International SMEs and Sustainability in the Manufacturing Industry

Abstract

Purpose—This study examines how international Small and Medium-sized Enterprises (SMEs) explore and exploit opportunities to develop circular business models (CBMs) based on circular economy principles (CEPs), specifically resource recycling, reuse, and recovery.

Methodology—The research employs an exploratory, grounded methodology, utilising six case studies of international Chinese manufacturing SMEs.

Results—Our findings suggest that international SMEs explore opportunities to develop CBMs by leveraging their managers' cognitive understanding of circularity and by taking advantage of government policies as external enablers. They exploit these opportunities through organisational capabilities, global market exposure, and the implementation of circular innovation across multiple departments, often resulting in business model innovation or radical redesign to align with circular principles.

Research limitations—The small sample size limits the empirical generalizability of the findings, as the study focuses on six international SMEs that have successfully developed CBMs in a particular context.

Managerial implications—The study offers practical recommendations for managers to develop CBMs internationally, emphasising the recruitment of young talent and green marketing.

Originality of the paper—This study advances research on SME internationalisation and circularity by integrating micro-foundations and institutional theory to explore the development of CBMs as SMEs become exposed to global markets, while highlighting typologies of business model transformation toward circularity.

Keywords: SMEs, circular business model, global markets, internationalisation, circular economy, manufacturing industry, managerial cognition, managerial motivation.

1. Introduction

The internationalisation of SMEs drives economic growth, market diversification, and competitiveness by providing access to new markets and resources (Denicolai et al., 2021). However, in the context of environmental sustainability, internationalisation poses challenges, such as increased resource consumption and carbon emissions. Circular business models (CBMs) offer a solution by prioritising circular economy principles enabling SMEs to align their economic and environmental goals (Geissdoerfer *et al.*, 2020). Circularity is one archetype of sustainable business models (Bocken et al. 2014). It is defined as 'the adoption of practices and business models focused on diminishing environmental impact, promoting resource efficiency, preventing waste, and emphasising the value of reuse and recycling' (Basile et al., 2024). Although circularity has a beneficial impact on sustainability, it ignores some dimensions, particularly the social one (Murray et al., 2015).

Multinational enterprises (MNEs) leverage extensive resources to embed sustainability into global strategies (Marano *et al*, 2024). SMEs face unique challenges due to limited financial and operational capacities, regulatory complexities, and market pressures (Atasu *et al.*, 2021). However, unlike MNEs, SMEs exhibit agility in decision-making and localised strategies (Cavusgil and Knight, 2015), facilitating rapid CBM adoption. More attention needs to be paid to how international SMEs explore and exploit the opportunities to develop CBMs in the manufacturing sector (Denicolai et al., 2021). More specifically, the complex interplay among international SMEs, circularity, opportunities' exploration and exploitation requires an in-depth investigation, particularly in the Chinese manufacturing context.

This research stems from the firm internationalisation theory, which has traditionally been viewed through the lens of the Uppsala model. This model suggests an incremental process driven by knowledge accumulation and increasing commitment to foreign markets (Johanson and Vahlne, 2009). For exporting SMEs, internationalisation often occurs rapidly from inception, leveraging organisational capabilities and innovation to overcome resource constraints (Knight and Cavusgil, 2004). Despite rising interest in CBM literature on circular international entrepreneurship (Zucchella and Urban, 2019), the literature addresses the internationalisation of SMEs and exporting SMEs only minimally. Addressing this gap is crucial, as SMEs are the backbone of many economies, including China, where they account for more than 85% of private-sector GDP (Zhang, 2023). Thus, we address the following

research question: “How do international SMEs explore and exploit opportunities to develop CBMs in the manufacturing industry?”

To explore this question, we employ a qualitative and exploratory methodology grounded in theory, analysing six case studies of international SMEs from the Chinese manufacturing sector. China’s unique policy environment and its high concentration of SMEs make it an ideal context for studying CBM development (Bleischwitz *et al*., 2022). This study integrates micro-foundations theory with institutional theory. Micro-foundations theory focuses on individual-level factors, such as managerial cognition, motivations, and interactions, which underpin organisational capabilities and drive the exploration of opportunities and their exploitation through refinement, implementation, and efficiency (Felin et al., 2015).

In the context of SME internationalisation, these micro-level elements enable managers to leverage their personal networks, vision, and experience to identify circular opportunities in global markets. Complementing this internal perspective, institutional theory examines how external pressures and enablers, including regulatory frameworks, shape firm behaviour through processes such as isomorphism, in which SMEs conform to prevailing standards to gain legitimacy and access resources (DiMaggio and Powell, 1983). Our study contributes to advancing sustainable development in global SME operations. It adds to SMEs' internationalisation and sustainability research by integrating micro-foundations, which explore individual-level motivations (Felin *et al.*, 2015), with institutional theory, which examines external policy influences (DiMaggio and Powell, 1983). The remainder of this paper is organised as follows. First, we present the literature background on SMEs' internationalisation and CBMs and identify research gaps in the field. Then, we highlight research design and methodology. Next, qualitative information is analysed using a grounded theory approach, aiming to integrate theory. Finally, we conclude with a discussion of the limitations.

2. Literature review and theoretical background

2.1 SMEs and Internationalisation

A recent bibliometric analysis by Fernandes et al. (2023) provides a comprehensive overview of SME internationalisation trends, highlighting past developments, current states, and future directions in the field . Digitalisation and sustainability have recently emerged as key growth avenues for

studying the operations of SMEs at a global scale (Denicolai et al., 2021) particularly because SMEs are frequently involved as actors in the global value chains, which expose them to shocks that threaten their survival and resilience (Conz et al., 2023).

