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Research paper

Regenerative Business Practices: Supporting Micro, Small and Medium Enterprises' Transition to a Net-Positive Circular Economy

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Abstract

As humanity confronts the escalating challenges of climate change, resource scarcity, and biodiversity loss, the role of regenerative business practices (RBPs) within circular economy (CE) frameworks remains critically underexplored. This article aims to address this gap, particularly in the context of micro, small and medium enterprises (MSMEs), as they represent 99.8% of businesses in many European economies and thus play a vital role in CE transitions. It employs the Three Horizons Framework to investigate the limitations in existing CE definitions (Horizon 1), through emergent RBPs (Horizon 2), towards a net-positive CE (Horizon 3). Through this lens, it explores how RBPs are currently embedded in CE literature and can potentially enable MSMEs to transition towards a net-positive CE. Utilising PRISMA methodology, thematic coding, and co-occurrence analysis, our study uncovers a fragmented understanding of regeneration within existing CE literature. Key findings include clarity on why CE is stuck in a net-zero 'restoration' loop and a curated typology of RBPs that are increasingly applied by MSMEs, enabling a shift towards net-positive CE. The review discusses the complexity of integrating RBPs, and the need for more empirical studies on how RBPs can act as deep leverage points, moving away from shallow leverage points such as material flows, subsidies and tax driven interventions. Finally, we offer insights on practical applications of RBPs for MSME entrepreneurs, managers, and leaders along with recommendations for further exploration of sector-specific applications of RBPs.

Keywords: Circular Economy · Regenerative Business Practices · Transitions · Micro · Small and Medium Enterprises · MSMEs · Net-positive Circular Economy · CE, Sustainability

1. INTRODUCTION

The transition to a Circular Economy (CE) is positioned as a key strategy to address climate change, biodiversity loss, and resource scarcity. CE aims to decouple economic growth from resource consumption by designing systems that are regenerative by intention. However, despite widespread support, the global transition to a CE has been slow (Sarokin & Bocken, 2024). The Netherlands, for example, has set an ambitious goal to achieve a fully circular economy by 2050 (Ministry of Infrastructure & Water Management, 2023). However, recent reports (Circle Economy, 2024) indicate that circularity rates have actually declined from 9.1% in 2018 to 7.2% in 2023, underscoring the urgent need for more radical approaches that move beyond mere efficiency and restoration, to achieve the 2050 ambitions.

The transition to a CE is vital for all types of businesses, but it is particularly critical for micro, small, and medium-sized enterprises (MSMEs). MSMEs represent 99.8% of businesses in many economies (European Commission, 2024), yet they face unique challenges that differentiate their path to circularity from larger firms

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(McEvoy, 2023). Unlike large enterprises that can leverage economies of scale, MSMEs operate with constrained financial and technical resources (OECD, 2018), making them particularly vulnerable to external shocks and market pressures. Furthermore, despite their smaller individual size, MSMEs collectively contribute 60-70% of industrial pollution in Europe (OECD, 2018). This makes their transition essential not only for the survival of their businesses but also for achieving broader sustainability goals (Kuik et al., 2023). As such, while the transition towards a CE is essential for EU sustainability, its implementation poses unique challenges for MSMEs, highlighting the critical need to understand the best means for them to transition.

1.1 Regeneration and Regenerative Business Models

Most of the CE literature and policy leans towards 'passive restorative' principles, which emphasise actions such as recycling rather than actively prioritising waste prevention or creating positive social and ecological value (Clube & Tennant, 2023). As the term ‘regeneration’ gains popularity within CE literature (Kirchherr et al., 2023), this study focuses on highlighting the limitations of framing it only as a disruptive concept within the CE. Instead, the paper focuses on recognizing its value in facilitating deeper leverage points (Meadows, 1999) which can include structural changes or shifts in mental models. In the context of regenerative practices within MSMEs, fostering shifts in values and mindsets is particularly relevant as it encourages long-term cultural and organizational change essential for a net-positive transition. Unlike passive restorative approaches, regeneration emphasises the need for businesses not only to restore, but also actively renew, and replenish ecosystems and resources they rely on (Morseletto, 2020). A Regenerative Business Model (RBM) does not merely mitigate harm or aim to offset emissions but seeks to create a holistic impact by employing “strategies that go beyond net zero” to actively replenish and contribute to ecological and societal well-being (Das & Bocken, 2024). For example, companies in the regenerative agriculture sector focus on rebuilding soil health, which not only supports biodiversity but also improves long-term agricultural productivity (Newton et al., 2020). Similarly, in the construction industry, regenerative design principles are used to create buildings that actively contribute to replenishing ecosystems (Plessis, 2012), such as green buildings that support local biodiversity.

