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Understanding the effect of market orientation on circular economy practices: The mediating role of closed-loop orientation in German SMEs

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Abstract

The implementation of circular economy (CE) practices is considered a key driver towards sustainable development of firms. Earlier studies point to the general strategic approach of market orientation as an antecedent to CE practice implementation. Still, insights are limited as the mechanisms underlying this relationship remain unclear. Based on a sample of 121 German small and medium-sized enterprises (SME), we empirically examine how the strategic approach of closed-loop orientation mediates the relationship between market orientation and the implementation of three types of CE practices. Using structural equation modelling, we find that while market orientation is positively related to all three types of CE practices, closed-loop orientation mediates these relationships for only two. Our study extends CE literature by suggesting that market orientation is translated into closed-loop orientation to spur CE practice implementation. We also offer a differentiated understanding of CE practice implementation in the context of German SMEs.

KEYWORDS
circular economy practices, closed-loop orientation, market orientation, natural-resource-based view, small and medium-sized enterprises, sustainable development

1 | INTRODUCTION

The 2015 Paris Climate Agreement is seen as an important milestone for economic transformation towards a circular economy (CE) within the European Union (European Commission, 2016). The CE paradigm "offer[s] an alternative to prevalent linear take-make-dispose practices by promoting the notion of waste and resource cycling" (Blomsma & Brennan, 2017, p. 603), thereby decreasing manufacturing impact on the environment (Kirchherr et al., 2018). In a recent Taxonomy Regulation, the European Commission (2020a) even defines the transition towards a CE as one of six conditions for companies to qualify as environmentally sustainable. Consequently, academics, policymakers, and the private sector increasingly pay attention to the need for implementing a CE (de Jesus & Mendonça, 2018; Geissdoerfer et al., 2017; Murray et al., 2017).

However, it seems that CE implementation remains relatively low within European firms (Eurostat, 2019). In addition, empirical research on the strategic antecedents of CE implementation continues to be scarce. In fact, Chan et al. (2012) and Kirchoff et al. (2016) are among the first to analyze the effects of strategic environment orientations on CE-related practices. Related research has focused on the impact of general strategic orientations—such as market orientation—on

environmental strategies and practices (e.g., Chen et al., 2015; Green et al., 2015). Market orientation is defined as the coordinated and cross-functional integration of customer orientation and competitor orientation within the firm (Narver & Slater, 1990). These studies do yield first empirical evidence of the facilitating role strategic orientations play in CE implementation, yet their insights tend to be vague for three reasons. First, current literature lacks detailed descriptions of the specific mechanisms that help translate general strategic orientations into concrete CE practices. Some studies advocate the role of more specific orientations in this regard: S. Liu and Chang (2017, p. 7), for instance, introduce closed-loop orientation as reflecting the "strategic orientation toward the recyclability of materials/components/products throughout the entire supply chain loop," thereby suggesting a mechanism that might explain the process by which general strategic orientations translate into CE practices. However, detailed empirical investigations of such relationships are still lacking. Second, scholars so far do not differentiate the three types of CE practices: internal environmental management, eco-design, and corporate asset management and recovery. Third, much of our knowledge is based on studies of Asian markets—comparable analyses of European contexts are rare. These gaps present both researchers and practitioners with substantial challenges.

The natural-resource-based view of the firm (Hart, 1995; Hart & Dowell, 2011) suggests that developing strategic capabilities, such as the implementation of CE practices, is critical for creating a firm's sustained competitive advantage. It is imperative to understand the exact mechanisms that help generate such CE practices. Scholars thus call for further investigations of the antecedents and mechanisms of CE practice implementation (de Oliveira et al., 2018; Defee et al., 2009; S. Liu & Chang, 2017; Masoumik et al., 2015). Building on previous research, this study aims to explore how the general strategic approach of market orientation—and its interplay with the more specific strategic orientation of closed-loop orientation—influences CE practice implementation. We pursue answers to the following research question: *How does a closed-loop orientation help firms translate market orientation into circular economy practices?*

To address this question, we analyze survey data obtained from 121 German firms. We focus on small and medium-sized enterprises (SMEs), as research suggests that the specific relationships and concepts proposed in this study can be particularly well observed in this group of firms (Courrent et al., 2018; Dey et al., 2020; Jansson et al., 2017; Prieto-Sandoval et al., 2018; Sharma et al., 2021). Our findings indeed support the proposition that market orientation fuels the implementation of CE practices through closed-loop orientation. Importantly, while our analysis differentiates three types of CE practices—internal environmental management, eco-design, and corporate asset management and recovery—we find no direct or mediating effect for corporate asset management and recovery.

Our results expand the literature on CE in specific and the natural-resource-based view in general: First, our study delineates a novel mechanism by which SMEs can realize CE practices. We extend previous studies, underlining how important it is to translate the general strategic approach of market orientation into a more concrete strategic approach—closed-loop orientation—to promote CE practice implementation. Second, by investigating our research question against the disaggregate subcomponents—internal environmental management, eco-design, and corporate asset management and recovery—we contribute to a more granular and differentiated understanding of the implementation of CE practices. As literature so far has rarely scrutinized this disaggregate level, this focus renders our findings more applicable for managers aiming to promote their firms' CE practice implementation. Third, by adding a perspective on a previously under-researched context, we complement previous insights into CE practices and related antecedents, which are largely based on studies conducted in Asian markets.

2 | THEORETICAL FOUNDATION

2.1 | The natural-resource-based view

The natural-resource-based view was introduced by Hart (1995) and extends the more general notion of the resource-based view (Barney, 1991). In its traditional form, the resource-based view predicts that resources that are valuable, rare, imperfectly imitable, and nonsubstitutable generate a sustained competitive advantage for firms (Barney, 1991). The natural-resource-based view suggests three additional, environment-oriented capabilities as prerequisites for superior profitability: pollution prevention, product stewardship, and sustainable development (Hart, 1995). Pollution prevention refers to the prevention of waste and emissions in the production process, which is assumed to lead to efficiency gains (Hart & Dowell, 2011). Product stewardship emphasizes that the "voice of environment" should already be integrated in product design and product development (Hart, 1995, p. 993). This capability goes beyond mere pollution prevention and embraces the "entire […] 'life cycle' of the firm's product systems" (Hart & Dowell, 2011, p. 1466). Sustainable development refers to a production configuration that can be "maintained indefinitely into the future" (Hart & Dowell, 2011, p. 1466). While pollution prevention and product stewardship focus on decreasing environmental harm in developed markets, sustainable development broadens this scope to include "wider economic and social concerns" in developing markets as well (Hart & Dowell, 2011, p. 1466).