SMEs have become increasingly aware of sustainability since 2015 (United Nations, 2015). The general tendency of SMEs towards sustainability and circular-economy strategies to address environmental challenges has become a global phenomenon that has impacted their international processes over the last few decades (Denicolai *et al.*, 2021). Literature on SMEs has addressed the role of managers in the internationalisation process of these enterprises (Suárez-Ortega and Álamo-Vera, 2005) and the role of sustainability in accelerating their internationalisation. Despite technological progress, we currently face several challenges, including climate change (Howard-Grenville *et al.*, 2014). Research on business and the environment primarily focused on identifying a positive relationship between environmental care and profitability (Vallet Bellmunt *et al.*, 2024). The methods of innovation employed emphasised creating openings for new markets or enhancing their reputation, even if there is no direct profit from reducing the primary operating costs. Similarly, as noted by Woo et al. (2014), evidence suggests that many businesses contribute to sustainable development only when it is convenient; they cannot be blamed for doing so at the expense of their financial interests.

2.2 SMEs and CBMs

Given the growing concerns about global warming, the depletion of natural resources, and reductions in biodiversity, finding the most effective ways to engage firms in environmentally sustainable actions is of utmost importance and urgency (Uhlaner *et al.*, 2012). These challenges are too complex and wicked to be solved by a single actor and require collective contributions from governmental, individual, and corporate actors (Olsen *et al.*, 2016). To provide guidelines for these actors, nations have agreed on a set of 17 SDGs that are defined to give a "(...) *shared blueprint for peace and prosperity for people and the planet, now and into the future*" (United Nations, 2015). These goals provide a comprehensive view of sustainability that incorporates ecological, social and economic perspectives. In addition to these institutional initiatives, the perceived need to address sustainability challenges has created greater pressure and new customer demands, forcing firms to embrace sustainability by integrating ecological goals into their commercial activities (Zollo *et al*., 2013). More recently, attention has been directed to more holistic circularity transitions, in which firms systematically integrate sustainability into their organisation and business model design (Buckley, 2025; Morioka *et al.*, 2017).

Circular business models offer a comprehensive strategy for corporate rejuvenation, value creation, and the establishment of new revenue streams. By implementing procedures such as product refurbishment, remanufacturing, and recycling, organisations can prolong the lifespan of their products, thereby diminishing the overall environmental impact associated with continuous production and disposal (Oghazi *et al.*, 2024). Saidani *et al.* (2022) argue that increasing the economy's level of circularity enhances the likelihood of achieving the Sustainable Development Goals (SDGs) set forth by the UN (UN, 2015), particularly those related to responsible production and consumption (SDG 12).

Table1

Table 1 summarises the conceptualisation of circular business models**.** For this paper, we will adopt the definition of Lahti et al. (2018, p. 3). This definition emphasises the integration of innovations and assumes that the business model is sustainable (Geissdoerfer et al., 2020). Furthermore, many studies have shown that actively pursuing circularity requires innovation (Keskin et al., 2020) or even business models meta-innovation (Schneider and Clauß, 2020; Spieth et al., 2019) to utilise technology and solutions that are socially, ecologically, and economically viable to achieve their social and environmental goals (Geissdoerfer et al., 2016).

Gauthier and Gilomen (2015) outlined some typologies to describe this transformation toward circularity. This encompass: 1) business-as-usual in which no transformation takes place, 2) business model adjustment, in which the transformation focuses on a single BM element such as procurement or waste management, 3) business model innovation, in which significant BM changes are implemented, altering multiple BM elements to align with circular principles, 4) business model redesign, a radical transformation occurs, including the development of entirely new value propositions rooted in circularity. However, there is a gap in understanding which of these typologies are most commonly adopted by international SMEs in the manufacturing industry. More empirical evidence is needed to show whether international SMEs are progressing beyond minor adjustments toward more innovative or radical redesigns aligned with the circularity principles.

2.3 Innovation in SME Business Model Transformation

Ferreira et al. (2024) offer a systematic review of innovative business models in SMEs, outlining the state-of-the-art and proposing a future research agenda that aligns with our focus on CBM development. The "micro-foundations movement", as Felin *et al*. (2015) refer to it, has as its primary objectives the breakdown of collective concepts into their more fundamental constituent parts, the study of how individual interactions lead to emergent collective and organisational-level outcomes and performance, and the study of how micro-actions and interactions mediate relationships between macro variables. The microfoundations' approach highlights the critical role that actors involved in digitalisation and sustainability transfer play in their collective and individual behaviour (Scuotto *et al*., 2020). Accordingly to micro-foundations, organisational environments define or facilitate human interactions in knowledge exchange, resulting in new organisational patterns (Felin *et al*., 2012; Foss and Pedersen, 2016).

Additionally, managerial cognition refers to the mental processes managers use to perceive, interpret, and respond to complex business environments, shaping strategic decision-making and organisational and human resource management. Previous literature has highlighted the role of managerial cognition in implementing sustainable practices within firms. For instance, Sharma (2000) stated that managers with pro-environmental cognitive frames are more likely to recognise ecological threats and identify opportunities for sustainable innovation in their companies.