While Konietzko et. al. (2023) effectively differentiates sustainable, circular, and regenerative business models, (with sustainability reducing harm, circularity closing resource loops, and regeneration aspiring to replenish ecosystems), regeneration has always been a part of the CE as defined by EMF (2013). This widely used CE definition already includes ‘regeneration’, making it a more familiar and structured concept compared to the new and growing ‘regenerative economy’, which currently lacks consensus and can confuse or alienate businesses, particularly MSMEs (Morseletto, 2020). Consequently, this paper proposes that aiming for a ‘net-positive CE’ (where net-positive means contributing more to social and ecological value then they extract, eventually leading to regenerative futures) (Hutchins & Storm, 2019), is a more achievable and approachable goal for MSMEs. While RBPs are not prerequisites for circular practices, they can enhance and accelerate circularity by fostering systems thinking, ecological regeneration, and long-term sustainability. This provides a well-established and recognized framework where RBPs can be adopted as part of the CE. While EMF (2013) defines regeneration as an integral aspect of CE, Konietzko et al. (2023) distinguish between circular and regenerative practices. This paper aligns with the EMF definition because it offers a more structured and widely accepted approach, particularly relevant for MSMEs seeking practical pathways to transition. At the same time, exploring the disruptive potential of RBPs towards a net-positive CE allows these MSMEs to make meaningful contributions to sustainability within a familiar context (Kuik et al., 2023). Thus, by aligning RBPs within the more familiar framework of a ‘net-positive CE,’ MSMEs can drive impactful regenerative efforts without the complexity and uncertainty of adopting an entirely new economic paradigm.

1.2 Research Gap and Novelty

Despite the growing body of literature on CE, there is limited research on the specific practices that can enhance MSMEs' transition (Konietzko et al., 2023) to a regenerative, net-positive CE. This paper seeks to fill this gap by conducting a systematic literature review of existing CE literature, focusing on how CE is currently defined, and the role of RBSs, in the context of MSME circular transitions. The contribution of this research is two-fold: firstly, it explores the limitations of the CE through the constraints of how it is defined, and secondly it provides a typology of RBPs used by MSMEs within existing CE literature. This is of particular importance for policymakers, entrepreneurs, and academics, as it offers actionable insights into how MSMEs can be supported in overcoming the

barriers of the current sustainability transitions. Currently, the most critical limitation of the CE pursuit is that due to its focus on net-zero, resource efficiency and restoration, the momentum has not only slowed down but is actively regressing (Circle Economy, 2024). A net-positive CE instead offers an opportunity to take a step further and shift the mindset to creating positive social and ecological value (Clube & Tennant, 2023). To do so, our research attempts to operationalize RBPs by distilling them from existing CE literature and placing them into a typology that can be used to support MSMEs in transitioning to a net-positive CE.

Building on these considerations, the authors design this study to explore the main research question: How is CE defined in existing MSME transition literature, and how regenerative business practices can help them transition towards a net-positive CE? We do this by answering the following sub questions:

- SQ1: What are the limitations in existing CE definitions across studies focused on MSMEs transition to a CE?
- SQ2: Which RBPs are most frequently mentioned in this literature and how can they support MSMEs transitioning towards a net-positive CE?

Building upon the identified research gap, this study contributes to ongoing discussions on RBPs by exploring their role in supporting MSMEs' transitions to a net-positive CE. The curated typology of RBPs serves as both a theoretical framework and a practical tool, emphasizing their critical role in fostering systemic change. By applying these concepts to MSMEs, this study demonstrates how transitioning from 'net-zero' to 'net-positive' can yield significant economic and environmental benefits.

This paper bridges the gap between theory and practice, offering MSMEs actionable strategies to adopt holistic, systems-based business models (Morseletto, 2020). By categorizing RBPs into clear, adoptable strategies, it provides practical guidance for many sectors where industry-specific challenges hinder CE adoption. Aligning RBPs with MSME business models enables ecological restoration (Konietzko et al., 2023; Geissdoerfer et al., 2017) and unlocks new opportunities for long-term net-positive outcomes and profitability.