In their 2011 study, Hart and Dowell review the impact of the natural-resource-based view and evaluate the progress achieved since its introduction in 1995. Specifically, they find that most scholarly works focus on pollution prevention capabilities, whereas fewer empirical analyses center on the other two capabilities (Hart & Dowell, 2011). Of those, product stewardship, given its underlying product life cycle logic, can be considered particularly well suited to theorize about more recent CE phenomena. However, it still represents a "nascent area" (Hart & Dowell, 2011, p. 1469). Many studies on product life cycle strategies focus on practices of green supply chain management as a concretization of the ideas behind product stewardship (e.g., Green et al., 2015). While green supply chain management and CE practices partially overlap conceptually (especially at

the micro or enterprise level of CE practices), they do differ in key aspects (J. Liu et al., 2018). As previous literature suggests, green supply chain management focuses on environmental aspects, whereas CE rather facilitates an economic view (Geng et al., 2009; J. Liu et al., 2018; Sarkis, 2012).

2.2 | Circular economy practices implementation

In our study, we consider CE practices to reflect capabilities relevant for product stewardship. Developing such practices requires firms to integrate ecological criteria including reduction, recycling, reuse, and substitution of materials into their management activities and supply chains (Botezat et al., 2018; Masi et al., 2017). Zhu et al. (2011) argue that those practices can be broken down into three key dimensions: internal environmental management, eco-design, and corporate asset management and recovery.

Internal environmental management describes processes and procedures that incorporate environmental factors, such as special environmental trainings for workers or internal performance evaluation systems (Zhu et al., 2011). Moreover, it supports intra-organizational environmental objectives and is central to improve a firm's ecological performance (Christmann, 2000; Handfield et al., 1997; Melnyk et al., 2003). The activities included under internal environmental management resonate well with the natural-resource-based view's notion of pollution prevention. However, as proposed by Hart (1995), practices related to pollution prevention can be considered a necessary precondition for product stewardship. As such, internal environmental management represents a key ingredient to implementing product stewardship. Eco-design describes product design processes taking into account the environmental impact, and is thus a promising strategy to achieve eco-efficiency (Aoe, 2007). Therefore, several requirements for specific product designs have already been put into place within the European Union (Schischke et al., 2008). Besides eco-efficiency, eco-design practices offer firms an opportunity to provide markets with differentiated products—for example, with increased durability or recyclability (Dalhammar, 2016; Sakao & Fargnoli, 2010)—and to address specific consumer needs. Corporate asset management and recovery refers to the ability to resell and reuse used materials (Zhu et al., 2008; Zhu et al., 2011). It is relevant for closing the loop from a firm's perspective and for capturing the value within the supply chain (Zhu et al., 2011). This requires firms to think strategically about how to derive greater value from materials and products (Zhu et al., 2008), and it is an important goal to be achieved within the CE (Lieder & Rashid, 2016).

2.3 | Antecedents to circular economy practices—Strategic orientations

According to the natural-resource-based view, product stewardship is an important factor for the development of sustained competitive advantage (Hart, 1995). Hence, researchers have started to identify the drivers leading to the generation of underlying firm practices (Ciliberto et al., 2021; Colucci & Vecchi, 2021). A number of related studies point to the effect of strategic orientations, which can be defined as "the firm's philosophy of how to conduct business through a deeply rooted set of values and beliefs that guides the firm's attempt to achieve superior performance (Gatignon & Xuereb, 1997)" (Zhou et al., 2005, pp. 44–45). Specifically, extant research suggests the positive effects of market orientation (e.g., Green et al., 2015). To realize superior value for buyers based on market orientation, firms constantly need to acquire information about their customers and competitors, and they have to be able to disseminate it throughout their organization (Narver & Slater, 1990). Originally, market orientation follows a relatively wide conceptualization that is not limited to the environmental realm (Narver & Slater, 1990). In fact, marketing literature outlines a plethora of potential consequences of firms' market orientation (see Kirca et al., 2005). According to the natural-resource-based view, the emergence of product stewardship is driven by the integration of stakeholders or external perspectives into product design and product development processes (Hart, 1995; Hart & Dowell, 2011). Market orientation focuses on a specific segment of stakeholders—customers, competitors (Ferrell et al., 2010), and government agencies (Green et al., 2015; Slater & Narver, 1995)—and hence can be assumed to have a potential impact on the emergence of related CE practices as well. Matos and Hall (2007) suggest that devising product stewardship strategies requires firms not to "approach life cycle issues as specialized, disconnected aspects of the product" (Hart & Dowell, 2011, p. 1470). Accordingly, to implement CE practices successfully, firms presumably need a holistic, environment-focused approach that translates the more general aspects of market orientation into specific measures—such as a closed-loop orientation.

Closed-loop orientation includes a holistic view on a firm's life cycle of materials and products and their recyclability (Beamon, 1999; Carter & Ellram, 1998; Guide & van Wassenhove, 2009; Zhu et al., 2008). As such closed-loop orientation presents a more concrete strategic orientation, compared to market orientation. Recently, S. Liu and Chang (2017) have proposed it as a strategy to advance CE practice implementation. Defee et al. (2009) find that firms with a closed-loop orientation focus on three major themes: (1) returns management, asset recovery, and product acquisition; (2) remanufacturing; and (3) secondary markets and channel design. In line with the literature on strategic orientations (Hong et al., 2009; Sarkis, 2001; Srivastava, 2007), S. Liu and Chang (2017) conclude that both resource commitment and management support of the topic are two additional key requirements besides a holistic view when firms intend to establish a closed-loop orientation. If endowed with appropriate resources, a closed-loop orientation may result in firm-internal investments—for example, into employee trainings, in recycling, or into the development of processes to disassemble returned products (S. Liu & Chang, 2017). Previous literature mainly addresses the closing of resource loops with the concepts of closed-loop supply chains (e.g., Defee et al., 2009; Fleischmann et al., 2001; Guide & van Wassenhove, 2009) and reverse logistics (Carter & Ellram, 1998; Daugherty et al., 2001; Stock, 1992). With its focus on the efficient

use of resources and recovery of value, a closed-loop orientation can be seen as a key component of effective green supply chain management, and ultimately of a CE (Geissdoerfer et al., 2017; Govindan et al., 2015; Guide & van Wassenhove, 2009). A strategic orientation focusing on closing resource loops can thus be considered an antecedent to CE practice development. S. Liu and Chang (2017) have recently refined closed-loop orientation as a measure well-suited to achieve this goal. Establishing a holistic view on the entire material and product life cycle, ensuring management support, and providing necessary resources can all be considered activities related to CE practice implementation, as suggested by the natural-resource-based view (Hart, 1995).

Market-oriented firms seem to be best positioned to sense increasing stakeholder pressure and disseminate it within their organization (Kirca et al., 2005; Narver & Slater, 1990). Our reasoning, however, indicates that product stewardship emerges when a firm allocates the required resources and ensures senior executives' commitment. We therefore propose that a closed-loop orientation, with its focus on resource commitment and management support towards a holistic life cycle view on materials and products, will be necessary for market-oriented firms to develop CE practices. Based on the natural-resource-based view, our research model suggests that closed-loop orientation acts as a mechanism helping market-oriented firms implement internal environmental management, eco-design, and corporate asset management and recovery. Figure 1 shows our research model.

