 semistructured interviews with 26 top and middle managers (in one of the interviews, two managers have participated). To achieve theoretical saturation (Glaser and Strauss 1967), we continued data collection until we could not find any nonredundant information among the interview participants and confirmed the developed themes and dimensions (Nag and Gioia 2012).

During data collection, we undertook several actions to address possible biases. Biases can arise both on the part of the researchers (e.g., confirmation bias) and on the part of the informants (e.g., social desirability bias, retrospective bias) and reduce the validity and reliability of a study (Bergen and Labonté 2020; Graebner et al. 2012; Tuladhar et al. 2024). While the interviews were the primary form of data collection, we intensively engaged in data triangulation to enrich contextual knowledge and increase trustworthiness (Flick 2018; Nag and Gioia 2012). In doing so, we collected and analyzed over 200 publicly available documents to reduce informant bias (see Appendix 1).

We developed the interview protocol based on design principles for semistructured interviews (Adams 2015; Rowley 2012) and previous empirical work on CE collaboration (Leising et al. 2018) to reduce researcher bias. Interview questions can be found in Appendix 2. To reduce informant bias during the interviews, we made a point of following up if an answer seemed incomplete or generic and regularly asked for additional real-life examples or experiences (Bergen and Labonté 2020). Two interviewers conducted the interviews. One could concentrate on listening and asking questions, while the second led the interview. We recorded and transcribed all interviews (see also Appendix 3). We followed up each interview with a reflection on our expectations and possible interpretations of the answers to counteract confirmation bias.

3.2 | Data Analysis

For our study, we chose the qualitative research design as it is advantageous in areas of nascent, not well-established theory (e.g., Graebner et al. 2012). Qualitative research builds on inductive theorizing of static and dynamic words and visuals that make up qualitative data, which require detailed description and an interpretation of the database (Bansal et al. 2018; Gephart 2004). Qualitative methods help to reach the goal of understanding (Bettis et al. 2015). An important argument for applying qualitative research is that this research design allows the analysis of phenomena that take place on different levels (Bansal and Corley 2011). Since the implementation of CE takes place both internally and through CE collaborations, as argued above, this is an advantage as both the internal level and the level of interorganizational collaborations as well as the ecosystem level can be considered. Additionally, qualitative research seeks to understand complex, often messy and new phenomena (Bansal et al. 2018), when the existing literature needs advancements by additional detailed descriptions, interpretations, and theoretical explanations (Bluhm et al. 2011). As the CE transformation in the plastics sector is still in its infancy, knowledge on this phenomenon is yet limited, which requires further description, understanding, and explanations. To achieve the goal of describing, understanding, and explaining, qualitative research is especially valuable to answer research questions about how and why (Bansal et al. 2018; Gephart 2004; Gioia et al. 2013). The formulated research question, how established firms of the plastics industry reorganize internally and externally toward achieving circularity, shows a fit with the logic of qualitative inquiry.

The research design of this work was based on the Gioia methodology (Gioia et al. 2013; Magnani and Gioia 2022), a recent refinement of the grounded theory approach. The guiding principles of all grounded theory methods refer to the ongoing comparison of emergent categories, concepts, patterns, and interrelations with each other and existing theoretical arguments, simultaneous data collection and data analysis, theoretical sampling, and theoretical saturation (Charmaz and Thornberg 2021; Corbin 2021). These methods are aimed at building theories inductively (Heath and Cowley 2004).

We began our data analysis with the first interview round, steadily supplemented insights, and developed the emerging framework via the newly added interviews and data triangulation. We used MAXQDA 2022 and began with an inductive open coding to identify topics from informants' perspectives (Corley and Gioia 2004; Gioia et al. 2013). Relevant and interesting aspects for the research question or the understanding of the phenomenon have been highlighted and coded. In this step, we remained very close to the wording of the data basis to avoid unintentional interpretation. In the second step, we compared codes to build superordinate categories representing researcher-focused themes (Corley and Gioia 2004; Gioia et al. 2013; Nag and Gioia 2012). Similar codes from the first step have been grouped into superordinate categories and labeled with names that provide a first theoretical interpretation. This bundling into categories requires a repeated comparison of the previously formed codes with each other and the emerging categories, taking into account the actual meaning contained in the data. The analysis of the interviews from the first round followed a purely inductive approach with a focus on internal organizational design and related external CE collaboration. Only afterwards, we consulted the literature on CE collaboration regarding the three emergent themes (circularity-related innovation challenges, internal reorganizing, and external collaboration adjustment) and included more questions in the interview guidelines for the

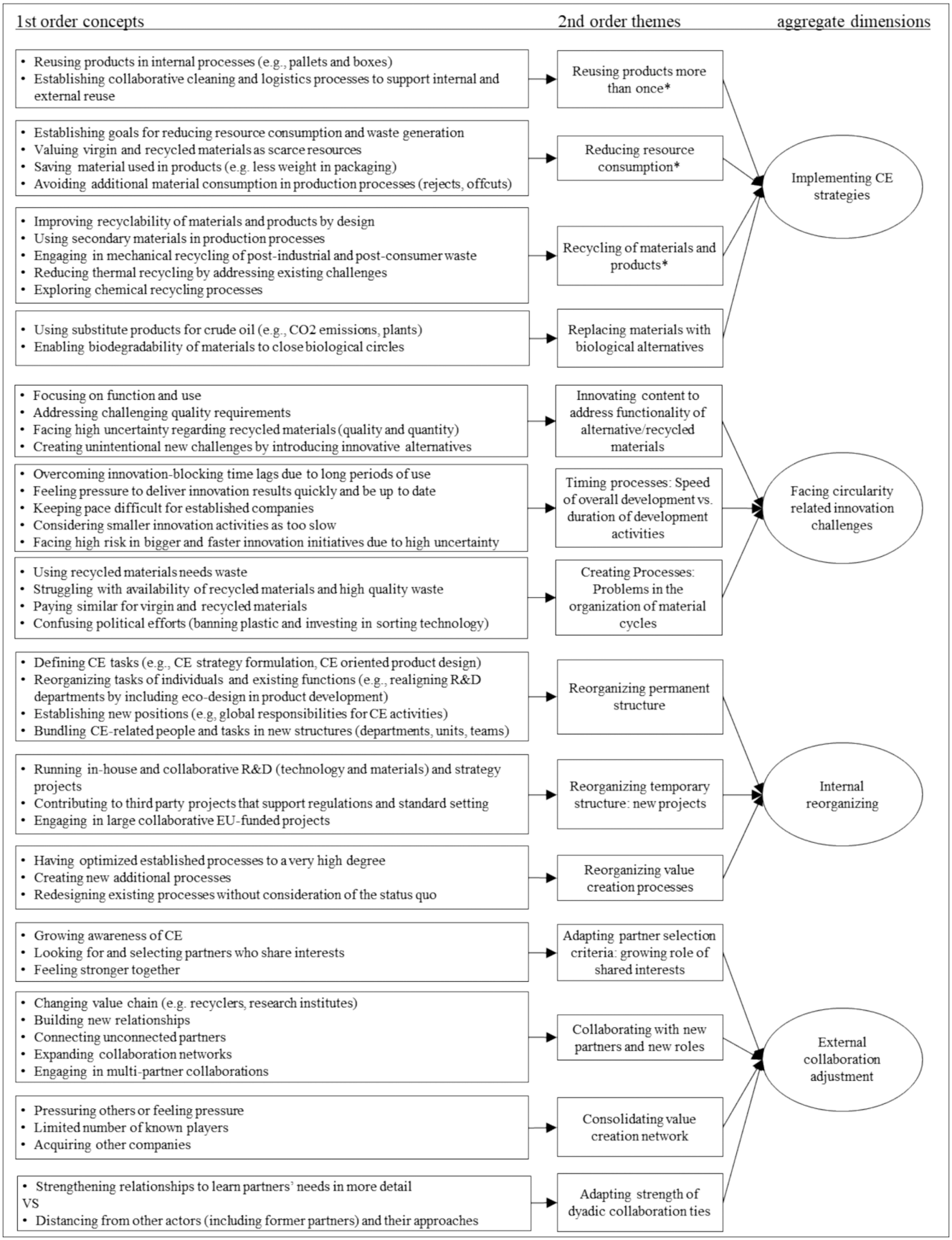

FIGURE 1 | Data structure. *R labels from CE literature (Bocken et al. 2016; Kirchherr et al. 2017; United Nations Environment Programme 2023). Abbreviations: circular economy (CE), research & development (R&D).

second interview round. Our qualitative analysis constitutes an ongoing comparison of emergent codes, categories, patterns, and interactions with each other (Charmaz and Thornberg 2021; Corbin 2021). We reread interviews several times and discussed emergent themes (Gioia et al. 2013; Lincoln and Guba 1985). Furthermore, in line with the informed grounded theory, we compared insights with theoretical arguments (Locke 2002; Thornberg and Dunne 2019). The resulting *data structure* (Figure 1) shows informant-based first-order codes, researcher-centric second-order themes, and general, overarching theoretical dimensions.

In addition to the data triangulation, we took several other steps to ensure the rigor of our analysis and reduce possible bias. Both authors engaged in data analysis to reinforce the credibility of our findings (Bähr and Fliaster 2023; Gioia et al. 2010). We also deployed several procedures, such as checking transcripts for obvious mistakes and managing interview transcripts, published articles, reports, and other collected documents using a software program (Corley and Gioia 2004). We have tried to consider and represent all data sources in the data analysis (Tuladhar et al. 2024). We emphasize this by giving examples of the data sources. Data sources are named with an abbreviation consisting of a letter and a consecutive number. "I" stands for "interview" and "D" stands for "document." This form of data triangulation enabled us, for example, to compare statements from different data sources in a comprehensible way. Finally, we also discussed the results with external experts at international research conferences in order to challenge our own assumptions and counteract confirmation bias.

4 | Findings

The following section describes key findings. The discussion of our empirical findings is provided in the final section.

4.1 | The Plurality of CE Strategies and CE-Related Innovation Challenges

In order to understand how companies can succeed in CE transformation, it is first necessary to explore the underlying CE strategies and the associated CE innovation challenges. CE includes narrowing, slowing, and closing loops, also known as reducing, reusing, and recycling (Bocken et al. 2016). Such CE strategies are often described with "R"s ranging from typologies containing four Rs (e.g., reduce, reuse, recycle, and recover) up to ones that include nine or more Rs (Barreiro-Gen and Lozano 2020; Kirchherr et al. 2017; United Nations Environment Programme 2023; D37, D71). The individual strategies are not free of overlap (Bocken et al. 2016). Therefore, our first research objective was to understand what CE means for our sample companies (see Figure 2).