2. THEORETICAL FRAMING

2.1 The Evolution of CE

The concept of circularity in economic systems has evolved through various perspectives, leading to an ongoing shift in how the CE is understood and applied. This evolution and subsequent lack of a clear and consistent definition contributes to how CE practices are adopted and integrated. Early circularity thinking focused on creating closed systems to manage resource use, primarily through waste management techniques (Yen, 1975; Smith, 1976). It was not until the late 1980s that scholars began rethinking waste as a resource, with Frosch and Gallopoulos (1989) introducing the concept of industrial symbiosis wherein waste from one process serves as input for another. Building on this, Pearce and Turner (1989) highlighted the economic-environmental interdependence and coined the term "circular economy" to describe systems that minimise waste and maximise resource reuse.

While early CE thinking focused on eco-efficiency and resource loops, since the early 1990's scholarship has embraced systemic approaches integrating social, economic, and environmental sustainability, influenced by the Rio Declaration (UN, 1992). Friant et al. (2020) trace this evolution, with notable contributions from Lyle (1994), Hawken et al. (1999), Stahel (2010), Raworth (2017), and Felber (2019) advancing the integration.

Despite recognition of the need for systemic approaches since the 1990s, Kirchherr et al. (2017) note that broader CE frameworks only began gaining significant traction in recent years. Until 2017, CE definitions predominantly focused on economic prosperity (46%) and environmental quality (37–38%) (Kirchherr et al., 2017), limiting their transformative potential. A shift occurred post-2017, as systemic approaches began emphasizing Regenerative Business Practices (RBPs), marking the transition toward a net-positive CE.

Scholarship has increasingly framed CE as regenerative. Geissdoerfer et al. (2017) were among the first to describe CE as a system that not only minimizes harm but actively replenishes ecosystems. This perspective has grown, with Kirchherr et al. (2023) identifying a rise in the use of 'regenerative' in CE literature from 2017 to 2022, reflecting a shift toward net-positive outcomes where businesses give back more than they take (Das & Bocken, 2024; Morseletto, 2020). However, despite the growing emphasis on regeneration, definitions of CE still vary, particularly in MSME contexts. Thus, exploring these diverse definitions is crucial for identifying the challenges MSMEs face and determining effective strategies for their transition to a net-positive CE.

2.2 Micro, Small and Medium-Sized Enterprises

Just as Micro, Small, and Medium-Sized Enterprises (MSMEs) have a pivotal role in driving a shift toward a CE (Bag et al., 2022), they will be essential in the pursuit of a net-positive CE. According to the EU's classification, MSMEs include enterprises with fewer than 250 employees, accompanied by annual net sales not exceeding €50 million (EU SME Centre, 2005). Startups are a subset of MSMEs, typically younger firms that may have high-growth potential, but share the same structural limitations as other MSMEs (ILO, 2021), thus our working definition of MSMEs includes startups. The following table by Varga (2021) provides a clearer delineation of size classes for MSMEs:

Table 1. Size Categories of the MSME Sector Adapted From Varga (2021)

MSME classification	Number of people (persons)		Annual net turnover (in EUR)		Balance sheet total (in EUR)
micro-enterprise	<10	and	≤2.000.000	or	≤2.000.000
small enterprise	<50	and	≤10.000.000	or	≤10.000.000
medium enterprise	<250	and	≤50.000.000	or	≤43.000.000

The expansive nature of these size classifications offers a broad spectrum for defining MSMEs. This broad inclusivity might be a contributing factor to the remarkable statistic that 99.8% of enterprises operating within the European Union fall within the MSME category (McEvoy, 2023). These entities play a significant role, contributing almost 52% of the EU's total added value (Rotar, 2019). They are not only pivotal for fiscal vitality but also serve as crucial elements of European communities. In 2023, MSMEs in the European Union employed nearly 85 million individuals, accounting for over 65% of the employment and labour force (European Commission, 2023). Dey et al. (2022) further highlight MSMEs' role in driving innovation, job creation, and economic growth, benefiting local communities and entrepreneurs. Marrucci et al. (2021) stress their adaptability and ability to serve niche markets in both developed and developing economies, while Deyet al. (2022) emphasize their contribution to a vibrant business ecosystem and overall economic development.