2.4 | Circular economy practices in small and medium-sized enterprises

To analyze our research model and the hypothesized relationships, we draw on SMEs. Some scholars suggest that the introduction of environment-oriented strategies might be rather challenging for SMEs, given their resource constraints (Courrent et al., 2018; Hamann et al., 2017). However, SMEs also exhibit characteristics that allow researchers to embark on a particularly fine-grained analysis of topics related to such limitations. Courrent et al. (2018) summarize these features, which include the following aspects: First, SMEs often have simple capital structures that might allow owners/managers to make environment-oriented investments with little need of justification. Second, SMEs might be better able to respond flexibly to changes in stakeholder requirements. Third, less complex and less hierarchical structures might result in "relatively low coordination costs" (Courrent et al., 2018, p. 319), which facilitates internal collaboration when implementing environment-focused practices. Fourth, as their resources might be limited, SMEs potentially have a greater "propensity to collaborate with external partners" (Courrent et al., 2018, p. 319)—another important prerequisite for the introduction of CE practices. Scholars have only recently started to investigate strategic orientations and the implementation of CE practices in SMEs (Courrent et al., 2018; Dey et al., 2020; Jansson et al., 2017; Katz-Gerro & López Sintas, 2018; Mafini & Muposhi, 2017; Prieto-Sandoval et al., 2018; Rizos et al., 2016; Sharma et al., 2021). To advance this nascent research stream, we focus on SMEs as a suitable empirical context for our study.

We focus on German SMEs because we expect that empirically assessing the strategic antecedents of CE practices works particularly well within this national context: Germany has a long history of environmental legislation and closed-loop recycling; it is often referred to as one of the "pioneers in CE-like policies" (Geng et al., 2013, p. 1526). Consequently, stakeholders have higher expectations of a firm's environmental standards than stakeholders in most other countries do (Patel et al., 2000; Schmidt et al., 2017). Being aware of these expectations, senior managers feel compelled to implement CE practices to gain a competitive advantage, as suggested by the

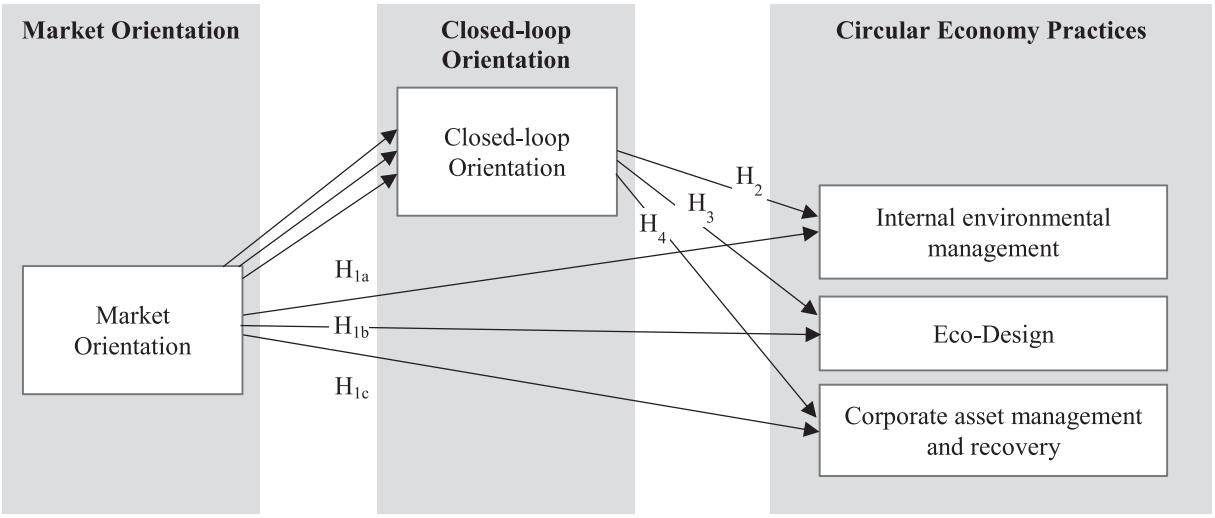

FIGURE 1 Research model

natural-resource-based view (George et al., 2015; Schaltenbrand et al., 2015). To comply with environmental legislations and meet stakeholder expectations, German SMEs are highly innovative, making Germany one of the largest innovation-driven economies in Europe. Horbach and colleagues provide empirical evidence of the high level of CE innovations (Horbach & Rammer, 2020), environmental innovations (Horbach, 2008), and eco-innovations (Horbach et al., 2013) within Germany compared to other European countries. German SMEs are frontrunners in environmental awareness and in the uptake of CE practices, aiming to sustain their competitive edge (Schaltenbrand et al., 2015). Investigating the strategic antecedents of CE practices in German SMEs offers an advantage because CE plays a relevant role within the German business environment for some time, which rules out potential short-term effects (Ehrgott et al., 2011; Schmidt et al., 2017). We expect our analyses to reveal that German SMEs' strategic orientations reliably translate into CE practices. Given the high CE standards in Germany, we also expect that "firms have already capitalized on all 'low-hanging fruit,' in terms of realizing direct efficiencies" (Schmidt et al., 2017, p. 18) and are thus required to focus their strategy on advancing CE practice implementation. By exploring the antecedents of CE within Germany, we examine a standard which other countries are striving for as the awareness for CE grows—this makes our study also relevant to other European countries as well as developed countries beyond the European setting. Similar to our reasoning, Geng et al. (2013) and Singh et al. (2018) show that the CE approach of Germany has been adopted by both China and India, and it is increasingly highlighted within literature reviews (Barreiro-Gen & Lozano, 2020; Ferasso et al., 2020; Pieroni et al., 2019).

3 | HYPOTHESES DERIVATION

3.1 | Market orientation and CE practices

A market-oriented firm focuses on stakeholders such as customers, competitors, and government agencies and on their potential behaviors and expressed needs (Green et al., 2015; Slater & Narver, 1995). Several studies suggest that customers are becoming increasingly aware of sustainability and environmental topics (Belz & Schmidt-Riediger, 2009; Jansson, 2011). To meet changing customer needs, market-oriented firms have been found to develop a commitment towards sustainability (Jansson et al., 2017): they incorporate environmental specifications into their product design and assume an end-to-end life cycle view (Blomsma & Brennan, 2017; Lewandowski, 2016). Moreover, such firms engage in product stewardship, which facilitates taking into account market demands, natural constraints, and sustainable development requirements (Yunus & Michalisin, 2016). This suggests that market orientation induces firms to commit resources and management towards implementing concrete CE practices.