Following previous works (e.g., Bähr and Fliaster 2023; Weber et al. 2019), as we proceeded further with data collection and analysis regarding CE strategies, we did not assemble first-order categories into second-order themes inductively. Instead, we have assigned them to different predefined themes, that is, different "R" strategies drawn from the recent CE literature. This procedure allows us to systematize novel data "without reinventing the well-ridden wheels" (Gioia et al. 2013, 21). Our data show that the CE strategies of the investigated companies are diverse and divided into four thematic areas.

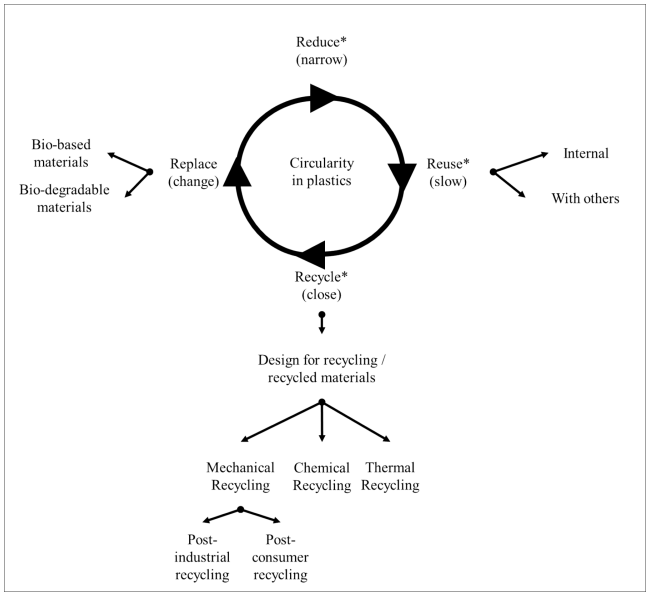

FIGURE 2 | Pluralism of circularity strategies in plastics. *R labels from CE literature (Bocken et al. 2016; Kirchherr et al. 2017; United Nations Environment Programme 2023).

The first strategy, *reduce*, is aimed at using fewer resources and producing less waste. It includes making existing production facilities more efficient to save resources and energy (D4, D38, D177) and using less material while maintaining full functionality (D17, D60, D169). Firms have pursued this strategy for many years, essentially for economic reasons (D39, I19, I23). The second strategy, *reuse*, refers to repeated or prolonged use of products and the resulting slowing down of cycles. Pursuing smaller *internal* initiatives marks the mere beginning of CE transformation (D40, I4, I23) before firms initiate more complex reuse approaches in collaboration with *external* partners (D186, I6, I18, I22).

Recycling includes approaches that aim to close cycles through design for recycling to improve the recyclability of materials and products (I16, I19, I23) and the use of secondary materials such as recyclates (I8, I13, I22) or the use of waste gas for plastics production (D1). Mechanical recycling is the most widespread approach to producing recyclates, in which granules are created from homogeneous monomaterial plastic waste by washing, crushing, and melting processes. Mechanical recycling approaches can be differentiated according to the type of waste used. Several companies in our sample have a long tradition of so-called postindustrial recycling (D37, D148) in which production waste is fed back into the production process (I4, I15, I20). Postindustrial recycling is distinguished from postconsumer recycling, which uses waste collected from end consumers as input material (D11, D22, D73). Postconsumer waste creates higher challenges for companies since neither the materials nor their prior uses are known (I3, I8, I21).

Furthermore, several respondents mentioned "thermal recycling," that is, energy production from waste (I3, I5, I15). Some companies are exploring *chemical recycling* processes, especially for materials unsuitable for mechanical recycling, or using the output of chemical recycling processes in applications where mechanically produced recyclates are prohibited due to product safety concerns (I6, I12, I23). Chemical recycling is an umbrella term for several chemical processes that produce substances from plastic waste with similar chemical properties to crude oil (Ragaert et al. 2017; D40). These processes are still under development (D1, I24, I25).

The fourth "R" strategy we found in our sample is related to enabling biological flows. We label this strategy as *replace*. This strategy includes the use of CO_2 emissions (D130) or bio-based materials such as corn, as well as the biodegradability of substances through composting processes (I6, I16, I19). Usually, bio-based plastic shows the same properties as conventional plastic (D26, D33) and cannot automatically enter biodegradation. Some companies have successfully created bio-based plastic and biodegradability but still see these approaches as niche solutions (I20, I21, I23).

We further found that the implementation of these CE strategies causes innovation challenges for the companies. Our data reveal that these challenges refer to the innovation content and process. First, the total need for innovation, for example, re- and upcycling (I11, I13, I20), is growing as various industries with distinct material streams use plastics (I14). In particular, firms must innovate to meet quality requirements, as some companies cannot easily use recycled materials. For instance, regulation determines the (non)use of recyclates due to product safety issues in food and pharmaceutical industries or fire protection of technical plastics (D107, D199, D209).

Regarding the research and development (R&D) process, its speed and duration came to the fore as important challenges. Innovation activities in many industries aim at rapid progress. However, due to the CE shift, the targeted long period of use tends to delay innovation (I20). Furthermore, redesigning existing interdependent business models and their underlying technological base is a substantial challenge that takes time (I25, D149, D171). For instance, developing approaches to chemical recycling takes years (I5, I15), and innovation projects frequently take longer than initially planned (I19). The mentioned disadvantages of recycled materials are the complexity and costs of recycling processes compared to the production of virgin materials (D199). One respondent explained that recycling includes "too many individual steps to get something back from the collected waste. You can only do that by reducing these steps. But you compete against an optimized product with fully automated mass production" (I20). Some companies engage in various parallel development activities (I25) and anticipate that projects might fail (I19) or orient their development activities toward the strictest regulation (I18) to reduce risk. Other firms postpone development activities or invest in other regions because uncertainty regarding future approval procedures and regulation is considered too big (I23, I25).

The organization of material cycles is also challenging because of conflicting loops and the "limited availability" of resources (plastic waste). The OECD currently estimates that plastic production will triple by 2060 (OECD 2022). Hence, the growing use of recycled materials cannot satisfy the industry's demand (I14, I21) without enhanced quality (Schmidt and Laner 2023). While CE generally includes narrowing, slowing, and closing loops (Bocken et al. 2016), concerning plastics waste, political efforts support reducing plastics and narrowing loops (Turning the Tide on Single-Use Plastics, 2021). Thus, companies feel that political measures interfere with their innovation efforts providing fewer incentives for firms' R&D investments in slowing and closing loops (I3). There are also conflicts of interest between the various stakeholders due to conflicting loops. For example, as one packaging producer explained, "an innovation that significantly reduces the weight of packaging [narrowing] is of no interest to the recycling industry [closing]" (I24).

In addition, it is increasingly difficult for small and medium-sized plastic-producing companies to purchase recycled materials on the market (I8, I17, I21) as larger companies absorb significant shares of available capacities to meet quota regulations on recycled materials in production (I13) and thus reduce freely available quantities through exclusive contracts with collectors and recycling companies (I25). To address these CE innovation challenges, industrial companies in our study combine internal reorganizing with adjustments of external collaboration activities.

4.2 | Internal Reorganizing

Figure 3 contains central aspects of internal reorganization, adjustment of external collaboration, and their interplay. Concerning the former, we found that internal reorganizing includes three approaches: reorganizing permanent structures, temporary structures, and value creation processes. The organizational structure refers to the company's solution for how work is distributed (Balachandran and Eklund 2024; Joseph and Gaba 2020). It entails decisions concerning, for example, specialization (occupations and job titles), functional and vertical differentiation (number of different units and hierarchical layers), formalization (rules and job descriptions), and centralization (participation in decision-making and bundling of tasks) (Balachandran and Eklund 2024; Damanpour 1991). Thus, reorganizing the permanent structure is defined as a change in specialization, differentiation, formalization, or centralization without the plan to reverse these changes with the achievement of a predefined goal or time. Reorganizing the *permanent organizational structure for CE* relates to a realignment of R&D and the creation of new CE responsibilities. Organizational design solutions include creating a CE position for the first time (I6, I16, I19, I24, I25) and reorganizing tasks of organizational functions (e.g., R&D, sales) to free up sufficient time resources for the fulfillment of new CE-related tasks (D147, I17, I23), as well as bundling of existing CE-related functions in new departmental structures, business units, or coordinating entities, such as committees and working groups (D112, I11, I17). As a result, the circular oriented reorganization of the permanent structure leads to more centralization and specialization (D70, D148, I25). For example, one firm introduced several new units:

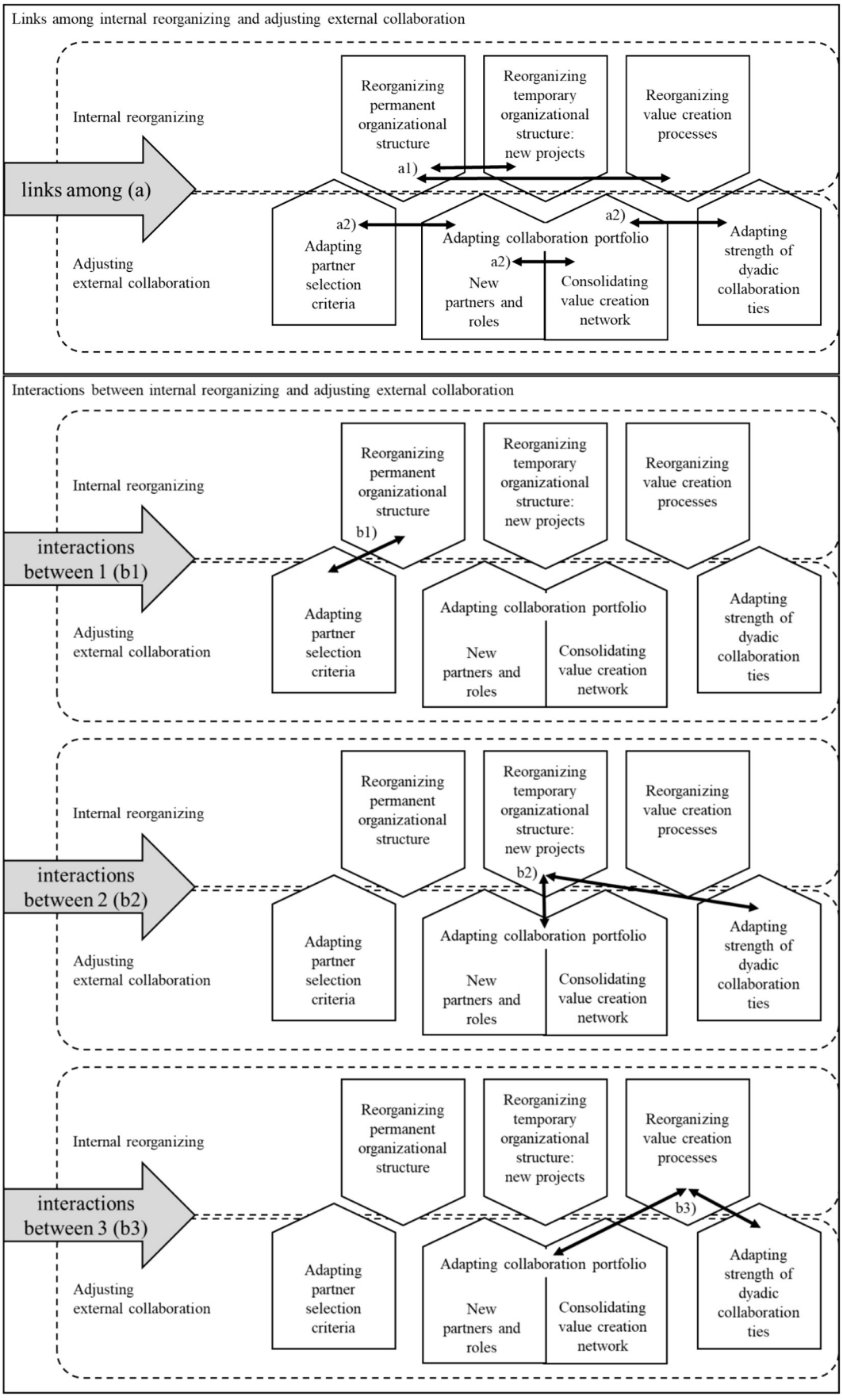

FIGURE 3 | Established companies' transformation to circularity as interplay of internal reorganizing and adjustment of external collaboration.