Innovation is central for international SMEs in the manufacturing sector, as it enables the redesign of value chains, the adoption of resource-efficient technologies, and the creation of novel offerings that close material loops while enhancing economic viability. For SMEs, innovation in CBMs fosters niche advancements in areas like product redesign, waste minimisation, and collaborative ecosystems, thereby driving sustainability without compromising competitiveness. Recent research highlights that circular economy innovation significantly contributes to market positioning for SMEs by integrating digital tools, entrepreneurial strategies, and adaptive practices that address environmental shocks and regulatory demands (Pan *et al.*, 2023). Moreover, systematic frameworks tailored for SMEs highlight how innovation facilitates the transition to CBMs, emphasising dynamic approaches that incorporate product, process, and business model innovations to achieve long-term resilience and positive societal impact. This micro-foundational lens reveals that individual-level motivations, such as managerial cognition in identifying circular opportunities, are amplified through innovative interactions, ultimately leading to organisational-level outcomes that align with global sustainability goals.

De Massis *et al.* (2013) analysed the role of technological innovation in SMEs. They emphasised the direct effects of (SME) managers' involvement on innovation inputs, including Research and Development (R&D) expenditures, innovation activities such as leadership in new product development (NPD) projects, and innovation outputs, specifically the number of products or patents (De Massis *et al.*, 2013). While Woo *et al.* (2014) note firms' convenience-driven approach to sustainability, this overlooks SMEs' agility in adopting CBM amid global pressures. Innovation is a tacit organisational resource SMEs use to develop a CBM.

3. Research Design and Methodology

This exploratory study employs a qualitative, inductive approach, involving multiple case studies (Eisenhardt and Graebner, 2007), and grounded theory analysis via Gioia's method (Gioia et al., 2013), to derive insights from underexplored phenomena (Corley and Gioia, 2004).

3.1 Sampling

SMEs were selected via purposeful and theoretical sampling (Patton, 2014; Glaser and Strauss, 2017) following these criteria: international exporters producing sustainable products, GRI-certified with CSR reports. The focus was on China's manufacturing sector, its SME density, and policy context, offering insights into government enablers (Olsen *et al.*, 2016).

As a global leader in implementing the circular economy, China has enacted a comprehensive and evolving policy framework, including the Circular Economy Promotion Law, which creates intense institutional pressure for firms to adopt circular practices (Zhu *et al*., 2019). These top-down mandates, combined with the reinforcement of significant regional heterogeneity and resource allocation, enable researchers to investigate how CBM adoption varies under different institutional conditions (Zhao, 2020). Additionally, China's national decarbonization goals are driving CE and CBM policies to examine how sustainability transitions unfold in practice (Zhao *et al.*, 2022). These factors position China not only as an empirically rich case but also as a theoretically generative context for advancing understanding of CBM development and institutional embeddedness. The circular economy has been applied in the manufacturing, petroleum, chemical, and steel industries. China’s circular economy Policy is the world’s first national law proclaiming an economic model different from the mainstream linear “raw materials in at one end and waste out” model (Mathews and Tan, 2011). We contacted 13 Chinese SMEs with the mentioned characteristics; six were available for interviews. We started data collection and analysis simultaneously, as recommended in grounded theory (Glaser and Strauss, 2017). Table 2 summarises key data about the six case studies.

Table 2

3.2 Data collection procedures and sources

Given our research question, we primarily relied on semi-structured interviews as our primary data collection method to gather data directly from participants' perspectives, thereby capturing the richness and depth of the information. This qualitative approach enabled us to explore the diverse experiences and strategies employed by international SMEs in developing CBMs. To enhance the credibility and depth of our analysis, we supplemented these interviews with a robust examination of archival resources (Table 2). These included historical data, policy documents, and prior research findings, which helped triangulate our interview data and provided a comprehensive understanding of the phenomenon under study (Siggelkow, 2007). This mixed-methods approach to data collection enriched our research findings, enabling a deeper understanding of the dynamic interplay between managerial decisions and policy environments in shaping sustainable practices in international SMEs. This approach ensured data verification through multiple sources, enhancing our research by addressing potential biases and gaps in single-source data.

Data collection posed a significant challenge during the research process, primarily due to the language barrier. A substantial portion of the archival resources – such as press releases and social media video materials – was available exclusively in Chinese. Our interviews were conducted in Chinese, as preferred by the interviewees. This linguistic obstacle was mitigated by the presence of one Chinese-speaking member of the research team, whose language proficiency was instrumental in conducting interviews, interpreting source materials, and ensuring accurate translation of data. This significantly facilitated data collection, thereby enhancing the reliability and depth of the gathered information.

3.2.1. Interviews

We conducted six semi-structured interviews with highly knowledgeable informants (founders, CEO, deputy General Manager, R&D director, and sales directors) (Eisenhardt and Graebner, 2007). The interviews took place between March and July 2022. We employed a semi-structured approach during the interviews, providing each respondent with ample opportunity to share the story of their firm and its transition toward circularity. Since our study emphasises the role of individuals in

driving organisational changes (Barney and Felin, 2013) and aims to understand the path of the implementation and development of CMBs within international SMEs, the interview protocol (see Annex 1) was designed as follows.

We began the interviews by asking the interviewee to describe their personal understanding and motivation behind implementing circularity within their firm. This initial focus allowed us to explore the role of the individual managers in the development of CBM. A subsequent set of questions focused on the organisational level, aiming to capture firm-specific characteristics and the influence of international presence on CBM development. These questions examined factors such as the internal decision-making process and external pressures, particularly the global demand for circular products. A further set of questions was devoted to understanding the firm's relevant circular practices (reuse, recycling, resource efficiency) and how these practices were being managed and innovatively integrated into the CBM to ensure that our informants were referring to CBM, and to establish communicative validity (Sandberg, 2000), we used CBM as introduced by Lahti *et al.* (2018). Finally, the last set of questions was designed to understand the role of governmental actors in sustaining the development of the CBMs. This included discussions on how policies and regulatory frameworks affect firms' adoption of circular practices.