Firms also need to mitigate competitor pressure and threats. To this end, they need to keep pace with or surpass competitors' performance (Yen, 2018). Sustainable business practices have turned mainstream over the past years (Crittenden et al., 2011), and some developed markets such as Germany already have a long history of recycling (Patel et al., 2000). As a result, more and more companies are adopting green practices (Federal Government of Germany, 2012; Thun & Müller, 2009). Subsequently, and in line with the natural-resource-based view, market-oriented firms sense the pressure to become environmentally proactive to obtain or sustain a competitive advantage (Berry & Rondinelli, 1998). Thus, market orientation is expected to induce firms to develop specific strategic capabilities and CE practices in response.

In addition to customer and competitor pressure, institutions such as governments and environmental protection agencies impose considerable pressure on firms to adapt green practices as well (Thun & Müller, 2009; Yen, 2018). Although not implemented as legislation, the European Union has developed a Circular Economy Action Plan to foster a competitive, carbon neutral, and resource-efficient economy (European Commission, 2015, 2020b) and has only recently introduced a taxonomy specifying the transition to a CE as one of its environmental objectives (European Commission, 2020a). Influential private bodies such the Ellen MacArthur Foundation also promote CE principles like circulating products and reducing the share of virgin materials (Ellen MacArthur Foundation, 2015). These stakeholders exert specific pressure to increase attention to product stewardship and related CE practices. Under pressure from various stakeholders, market-oriented firms are expected to sense related information better and disseminate it effectively throughout their organizations. Consequently, if such pressures are sufficiently strong, firms with a high market orientation develop CE practices to consider environmental concerns in product design and product development. This relation is supported by the propositions of the natural-resource-based view: Hart (1995, p. 1001) states that "[p]roduct stewardship […] implies an organizational ability not only to coordinate functional groups within the firm, but also to integrate the perspectives of key external stakeholders […] into decisions on product design and development (Welford, 1993)." Furthermore, this relationship might be particularly well pronounced in SMEs, as it is far easier to achieve internal dissemination of relevant stakeholder information if complexity and hierarchical structures are low (cf. Courrent et al., 2018; Hamann et al., 2017).

The general association between market orientation and CE practices related to product stewardship is supported by previous literature in the field (e.g., Chen et al., 2015; Green et al., 2015). For each of the three CE practices, we propose:

Hypothesis 1a. Market orientation is positively associated with internal environmental management.

Hypothesis 1b. Market orientation is positively associated with eco-design.

Hypothesis 1c. Market orientation is positively associated with corporate asset management and recovery.

3.2 | The mediating role of closed-loop orientation

According to S. Liu and Chang (2017), a firm displays closed-loop orientation if it proclaims to assume a holistic life cycle view on its materials and products and provides the respective resources and management support. Closed-loop orientation hence mainly describes a firm's conviction to enable recycling and remanufacturing of materials used in its production and to recycle production process waste. Such firms' key capabilities relate to their operational processes, products, and assets (Größler & Grübner, 2006; Moktadir et al., 2020; Swink & Harvey Hegarty, 1998); a closed-loop orientation is thus expected to drive the development of those operational, product, and asset capabilities that are in line with a holistic life cycle view. As S. Liu and Chang (2017) suggest, closed-loop-oriented firms aim to maximize the rate of recycled materials and to reduce waste within the production process from an operational point of view. As recyclability is seen as an important factor of product quality, closed-loop-oriented firms also need to pay attention to specific indicators and raise employees' awareness of recycling. Finally, closed-loop-oriented firms aim to assess their products' entire life cycle; to this end, they have to develop the capabilities needed for goal setting and indicator reporting. Implementing such a holistic life cycle view might entail profound changes to previous value creation and capture—hence highly flexible and adaptable firm processes and infrastructures may represent an important advantage. We argue that SMEs in particular can leverage closed-loop orientation to translate the previously disseminated stakeholder information into even more concrete practices (cf. Courrent et al., 2018; Hamann et al., 2017). Subsequently, we describe this translational process for each of the three CE practices.

In the literature, one of the key practices used to describe corporate environmental activities is internal environmental management (Melnyk et al., 2003; Sayre, 2014). Internal environmental management has generally been outlined as pollution control, waste minimization, employee training, goal setting, and top management reporting (Melnyk et al., 2003; Sarkis et al., 2010). According to Zhu et al. (2011), internal environmental management specifically includes activities like, for example, deploying management systems that are able to assess environmental factors, generating environmental reports, or working cross-functionally on environmental matters. Consequently, a firm's closed-loop orientation is expected to drive the implementation of operational internal environmental management activities. In line with the natural-resource-based view, we propose:

> **Hypothesis 2.** The positive association between market orientation and internal environmental management is mediated by closed-loop orientation.

Environmental impacts are not only generated by operational product processes, which are mainly addressed by internal environmental management, but also by product use and disposal (Roy, 1994). To offer products with a minimum of environmental impact, closed-loop-oriented firms need to create designs with minimized manufacturing emissions and resource and energy consumption during consumer use; such products also need to feature high recyclability and re-manufacturability (Dangelico et al., 2017). Firms with closed-loop orientation embody a holistic life cycle view (Defee et al., 2009). In addition to environmentally optimized operational processes, they aim to increase their products' recyclability and re-manufacturability (S. Liu & Chang, 2017). Closed-loop-oriented firms therefore allocate resources to employee training and set targets for reduced material input. Such internal willingness to commit resources and to act in a morally correct manner is shown to be a driver of eco-innovation and eco-design (Salo et al., 2020), which suggests that closed-loop orientation positively affects eco-design. A firm's holistic product life cycle view is consequently expected to advance the development of capabilities enabling the firm to design products that can be re-manufactured or taken back at the end-of-life. Thus, closed-loop orientation within a firm can be seen as an important factor in eco-design practice establishment. Following this rationale, we conclude that market orientation promotes the implementation of eco-design practices through the mechanism of closed-loop orientation:

> **Hypothesis 3.** The positive association between market orientation and eco-design is mediated by closed-loop orientation.

The ultimate goal of a CE is an economy in which waste is seen as resource (Blomsma & Brennan, 2017). Internal environmental management and eco-design aim towards minimizing waste throughout the manufacturing process and the product life cycle. Closed-loop-oriented firms, however, also focus on closing resource loops for the waste they generate despite existing internal environmental management and eco-design practices. They generally emphasize employee training in recycling and invest in technologies required to disassemble and clean components and materials (S. Liu & Chang, 2017). Yet, closed-loop-oriented firms are also expected to build capabilities enabling them to close resource loops not directly related to their products (Defee et al., 2009). Corporate asset management and recovery plays a significant role in this context because it is considered an alternative to the disposal of scrap and excess materials (Zsidisin & Hendrick, 1998). Corporate asset management and recovery can be described as finding alternative uses for items that are no longer of value to a firm. Zsidisin and Hendrick (1998) suggest that corporate asset management and recovery, with its focus on investment recovery, directly aligns environmental concerns with potential value generation. Specifically, corporate asset management and recovery enables firms to capture value by reselling and reusing materials and managing product end-of-life processes (Kirchoff et al., 2016). Corporate asset management and recovery thus requires that firms coordinated their recovery efforts with upstream and downstream supply chain partners. Moreover, to capture the value within the supply chain, firms need to actively manage the life-cycle of products and materials (Zhu et al., 2008; Zhu et al., 2011). It is

expected that a firm's closed-loop orientation will act as the mechanism that translates market orientation into corporate asset management and recovery practice implementation. We propose:

> **Hypothesis 4.** The positive association between market orientation and corporate asset management and recovery is mediated by closed-loop orientation.