> A completely new department was created, mainly for strategic product management. Product management is now in charge of dealing with [CE-related] tasks. ... A new business unit has been created in recent years. This unit is now responsible for ... compounds. It directly results from sustainability considerations and CE efforts.
>
> (I12)

Another interviewee explained:

> We need a [...] network function that tries to establish cooperation via the various stakeholders, ... because the whole issue [CE] definitely cannot be solved alone [... We need] a cross-departmental function that can act and operate independently and then strategically initiate actions or activities in a structured manner.
>
> (I24)

Noteworthily, the reorganization of internal R&D comes along with additional innovation content mentioned above, for example, the use of recycled materials, eco-design, and design that enables reselling, refurbishing, and remanufacturing after the initial use ends (I6, I12, I18). This means that the reorganization of internal structures makes it possible to visibly anchor the new innovation content in the company by defining roles, tasks, and units. Besides, this internal and permanent reorganizing of R&D supports the management of CE-oriented projects (D112, I19, I25) and the accompanying reorganization of processes (D75, I23, I24).

In addition to the reorganization of the permanent structure, companies also reorganize their *temporary organizational structure by bundling activities in new projects* to enable CE implementation. In contrast to permanent structures, which are created for an unlimited period of time, temporary structures refer to a specified goal to be achieved or a predefined period of time (Bakker et al. 2016). For example, additional temporary units result in project teams, while temporary specialization and formalization result in the definition of project tasks and roles. Firms in our study start several in-house CE-related R&D (D178, I2, I17) and strategy projects (D3, D72, D147). These projects go hand in hand with firms' increased willingness to invest financial resources in CE (D5, D37, D122) and higher awareness regarding the availability of (supra-) national research funding (D147, D162). In addition to technology-oriented projects, companies also carry out new market-related activities, for example, by commissioning studies and polls on waste/resource flows and consumer preferences to expand the organizational knowledge base (D2, D91, D196). Firms also engage more in industry and trade associations on national and supranational levels (I3, I17, I19).

The temporary projects support the implementation of the CE strategies and address the CE innovation challenges described above in several ways. The defined duration of projects supports the formulation of objectives, making it easier and more transparent to track the implementation of CE initiatives. This also allows for a better assessment of one's own progress over time and identification of delays. Hence, creating temporary projects leads to a more informed assessment of the innovation challenge in terms of speed and duration. Furthermore, projects address the innovation content challenge by pooling together employees with different functional backgrounds. These different functional backgrounds bring complementary knowledge, which helps cover the entire product life cycle and consider relevant external stakeholders across the entire value creation process.

Finally, our data analysis reveals that firms transform their *value creation processes*. Organizational value creation is organized in processes that involve multiple activities carried out by different organizational actors (Mohapatra et al. 2024). Therefore, the reorganization of value creation processes refers to the adaptation of existing activities and the CE-oriented design and integration of new activities in the course of the implementation of CE strategies (reuse, reduce, recycle, and replace). This reorganization is challenging because firms have optimized linear production processes for many years. Consequently, highly efficient organizational routines in the linear setting become obstacles to new circular solutions. Hence, the perceived requirement is, for instance, that recycled materials used as a replacement must perform at least as well as the replaced virgin materials (I9). To substitute virgin materials with recycled ones, the involvement of the R&D department in procurement processes is growing rapidly as recycled materials are less standardized and more demanding to process, resulting in a growing need for expert know-how and additional testing processes (I16, I19, I22). Furthermore, additional administrative processes emerge in the context of R&D due to the certification of new circular oriented process technologies and materials (D78, I4, I20). The relevance of R&D also grows for sales processes because using recycled materials in products requires the (R&D) staff to explain new technical specifics in more depth (I16, I23). This means that the adaptation of the processes entails a change in the responsibility of the R&D department with regard to new and more extensive tasks. There is therefore an interaction between the introduction of CE processes and the definition of tasks and roles of R&D.

Regarding the innovation challenges mentioned above, our data shows that while established, thoroughly optimized linear production processes no longer offer potential for easy improvements ("narrowing loops"), new CE processes are still less efficient (I4, I8, I16). Thus, instead of incremental improvements, firms strive to develop and adopt new circular processes (I5, I12, I13) through a CE-based redesign. This changes the content of innovation in a radical way and means that the necessary adjustments for companies cannot be fully anticipated. For example, I15 explained that as the company began to sell not only films but also granules, "adding the compounding component to these processes was a lot more complicated than expected" and the company "had to add and change several activities for the compounding business to operate smoothly."

What is more, we found that redesigning internal processes for circularity is most challenging when accompanied by the need to coordinate with other actors along the value chain. One reason for this is the different interests and perspectives of the stakeholders due to the sometimes-contradictory logic of the different CE strategies. A reduction in easily sortable and recyclable materials in production (reduce) can make recycling more

difficult and thus reduce the quality of recycled materials. It is therefore important that the actors coordinate their processes. For instance, I22 explained: "a big deal is that we develop [recycled] materials together with recyclers and also strive to develop processes together with recyclers [who] ... improve the [recycled] material for us." In addition, the joint development of recycled materials ensures that they meet the requirements of producers and thus create demand for the innovative materials. This explanation also highlights how the internal reorganizing of processes triggers external collaboration and vice versa (see below).

4.3 | Adjusting External Collaborations

After the explanation of the internal reorganization in the previous section, this section describes the adaptation of CE collaboration. We identified four main arenas of change concerning interorganizational CE collaboration. First, with the shift toward CE, the firms adapted their *criteria for the selection of collaboration partners*: As the awareness of CE increases (I10, I11, I21), CE pioneers increasingly look for and collaborate with partners who share their interests in CE and sustainability (D148, I23, I17). For example, as observed by I13, some business customers "pay attention to this [CE and sustainability] and make their entire product range sustainable. For example, their cleaning agents are organic; hence, they also use environmentally friendly circular oriented packaging to go with it." This consideration of CE also results from the challenge of dealing with conflicting loops and interests of actors. A greater awareness of the interests of different stakeholders enables companies to come up with complementary win–win solutions. In order to support partner selection, the companies in our study communicate their CE strategies extensively to the outside world. They signal their CE awareness and, thus, attractiveness as collaboration partners by introducing CE-oriented labels and trademarks (D32, D96, D164).

The new CE-oriented selection criteria result in a further change in firms' collaboration portfolios. We found two main changes regarding firms' *collaboration portfolio*. On the one hand, firms collaborate with new and different partners; on the other hand, firms consolidate their value creation network through targeted interventions. Particularly the reorganized internal processes trigger collaboration with *new and different partners and roles*. Current partners bring together formerly unconnected value chain actors by hosting meetings with different partners, such as machine manufacturers (I23). Likewise, firms' representatives from R&D departments participate in trade fairs and engage in industry projects and associations to build networks and initiate new collaborative relationships (D80, D103, D167). I17 explained: "A [research] institute approached me and asked if we could do a joint project. The person from the institute met me in a [CE-oriented] committee. It is a [new] project about recycled materials. You get to know each other in those networks." The common interest in CE is therefore also a door opener for the initiation of joint projects, as the players get to know each other as like-minded people and connect other actors in their personal networks.

CE collaboration that involves new roles in the value chain is necessary, as additional dependencies must be taken into account if material flows are to be maintained in the loop. Plastics in the context of CE means "a completely different value chain, completely different players" (I5), and thus, firms establish "exchange with other partners, business associations, completely other stakeholders" (I7). For example, I15 noted that "regarding possible investment partners in chemical recycling capacities ... you always have to look for partners who handle enough waste to operate such a plant. ... These are usually the waste disposal companies." Such partnerships did not exist in the linear economy as waste management was another separate industry. Waste management processed what was left over at the end of the life cycles. In the CE, there is a growing mutual interdependency because producers are also dependent on high-quality material flows from the waste management industry as they strive to incorporate recycled materials into the production process.

Particularly regarding suppliers of recycled materials, implementation of CE moves forward through new partnerships with companies whose core competence is related to recycling processes (I16, I19, I23). One respondent explained: "Regarding standard [virgin] materials, of course, it is also the case that the purchasing department somehow dictates and says: 'Listen, if you use the standard materials, then we have one, two, three preferred suppliers. So, please do me a favour and try to get along with them.' ... But ... the suppliers who deliver recycled polypropylene are not the standard polypropylene suppliers" (I19). In the linear economy, the standard suppliers were large chemical companies that produce the precursors for plastics from crude oil. The CE transformation adds recyclers as completely new actors for collaboration.

Shifting toward CE firms cannot rely solely on bilateral collaborations but frequently approach the entire supply chain (I11, I15, I17). For example, one interviewee listed the collaborating partners: "We as a film-packaging manufacturer, the food manufacturer, the waste disposal company, and the chemical company. So, this is definitely a collaboration along the entire value chain" (I12). Collaboration across the entire value chain enables the firms to coordinate the material flows and design coherent and closed value creation processes and reduce the challenge of conflicting loops. In addition, firms are also beginning to collaborate with institutions they did not consider in the past, such as national (D88, I19) and foreign universities (D98, I14). The importance of universities and research centers is increasing, as they provide, for instance, information on complex CE processes, upcoming trends, and current developments (I24). Above all, these new partners help the companies to overcome the innovation challenge of the new content: These partners facilitate radical solutions by bringing fresh knowledge and complementary perspectives from other industries and sectors.