We conducted the interviews in the language preferred by the interviewees. On average, the interviews lasted between 1 hour and 30 minutes and 2 hours. For accuracy, we audio-recorded all the interviews. We transcribed all the interviews in the respondents' language and translated the Chinese transcripts (n = 4) into English using a professional translator. As mentioned above, one of the researchers speaks Chinese, which made it easier to translate and interpret the interview material, thereby ensuring greater accuracy and a better understanding of the context. We examined both the transcriptions and translations for quality (Klotz *et al*., 2023). Theoretical saturation was reached when we ceased finding differences in the categories and concepts we were building through the data collection procedure (Hagaman and Wutich, 2017).

3.2.2 Archival sources

Our research documented the stated strategies and outcomes while critically assessing the authenticity and impacts of these sustainable innovations within the operational realities of international SMEs. To deepen understanding of the intricacies of developing SMEs' CBMs, we employed a comprehensive methodological strategy that integrated archival data with insights from semi-structured interviews. This integration was pivotal in examining the complex processes that underpin the transition to circular-oriented business practices. Following the guidance of Langley et

al. (2013), we aimed to uncover the layers of organisational decision-making and innovation implementation.

We verified that the CBM innovations reported by our informants were robustly supported through triangulation, utilising secondary sources and archival data to corroborate and elaborate on the interview narratives. This approach, as advocated by Eisenhardt (1989) and Yin (2003), allowed us to scrutinise the data from multiple angles, enhancing the reliability and depth of our findings. This was particularly crucial for understanding the managerial perspectives and organisational capabilities influencing the adoption and integration of circular practices within SMEs. To minimise the effects of retrospective recall bias—a common challenge in qualitative research, where participants may reconstruct past events that may not be entirely accurate—we utilised a diverse array of archival materials. These included press releases (n=12), which often contain official statements and strategic focuses of companies; videos of previous interviews (n=6), offering insights into the evolution of managerial thought and circularity motivation and strategies over time; company websites (n=6) and Environmental, Social and Governance (ESG) report (3) which provide a snapshot of current and past business models and environmental sustainability and circularity initiatives; and social media posts and blogs, which reflect the dynamic and public-facing aspects of how international SMEs communicate about circularity transition.

3.3 Analysis

In our methodological approach to analysing the qualitative data collected through interviews and archival sources, the research team employed a structured coding process following the “Gioia protocol” to distil complex information into analysable elements (Gioia *et al*, 2013). We focused on key issues related to opportunity exploration and exploitation in the development of CBM in international SMEs, as per the research question. Hence, we started by coding words or phrases that appeared to be important to the informants’ circular activity regarding their managerial motivation to circularity, the organisational capabilities of the firms, the importance of the international dimension in the manufacturing industry, the importance of innovation integration for transformation, and the role of the government, as external factor, to support the development of CBMs.

We used the informants’ words whenever possible to label terms like those. Following the initial coding phase, we then started grouping the transcripts and our codes into "similar codes". This step involved comparing and contrasting the coded data to refine the accuracy of the interpretations, which were then consolidated into "first-order categories." We coded the interview transcript independently and discussed our divergences until we reached a shared understanding of the code

names and their meanings (Locke, 2001). We adjusted our semi-structured interview for subsequent interviews using this shared list. For instance, initial interviewees highlighted the importance of innovation in the company's development to support circularity transitions, so we explicitly asked more about this concept in later interviews. We repeated the formal data analysis three times until no further codes emerged that could reveal additional trends among the respondents.

For instance, the first-order codes related to thoughts about the characteristics of the managers in relation to "background in sustainability'', "personal value regarding circularity", "social responsibility'', "intention for growth", "awareness of financial benefits," "openness and commitment to circularity" "managerial leadership" "related to the second-order codes of "Manager's social value'', "manager's economic value," and "manager's perception of circularity". Therefore, compared to the first-order categories, the second-order themes were at a more abstract theoretical level. However, whenever possible, we aimed to retain the informants' language when naming these themes, thereby offering understanding of the underlying phenomena and emphasising the connections between individual contributions and broader organisational factors. In the final stage of the analysis, the second-order themes were synthesised into overarching themes. For instance, we arranged the second-order codes of "Manager's social value, "Manager's economic value," and "Manager's perception of circularity" into the overarching dimension of managerial cognition in circularity transition. The team discussed the data structure and occasionally referred back to the original data to resolve minor discrepancies before finalising the data structure (Figure 1). Four aggregate dimensions matter in developing a model of how international SMEs explore and exploit opportunities to build a CBM (Figure 2).

4. Findings

Figure 1 depicts data structure that emerged from our thorough analysis (Table 3 for samples of the most representative quotes) of the factors influencing the development of CBMs in international SMEs. Through a thorough coding and thematic development process, twelve distinct themes were identified and subsequently organised into four main dimensions that encapsulate the core aspects of CBM development.

Figure 1

The first dimension is ‘Managerial cognition in circularity transitions, which includes: Manager’s social value, Manager’s economic value, and Manager’s perception of circularity. This examines the internal drivers that encourage managers to adopt and promote circular practices within their businesses, and explores the personal values, commitment to circularity, and strategic vision of SME leaders, which inspire them to pursue CBMs that are economically viable, environmentally sound, and socially responsible.

The second dimension, SMEs ‘organisational capabilities and international exposure’ includes: Product circularity Readiness for international market, Agility in decision making for circularity, and SMEs’ international reputation. This assesses SMEs' operational and organisational preparedness to implement circular practices, including decision-making agility, the level of employee engagement and training in sustainability practices, and the business's structural adaptability for integrating new sustainable processes and technologies.