4 | METHODOLOGY

4.1 | Data collection and sample

We focus on German producing companies in the SME segment (i.e., with 50–250 employees; European Commission, 2020c), which form the backbone of the German economy (BMWi, 2016). For this purpose, constructs were translated into German and tested with industry experts and academics. To obtain our initial sample, we used the DAFNE database to identify CEOs, top management team members, and senior managers. Senior individuals are the ideal target group to investigate mechanisms and relationships in the context of strategic orientations as they are generally seen as being able to adjust characteristics of the firm to ensure continued success (Glick et al., 1990). We randomly selected companies and phoned them asking whether identified persons would be interested to take part in our study. All interested individuals received a personally tailored e-mail with a link to our online survey. In addition, we were able to collaborate with the Association of German Engineers to distribute anonymous links to our survey through their distribution network. The data were collected over the course of 3 months from November 2018 to January 2019 and yielded a total of 134 responses. After deleting incomplete answers and excluding answers from respondents that were not CEOs, part of the top management team, or senior managers, we obtained a total of 121 usable responses. Table 1 contains descriptive statistics of the sample.

4.2 | Measures

Our research model is based on established measures from different literature streams that are measured on a 7-point Likert scale. Table 2 shows relevant items used in the questionnaire.

4.2.1 | Independent variable

We use the market orientation measure of Narver and Slater (1990) with a few wording adaptations based on Ozkaya et al. (2015), asking respondents for their level of support for the different statements (1 = *strongly disagree*; 7 = *strongly agree*). While market orientation has originally been designed as second-order construct comprising customer orientation, competitor orientation, and cross-functional integration, we follow Rhee et al. (2010) and aggregate those subdimensions within market orientation as first-order construct (Cronbach's alpha = .87).

4.2.2 | Mediator variable

The scale to measure closed-loop orientation (Cronbach's alpha = .91) was taken from S. Liu and Chang (2017). We use it as a first-order construct that comprises items of the subconstructs: holistic perspective, resource commitment, and management support. Again, we asked respondents to specify their level of support (1 = *strongly disagree*; 7 = *strongly agree*) for the different orientation statements.

4.2.3 | Dependent variable

The measures for our dependent variables were derived from Zhu et al. (2011), who used internal environmental management (Cronbach's alpha = .91), eco-design (Cronbach's alpha = .75), and corporate asset management and recovery (Cronbach's alpha = .65)

TABLE 1 Overall composition of the sample

Position of respondent	%	Product type	%	ISO 14001 certified	%
CEO	34	Final	55	Yes	48
Member of TMT	42	Intermediate	36	No	52
Senior manager	24	Material	8		
Firm size	**%**	**Firm age**	**%**	**Industry/activity**	**%**
≤50	7	≤10 years	3	Manufacturing	36
51–100	25	11–30 years	22	Construction R&E	3
101–250	36	31–50 years	17	Medical/pharma/chemical	10
251–500	12	51–70 years	24	Packaging	20
≥501	21	71–90 years	14	Food	7
		91–110 years	7	Textile	11
		≥111 years	12	Other	13

Note: Sample comprises 121 observations; due to rounding, percentages do not always add up to 100%.
Abbreviation: TMT, top management team.

TABLE 2 Measurement items

	Factor loading
Circular economy practices—Internal environmental management	
Cross-functional cooperation for environmental improvements.	0.714
Special training for workers on environmental issues.	0.738
Total quality environmental management.	0.799
Existence of pollution prevention programs such as cleaner production.	0.598
Internal performance evaluation system incorporating environmental factors.	0.704
Generate environmental reports for internal evaluation.	0.800
Commitment to named practices from senior managers.	0.759
Support for named practices from mid-level managers.	0.794
Circular economy practices—Eco-design	
Design of products for reduced consumption of materials/energy.	0.735
Design of products for reuse, recycle, recovery of material, component parts.	0.532
Design of products to avoid or reduce use of hazardous of products.	0.722
Design of processes for minimization of waste.	0.662
Circular economy practices—Corporate asset management	
Investment recovery (sale) of excess inventories/materials.	0.593
Sale of scrap and used materials.	0.602
Sale of excess capital equipment.	0.645
Closed-loop orientation	
In our firm, the recovery rate of end-of-life products is an important component in performance measures.	0.748
In our firm the maximization of materials recycling is an important goal to be achieved.	0.806
Our firm regards recyclability as an important indicator of product quality.	0.773
Our firm attaches importance to recyclability when designing products, selecting materials, manufacturing products, and distributing products.	0.791
Our firm evaluates products from the entire life cycle perspective throughout the stages of purchasing materials, designing, manufacturing and distributing products, and recycling end-of-life products.	0.671
Our firm invests in technologies (e.g., disassembly technology and cleaning type systems) for the processing of used materials.	0.481
Our firm has a specially-assigned person to manage the function of taking back end-of-life products.	0.501
Our firm communicates information about the recyclability of our products across all business functions.	0.734
Our firm has information and know-how relating to materials recycling in our industry.	0.676
Our firm has recycling training programs for employees.	0.609
Our top management emphasizes the importance of recovery of the company's waste materials.	0.588
Our top management emphasizes the necessity of avoiding waste where possible.	0.571
Market orientation	
Our company has a strong focus on understanding customers' needs.	0.726
Our company focuses on creating greater value for customers.	0.672
We measure customer satisfaction systematically and frequently.	0.415
Our salespeople regularly share information within our business concerning competitors' strategies.	0.592
Top management regularly discusses competitors' strengths and strategies.	0.470
We communicate information about our successful and unsuccessful customer experiences across all business functions.	0.797
All of our business functions are integrated in serving the needs of our target markets.	0.823
All of our managers understand how the different functions in our company can contribute to creating customer value.	0.836
All functional groups work hard to thoroughly and jointly solve problems.	0.825

Note: Exploratory factor analysis with varimax rotation; Kaiser–Mayer–Olkin criterion = 0.835.

as first-order constructs, which together were described as CE practices. Similar to Zhu et al. (2011), we use those measures as first-order constructs, asking respondents to specify the implementation status of the different items within their firm (1 = *not considering*; 7 = *implementing successfully*).