We found that companies also intervene to *consolidate their value creation networks*. For instance, some firms acquire other companies and strengthen their circular innovation capabilities (I24, D4, D156) and their position within the ecosystem through vertical integration (I16, I18, I20). Acquisitions change not only the internal organizational design but also the structure of the network of relationships, initiating shifts in the power balance. This type of power through advantageous access to resources or customers opens up additional opportunities for action. For

example, customers of plastic firms with substantial market power, for example, well-known brands and retail chains, can either steer the overall system toward CE and motivate others into joint CE activities or undermine the transition (I13, I21, I23).

The last adaptation of collaborations is the change in relationship strength. Our data reveal that firms *adapt the strength of dyadic collaboration ties* in both directions. Tie strength is one of the significant attributes of interfirm networks that refers to the closeness and intensity of interorganizational relationships. Recent studies showed that "strong ties," that is, repeated, trustworthy, and intensive interactions between firms, encourage joint problem-solving, mutual learning, and interorganizational knowledge sharing (e.g., Reck et al. 2022; Reck and Fliaster 2022). On the one hand, our data reveals that close collaborative relationships have become more critical for the firms; one respondent described the modern chemical industry as "a world of partnerships" (I2). Companies in our sample communicate more to understand the needs of partners (I5, I20, I23), explain the consequences regarding the use of recycled materials (D68, I20, I19), enter more detailed bilateral agreements (D39, I15, I23), and jointly develop processes and materials (I19, I20, I22). Furthermore, organizational actors create additional ties between already affiliated partners, as several additional contributors with specific expertise join the exchange, for example, R&D and CSR departments (I25). The more intensive collaboration also results from the complexity of the CE transition and the distribution of the necessary knowledge to overcome the content of innovation challenge among different actors.

On the other hand, management of tie strength is not a unidirectional activity since firms not only strengthen but also weaken or end partnerships. The latter happens, for instance, when companies discover that their partners have a different understanding of CE (I1, I13). In addition, companies distinguish between who they consider to be responsible and nonresponsible partners in terms of the corporate attitude to sustainability (I4, I9) and adapt the relationships accordingly. Hence, while collaboration in general plays a significant role in firms' CE transformation, the existing partnerships are re-evaluated and adapted.

4.4 | The Interplay of Internal Reorganizing and Adjustments of External Collaboration

Having described the internal reorganization and the adaptation of CE collaborations, we will now discuss the links between the internal and external levels. Our analysis shows that companies strive to synchronize internal reorganizing efforts with the adjustment of external collaborations to tackle CE-related innovation challenges. The data we collected indicate that there are two distinct modes of interplay—(a) the links among different elements of internal reorganizing or the elements of external collaboration activities and (b) the interactions between internal and external elements (see Figure 3).

(a1) Links among internal reorganizing activities: Our data shows that internal reorganizations in the three subareas identified above (permanent structure, temporary structure, and value creation processes) do not take place in isolation from each other but rather form coherent interdependent configurations. New and distinct positions, units, and departments created as entities within the permanent structure support the creation of temporary projects by bridging the gap between permanent and temporary organizational structures. A notable example involves personnel in the recently instituted units actively participating or taking responsibility for temporary projects due to their growing CE proficiency (I12, I17, I23). This expanding expertise further bolsters the identification of necessary and feasible process reorganizations. The companies in our study effectively manage the sophisticated tasks of restructuring the value creation processes through thorough coordination within cross-functional and interorganizational project groups (I15, I19, I24). Hence, new temporary structures (e.g., CE projects) enable the reorganization of value creation processes.

(a2) Links among external collaboration adjustments: The adaptations of individual collaboration activities do not take place in isolation from each other but are mutually dependent. The modified selection criteria for collaboration partners, such as shared interest or CE expertise, pave the way for adapting the collaboration portfolio. These novel criteria are the foundation for identifying and engaging with suitable partners (D103, D167, I17). Establishing collaboration between formerly unrelated companies also closely connects with the augmented consolidation of the value creation network and the adaptation of network relationships' strength. Notably, the new CE-oriented suppliers foster more profound collaboration when compared to traditional suppliers such as global chemical corporations (I16, I19, I23).

(b) The interplay between internal reorganization and adjustments of external collaboration: Another important finding is that internal reorganizing is also closely interwoven with the adaptation of collaboration. More precisely, we have identified three different interaction patterns between internal reorganizing and adjustment of external collaboration (b1, b2, and b3).

(b1) Our analysis revealed that the reorganization of the permanent organizational structure facilitates the search for collaboration partners with congruent sustainability interests (I17, I23, I24). Emerging units bundle internal expertise, signal the company's involvement in CE initiatives, and present a clearer and more accessible entity to prospective external collaborators. The freshly established units explicitly shoulder internal and external CE-related collaboration responsibility. This responsibility includes tasks such as identifying suitable partners. They progressively build up the knowledge needed to obtain and interpret labels and certificates, such as RecyClass and Cyclos Certifications, that signify the firm's commitment to CE initiatives to external partners (I19, I20, I24).

The temporary organizational structure interacts closely with the adaptation of the collaboration portfolio and the changes in relationship strengths (Interaction b2). Our data underscores the pivotal role of permanent sales staff in initiating customer-related projects (Link a1, D29). Supported by emerging internal temporally limited project structures, firms participate in cross-company, cross-industry, and cross-national collaborative R&D projects (I5, I17, I19). For instance, one firm "set up an interdisciplinary team for a circular model for a customer ... where all these players, both internal and external, that are required to implement the model meet regularly for two years" (I15).

Such market- or customer-focused collaborative R&D projects "are mostly about how we can convert existing products into circular products" (I23). The temporary projects deepen established partnerships and forge new collaborative links between previously disconnected actors (I19, I23, I24). For instance, one interviewee stated that one of the company's largest customers, currently working with an American university, invited the company to join a CE project (I14).

Finally, the reorganization of internal processes catalyzes firms to adjust their external collaborations, leading to changes in the portfolio of collaboration partners and dyadic relationships (Interaction b3, D37, D120, D126). To establish closed loops within the CE, firms must approach and partner with new actors like waste collectors, recyclers, and consumers (I16, I29, I23). In numerous organizations, we have identified a mutually reinforcing and synergistic interplay between the internal reorganization of value creation processes and the establishment of new CE collaborations. The internal reorganization of processes propels firms into novel partnerships. For instance, plastic goods manufacturers attract new clients who are looking for recycled plastic products. Expanding a company's value creation processes to encompass recycling initiatives necessitates unique collaborative interactions with business organizations that specialize in plastic waste collection and sorting. Vertical integration consolidates partnership networks as internal processes may substitute former relationships with external partners.

5 | Discussion

5.1 | Theoretical Contribution

CE is vital in the organizational and societal transition toward sustainability (Kirchherr et al. 2023). In this context, our qualitative study addressed the research question of how incumbent companies in the plastics industry transform toward CE. Our research shows that these companies deploy a broad variety of CE activities, including strategies such as replacing, recycling, reducing, and reusing (see Figure 1). Hence, we conclude that the organizational shift toward CE does not represent what scholars critically labeled "sustainababble" (Engelman 2013, cited in Kirchherr et al. 2023, 1). Instead, we observed real and complex organizational activities aimed at the delinearization of business processes and value creation supporting circularity (Blomsma et al. 2023; Neligan et al. 2023). Our research demonstrates that the corporate shift toward CE is also very challenging. We identify three main CE innovation challenges related to the content of innovation, timing of innovation, and innovation processes. To master them successfully, firms must develop new products, introduce new manufacturing processes and organizational design changes, and transform relationships with business ecosystem partners.

Furthermore, we found that as companies generate and implement innovations addressing these challenges, they also face two important and interconnected underlying issues. The companies face manifold external uncertainties on the move toward circularity. In addition to market- and customer-related ones that are typical for many radical innovations (Crossan and Apaydin 2010), regulatory uncertainties (Engau and Hoffmann 2011), for instance, regarding approval procedures and quotas for the use of recyclates, also must be taken into account by firms that develop and implement CE strategies. We argue that these external and regulatory uncertainties cause and reinforce the three innovation challenges mentioned above. The prevailing regulatory framework is perceived by many of our respondents as restrictive. In the case of innovation content, actors consider various requirements contradictory or impossible to implement. For example, a fixed proportion of recycled materials is prescribed in plastic packaging, but there was no production process approved for food at the time of the study. Furthermore, many goals are rather short term, while larger projects and basic research require a lot of time and high investments. As it is difficult for the players to foresee and predict t the future, there is some reluctance to engage in long-term projects.

Another important reason why the transition toward CE is a challenging undertaking is that in the past, industry incumbents have spent significant amounts of time and resources to bring linear value creation to perfection. These findings extend results from previous works (e.g., Aminoff and Pihlajamaa 2020) that highlighted organizational inertia in the CE transformation of companies. To survive in this competitive business environment, the incumbent companies in the plastics industry had to make substantial efforts to optimize their processes, nurture core organizational capabilities, and establish valuable partnerships with suppliers and customers. Ironically, the past formula for success seems to be becoming an increasing impediment to progress. Therefore, we conclude that the current transformation toward circularity requires promoting organizational change in face of uncertainty and must be managed strategically. This argument augments previous works that advocate that organizational change toward the CE requires a strategic and holistic perspective (e.g., Graessler et al. 2024).

Further important insights refer to different activities that constitute the organizational transformation toward CE. Concerning internal organizing, past research argued that organizational design can be a hurdle or an enabler to firms' CE transition (Assmann et al. 2023; Bocken and Geradts 2020; Khan et al. 2020a). Previous studies also indicated that business model innovations for circularity frequently require redesigning departmental structures, units, and tasks. For instance, the creation of separated and autonomous units (Bocken and Geradts 2020) and the embeddedness of CE in the corporate structure illustrate its increasing importance (Bocken and Geradts 2020; Khan et al. 2020a). Our findings align with previous research that found that CE implementation activities include introducing new CE projects (Piila et al. 2022) that represent temporary organizational design (Burke and Morley 2016). Our study enriches these insights, showing that moving toward circularity entails three distinct facets of internal CE transformation—reorganizing permanent and temporary organizational structures and intraorganizational value creation processes.

Regarding external collaboration, our study draws on previous works that advocate that implementing CE strategies increases the need for companies to collaborate (Aarikka-Stenroos et al. 2022; Gebhardt et al. 2022). Our analysis augments this literature by revealing that established firms adapt their external

collaborations in four ways: industry incumbents modify partner selection criteria and the strength of dyadic relationships, add new partners and roles in the value chain, and consolidate the external collaboration networks.