The third dimension, ‘Government Policies as external enabler for circularity’, includes Environmental tax law and Sustainable initiatives, and examines the role of governmental bodies' regulatory frameworks, financial incentives, and support programs in facilitating or hindering the adoption of CBMs by SMEs. This dimension emphasises how external forces, especially governmental interventions, can drive SMEs' shift towards more circular operational models.

The fourth dimension, ‘implementing circular innovation’, includes: Marketing innovation, R&D innovation, Production innovation, and Product innovation. It examines how SMEs integrate innovative practices into their business models to enhance circularity. This involves adopting new technologies, redesigning processes to minimise waste and maximise resource efficiency, and implementing new business practices that align with global circularity standards.

The dimensions above collectively provide a comprehensive overview required to foster the development of CBM in international SMEs. Subsequent subsections further explore each dimension through this structured approach. Our study sheds light on the interplay between managerial motivations, international SMEs characteristics, external role of the government, and circular innovation in the development of CBM in the manufacturing sector.

Table 3

4.1 Managerial Cognition in Circularity Transition

The first component of this dimension is the *manager's Social value*. The ultimate model for creating social value tomorrow is the ability to decide today as if the future generations matter, and the ability to spend one's life in conditions conducive to future lives on the planet. Sustainability awareness matters for implementing measures that engage with circular practices (Torres *et al.*, 2016). In firm C, the founder said, "*For us, we are working to improve the awareness of our business members toward sustainability, and I participated in online courses to be more aware of developing a solid CBM".* Similarly, the sales director of firm F pointed out: '*I found myself responsible for taking concrete actions to develop sustainability models, and I clearly understand its advantages for the coming years."* Data reveal that being aware of and willing to adopt circularity will make individuals more responsible and serious about social values.

The second component is the *manager's Economic value.* Interviews suggest that business members plan to expand into regional and global markets, as well as extend the life cycle of their products. This intention is translated by sharing, reusing, repairing, refurbishing, and recycling existing materials and products for as long as possible internally, with transparency in tracking, to convince customers and governmental bureaus (Kamal *et al.*, 2022). In firm D, the founder emphasises that: ''(...) *it is clear that if we replace recycled plastic instead of virgin raw materials in our formulation, that will open a new market for us in Europe or the US, then the sales will increase".* This sentence suggests that SME managers have the financial motivation to develop a CBM, enabling them to grow in regional and global markets and stay ahead of competition. Similarly, the founder of firm E pointed out, '*Circularity is not just a sustainable choice, it is a profitable one that drives long-term value'.* From a managerial perspective, our findings indicate that integrating circular practices leads to greater efficiency and increased sales, resulting in a positive economic impact on the organisation.

The third component of this dimension is the *manager's perception of circularity*. Firms like Firm C started their sustainability projects in 2016. The sales director stated that he is now 33 years old; he understands the importance of CBM, having spent his study years in the US. He mentioned, "*I convinced my director at that time to start investing in circular projects, and he believed in my study; we started to integrate such innovation and sustainability projects in 2016, which became a key success for the company. In the same way, I have proved myself as a next-generation leader."* Similarly, the founder of firm D said, "*I am open to embrace change; circularity is not just a compliance issue it is a forward-thinking strategy for resilience and long-term growth*." Findings

illustrate that the new generation of enterprise managers is open and committed to change and has a positive impact on the CBM. We found they want to innovate to prove themselves as the next generation of leaders, and that these circular models are a part of strategic vision for sustainability and innovation.

4.2 SME's Organisational Capabilities and International Exposure

The first component of this dimension pertains to the '*product circularity readiness for the international markets.* Almost all managers emphasise that their products are ready to be transformed into circular products and are already in high demand internationally. In firm C, the deputy GM and R&D group director said: *"For us, circular transformation of our product was not a big challenge, given our product's design and the ease of integrating biodegradable materials''.* When the CEO of firm A pointed out*, "We strategically invested 23% of our net profit into a circular transformation- a move that, according to me, was timely and straightforward. Driven by our product's strong international appeal and the need to remain competitive with global peers, we see this as the key to our future growth".* This suggests that a product's state of circular readiness and its international appeal are critical determinants of CBM development in SMEs.

The second component of this dimension is *decision-making agility for circularity*. Data reveal that all SME managers cited the importance of agility in decision-making, with almost no boundaries, as related to circularity. According to them, a few actors in the company consolidate most organisational decision-making, and the relationships are structured hierarchically. In Firm A, the CEO remarked: *"* This *is a booster since we don't have shareholders to convince when taking small or large decisions.*' Similarly, the R&D manager in Firm E also stated, '*I spoke with my CEO, and based on my study, we make decisions immediately, and I can tell you that most of the decisions we made were during our informal meetings."* Our findings indicated that this level of freedom in decision-making and progress is a distinct advantage for developing a CBM in SMEs.

The third component of this dimension is the *SMEs' international reputation*. For SMEs operating in the global market, maintaining a strong international reputation is crucial — not only for competitiveness but also for fulfilling their responsibilities toward international consumers. Exposure to international markets puts SMEs' reputations under additional pressure to uphold the values of transparency and accountability. Data reveal that the international reputation is considered a strategic asset and a means of safeguarding the legacy of the international businesses. For example, in Firm E, the leading Chinese company in manufacturing injection machines and recycling plastic products, the R&D manager stated: *"I wanted to move forward with taking serious responsibilities towards*

innovation projects to reduce our high water and electricity consumption, which will keep us at the top of our peer manufacturers in the international market." Similarly, we have this representative quotation from firm C: *"Adopting circularity represents our commitment to protecting the firm's legacy and enhancing its reputation in the global market"*. This finding suggests that a fundamental awareness exists among the young generation in firms E and C regarding the importance of reputation internationally, which helps safeguard a legacy by demonstrating clear responsibility.