4.2.4 | Control variables

We build on previous research in the context of CE practices to define our control variables. Controlling for firm size is related to potentially more resources in larger firms that are available to invest in environmental programs (Longoni et al., 2018). Moreover, as suggested by Zaid et al. (2018), we control for ISO 14001 certification, which provides a global standard for an environmental management system, to maximize hardiness and reliability of the findings. The correlation of ISO 14001 certification and CE practices has been emphasized in prior studies (Laosirihongthong et al., 2013; Yunus & Michalisin, 2016) and will therefore also be regarded as a control in our study. In addition, we control for cradle-to-cradle certificates of the Environmental Protection Encouragement Agency, which describe a company's continuous improvement design approach with regard to material health, material reutilization, renewable energy, water stewardship, and social fairness (McDonough & Braungart, 2002). Prior research shows that cradle-to-cradle certificates facilitate a company's shift to the circular paradigm (Betancourt Morales & Zartha Sossa, 2020; Prieto-Sandoval et al., 2018) and thus need to be controlled for.

Table 2 shows the different measurement scales for the reflective constructs for market orientation, closed-loop orientation, internal environmental management, eco-design, and corporate asset management and recovery.

5 | RESULTS

5.1 | Preliminary analysis

To ensure a consistent model, we confirmed measurement reliability and validity before estimating our hypotheses. We assess internal consistency reliability using Cronbach's alpha (Churchill, 1979) and composite reliability scores with a threshold of 0.70 (Nunnally, 1978) as well as average variance extracted (AVE) with a threshold of 0.50 (Bagozzi & Yi, 1988). All used constructs meet the respective thresholds, except for corporate asset management and recovery with a Cronbach's alpha of .65. We still attribute internal consistency reliability as Cronbach's alpha tends to underestimate internal consistency reliability, and .65 is acceptably close to the threshold of .70 in this context. Specifically, DeVellis (2017, p. 145) states that "research scales are [...] between .65 and .70 minimally acceptable," thereby considering that Cronbach's alpha is sensitive to the number of items. Thus, and taking into account that composite reliability and AVE meet the respective thresholds, we view the measure of corporate asset management and recovery as being reliable. Table 3 shows Cronbach's alpha, composite reliability, and AVE values for the different measurement constructs. We assess discriminant validity by showing that the square root of AVE exceeds the correlation between each pair of constructs (Fornell & Larcker, 1981), as displayed in Table 4.

We conduct exploratory factor analysis (EFA) with a varimax rotation using STATA 16 to confirm convergent validity of our constructs (Hair et al., 2010), shown in Table 2. We perform Bartlett's test of sphericity and use the Kaiser–Meyer–Olkin (KMO) value to determine the sample adequacy and the suitability of the data for the hypothesized model (Cerny & Kaiser, 1977; Cop et al., 2020). The results confirm the suitability of the data and model with a p-value of less than .05 and a KMO value higher than 0.8 (KMO = 0.835, p = .000). Moreover, we conduct confirmatory factory analysis (CFA) using AMOS 27 to confirm the overall fit of the data for our model. Results indicate an acceptable fit of our measurement model, as all indicators show appropriate values: chi-square (χ^2) = 677.598; degrees of freedom (df) = 542; minimum discrepancy (χ^2/df) = 1.250, with fitness between 1 and 3; root-mean-square error of approximation (RMSEA) = 0.046, which is well below the threshold of 0.08; comparative fit index (CFI) = 0.947, Tucker-Lewis index (TLI) = 0.938, and incremental fit index (IFI) = 0.949, which are above the threshold of 0.90. These results indicate that the model fits the data well (Hair et al., 2010).

As dependent and independent variables were obtained using the same survey, we took several steps to address the threat of common method bias while conducting the survey (Podsakoff et al., 2012). To verify that common method bias is not affecting our results, we conducted a marker variable test based on Lindell and Whitney (2001). We used a three-item marker variable suggested by Amundsen and Martinsen (2014), asking respondents about their interest in football (Cronbach's alpha = .96), which is assumed to be theoretically unrelated to the other constructs in our survey. All correlations of the marker with the different constructs were below the 0.3 threshold. Based on these measures, we suggest that common method bias is unlikely to affect the validity of our measures.

5.2 | Hypotheses testing

To assess our hypotheses, we use structural equation modelling in AMOS 27 and estimate two models: First, we assess the direct effects of market orientation on the three CE practices to account for Hypotheses 1a, 1b, and 1c (Model 1). Second, we assess the mediated model including closed-loop orientation to account for Hypotheses 2, 3, and 4 (Model 2). We depict the results of Model 1 in Table 5 and the results of Model 2 in Table 6. Moreover, we assess global model fit and find that adding the variable of closed-loop orientation improves the overall model fit, suggesting the need to include this mediator in our model (Model 1: χ^2/df = 1.477; RMSEA = 0.063; CFI = 0.909; TLI = 0.892; IFI = 0.912; Model 2: χ^2/df = 1.299; RMSEA = 0.050; CFI = 0.928; TLI = 0.917; IFI = 0.931).

TABLE 3 Validity and reliability indicators

	Number of items	Cronbach's alpha	AVE	CR
Market orientation	9	.87	0.59	0.90
Closed-loop orientation	12	.91	0.60	0.93
IEM	8	.91	0.68	0.93
ECO	4	.75	0.64	0.84
CAMR	3	.65	0.65	0.81

Abbreviations: AVE, average variance extracted; CAMR, corporate asset management and recovery; CR, composite reliability (Fornell & Larcker, 1981); ECO, eco-design; IEM, internal environmental management.

TABLE 4 Correlations and discriminant validity

	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Market-orientation	4.991	1.090	0.769							
(2) Closed-loop orientation	3.206	1.443	0.337	0.775						
(3) IEM	4.076	1.799	0.274	0.546	0.823					
(4) ECO	4.469	1.670	0.161	0.441	0.437	0.800				
(5) CAMR	4.871	1.861	−0.132	0.052	0.141	−0.007	0.806			
(6) Firm size	3.628	2.259	−0.065	−0.001	0.249	0.155	−0.073	—[a]		
(7) ISO 14001	0.479	0.497	−0.068	0.143	0.478	0.062	0.118	0.379	—[a]	
(8) Cradle-to-cradle	0.029	0.156	−0.122	0.138	0.126	0.118	0.060	0.123	0.082	—[a]

Note: The root square of the AVE is shown in the diagonal.
Abbreviations: CAMR, corporate asset management and recovery; ECO, eco-design; IEM, internal environmental management; SD, standard deviation.
[a]Not applicable.