Furthermore, our study provides new insights into the interdependencies concerning internal and external reorganizing associated with corporate CE transformation. While most previous CE studies addressed these two areas as isolated, we found that two types of interplay do exist: the interactions *among* and *between* the internal reorganization and the adjustment of external collaboration patterns. For instance, our analysis shows that reorganizing permanent internal structures can support CE projects (a temporary form of organizing; Bakker et al. 2016). Two explanations help to shed more light on this observation. First, some major CE projects, for example, for new circularity processes like chemical recycling, run for extended periods. Such fundamental projects are usually operated in companies in a centralized manner (Argyres et al. 2020). Hence, redesigning the permanent structure is a foundation for establishing temporary but long-term innovation projects that can yield fundamental and far-reaching impacts, ultimately contributing to the reorganization of value creation processes (e.g., closing the loops). The complexity inherent in CE necessitates innovations that create comprehensive and transformative impact. In this context, the design of pathways that involve both internal reorganization of permanent structures and temporary innovative projects aligns with the objectives of pioneers who strive to address the complex CE innovation challenges in a holistic manner.

We argue that centralizing activities within the permanent CE structure supports goal-oriented learning from various customer projects and seamless knowledge transfer across individual business divisions. Our respondents also observe that the cross-functional composition of project teams plays a pivotal role in learning and knowledge transfer (e.g., D55, D75). In addition to the employees responsible for CE who initially often come from innovation, R&D, or business development units, staff from other corporate areas such as procurement, sales, and production also get involved in CE projects. This involvement of personnel from different departments prevents CE initiatives from taking place in isolation and promotes the ongoing CE transformation.

Moreover, our explorative study contributes to an enhanced understanding of how internal reorganizing can empower CE collaborations, consequently facilitating the expansion of CE transformations beyond individual company boundaries. CE value creation processes forge interdependencies between formerly unrelated actors, thereby giving rise to the imperative for collaboration mentioned in the literature (Aarikka-Stenroos et al. 2022; Gebhardt et al. 2022). Many CE projects in our study are collaborative, entwining internal and external actors. The observed changes in organizational structure hold relevance not only for the individual company but also for the resulting CE-oriented ecosystems (Parida et al. 2019). For instance, the novel permanent structure does not only facilitate the establishment of new criteria when selecting collaboration partners, but it also signals interest in CE to future potential external partners and ecosystem actors, signifying the company's commitment and readiness for CE collaboration.

5.2 | Practical Implications

Our study also allows for practical recommendations regarding the organizational CE transformation. First, the detailed descriptions and examples of individual initiatives that the companies in our sample implement can contribute to a more profound understanding among organizational decision-makers regarding which internal and external reorganization activities might support CE strategies in their firms. This is also true for fostering the synergistic integration of internal and external elements necessary to achieve successful CE transformation outcomes.

Moreover, our findings suggest that there may be multiple pathways toward circularity that can be adopted by firms. Hence, at the top management level, the decision has to be made on which CE strategies (e.g., reducing, reusing, and recycling) are most appropriate considering the waste hierarchy (e.g., Kirchherr et al. 2017) as well as the given company's competitive strategy, organizational capabilities, and position within the business ecosystem. Past research also indicates, for instance, that not all CE strategies are compatible with different competitive strategies (cost/price leadership, differentiation). For example, a recent study found that only half of the analyzed CE strategies show a fit with cost leadership, while even fewer activities support the differentiation strategy (Mura et al. 2020). While our study showed examples of how the reduce and reuse approaches can contribute to cost leadership, the potential contributions to differentiation are less obvious. Nevertheless, we were able to identify how the redesign of value creation processes in combination with changes in CE collaboration reflects the interests of the ecosystem. In such a context, CE strategies can also offer differentiation advantages, as the example of recycled packaging for ecopurifiers shows. We therefore explicitly encourage companies to ensure the fit between their competitive strategies and the chosen CE strategies.

Given these intricate dynamics, companies are well-advised to deploy instruments of strategic planning and foresight, such as, scenario analysis (Grant 2022), to develop and implement appropriate circularity strategies. As the regulatory, technological, and market environment changes, a more proactive and comprehensive strategic planning could help companies master the multifaceted transition toward CE. Furthermore, given the dynamic nature of today's business environment, organizations need robust risk management to navigate uncertainties and adapt to changing circumstances (Dellermann et al. 2017).

Previous research also showed that external resources are a particularly interesting option for small and medium-sized companies, in addition to their own internal resources. In particular, new knowledge can be acquired through exchange with other ecosystem partners, for example, through cross-sector collaboration with universities in research projects. Associations also fulfill an additional support function by offering a platform for exchange, thereby enabling small and medium-sized enterprises to learn from one another and develop joint strategies. In the course of the collaboration, the companies also develop relationship and portfolio management skills that have a positive impact on their innovation performance (Reck et al. 2022).

Another important managerial implication of our research insights is the revealed need for organizational integration. Our findings demonstrate that to make circularity work, several departments, such as R&D, procurement, sales, and organizational communication, must adapt their activities, which demands a substantial degree of internal orchestration. In light of this, we argue that companies have to make more use of organizational coordination instruments, such as "dialogic coordination practices" that are conducive to integrating "organizational work under conditions of task interdependence and uncertainty" (Faraj and Xiao 2006, 1156). By embracing such instruments, companies facilitate the alignment of activities spanning multiple functions, thus bolstering the prospects of successful CE transformation.

6 | Conclusions

Despite its theoretical and practical contributions, our study is not without limitations, which, in turn, open avenues for future research. Due to the focus of our work, we cannot assess the impact of CE transformation on sustainability or foresee its unintended consequences. One reason for this is the early implementation phase that we investigated. In particular, unintended consequences often manifest over time, and the potential contributions to sustainability cannot be comprehensively assessed immediately. In addition, an evaluation must be also conducted at the level of the overall system, as external effects must also be fully taken into account. The present study has mainly focused on the CE transformation of individual companies, thereby precluding the evaluation of the overall effect on sustainability. We therefore see great potential for future research that critically examines the contribution of organizational CE transformations to the sustainability transition.

Furthermore, while the qualitative research methodology used in our study provided several valuable insights, like all other research methods, it is not free from limitations. The theoretical sampling approach primarily concentrated on pioneers, that is, companies that have made substantial efforts to establish circularity and have made notable progress in delinearizing their value creation processes. In doing so, we considered whether the companies had received awards for their CE efforts or engaged in publicly funded R&D projects that featured competitive selection mechanisms. Thus, we emphasize that additional studies are needed to address "CE laggards," shed light on barriers that impede the shift toward circularity at the organizational level, and diagnose the reasons for the failure of undertaken circular initiatives. Recent papers have already begun to explore barriers to CE transition, also in the special context of a plastics CE (e.g., Barford and Ahmad 2023; Bocken and Geradts 2020). Concurring with Bocken et al. (2023), we advocate that further analysis of barriers would be insightful from both academic and practical perspectives, especially as the practical implementation of CE strategies worldwide is still at an early stage and, in some fields, even declining (Kirchherr et al. 2023).

Second, from the methodological standpoint, the qualitative research design we deployed is particularly suited for exploring novel, under-understood phenomena and allows for theorizing based on "rich and nuanced" data, revealing mechanisms that might be overlooked in quantitative data (Graebner et al. 2012, 278). However, we advocate that in addition to qualitative methodologies, further research is warranted to deploy other methods to cover the variety of organizational approaches to CE transition.

More specifically, our study revealed several internal and external adaptations and indicated some external conditions relevant to the transformation toward circularity. As these transformation initiatives are at least partly interdependent, we advocate using research designs that are especially conducive to uncovering interdependencies instead of addressing isolated effects of individual variables. More specifically, to explore CE transformations further, we recommend the deployment of the QCA methodology that has already found its way into strategy research (e.g., Fiss 2011) and sustainability research (e.g., Juntunen et al. 2019) as well as into studies of collaborative interorganizational networks (e.g., Reck and Fliaster 2022). The QCA methodology builds on configurational thinking to unveil distinct combinations of explanatory factors. Based on our qualitative study, we advocate the logic of "conjunctural causality," hypothesizing that successful implementation of various CE strategies as an organizational outcome results from different configurations of internal reorganizing and adaptations of CE collaborations rather than from the net effects of any of these factors in isolation. With this approach, future research that takes up our framework could not only show which combinations are particularly promising to contribute to successful CE transformations but also explain even better why certain elements are implemented in combination. We leave this intriguing analysis for future research.

Last but not least, while our study provided some interesting examples, a more profound analysis of alternative collaborative arrangements for CE has not been the central focus of this work. This limitation presents a fertile ground for future research to explore the interplay of internal reorganizing and different forms of collaboration (strategic alliances, joint ventures, and ecosystems) and diverse partners (suppliers, customers, research institutes, companies in other industries, and actors from other sectors).

The goal of this study has been to answer the research question of how established firms in the plastics industry reorganize internally and externally toward achieving circularity. We analyzed qualitative data on 21 firms from Germany and France, including 25 interviews and more than 200 publicly accessible company documents. Our qualitative analysis followed the Gioia methodology, which provides important guidelines for systematic and rigorous qualitative inquiry, especially within the research tradition of the grounded theory methodology (Gioia et al. 2013; Magnani and Gioia 2022). Our paper provides three contributions to current research on organizational transformation and collaboration toward CE. First, we have demonstrated that contributing to the CE requires internal reorganizing (permanent structures, temporary structures, and value creation processes). Second, we have shed light on how companies that shift to circularity adjust their external CE collaboration. Third, in addition to augmenting the literature on intra- and interorganizational modes of organizational transformation, we have also enhanced research on CE by identifying two links among (a1, a2) and three interactions between (b1–b3) these two fundamental modes. By connecting these research streams, our study also creates a promising avenue for further CE and transformation studies.

Acknowledgments

The authors have nothing to report. Open Access funding enabled and organized by Projekt DEAL.

Disclosure

An earlier version of this paper has been presented at the EGOS Colloquium 2023 in Subtheme 47: Interorganizational Relationships for Sustainable Development: Collaboration in the Circular Economy. Third parties, such as interviewees, did not influence the results presented beyond their interview participation.

Conflicts of Interest

The authors declare no conflicts of interest.

References

Aarikka-Stenroos, L., D. Chiaroni, J. Kaipainen, and A. Urbinati. 2022. "Companies' Circular Business Models Enabled by Supply Chain Collaborations: An Empirical-Based Framework, Synthesis, and Research Agenda." *Industrial Marketing Management* 105: 322–339. https://doi.org/10.1016/j.indmarman.2022.06.015.

Adams, W. C. 2015. "Conducting Semi-Structured Interviews." In *Handbook of Practical Program Evaluation*, edited by K. E. Newcomer, H. P. Hatry, and J. S. Wholey, 492–505. John Wiley & Sons, Inc. https://doi.org/10.1002/9781119171386.ch19.

Aminoff, A., and M. Pihlajamaa. 2020. "Business Experimentation for a Circular Economy—Learning in the Front End of Innovation." *Journal of Cleaner Production* 275: 124051. https://doi.org/10.1016/j.jclepro.2020.124051.

Argyres, N., L. A. Rios, and B. S. Silverman. 2020. "Organizational Change and the Dynamics of Innovation: Formal R&D Structure and Intrafirm Inventor Networks." *Strategic Management Journal* 41, no. 11: 2015–2049. https://doi.org/10.1002/smj.3217.