While the historical development of CE largely focused on large-scale industrial processes (Frosch and Gallopoulos, 1989), MSMEs are now recognized as essential players in the CE transition due to their sheer number and environmental impact. MSMEs account for a significant portion of industrial pollution globally, with studies showing that MSMEs in regions like Europe contribute 60–70% of total industrial pollution (OECD, 2018). Given their substantial impact on both fiscal and economic vitality, as well as the environment, the transition of MSMEs towards a net-positive CE plays a crucial role in the EU's circularity goals. European policy frameworks, such as the European Green Deal, Circular Economy Action Plan (CEAP), and Waste Framework Directive (WFD), also emphasise the critical role of MSMEs in driving this transition. These frameworks reiterate the importance of MSMEs in achieving a resource-efficient and competitive economy (European Commission, 2019), with the CEAP (European Commission, 2020) specifically calling for enhancing support for MSMEs to innovate and adopt circular practices.

Unlike large corporations, MSMEs operate with fewer resources and are often constrained by limited financial and technical capacity (Kuik et al., 2023). However, they possess unique advantages in their agility and ability to innovate. These characteristics position them as key actors capable of adopting RBPs that contribute to net-positive outcomes. According to Das & Bocken (2024), MSMEs are well-suited to implement RBPs due to their capacity for innovation and collaboration, even though they face greater challenges compared to larger organisations. MSMEs are also seen as critical facilitators of the broader CE transition because of their close ties to local economies and their ability to respond quickly to changing market conditions (Kirchherr et al., 2023). Scholarship such as Vásquez et al. (2024) and Geissdoerfer et al. (2017) underscores the need for businesses, particularly MSMEs, to take a leading role in promoting RBPs by embedding them into their business models. This transition is critical not just for environmental restoration but also for achieving economic resilience and social well-being.

By adopting RBPs, MSMEs can not only reduce their environmental footprint but actively contribute to the regeneration of natural ecosystems. Unfortunately, MSMEs worldwide face several barriers when attempting to transition to a CE. A significant amount of research has been conducted on this topic (Ahmadov et al., 2023; Baral et al., 2023; Carissimi et al., 2023; Rodríguez-Espíndola et al., 2023; Al-Awlaqi & Aamer, 2022 Takacs et al., 2022; Caldera et al., 2019). Mishra et al. (2022) classify the barriers faced into seven main dimensions: market, strategic, government and regulatory, knowledge and skills, technological, financial, and cultural. However, the question remains as to how these barriers can be overcome to facilitate MSMEs' transition to a net-positive circular economy.

2.3 Regenerative Business Practices (RBPs) in MSMEs

A possible enabler for MSMEs wanting to transition to a net-positive CE is to adopt RBPs. According to Morseletto (2020) and Drupsteen & Wakkee (2024), the literature offers a wide range of definitions of regeneration, which can be challenging to operationalise due to their broad nature. Although there is no agreed definition of RBPs, Batista et al. (2018, p.439) define them as those that "recuperate to a new usually improved state". Additionally, other scholars assert that "any and all actions that are life-affirming are regenerative" (Hutchins & Storm, 2019; Hutchins, 2022; Vamvalis, 2022; Buckton et al., 2023). Hahn and Tampe (2021) attribute the origin of RBPs to agriculture. Rodale (1983) initially introduced the concept as the notion of "maintaining and improving resources through continuous organic renewal of the complex living system" (Morseletto, 2020, p. 765). This term has gained traction in agricultural literature due to its perceived potential to enhance species abundance, soil health and fertility (Konietzko et al., 2023, p. 376). Schreefel et al. (2020, p.1) suggest that this approach can "contribute to multiple ecosystem services". This is a growing trend in CE literature, as observed by Kirchherr et. al. (2023).

However, the majority of the literature on RBPs critiques traditional circular economy initiatives for prioritising material efficiency without adequately addressing the social and ecological limits to growth (Clube & Tennant, 2023). Scholars argue that the outcomes of CE practices are often "relative and incremental," failing to lead to the systemic improvements needed to address current environmental and social crises (Clube & Tennant, 2023; Johannsson & Hendriksson, 2020; Van den Bergh, 2022). RBPs, on the other hand, prioritise non-material needs, such as clean air, nature, and well-being, and aim for systemic change to rebalance the relationship between nature and humans. While there is still limited literature on how RBPs can be fully translated into business models, Konietzko et al. (2023) note that RBPs aim to go beyond net-zero and instead move toward a net-positive impact—in other words, to "give more than they take" (Konietzko et al., 2023, p.382; Muñoz & Branzei, 2021). This shift represents a fundamental transformation in how businesses operate, with the goal of creating economic value in tandem with social and ecological value. Unlike traditional circular initiatives, regenerative business models integrate social equity into their core objectives (Morseletto, 2020).