TABLE 5 Results of SEM hypotheses—Model 1

Hypothesis testing	Std. Est.	SE	CR	p^{***}	Results
Main effects					
H1a: MO → IEM	0.260	0.200	3.495	.000***	Supported
H1b: MO → ECO	0.254	0.159	2.164	.030*	Supported
H1c: MO → CAMR	−0.116	0.237	−1.057	.291	Not supported
Controls					
Firm size → IEM	0.104	0.102	1.216	.224	—[a]
Firm size → ECO	0.121	0.062	1.113	.266	—[a]
Firm size → CAMR	−0.191	0.102	−1.706	.088	—[a]
ISO 14001 → IEM	0.467	0.324	5.300	.000***	—[a]
ISO 14001 → ECO	0.031	0.276	0.286	.775	—[a]
ISO 14001 → CAMR	0.166	0.458	1.493	.136	—[a]
Cradle-to-cradle → IEM	0.123	0.933	1.537	.124	—[a]
Cradle-to-cradle → ECO	0.160	0.845	1.555	.120	—[a]
Cradle-to-cradle → CAMR	0.076	1.366	0.729	.466	—[a]

Abbreviations: CAMR, corporate asset management and recovery; CR, critical ratio; H, hypothesis; IEM, internal environmental management; ECO, eco-design; SE, standard error; SEM, structural equation model; Std. Est., standardized estimate.
*p < .05. **p < .01. ***p < .001. [a]Not applicable.

Hypotheses 1a, 1b, and 1c assess the direct association between market orientation and the three CE practices. As shown in Table 5, the direct association between market orientation and internal environmental management is significant and positive ($\beta =$ 0.260, $p = .000$). Thus, Hypothesis 1a is supported. The direct association between market orientation and eco-design is significant and positive ($\beta =$ 0.254, $p = .030$), supporting the relationship stated in Hypothesis 1b. However, the coefficient for the direct association

TABLE 6 Results of the bootstrapping

Hypothesized relationship	Indirect effect	SE	p^{***}	LLCI	ULCI	Result
H2: MO → CLO → IEM	0.386	0.144	.000***	0.172	0.742	Supported
H3: MO → CLO → ED	0.305	0.116	.000***	0.136	0.622	Supported
H4: MO → CLO → CAMR	0.109	0.148	.330*	−0.110	0.482	Not supported

Note: Bias-corrected bootstrapping analysis with 5000 resamples at a 95% confidence interval. The indirect effect was estimated using the unstandardized coefficient.
Abbreviations: CAMR, corporate asset management and recovery; CLO, closed-loop orientation; ECO, eco-design; H, hypothesis; IEM, internal environmental management; LLCI, lower level confidence interval; M, market orientation; *p*, significance level; SE, standard error; ULCI, upper-level confidence interval.
*$p < .05$. **$p < .01$. ***$p < .001$.

TABLE 7 Results of SEM hypotheses—Model 2

Hypothesis testing	Std. Est.	SE	CR	p^{***}
Main effects				
MO → CLO	0.415	0.151	3.355	.000***
MO → IEM	0.156	0.155	1.823	.068
MO → ECO	−0.035	0.122	−0.357	.721
MO → CAMR	−0.162	0.266	−1.326	.185
CLO → IEM	0.512	0.158	4.843	.000***
CLO → ECO	0.597	0.168	3.599	.000***
CLO → CAMR	0.121	0.214	1.009	.313
Controls				
Firm size → CLO	−0.036	0.050	−0.384	.701
Firm size → IEM	0.089	0.058	1.195	.232
Firm size → ECO	0.083	0.049	0.906	.365
Firm size → CAMR	−0.184	0.103	−1.682	.093
ISO 14001 → CLO	0.171	0.229	1.779	.075
ISO 14001 → IEM	0.359	0.278	4.599	.000***
ISO 14001 → ECO	−0.035	0.220	−0.381	.703
ISO 14001 → CAMR	0.140	0.470	1.273	.203
Cradle-to-cradle → CLO	0.188	0.694	2.064	.039*
Cradle-to-cradle → IEM	0.033	0.806	0.465	.642
Cradle-to-cradle → ECO	0.042	0.667	0.479	.632
Cradle-to-cradle → CAMR	0.050	1.420	0.475	.635

Note: CAMR, corporate asset management and recovery; CR, critical ratio; IEM, internal environmental management; ECO, eco-design; SE, standard error; SEM, structural equation model; Std. Est., standardized estimate.
*$p < .05$. **$p < .01$. ***$p < .001$.

between market orientation and corporate asset management and recovery is insignificant ($\beta = -0.116$, $p = .291$); therefore, Hypothesis 1c is not supported.

In addition to exploring the direct effects, we examine the mediation effects of closed-loop orientation by employing a bootstrapping approach with bias-corrected confidence intervals and 5000 samples generated at 95% interval (Hayes & Scharkow, 2013; Zhao et al., 2010). The results are reported in Table 6.

Hypotheses 2, 3, and 4 suggest that the associations of market orientation with the three CE practices are mediated by closed-loop orientation. As shown in Table 6, the association between market orientation and internal environmental management mediated by closed-loop orientation is significant and positive ($\beta = 0.386$, $p = .000$), which provides support for Hypothesis 2. The association between market orientation and eco-design mediated by closed-loop orientation is significant and positive ($\beta = 0.305$, $p = .000$), which provides support for Hypothesis 3. The association between market orientation and corporate asset management and recovery mediated by closed-loop orientation is insignificant ($\beta = 0.109$, $p = .330$), which does not provide support for Hypothesis 4.

As the results for Hypotheses 2 and 3 provide support for mediation, we follow Zhao et al. (2010) to determine the type of mediation. As shown in Table 7, none of the coefficients for the direct association of market orientation with internal environmental management

($\beta = 0.156$, $p = .068$) and eco-design ($\beta = -0.035$, $p = .072$) are significant when the mediator of closed-loop orientation is included in the model. Hence, our results suggest an indirect-only mediation of closed-loop orientation for the association of market orientation with internal environmental management and eco-design (Hypotheses 2 and 3), and no mediation of closed-loop orientation for the association of market orientation with corporate asset management and recovery (Hypothesis 4).

6 | DISCUSSION

6.1 | Interpretation of results and theoretical implications

Academia, policymakers, and practitioners alike display an increasing interest in CE practices, which have the potential to advance diverse sustainable development goals (Schroeder et al., 2019). Against this background, our study seeks to shed light on the mechanisms firms can leverage to implement CE practices successfully. Our findings enhance our understanding of the role market orientation and closed-loop orientation play in realizing CE practices. They also complement the sparse prior research on antecedents to CE practices in specific (Green et al., 2015; Kirchoff et al., 2016; S. Liu & Chang, 2017) and to product stewardship strategies in general (Hart & Dowell, 2011). The small number of previous studies exclusively focuses on the direct relationships between strategic orientations and CE practices implementation. Our study, in contrast, finds in the case of German SMEs that closed-loop orientation significantly mediates the relationship between market orientation and two of the three CE practices, internal environmental management and eco-design. We thus contribute to CE literature and related theory in three main ways.