Arranz, C. F. A., M. F. Arroyabe, and J. C. Fernandez de Arroyabe. 2024. "Organisational Transformation Toward Circular Economy in SMEs. The Effect of Internal Barriers." *Journal of Cleaner Production* 456: 142307. https://doi.org/10.1016/j.jclepro.2024.142307.

Asgari, A., and R. Asgari. 2021. "How Circular Economy Transforms Business Models in a Transition Towards Circular Ecosystem: The Barriers and Incentives." *Sustainable Production and Consumption* 28: 566–579. https://doi.org/10.1016/j.spc.2021.06.020.

Assmann, I. R., F. Rosati, and S. N. Morioka. 2023. "Determinants of Circular Business Model Adoption—A Systematic Literature Review." *Business Strategy and the Environment* bse.3470: 6008–6028. https://doi.org/10.1002/bse.3470.

Bähr, K., and A. Fliaster. 2023. "The Twofold Transition: Framing Digital Innovations and Incumbents' Value Propositions for Sustainability." *Business Strategy and the Environment* 32, no. 2: 920–935. https://doi.org/10.1002/bse.3082.

Bakker, R. M., R. J. DeFillippi, A. Schwab, and J. Sydow. 2016. "Temporary Organizing: Promises, Processes, Problems." *Organization Studies* 37, no. 12: 1703–1719. https://doi.org/10.1177/0170840616655982.

Balachandran, S., and J. Eklund. 2024. "The Impact of Partner Organizational Structure on Innovation." *Administrative Science Quarterly* 69, no. 1: 80–130. https://doi.org/10.1177/00018392231212680.

Bansal, P., (Tima), and K. Corley. 2011. "The Coming of Age for Qualitative Research: Embracing the Diversity of Qualitative Methods." *Academy of Management Journal* 54, no. 2: 233–237. https://doi.org/10.5465/amj.2011.60262792.

Bansal, P., (Tima), W. K. Smith, and E. Vaara. 2018. "New Ways of Seeing Through Qualitative Research." *Academy of Management Journal* 61, no. 4: 1189–1195. https://doi.org/10.5465/amj.2018.4004.

Barford, A., and S. R. Ahmad. 2023. "Levers for a Corporate Transition to a Plastics Circular Economy." *Business Strategy and the Environment* 32, no. 4: 1203–1217. https://doi.org/10.1002/bse.3182.

Barreiro-Gen, M., and R. Lozano. 2020. "How Circular Is the Circular Economy? Analysing the Implementation of Circular Economy in Organisations." *Business Strategy and the Environment* 29, no. 8: 3484–3494. https://doi.org/10.1002/bse.2590.

Bergen, N., and R. Labonté. 2020. ""Everything Is Perfect, and We Have No Problems": Detecting and Limiting Social Desirability Bias in Qualitative Research." *Qualitative Health Research* 30, no. 5: 783–792. https://doi.org/10.1177/1049732319889354.

Bertassini, A. C., A. R. Ometto, S. Severengiz, and M. C. Gerolamo. 2021. "Circular Economy and Sustainability: The Role of Organizational Behaviour in the Transition Journey." *Business Strategy and the Environment* 30, no. 7: 3160–3193. https://doi.org/10.1002/bse.2796.

Bettis, R. A., A. Gambardella, C. Helfat, and W. Mitchell. 2015. "Qualitative Empirical Research in Strategic Management." *Strategic Management Journal* 36, no. 5: 637–639. https://doi.org/10.1002/smj.2317.

Blomsma, F., T. Bauwens, I. Weissbrod, and J. Kirchherr. 2023. "The 'Need for Speed': Towards Circular Disruption—What It Is, How to Make It Happen and How to Know It's Happening." *Business Strategy and the Environment* 32, no. 3: 1010–1031. https://doi.org/10.1002/bse.3106.

Blomsma, F., M. Pieroni, M. Kravchenko, et al. 2019. "Developing a Circular Strategies Framework for Manufacturing Companies to Support Circular Economy-Oriented Innovation." *Journal of Cleaner Production* 241: 118271. https://doi.org/10.1016/j.jclepro.2019.118271.

Bluhm, D. J., W. Harman, T. W. Lee, and T. R. Mitchell. 2011. "Qualitative Research in Management: A Decade of Progress." *Journal of Management Studies* 48, no. 8: 1866–1891. https://doi.org/10.1111/j.1467-6486.2010.00972.x.

Bocken, N., J. Pinkse, N. Darnall, and P. Ritala. 2023. "Between Circular Paralysis and Utopia: Organizational Transformations Towards the Circular Economy." *Organization & Environment* 36, no. 2: 378–382.

Bocken, N. M. P., I. de Pauw, C. Bakker, and B. van der Grinten. 2016. "Product Design and Business Model Strategies for a Circular Economy." *Journal of Industrial and Production Engineering* 33, no. 5: 308–320. https://doi.org/10.1080/21681015.2016.1172124.

Bocken, N. M. P., and T. H. J. Geradts. 2020. "Barriers and Drivers to Sustainable Business Model Innovation: Organization Design and Dynamic Capabilities." *Long Range Planning* 53, no. 4: 101950. https://doi.org/10.1016/j.lrp.2019.101950.

Brown, P., B. Baldassarre, J. Konietzko, N. Bocken, and R. Balkenende. 2021. "A Tool for Collaborative Circular Proposition Design." *Journal of Cleaner Production* 297: 126354. https://doi.org/10.1016/j.jclepro.2021.126354.

Brown, P., N. Bocken, and R. Balkenende. 2018. "Towards Understanding Collaboration Within Circular Business Models." In *Sustainable Business Models*, edited by L. Moratis, F. Melissen, and S. O. Idowu, 169–201. Springer International Publishing. https://doi.org/10.1007/978-3-319-73503-0_9.

Brown, P., C. Von Daniels, N. M. P. Bocken, and A. R. Balkenende. 2021. "A Process Model for Collaboration in Circular Oriented Innovation." *Journal of Cleaner Production* 286: 125499. https://doi.org/10.1016/j.jclepro.2020.125499.

Burke, C. M., and M. J. Morley. 2016. "On Temporary Organizations: A Review, Synthesis and Research Agenda." *Human Relations* 69, no. 6: 1235–1258. https://doi.org/10.1177/0018726715610809.

Castañer, X., and N. Oliveira. 2020. "Collaboration, Coordination, and Cooperation Among Organizations: Establishing the Distinctive Meanings of These Terms Through a Systematic Literature Review." *Journal of Management* 46, no. 6: 965–1001. https://doi.org/10.1177/0149206320901565.

Charmaz, K., and R. Thornberg. 2021. "The Pursuit of Quality in Grounded Theory." *Qualitative Research in Psychology* 18, no. 3: 305–327. https://doi.org/10.1080/14780887.2020.1780357.

Chavez, R., M. Malik, H. Ghaderi, and W. Yu. 2023. "Environmental Collaboration With Suppliers and Cost Performance: Exploring the Contingency Role of Digital Orientation From a Circular Economy Perspective." *International Journal of Operations & Production Management* 43, no. 4: 651–675. https://doi.org/10.1108/IJOPM-01-2022-0072.

Circle Economy. 2023. "The Circularity Gap Report *2023*."

Corbin, J. M. 2021. "Strauss's Grounded Theory." In *Developing Grounded Theory*, edited by J. M. Morse, B. J. Bowers, K. Charmaz, et al., 2. Aufl., S. 25–44. Routledge.

Corley, K. G., and D. A. Gioia. 2004. "Identity Ambiguity and Change in the Wake of a Corporate Spin-Off." *Administrative Science Quarterly* 49, no. 2: 173–208. https://doi.org/10.2307/4131471.

Crossan, M. M., and M. Apaydin. 2010. "A Multi-Dimensional Framework of Organizational Innovation: A Systematic Review of the Literature: A Framework of Organizational Innovation." *Journal of Management Studies* 47, no. 6: 1154–1191. https://doi.org/10.1111/j.1467-6486.2009.00880.x.

Damanpour, F. 1991. "Organizational Innovation: A Meta-Analysis of Effects of Determinants and Moderators." *Academy of Management Journal* 34, no. 3: 555–590.

Danvers, S., J. Robertson, and A. Zutshi. 2023. "Conceptualizing How Collaboration Advances Circularity." *Sustainability* 15, no. 6: 5553. https://doi.org/10.3390/su15065553.

Dellermann, D., A. Fliaster, and M. Kolloch. 2017. "Innovation Risk in Digital Business Models: The German Energy Sector." *Journal of Business Strategy* 38, no. 5: 35–43. https://doi.org/10.1108/JBS-07-2016-0078.

Dossou-Yovo, A., and C. Keen. 2021. "SMEs and the Innovation Management Process: A Multi-Level Process Conceptual Framework." *Technology Innovation Management Review* 11, no. 1: 22–33. https://doi.org/10.22215/timreview/1414.

Eikelenboom, M., and G. de Jong. 2022. "The Impact of Managers and Network Interactions on the Integration of Circularity in Business Strategy." *Organization & Environment* 35, no. 3: 365–393. https://doi.org/10.1177/1086026621994635.

Eisenhardt, K. M. 1989. "Building Theories From Case Study Research." *Academy of Management Review* 14, no. 4: 532–550.

Eisenreich, A., J. Füller, and M. Stuchtey. 2021. "Open Circular Innovation: How Companies Can Develop Circular Innovations in Collaboration With Stakeholders." *Sustainability* 13, no. 23: 13456. https://doi.org/10.3390/su132313456.

Ellen MacArthur Foundation. 2020. "Circular Economy Growth Potential by Sector: Plastics and Packaged Goods." https://emf.thirdlight.com/link/4v5yje6r74fn-6y87f3/@/preview/1?o.

Ellen MacArthur Foundation. n.d. "Circular Economy Growth Potential by Sector." https://www.ellenmacarthurfoundation.org/topics/finance/sector-insights.

Engau, C., and V. H. Hoffmann. 2011. "Corporate Response Strategies to Regulatory Uncertainty: Evidence From Uncertainty About Post-Kyoto Regulation." *Policy Sciences* 44, no. 1: 53–80. https://doi.org/10.1007/s11077-010-9116-0.

Engelman, R. 2013. "Beyond Sustainababble." In *State of the World 2013*, edited by Worldwatch Institute (Hrsg.), S. 3–16. Island Press/Center for Resource Economics. https://doi.org/10.5822/978-1-61091-458-1_1.

European Commission. 2020. "A New Circular Economy Action Plan. For a Cleaner and More Competitive Europe." https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM:2020:98:FIN.

Faems, D., B. Van Looy, and K. Debackere. 2005. "Interorganizational Collaboration and Innovation: Toward a Portfolio Approach*." *Journal of Product Innovation Management* 22, no. 3: 238–250. https://doi.org/10.1111/j.0737-6782.2005.00120.x.