Recent interpretations of RBPs have adopted a more holistic approach, often defining regeneration at the ecosystem level. For instance, Hahn & Tampe (2021, p.5) describe RBPs as those that enhance "the health of socio-ecological systems (SES) in a co-evolutionary process." Similarly, Konietzko et al. (2023, p. 381) define RBPs as practices that promote equality, human rights, fair labour practices, ethical sourcing, diversity, and inclusion, while addressing systemic inequities. These interpretations align with the growing recognition of RBPs as part of the broader CE framework, as noted by Kirchherr et al. (2023).

In this study, the working definition of RBPs is that they aim for a net-positive impact on the social, ecological, and economic dimensions of an entire ecosystem. By adopting RBPs, MSMEs can move beyond the efficiency-focused CE and actively contribute to the restoration and regeneration of ecosystems and communities. Thus, it is important to explore which specific RBPs are most frequently identified in the literature as essential for MSMEs' transition to a circular economy.

2.4 Conceptual Framework

As established in the literature, MSMEs play a pivotal role in transitioning the EU toward a CE, yet they face significant challenges in this process. Unlike large corporations with economies of scale, MSMEs operate with limited resources and narrower profit margins, making it difficult to balance short-term financial stability with long-term circular investments (Samsuri et al., 2022). This financial constraint intensifies the need for MSMEs to align profitability with circular transition goals (Ahmadov et al., 2023). Additionally, the literature on CE reveals significant variability in how CE is defined, particularly in the context of MSMEs. While extensive research underscores the importance of MSMEs in the CE transition (Geissdoerfer et al., 2022; Veleva & Bodkin, 2018; Rok

& Kulik, 2021; Gil-Lamata & Latorre-Martínez, 2022; Sehnem et al., 2022b), relatively little attention has been devoted to newly emerging practices that could facilitate their transition. Specifically, Regenerative Business Practices (RBPs) remain underexplored in this context, despite their potential to extend beyond traditional CE models focused on material efficiency. RBPs aim to create net-positive impacts, actively contributing to the regeneration of socioecological ecosystems (Konietzko et al., 2023; Muñoz & Branzei, 2021). As Morseletto (2020) highlights, RBPs shift the focus from merely reducing harm to improving environmental and social systems.

To conceptualize this transition, this study employs the 'Three Horizons Framework' (Sharpe et al., 2016), which offers a structured lens to understand the evolution of systems over time (see Fig. 1). The framework identifies three coexisting horizons: (H1) the dominant but declining system, (H2) the space of innovation and experimentation where old and new systems overlap, and (H3) the emerging future vision. In this article, H1 represents 'limitations in existing CE definitions'; H2 represents the emergent RBPs in existing CE literature; and H3 represents their potential to support MSMEs transition towards a net-positive CE. By situating MSMEs within these horizons, the framework provides a robust foundation to address the research questions and explore the role of RBPs in enabling systemic transformation.