First, our research adds to the natural-resource-based view as we delineate a mechanism by which a general market orientation can be translated into the implementation of product stewardship capabilities, in particular CE practices. The results suggest that market orientation is concretized in the more specific strategic orientation of closed-loop orientation. It can be implied that a potential barrier to implementing CE practices might consist in a failure to translate market orientation into more specific strategic orientations. Thus, we answer calls regarding antecedents that can help overcome obstacles to establishing CE practices (de Oliveira et al., 2018). Our findings contribute to the literature by integrating the previously separate findings on market orientation (e.g., Green et al., 2015) and closed-loop orientation (e.g., S. Liu & Chang, 2017) as drivers for the implementation of environmental practices. In particular, we show that in the case of CE practices, market orientation and closed-loop orientation are related: market orientation can fuel the emergence of closed-loop orientation, which in turn positively influences internal environmental management and eco-design. As for the natural-resource-based view of the firm, these results indicate the importance of strategic and, relatedly, cultural shifts within firms seeking to implement CE practices.

Second, we extend the literature by differentiating the three distinct CE practices of internal environmental management, eco-design, and corporate asset management and recovery. Most literature considers these specific practices only in an aggregated form as part of the CE practices or green supply chain management construct. Detailed results of the subconstructs as dependent variables are sparse. As called for by other authors (Agarwal et al., 2018; Zhu et al., 2013), our study distinguishes between these three practices. We find closed-loop orientation to positively mediate the relationship between market orientation and internal environmental management and eco-design, respectively; this does not hold for the relationship between market orientation and corporate asset management and recovery. While previous studies suggest a positive link between market orientation and CE practices (Green et al., 2015), our results show that this relationship is explained by the mediating variable of closed-loop orientation. Our results do not support a mediation effect of closed-loop orientation on the relationship between market orientation and corporate asset management and recovery. This is surprising, as we would have expected firms with a closed-loop orientation—and a strong focus on resource recovery—to develop corporate asset management and recovery practices more easily. An explanation could be German purchasing managers' relatively high involvement in investment recovery activities, which is also due to legal requirements, as suggested by Zsidisin and Hendrick (1998) and supported by recent research (Betancourt Morales & Zartha Sossa, 2020; de Jesus & Mendonça, 2018; Patel et al., 2000). With investment recovery already being part of German SMEs' business for several decades, corporate asset management and recovery might not anymore be influenced by market orientation and closed-loop orientation.

Third, although CE is a subject of growing interest for academia, policymakers, and practitioners, literature lacks a thorough empirical investigation of how German SMEs can develop CE practices. The majority of current empirical studies focus on Asian contexts, presumably also because of China's pronounced legislative activities such as the Circular Economy Promotion law (Geissdoerfer et al., 2017; Lieder & Rashid, 2016). Our study contributes to the growing body of CE literature by supporting findings established in an Asian context and by researching the dependencies on a more granular level within the largest economy in Europe: Germany. Our results show that both market orientation and closed-loop orientation play an important role in implementing CE practices, specifically internal environmental management and eco-design. To our knowledge, our study is the first in the context of CE practice antecedents to draw exclusively on respondents in very senior positions. All identified previous studies typically include respondents in lower level positions and only a small share of senior executives (e.g., Agarwal et al., 2018; Chan et al., 2012; Green et al., 2015; Kirchoff et al., 2016). Being able to base this study on these respondents gives us additional confidence regarding the representativeness of our results.

Overall, we are convinced that our findings are valuable to academics as they contribute to theory and yield evidence that aggregating the subconstructs of CE practices might not always be

appropriate, at least not in the context of developed countries like Germany. Our results also offer valuable insights to practitioners intending to implement CE practices within their firms.

6.2 | Managerial implications

From a practical point of view, our study contributes to the establishment of more sustainable production capabilities within SMEs. Such capabilities promote the manufacture of products designed to re-enter resource loops and thus ultimately drive the implementation of the CE concept. Although developing organizational, strategic orientations might be challenging, firms are able to direct their managers to foster the strategic approaches of market orientation and closed-loop orientation within their organization. As our results show, internal environmental management and eco-design practices cannot be expected to be automatically associated with market orientation. Rather, this general strategic orientation might need to be further transformed into and specified as a closed-loop orientation. More specifically, firms deploying a market orientation and aiming to increase their internal environmental management and eco-design practices should proactively seek to translate their market orientation into a close-loop orientation.

Our results suggest further that managers need to be aware that this mechanism might not apply to all types of CE-related practices. The lack of support for the influence of market orientation and closed-loop orientation on corporate asset management and recovery demonstrates that managers should refrain from regarding the implementation of CE as overly simplistic and rather differentiate between the various aspects related to it.

6.3 | Limitations and further research

We identified several limitations of our study that can yield avenues for further research. First, due to the study design, we used senior managers as key informants and as the single source of information to specify firms' strategic orientations and CE practices. Although we sought to accommodate concerns by testing for common method bias and key informant bias, future research might address this limitation upfront with a different study design. Second, we specifically focus on the mechanisms underlying the development of CE practices, and our results provide a first indication. Conceptualized as a strategic orientation, it can be assumed that closed-loop orientation acts as a prerequisite for firms to realize CE practices. However, future research might uncover additional aspects influencing the proposed mechanisms, such as people-driven factors as suggested by Sawe et al. (2021). An analysis of the role of location, for instance, might offer intriguing insights. Also, while there are a few studies focusing on antecedents of CE practices in developed countries, though not in Germany (González-Benito & González-Benito, 2008; Green et al., 2015; Kirchoff et al., 2016), more research is necessary to extend and generalize our findings—especially given the differences in institutional contexts across countries. Third, our research indicates that not all subconstructs of CE practices are affected in the same way: Corporate asset management and recovery seems to be a special case. While the unexpected results for corporate asset management and recovery might also be related to the context of our study—we investigate German SMEs—we suggest that the role corporate asset management and recovery plays for CE practices should be further examined. In our study, we rely on established measures based on Zhu et al. (2011); however, it should be discussed whether the corporate asset management and recovery subconstruct, as included in their original scale, should be regarded as similarly important for CE practices in developed countries like Germany as in developing countries. Most of the recent empirical studies on CE practices focus on Asia, where we expect a lower level of investment recovery capability in SMEs also due to legal requirements (de Jesus & Mendonça, 2018; Zsidisin & Hendrick, 1998), which subsequently might lead to different results. An implementation of a CE practice scale tailored towards more developed countries could help advance further research within this growing field of interest.

7 | CONCLUSION

SMEs play a key role in transitioning from a linear towards a circular economy. As one of the first empirical studies focusing on Germany in this context, we extend the understanding of antecedents and help unravel the mechanisms of CE practices implementation based on a response sample with senior executives. Our study offers valuable contributions to research and practice at the interface of strategic and environmental management and thus serves as a basis to advance the shift towards a more sustainable development of the industrial sector.

CONFLICT OF INTERESTS

The authors declare that they have no conflict of interests.

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