Faraj, S., and Y. Xiao. 2006. "Coordination in Fast-Response Organizations." *Management Science* 52, no. 8: 1155–1169. https://doi.org/10.1287/mnsc.1060.0526.

Fiss, P. C. 2011. "Building Better Causal Theories: A Fuzzy Set Approach to Typologies in Organization Research." *Academy of Management Journal* 54, no. 2: 393–420. https://doi.org/10.5465/amj.2011.60263120.

Flick, U. 2018. "Triangulation in Data Collection." In *The Sage Handbook of Qualitative Data Collection*, edited by U. Flick, 527–544. Sage Reference.

Fluchs, S., A. Neligan, C. Schleicher, and E. Schmitz. 2022. "*Zirkuläre Geschäftsmodelle. Wie zirkulär sind Unternehmen?* (Wirtschaftliche Untersuchung, Berichte und Sachverhalte 27/2022; IW-Report)." Institut der deutschen Wirtschaft Köln e. V. https://www.iwkoeln.de/fileadmin/user_upload/Studien/Report/PDF/2022/IW-Report_2022-Zirkul%C3%A4re-Gesch%C3%A4fsmodelle.pdf.

Foley, G., V. Timonen, C. Conlon, and C. E. O'Dare. 2021. "Interviewing as a Vehicle for Theoretical Sampling in Grounded Theory." *International Journal of Qualitative Methods* 20: 160940692098095. https://doi.org/10.1177/1609406920980957.

Frishammar, J., and V. Parida. 2019. "Circular Business Model Transformation: A Roadmap for Incumbent Firms." *California Management Review* 61, no. 2: 5–29. https://doi.org/10.1177/0008125618811926.

Gebhardt, M., M. Kopyto, H. Birkel, and E. Hartmann. 2022. "Industry 4.0 Technologies as Enablers of Collaboration in Circular Supply Chains: A Systematic Literature Review." *International Journal of Production Research* 60, no. 23: 6967–6995. https://doi.org/10.1080/00207543.2021.1999521.

Geisendorf, S., and F. Pietrulla. 2018. "The Circular Economy and Circular Economic Concepts—A Literature Analysis and Redefinition." *Thunderbird International Business Review* 60, no. 5: 771–782. https://doi.org/10.1002/tie.21924.

Geissdoerfer, M., P. Savaget, N. M. P. Bocken, and E. J. Hultink. 2017. "The Circular Economy – A New Sustainability Paradigm?" *Journal of Cleaner Production* 143: 757–768. https://doi.org/10.1016/j.jclepro.2016.12.048.

George, G., J. Howard-Grenville, A. Joshi, and L. Tihanyi. 2016. "Understanding and Tackling Societal Grand Challenges Through Management Research." *Academy of Management Journal* 59, no. 6: 1880–1895. https://doi.org/10.5465/amj.2016.4007.

Gephart, R. P. 2004. "Qualitative Research and the Academy of Management Journal." *Academy of Management Journal* 47, no. 4: 454–462. https://doi.org/10.5465/amj.2004.14438580.

Gioia, D. A., K. G. Corley, and A. L. Hamilton. 2013. "Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology." *Organizational Research Methods* 16, no. 1: 15–31. https://doi.org/10.1177/1094428112452151.

Gioia, D. A., K. N. Price, A. L. Hamilton, and J. B. Thomas. 2010. "Forging an Identity: An Insider-Outsider Study of Processes Involved in the Formation of Organizational Identity." *Administrative Science Quarterly* 55, no. 1: 1–46. https://doi.org/10.2189/asqu.2010.55.1.1.

Glaser, B. G., and A. L. Strauss. 1967. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Sociology Press.

Graebner, M. E., J. A. Martin, and P. T. Roundy. 2012. "Qualitative Data: Cooking Without a Recipe." *Strategic Organization* 10, no. 3: 276–284. https://doi.org/10.1177/1476127012452821.

Graessler, S., H. Guenter, S. B. de Jong, and K. Henning. 2024. "Organizational Change Towards the Circular Economy: A Systematic Review of the Literature." *International Journal of Management Reviews* 26, no. 4: ijmr.12367. https://doi.org/10.1111/ijmr.12367.

Grant, R. M. 2022. *Contemporary Strategy Analysis* (Eleventh Edition). Wiley.

Hansen, E. G., and F. Revellio. 2020. "Circular Value Creation Architectures: Make, Ally, Buy, or Laissez-Faire." *Journal of Industrial Ecology* 24, no. 6: 1250–1273. https://doi.org/10.1111/jiec.13016.

Heath, H., and S. Cowley. 2004. "Developing a Grounded Theory Approach: A Comparison of Glaser and Strauss." *International Journal of Nursing Studies* 41, no. 2: 141–150. https://doi.org/10.1016/S0020-7489(03)00113-5.

Ho, C., S. Böhm, and D. Monciardini. 2022. "The Collaborative and Contested Interplay Between Business and Civil Society in Circular Economy Transitions." *Business Strategy and the Environment* 31, no. 6: 2714–2727. https://doi.org/10.1002/bse.3001.

Joseph, J., and V. Gaba. 2020. "Organizational Structure, Information Processing, and Decision-Making: A Retrospective and Road Map for Research." *Academy of Management Annals* 14, no. 1: 267–302. https://doi.org/10.5465/annals.2017.0103.

Juntunen, J. K., M. Halme, A. Korsunova, and R. Rajala. 2019. "Strategies for Integrating Stakeholders Into Sustainability Innovation: A Configurational Perspective." *Journal of Product Innovation Management* 36, no. 3: 331–355. https://doi.org/10.1111/jpim.12481.

Khan, O., T. Daddi, and F. Iraldo. 2020a. "Microfoundations of Dynamic Capabilities: Insights From Circular Economy Business Cases." *Business Strategy and the Environment* 29, no. 3: 1479–1493. https://doi.org/10.1002/bse.2447.

Khan, O., T. Daddi, and F. Iraldo. 2020b. "The Role of Dynamic Capabilities in Circular Economy Implementation and Performance of Companies." *Corporate Social Responsibility and Environmental Management* 27, no. 6: 3018–3033. https://doi.org/10.1002/csr.2020.

Kirchherr, J., D. Reike, and M. Hekkert. 2017. "Conceptualizing the Circular Economy: An Analysis of 114 Definitions." *Resources, Conservation and Recycling* 127: 221–232. https://doi.org/10.1016/j.resconrec.2017.09.005.

Kirchherr, J., A. Urbinati, and K. Hartley. 2023. "Circular Economy: A New Research Field?" *Journal of Industrial Ecology* 27, no. 5: jiec.13426. https://doi.org/10.1111/jiec.13426.

Kleine Jäger, J., and L. Piscicelli. 2021. "Collaborations for Circular Food Packaging: The Set-Up and Partner Selection Process." *Sustainable Production and Consumption* 26: 733–740. https://doi.org/10.1016/j.spc.2020.12.025.

Köhler, J., S. D. Sönnichsen, and P. Beske-Jansen. 2022. "Towards a Collaboration Framework for Circular Economy: The Role of Dynamic Capabilities and Open Innovation." *Business Strategy and the Environment* 31, no. 6: bse.3000. https://doi.org/10.1002/bse.3000.

Kuhlmann, M., C. R. Bening, and V. H. Hoffmann. 2023. "How Incumbents Realize Disruptive Circular Innovation - Overcoming the Innovator's Dilemma for a Circular Economy." *Business Strategy and the Environment* 32, no. 3: 1106–1121. https://doi.org/10.1002/bse.3109.

Leising, E., J. Quist, and N. Bocken. 2018. "Circular Economy in the Building Sector: Three Cases and a Collaboration Tool." *Journal of Cleaner Production* 176: 976–989. https://doi.org/10.1016/j.jclepro.2017.12.010.

Lichtenthäler, S., and A. Neligan. 2023. "How Circular Are Businesses in Germany?" *Intereconomics* 58, no. 2: 79–86. https://doi.org/10.2478/ie-2023-0017.

Lincoln, Y. S., and E. G. Guba. 1985. *Naturalistic Inquiry*. Sage Publications.

Locke, K. 2002. "The Grounded Theory Approach to Qualitative Research." In *Measuring and Analyzing Behavior in Organizations: Advances in Measurement and Data Analysis*, 17–43. Jossey-Bass/Wiley.

Magnani, G., and D. Gioia. 2022. "Using the Gioia Methodology in International Business and Entrepreneurship Research." *International Business Review* 32, no. 2: 102097. https://doi.org/10.1016/j.ibusrev.2022.102097.

Mohapatra, S., S. Roy, A. Upadhyay, and A. Kumar. 2024. "Circular Value Creation Through Environmental Entrepreneurship Initiatives: A Case-Based Exploration." *Business Strategy and the Environment* 33, no. 5: 3811–3831. https://doi.org/10.1002/bse.3682.

Mura, M., M. Longo, and S. Zanni. 2020. "Circular Economy in Italian SMEs: A Multi-Method Study." *Journal of Cleaner Production* 245: 118821. https://doi.org/10.1016/j.jclepro.2019.118821.

Nag, R., and D. A. Gioia. 2012. "From Common to Uncommon Knowledge: Foundations of Firm-Specific Use of Knowledge as a Resource." *Academy of Management Journal* 55, no. 2: 421–457. https://doi.org/10.5465/amj.2008.0352.

Neligan, A., R. J. Baumgartner, M. Geissdoerfer, and J. Schöggl. 2023. "Circular Disruption: Digitalisation as a Driver of Circular Economy Business Models." *Business Strategy and the Environment* 32, no. 3: 1175–1188. https://doi.org/10.1002/bse.3100.

Newman, K. L. 2000. "Organizational Transformation During Institutional Upheaval." *Academy of Management Review* 25, no. 3: 602. https://doi.org/10.2307/259313.

OECD. 2022. *Global Plastics Outlook: Policy Scenarios to 2060*, 283. OECD Publishing. https://doi.org/10.1787/aa1edf33-en.

Parida, V., T. Burström, I. Visnjic, and J. Wincent. 2019. "Orchestrating Industrial Ecosystem in Circular Economy: A Two-Stage Transformation Model for Large Manufacturing Companies." *Journal of Business Research* 101: 715–725. https://doi.org/10.1016/j.jbusres.2019.01.006.

Pedersen, S., C. Clausen, and M. S. Jørgensen. 2023. "Navigating Value Networks to Co-Create Sustainable Business Models: An Actionable Staging Approach." *Business Strategy and the Environment* 32, no. 1: 240–258. https://doi.org/10.1002/bse.3127.

Piila, N., M. Sarja, T. Onkila, and M. Mäkelä. 2022. "Organisational Drivers and Challenges in Circular Economy Implementation: An Issue Life Cycle Approach." *Organization & Environment* 35, no. 4: 523–550. https://doi.org/10.1177/10860266221099658.