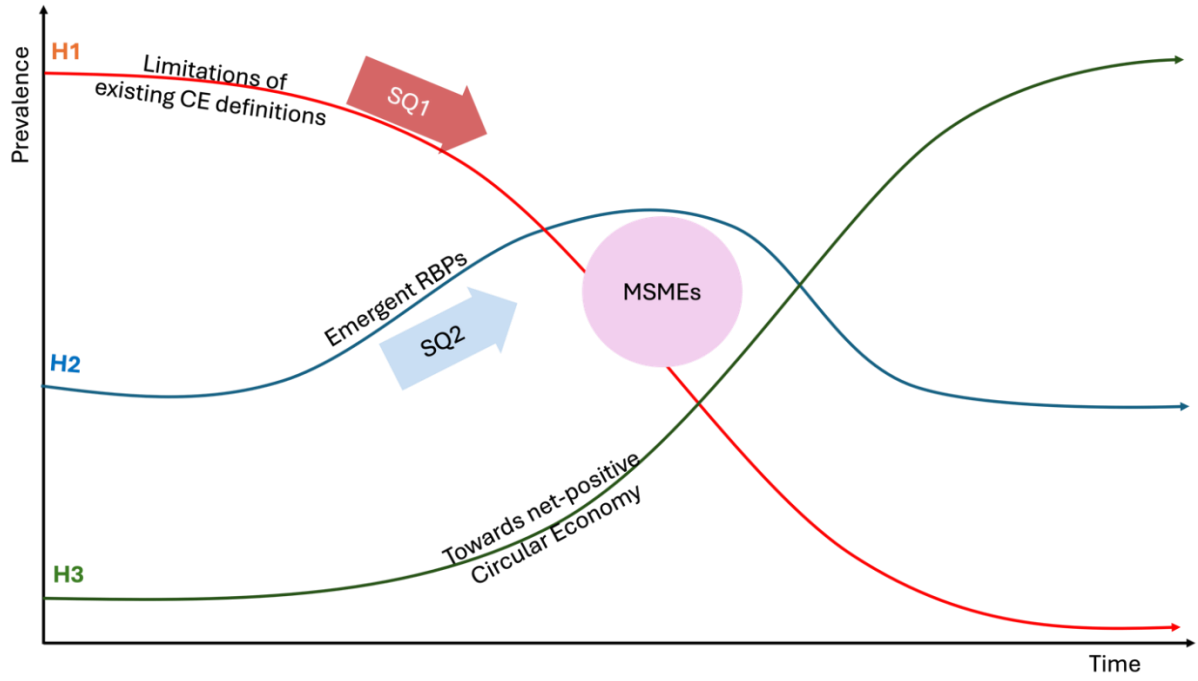

Figure 1. Conceptual Framework for This Study (adapted from 'Three Horizons Framework' by Sharpe et al., 2016)

3. RESEARCH METHOD AND DESIGN

To answer the main and sub research questions of this study, we employed a mix of quantitative and qualitative methods. Starting with a systematic review, we leveraged established guidelines to ensure a comprehensive and unbiased synthesis of the existing literature.

3.1 Systematic Review

A systematic review is a structured approach to synthesize research evidence that involves clearly defined, methodologically rigorous steps. According to Page et al. (2021a), a systematic review can synthesise knowledge, identify research priorities, address complex questions beyond the scope of individual studies, highlight research issues for future research, and generate or evaluate theories. The reason for choosing a systematic review for this paper was twofold. First, it allows for a comprehensive assessment of the existing evidence regarding the role of RBPs in MSMEs' transition to a CE. Second, it provides a robust framework for identifying gaps in the current literature and suggesting areas for future research.

We utilised the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021a) to inform the development of our review protocol. Although PRISMA is traditionally employed

in healthcare and medical research, it is easily applied across other research areas as “many items are applicable to systematic reviews with objectives other than evaluating interventions” (Page et al., 2021b); facilitated by its comprehensive checklist and guidance. The comprehensive guidelines and checklist (Page et al., 2021b) facilitated a structured approach to the review process, ensuring transparency and reproducibility. Certain items of PRISMA were not fully applicable to our study due to its focus on RBP rather than clinical interventions. For instance, elements related to the assessment of patient outcomes and adverse events were omitted.

3.2 Search Strategy and Selection Procedure

To uphold methodological rigour in this systematic review, predefined boundaries and eligibility criteria were meticulously established for the initial search. The Web of Science Core Collection was chosen as the primary information source due to its multidisciplinary nature and the prerequisite for all included journals to undergo peer review. The only exception to this requirement is for long-established journals indexed for many years but not peer-reviewed (Clarivate, 2022), ensuring a broad and reliable dataset. The review focused on articles pertaining to MSMEs within the context of the CE. While the study explores how RBPs help MSMEs transition, finding how many of them specifically included RBPs was a separate research goal and thus was not required for the preliminary search criteria. The preliminary parameters encompassed the period of publication (2018-2023), language (English), and document type (article or review article), with an emphasis on peer-reviewed status. These criteria were chosen to ensure the inclusion of contemporary and relevant studies published in a widely accessible language.

A preliminary 'topic' search using the initial parameters and key concepts namely 'circular economy' and 'micro, small and medium-sized enterprises' or 'MSME' was conducted on the Web of Science database. This yielded limited and largely irrelevant results. Consequently, an iterative refinement process was undertaken. This process involved selecting and testing keywords, evaluating the first page of search results for suitability, identifying reasons for irrelevance, and subsequently adjusting the keywords, resulting in a refined sequence of terms. This process involved a free-form evaluation of the overall structure, complexity, choice of keywords, and proofreading, resulting in an optimised search strategy (see Table 2).