4.3 Governmental and institutional enablers for circularity

The first component of this dimension is *environmental tax law.* Our findings indicated that environmental fiscal reform, including increased tax reductions, the phase-out of environmentally damaging subsidies and financial incentives, VAT cuts, and tax breaks for green initiatives, creates ideal conditions for transitioning to a circular economy in international SMEs (Torres *et al.*, 2016). As the Chinese economy continues to develop rapidly—growing at 10% per year, more than three times the global growth rate —it has a significant impact on competitiveness. Green taxation has a positive influence on the establishment of a CBM for enterprises in China, serving as a strong enabler for launching eco-friendly products or enhancing processes. Sales director of Firm F pointed out: "*For us, green taxation has a direct impact on our shift towards sustainability; without it, we would not be able to compete in the market. Most of our customers require a robust and high-end product, and many are willing to accept a 9 or 10% price increase to use more eco-friendly materials or to reduce our production lines' CO2 emissions, but we do care. If VAT is reduced further, we can progress more rapidly and become more competitive."* Similarly, the founder of firm C stated: ''*We received a tax reduction shortly after we began recycling our products. The government was clearly supporting our transition toward circularity".* Data illustrate the critical role of green taxation in accelerating circularity transition and recognise that environmental fiscal reforms catalyse the development of a CBM in international SMEs.

The second component of this dimension is *sustainable initiative.* We found that institutional norms and business models are considered key elements for developing a circular economy. Economic policy instruments, such as tax exemptions, can significantly influence the cost structure and revenue model. In firm E, the leading Chinese firm in making injection machines and recycling plastic products, the R&D director said: "*The government is supporting us through measures like VAT exemption and green taxation initiatives, which definitely help with the cost burden of our circular initiatives. But it is still challenging when state-owned companies prefer cheaper, conventional machinery over our sustainable solutions."* Furthermore, without implementing

additional cost-saving measures, municipalities or regional authorities could share responsibility for developing suitable collection infrastructure to make used products more accessible and affordable by establishing specific collection systems. In firm B, the founder noted: "*Green finance gives us the confidence to start our circular project"*.

4.4. Implementing circular innovation

The first component of this dimension is *Innovation in Marketing*. Findings suggest that identifying new demands from sustainable consumers and promoting a new circular product through digital marketing will lead to a market-oriented firm. Firms prioritise market intelligence and a strong customer focus. Moreover, effective advertising can influence people's desires and intentions, creating a need for products they were previously unfamiliar with or not interested in buying. Innovation in marketing provides valuable frameworks for managers seeking to cultivate environmentally conscious customers and follow up on their green attitudes and intentions with sustainable consumption behaviours that encourage the adoption and maintenance of new habits, such as recycling. In firm D, the founder emphasises that: '*For us, we built the marketing strategy as the first step, and we target our customers with our green marketing strategies after selecting what is feasible and what is not […].*

The second component of this dimension is *innovation in Research and Development.* The cost-benefit analysis suggests a comprehensive and reliable methodology for demonstrating the economic and environmental benefits of R&D projects, particularly when studies integrate both circularity and impact assessment to validate the projects ultimately considered. As mentioned, the studies include the cost increase associated with incorporating new materials or processes while considering advantages such as green taxation, VAT reduction, and various forward-looking benefits. The R&D director in firm E said, "*Once R&D engineers show us the prototypes and the feasibility studies, we know how to move forward. We reduced by 11% the carbon emission value on our finished products (Injection machinery 150T & 300T) to meet the best injection machine manufacturers worldwide; even though the production cost was not very competitive at that time, we knew that it would be very competitive in the coming few years."* Similarly the founder in firm B stated '*We have replaced over 600 tonnes of virgin plastic with recycled compounds".*

The third component of this dimension is *innovation in production.* We found that integrating validated ideas and concepts from R&D for implementation in the targeted production line takes the most time, as it aims to improve existing processes while maintaining the same efficiency and making them more environmentally friendly by using new eco-packaging or eco-friendly materials.

What appears feasible on paper is challenging to realise in mass production. In firm A, the CEO stated, "*For us, all the studies done before implementation represent less than 50% of the project success index. The real challenge begins once we start mass production, which is what we have learned from accumulating expertise. In recent years, we reduced energy consumption used in steel production by 18%, and we have calculated the ROI in 6 years, so we succeeded in the project, but the return will be gained in 6 years, when, usually, for us, our traditional project we calculate the ROI in a maximum of four years.'* Similarly, the manager in firm D reported:*"We switched to bio-based plastic instead of fossil-based one. It is a cleaner option, and it helps us lower carbon footprint across the production line."*

The fourth component of this dimension involves *innovation in product*. This concept creates value by prolonging product lifespans and establishing closed material cycles across different product stages and types. Companies aiming to be more circular should focus on designing and manufacturing goods that eliminate waste, keep materials functional, and restore natural systems. Indeed, it is essential to consider the entire life cycle of a product and the complete system. In firm B, the deputy GM and R&D group director stated: "*For us, the challenge was not easy because saturated formulation based on virgin plastic you can't change it in one day, but after two years of research and development, we succeeded in replacing the virgin plastic material with a compounded bio-composite from wood dust or rice husk."* In another example, the founder of firm F pointed out: *"we redesigned the packaging to use recycled paper and starch-based wrap"*

Table 4

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5. Discussion

Research findings reveal how international SMEs in the manufacturing industry explore and exploit opportunities to develop a CBM. Unlike MNEs, which rely on extensive resources to implement global sustainability strategies (Kano *et al.*, 2025; Marano *et al.*, 2024), SMEs in our study demonstrate agility in governance structures, enabling quicker decision-making for CBM adoption. This flexibility, coupled with reliance on external enablers such as policies, allows SMEs to innovate within resource constraints, providing insights into how smaller firms achieve sustainable competitiveness compared to their larger counterparts.