Plastics Europe. 2021. "Plastics—The Facts 2021 (S. 1–34)." https://plasticseurope.org/wp-content/uploads/2021/12/Plastics-the-Facts-2021-web-final.pdf.

Ragaert, K., L. Delva, and K. Van Geem. 2017. "Mechanical and Chemical Recycling of Solid Plastic Waste." *Waste Management* 69: 24–58. https://doi.org/10.1016/j.wasman.2017.07.044.

Reck, F., and A. Fliaster. 2022. "Far-Reaching or Closely Knit, Innovative or Complementary? Network Configurations and Firm-Level Innovation in the German Energy Sector." *Strategic Organization* 147612702210815: 668–698. https://doi.org/10.1177/14761270221081534.

Reck, F., A. Fliaster, and M. Kolloch. 2022. "How to Build a Network That Facilitates Firm-Level Innovation: An Integration of Structural and Managerial Perspectives." *Journal of Management Studies* 59, no. 4: 998–1031. https://doi.org/10.1111/joms.12768.

Rowley, J. 2012. "Conducting Research Interviews." *Management Research Review* 35, no. 3/4: 260–271. https://doi.org/10.1108/01409171211210154.

Schmidt, S., and D. Laner. 2023. "The Environmental Performance of Plastic Packaging Waste Management in Germany: Current and Future Key Factors." *Journal of Industrial Ecology* 27, no. 6: jiec.13411. https://doi.org/10.1111/jiec.13411.

Schöggl, J., L. Stumpf, and R. J. Baumgartner. 2023. "The Role of Interorganizational Collaboration and Digital Technologies in the Implementation of Circular Economy Practices—Empirical Evidence From Manufacturing Firms." *Business Strategy and the Environment* bse.3593: 2225–2249. https://doi.org/10.1002/bse.3593.

Schultz, F. C., V. Valentinov, J. Kirchherr, R. J. Reinhardt, and I. Pies. 2024. "Stakeholder Governance to Facilitate Collaboration for a Systemic Circular Economy Transition: A Qualitative Study in the European Chemicals and Plastics Industry." *Business Strategy and the Environment* 33, no. 3: 2173–2192. https://doi.org/10.1002/bse.3592.

Sehnem, S., A. A. F. S. L. de Queiroz, S. C. F. Pereira, G. dos Santos Correia, and E. Kuzma. 2022. "Circular Economy and Innovation: A Look From the Perspective of Organizational Capabilities." *Business Strategy and the Environment* 31, no. 1: 236–250. https://doi.org/10.1002/bse.2884.

Sharma, N. K., K. Govindan, K. K. Lai, W. K. Chen, and V. Kumar. 2021. "The Transition From Linear Economy to Circular Economy for Sustainability Among SMEs: A Study on Prospects, Impediments, and Prerequisites." *Business Strategy and the Environment* 30, no. 4: 1803–1822. https://doi.org/10.1002/bse.2717.

Steiber, A., and S. Alänge. 2021. "Corporate-Startup Collaboration: Effects on Large Firms' Business Transformation." *European Journal of Innovation Management* 24, no. 2: 235–257. https://doi.org/10.1108/EJIM-10-2019-0312.

Suchek, N., C. I. Fernandes, S. Kraus, M. Filser, and H. Sjögrén. 2021. "Innovation and the Circular Economy: A Systematic Literature Review." *Business Strategy and the Environment* 30, no. 8: 3686–3702. https://doi.org/10.1002/bse.2834.

Sudusinghe, J. I., and S. Seuring. 2022. "Supply Chain Collaboration and Sustainability Performance in Circular Economy: A Systematic Literature Review." *International Journal of Production Economics* 245: 108402. https://doi.org/10.1016/j.ijpe.2021.108402.

Thornberg, R., and C. Dunne. 2019. "Literature Review in Grounded Theory." In *The SAGE Handbook of Current Developments in Grounded Theory*, edited by K. Charmaz and A. Bryant (Hrsg.), S. 206–221. SAGE Publications.

Tidd, J. 2001. "Innovation Management in Context: Environment, Organization and Performance." *International Journal of Management Reviews* 3, no. 3: 169–183.

Tuladhar, A., K. Iatridis, and D. Dimov. 2024. "Collaboration Among Circular Start-Ups and Incumbents in the Circular Economy Context." *Business Strategy and the Environment* 33, no. 4: 3317–3330. https://doi.org/10.1002/bse.3670.

"Turning the Tide on Single-Use Plastics." 2021. Publications Office of the European Union.

Uhrenholt, J. N., J. H. Kristensen, M. C. Rincón, S. Adamsen, S. F. Jensen, and B. V. Waehrens. 2022. "Maturity Model as a Driver for Circular Economy Transformation." *Sustainability* 14, no. 12: 7483. https://doi.org/10.3390/su14127483.

United Nations Environment Programme. 2023. "Turning Off the Tap. How the World Can End Plastic Pollution and Create a Circular Economy." https://wedocs.unep.org/bitstream/handle/20.500.11822/42277/Plastic_pollution.pdf?sequence=4.

Veleva, V., and G. Bodkin. 2018. "Corporate-Entrepreneur Collaborations to Advance a Circular Economy." *Journal of Cleaner Production* 188: 20–37. https://doi.org/10.1016/j.jclepro.2018.03.196.

Weber, F., J. Lehmann, L. Graf-Vlachy, and A. König. 2019. "Institution-Infused Sensemaking of Discontinuous Innovations: The Case of the Sharing Economy." *Journal of Product Innovation Management* 36, no. 5: jpim.12499. https://doi.org/10.1111/jpim.12499.

Williamson, O. E. 1991. "Comparative Economic Organization: The Analysis of Discrete Structural Alternatives." *Administrative Science Quarterly* 36: 269–296. https://doi.org/10.2307/2393356.

Zollo, M., C. Cennamo, and K. Neumann. 2013. "Beyond What and Why: Understanding Organizational Evolution Towards Sustainable Enterprise Models." *Organization & Environment* 26, no. 3: 241–259. https://doi.org/10.1177/1086026613496433.

Appendix 1: Information on Data Sources

	Descriptive information on data sources						
Organization	No. of press releases	Pages in business reports	Pages in CSR reports	Website pages	Article pages	Other material pages (e.g., presentation slides)	Interviews
1	8	1095	201	—	—	62	1
2	—	1767	—	9	—	—	1
3	3	—	—	2	5	20	1
4	—	—	—	5	—	—	1
5	—	—	—	2	—	—	1
6	4	—	—	6	—	—	1
7	—	—	40	8	—	—	1
8	—	—	—	3	1	—	1
9	—	—	—	3	—	—	1
10	1	—	48	7	—	—	1
11	—	—	—	4	—	—	1
12	—	—	—	5	—	—	1
13	21	—	12	4	—	8	1
14	8	—	56	4	4	1	1
15	3	—	—	3	—	—	1
16	—	152	101	6	—	—	1
17	—	—	—	3	—	9	1
18	7	—	232	5	19	20	2
19	—	—	68	5	6	—	1
20	3	—	—	4	5	—	1
21	—	—	13	6	1	—	1
Other	2	—	—	6	280	—	3
Summary	60	3014	771	100	321	120	25

Abbreviation: CSR, corporate social responsibility.

Appendix 2: Interview Questions to Companies

- What significance does the idea of the circular economy have for your company's activities?
- We would like to learn about your company's journey from a linear to a circular economy; could you please explain it.
  - - What role does the circular economy play in your innovation activities?
  - - What do your innovation activities focus on in the context of the circular economy?
  - - How do you organize your innovation activities relating to the circular economy?
  - - How do you involve external partners in these innovation activities?
- How does the described [...] relate to the internal organizing of your company?
  - - How does this influence the company's structure?
  - - How does this influence internal workflows and processes?
  - - What role do projects play?
- How does the described [...] relate to collaboration with partners?
  - - How does it influence existing collaborations?
  - - How does it influence future collaborations?
- Is there anything else you would like to add on the subject of collaboration in the context of the circular economy?

Having chosen a semistructured approach to conducting the interviews, these questions provide stimulating narrative impulses. As explained in the text, we used incomplete answers from the informants as a starting point for further questions and thus gave space to the perspective of each individual informant.

Appendix 3: Information on Interviews[a]

Organization type	Position of interviewee	Descriptive information (duration of recording, volume of transcript, language[b])
Manufacturer of plastic products	Chief executive officer	45 min (F), 11 pages (G)
Manufacturer of packaging for the food industry	Chief executive officer	57 min (G), 14 pages (G)
Manufacturer of plastic packaging	Chief executive officer	49 min (G), 15 pages (G)
Manufacturer of plastic packaging esp. films	Chief executive officer	45 min (G), 11 pages (G)
Manufacturer of plastic packaging esp. films	Chief technology officer	59 min (G), 14 pages (G)
Manufacturer of plastic packaging	Chief sales officer	45 min (G), 13 pages (G)
Manufacturer of plastic packaging esp. industrial applications and tanks	Managing director	46 min (G), 13 pages (G)
Manufacturer of plastic electromechanical modules	Shareholder-managing director	45 min (G), 12 pages (G)
Manufacturer of plastic packaging films	Head of R&D	44 min (G), 13 pages (G)
Manufacturer of plastic packaging	Head of R&D and business development	47 min (G), 12 pages (G)
Plastics recycling esp. compounding and preparation	Head of R&D and production	29 min (G), 9 pages (G)
Manufacturer of thermoformed packaging	Head of communication	45 min (F), 12 pages (G)
Manufacturer of chemical products	Head of sustainability	53 min (F), 15 pages (G)
Manufacturer of plastic packaging	Business unit manager compounds	48 min (G), 13 pages (G)
Manufacturer of plastic films	Senior R&D manager	49 min (G), 13 pages (G)
Manufacturer of plastic films	Senior product manager	47 min (G), 14 pages (G)
Manufacturer of chemical products	Project manager CE	30 min (G), 8 pages (G)
Manufacturer of plastic products in several divisions	Enabler of sustainable innovation	54 min (G), 13 pages (G)
Manufacturer of plastic packaging	Business development & sustainability leader	46 min (G), 13 pages (G)
Manufacturer of plastic packaging	Sustainability & CSR manager	45 min (G), 13 pages (G)
Manufacturer of electrical insulation materials	CE & sustainability manager (Interviewee a) Business analyst (Interviewee b)	15 min (G), 5 pages (G)
Manufacturer of technical packaging	Plant manager CE	52 min (F), 14 pages (G)
Adhesive transformer	Quality health safety & environment manager	20 min (F), 6 pages (G)
Union of polymer manufacturers	Consultant/instructor	60 min (F), 14 pages (G)
Industry association plant manufacturers	Adviser environmental & sustainability affairs	30 min (G), 8 pages (G)

Abbreviations: CE, circular economy; CSR, corporate social responsibility; R&D, research & development.
[a] Sequence of the presented information does not correspond with the numbering of the interviews in the text.
[b] F = French; G = German.