Table 2: Search Strategy

Database	**Last Search**	**Sequence of Terms**	**Limits & Filters**
Web of Science: Core Collection (1980 - present)	29/11/2023	(TS=((circular NEAR/2 economy) OR (circular NEAR/2 business) OR circular)) AND TS=(("micro, small and medium-sized" NEAR/2 enterprise) OR ("small and medium-sized" NEAR/2 business) OR (small* NEAR/2 enterprise) OR (small NEAR/2 business) OR startup OR SME)	Date: 01/01/2018 - 31/12/2023 Language: English Document Type: Article or Review Article

Adhering to the PRISMA method, additional eligibility criteria for the full-text review stage were predetermined to ensure refined and relevant literature in the final selection. These criteria included a minimum Journal Citation Index (JCI) impact factor of 1, a clear CE definition within the article, and an overarching focus on the transition of MSMEs to the CE.

The article screening process commenced with the verification of adherence to the initial parameters, including the mention of CE and MSMEs. Two independent reviewers meticulously screened the title and abstract of each search result, consolidating their findings through consensus. All articles meeting these criteria and identified as retrievable underwent a full-text assessment by a single independent reviewer. The JCI score for the journal of each article was located on Web of Science, and those meeting the minimum score were further examined, first for the presence of a CE definition and then for an overarching focus on MSME transition to the CE.

To uphold objectivity and mitigate the potential for study selection bias, key phrases and synonyms qualifying an article at the full-text review stage were established. Specifically, terms indicative of MSMEs transitioning to the CE, such as ‘adoption’, ‘transformation’, or ‘implementation of circular business models’, ‘circular practices’,

and ‘circular supply chains’, were considered eligible. Notably, automation tools were not used in this process. A secondary reviewer facilitated the verification of exclusions, and any disagreement during the review process was resolved through consensus.

3.3 Study Selection

The search was conducted on 29/11/2023. The initial phase of our systematic review involved identifying and screening 346 studies retrieved from the database search. No studies were excluded at this stage due to the selected database's automated deduplication process. Following this, a screening of titles and abstracts was conducted, resulting in the exclusion of 241 studies that did not align with the predefined parameters.