Figure 2 illustrates the grounded model for SMEs' CBMs. As illustrated in Figure 2, our findings highlight the interplay between the role of SME managers in 'innovation' and the influence of 'institutional context' on the development of SMEs' CBMs. We provide new insights and contribute to a deeper understanding of the differences between SMEs and MNEs in their sustainability approaches. For instance, they share information about their sustainable strategies to enhance their social visibility and legitimacy while preserving their reputation (Zellweger *et al.*, 2013). They also leverage their governance structures to minimise the time spent on managerial decisions related to sustainability and innovation within their value chain.

Our findings also suggest that, in the manufacturing industry, SMEs perceive a managerial motivation to develop a CBM and recognise it as an opportunity to have an environmental impact, as well as a financial and economic impact on the firm. Opportunity to establish a CBM is deeply explored by the young and newly recruited SME managers who demonstrate managerial cognition (Ramírez‐Pasillas *et al*., 2021) to be 'one step ahead of their pioneers'; thus, they believe they can have a footprint in the firms by using circularity. Hence, our findings underline the importance of young managers with sustainability backgrounds and skills as a significant factor in developing a CBM in international SMEs.

Figure 2

By revealing the CBM of international SMEs, this research addresses the call for a broader understanding of managers' roles in sustainable development. Furthermore, given that our case studies involve international companies, our results underscore the global vision of SMEs and their financial intention to increase market growth locally and globally. Hence, our research emphasises internationalisation as another dimension that motivates SMEs to develop a CBM.

As noted in Figure 2, our findings demonstrate that SMEs also leverage innovation in the value chain to develop a CBM. Previous research on SMEs has primarily focused on their innovation (De Massis *et al.*, 2013) or on proactive environmental strategies (Dou *et al.*, 2019) for competitive and sustainable development. However, this research integrates innovation into the development of a CBM in SMEs to further the debate on the lack of resources compared with MNEs' sustainability approaches. Our cases confirm the role of innovation in the value chain as an essential driver for CBM development. By incorporating innovation in R&D, as well as in the production process and

product, SMEs can develop a CBM that includes recycling, minimising waste, and using biodegradable products, thereby preventing pollution and extending the product's life cycle (Hart and Dowell, 2011). By integrating these innovations, SMEs develop a CBM that is difficult to imitate, thereby increasing their sustainable competitive advantage.

Building on the typologies of business model transformation toward circularity outlined by Gauthier and Gilomen (2015), our findings reveal that international SMEs in the manufacturing industry, particularly those in the Chinese context, engage in business model innovation (typology 3) or even business model redesign (typology 4) to exploit opportunities and develop effective CBMs. Rather than settling for business-as-usual or mere adjustments to single elements like procurement or waste management, the cases demonstrate the necessity of significant changes that alter multiple BM elements—such as integrating innovation in marketing to target sustainable consumers, advancing R&D for eco-friendly prototypes and processes, and enhancing production with biodegradable materials and resource-efficient practices—to align with circular principles of recycling, reuse, and recovery.

This integrated approach, driven by managerial cognition, organisational agility, global market exposure, and institutional enablers like green taxation, underscores a radical transformation across departments, enabling these SMEs to create new value propositions rooted in circularity, boost competitiveness in international markets, and achieve long-term sustainability gains. The findings from our cases illustrate that international SMEs integrate innovation in marketing and launch initiatives, such as a “global consumer project,” to address the challenge of making intelligent purchasing decisions and changing their operating methods. By revealing how SMEs integrate innovation into their value chain, starting with marketing, and linking it to the development of CBMs, this study contributes to research on the role of innovation in developing CBMs.

Building on integrated innovations that foster inimitable CBMs, our findings further illuminate the role of institutional theory in shaping these transformations among international SMEs in manufacturing sector. Institutional theory posits that organisations conform to external pressures—coercive (e.g., regulatory mandates), mimetic (e.g., imitation of successful peers), and normative (e.g., professional standards)—to gain legitimacy and resources (DiMaggio and Powell, 1983). In our cases, government policies, such as China's Circular Economy Promotion Law, act as coercive enablers, compelling SMEs to adopt circular practices, like resource recovery, to comply with environmental regulations and access incentives, aligning with recent analyses of how institutional policies drive the development of CBMs. This is complemented by mimetic

isomorphism, where global market exposure prompts SMEs to emulate international standards observed in host countries, fostering business model innovation or redesign to mitigate risks and enhance competitiveness. Normative pressures, meanwhile, are evident in managerial motivations influenced by sustainability certifications (e.g., GRI) and peer networks, encouraging the recruitment of young talent attuned to circular norms. These institutional dynamics, as explored in multi-case studies of SMEs transitioning to circularity, interact with micro-foundations to facilitate opportunity exploitation, extending prior literature by demonstrating how SMEs in emerging contexts address institutional voids through agile CBM adaptations for sustainable international growth (Ahmadov et al., 2023). SMEs utilise the institutional context as an external facilitator in developing their CBMs. Our study reveals that Chinese policies serve as additional motivators for SMEs to establish CBMs, as they offer financial incentives. The government has introduced a new Strategic Investment tool to foster commercial and industrial leadership in these areas. The recent government supportive measures and investment in recycling will help ensure that strategic secondary raw materials are incorporated into the Circular Economy Action Plan.

6. Conclusion

This paper focuses on how international SMEs explore and exploit opportunities to develop CBMs for the manufacturing industry. It responds to calls for innovation and studies on CBMs, as well as those focused on Chinese SMEs and circularity. It highlights the role of SME managers' involvement and motivations as essential drivers for CBM development, thereby responding to calls for a better understanding of the features of SMEs that enable them to undertake sustainable actions. Our exploratory research is based on a purposeful sample of six SMEs in the manufacturing industry in China, aiming to gain a deeper understanding of a complex phenomenon within its context.

Our findings suggest that SMEs integrate ‘the voice of the environment’ into their development process (Hart, 1995, p. 993). First, SMEs explore the opportunity to develop a CBM focused on recycling, minimising waste, and reusing biodegradable products, relying on managers' perceptions and motivations to support strategic environmental choices, alongside a new generation of SME managers driven by social and financial circularity motivations. Additionally, SMEs leverage their institutional context incentives, particularly government policies, as enablers for the circularity transition. Second, SMEs capitalise on opportunities to develop CBMs by implementing circular innovation that leverages circularity within the value chain. Innovation manifests in marketing, R&D, production, and products, often progressing to business model innovation or redesign as per established typologies (Gauthier and Gilomen, 2015).

We contribute to research streams on the process of SMEs' internationalisation and, more specifically, to studies on the CBM of SMEs. The reliance on innovation approaches has often led to a focus on a single specific driver of SMEs, thereby mainly highlighting their digital business model innovation (Soluk *et al.*, 2021) or open service innovation (Rondi *et al*., 2021). The interactions of SMEs and business models in a circular economy, as linked to innovation and internationalisation, have been overlooked. This contribution examines the individual role of management and its contribution to the development of CBM. Moreover, this study contributes to the literature on global manufacturing processes by highlighting the role of circular innovation in creating eco-designs that facilitate international sustainable development across countries, as well as the government's role as an enabler of sustainable development, while supporting typologies of multifaceted business model transformation.

Contributions to policy and practice

Given the rise of sustainable international firms and the urgency of climate change, this study is timely and relevant, with several implications for policy intervention. Firstly, the findings demonstrate that the new generation of SMEs, motivated by financial and sustainability factors, integrates innovation and develops CBMs. Consequently, the government might allocate special funds, such as 'under 40 sustainable funds' aimed at young SMEs, to encourage young SME owners. Secondly, our analysis suggests that SMEs pursue marketing innovation to enhance communication, build a sustainable reputation, and foster networking among various stakeholders. Therefore, policymakers need to scrutinise promoted greenwashing strategies and only support SMEs holding sustainability certificates issued by professionals recognised by the GRI (Global Reporting Initiative).

Additionally, policymakers can establish knowledge-sharing platforms to create an international network that connects SMEs with experts who share best practices during the early stages of CBM development. Finally, policymakers can enhance access to circular technologies and infrastructure by promoting technology transfer programs that facilitate the implementation of digital tracking technologies among SMEs. Chinese governments bodies —mainly state-owned companies —should procure from international SMEs offering sustainable solutions, even when these come at a higher cost. Public procurement frameworks should be revised to include some criteria that prioritise refurbished and remanufactured products.

As for managerial implications, our study can stimulate international SME managers and entrepreneurs in China to reflect on the conditions for developing the CBM. This study

acknowledges the presence of young, new-generation managers committed to circularity as a crucial source for exploring these opportunities and taking the next step toward developing CBM within the organisation. As a result, international SMEs need to recruit young managers with sustainable, innovative backgrounds to lead their new sustainable path. Additionally, SMEs can invest in targeted training and workshops to deepen managers' understanding of circularity principles and their strategic relevance. A significant effort to understand how to develop a CBM could give Chinese SMEs a considerable advantage, boosting their local and global sales and expanding their businesses. Moreover, our findings underscore the need to implement circular innovation across multiple departments. Therefore, SMEs need to adopt integrated approaches that facilitate coordination between functions such as R&D, marketing, and production, leading to more effective CBM development.

Limitations and future research

Our purposeful sampling limits the empirical generalizability of the findings, as our research focuses on a limited number of SMEs that have successfully integrated innovation into their processes to develop CBMs in one single context, China. Additionally, our study does not address potential bias stemming from its focus on Global Reporting Initiative (GRI)- certified firms, which may already be positively predisposed toward sustainability and thereby limit data variation. We encourage future studies to formulate propositions through additional qualitative work and the operationalisation of constructs. This would assist in preparing for hypothesis testing in more deductive and quantitative studies within the manufacturing industry and facilitate comparative case studies across multiple contexts. An intriguing avenue for future research is to investigate the role of CBMs in the international development and growth of SMEs, as this requires as much effort as their regional development. This necessitates longitudinal research to capture the relationship between the advancement of CBMs and the speed at which SMEs enter new international markets. A promising direction for future research is to compare SMEs that have developed business models within the circular economy with those that have developed business models within a linear economy, examining SME managers' involvement in developing these models. Another promising area is the development of business models within the circular economy among firms that utilise other internationalisation modes, such as FDI or Joint Ventures, whether they are MNEs or SMEs.

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