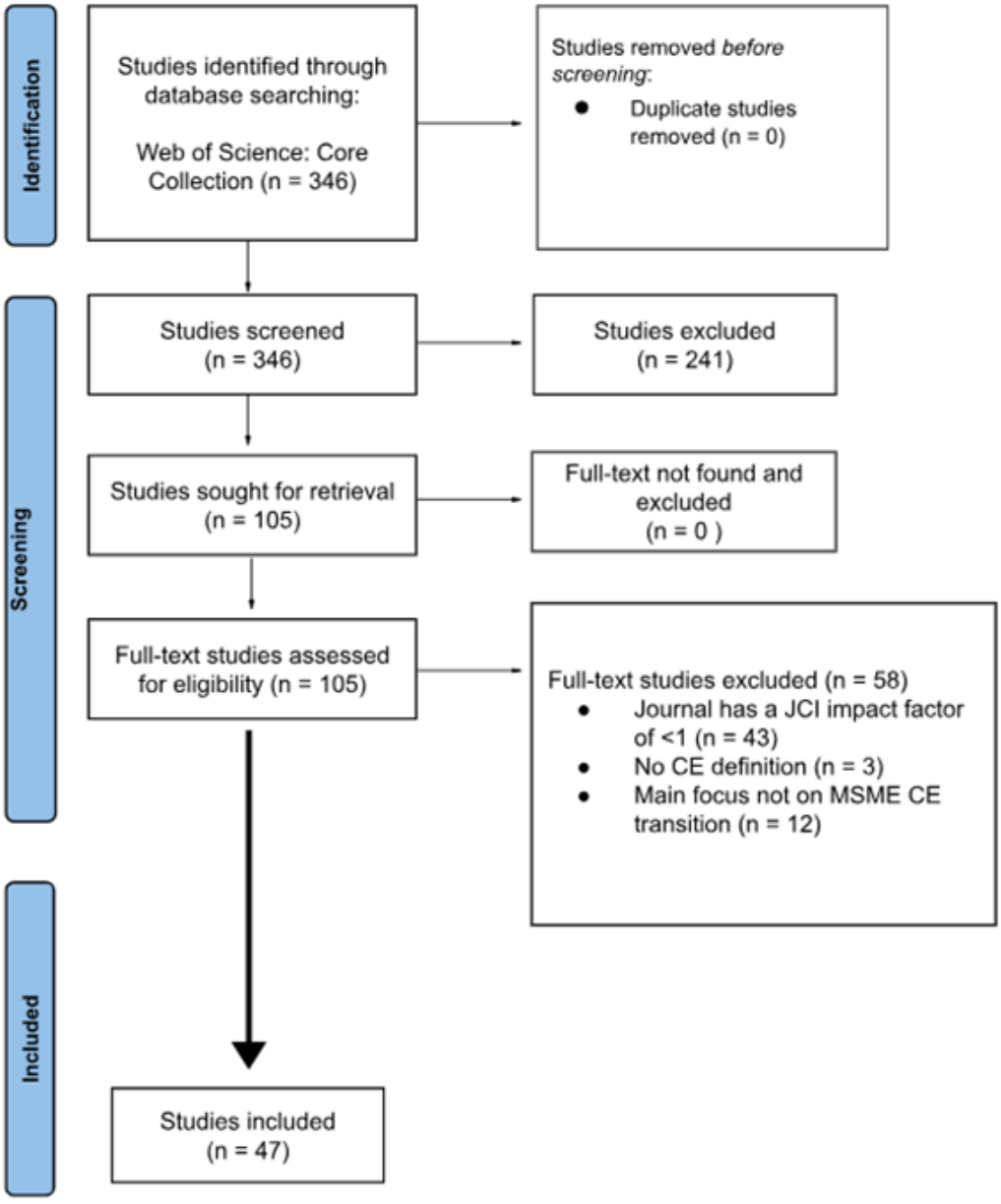

Figure 2. PRISMA 2020 Flow Diagram: Identification of Studies via Database. (Adapted from Page et.al., 2021a)

Subsequently, a thorough full-text review of 105 potentially eligible studies was conducted, ultimately yielding a final inclusion of 47 studies (refer to Figure 2 for a visual representation of this progression). Further details clarifying the reasons for exclusion during the full-text review stage are provided in Appendix A. The reasons for

exclusion were categorised as follows: 43 studies were removed due to a Journal Citation Index (JCI) score of less than 1, three were removed due to the lack of a clear CE definition, and 12 were removed because their main focus was not on the CE transition in the context of MSMEs.

3.4 Qualitative and Quantitative Content Analysis

Data collection from the selected studies was carried out systematically using the online software, Atlas.ti. Two authors independently extracted data from the final selection of 47 articles, ensuring consistency and reducing the likelihood of errors. Any discrepancies between reviewers were resolved through discussion or consultation with a third reviewer (supervisor) if necessary.

A codebook (see Table 3) was created based on the conceptual framework and existing theory prior to data collection to ensure clarity and consistency. The data items collected included CE definitions, and regenerative mentions. While the CE definition codes were analysed quantitatively, part of the regenerative mentions, namely the RBP were also analysed qualitatively to understand the frequently occurring themes (see section 4.3). This was done using an inductive method of thematic analysis. In Atlas.ti, we iteratively coded articles for RBP practices, these were then grouped and categorised into each relevant theme (see table 4) to answer SQ2.

To identify relationships and patterns between themes, a co-occurrence analysis was conducted as part of the thematic coding process. This analysis examined the frequency and contextual overlap of codes across documents, enabling the exploration of how key themes (such as definitions of circular economy and mentions of regenerative practices) interrelate. We first highlighted and coded all relevant segments under each category to ensure a comprehensive dataset. To enhance reliability and minimise bias, the main author and co-authors independently coded and reviewed each article, cross-checking results throughout the process. Specific findings from the co-occurrence analysis are presented in the Results section.

Table 3. Codebook

Coding Categories	Theme	Individual codes
Circular Economy Definition	Establish how many articles include Regeneration in their CE definition	1. Regenerative (includes the word in a net-positive context) 2. Non-regenerative but includes the word ‘regenerative’ in a net-zero context 3. Non-regenerative with no mention of the word regenerative
Regenerative mentions	Establish if and which regenerative terminology is most used in the context of MSMEs transitioning towards CE	1. Systems thinking 2. Holistic 3. Rethink the value creation 4. Regenerative business practices (RBP)

4. RESULTS AND DISCUSSION

4.1 Study Characteristics

The 47 included studies varied widely in their methodological approaches and population. These studies encompassed a variety of designs, including qualitative case studies, quantitative surveys, and mixed method approaches. Participant characteristics ranged from small local businesses to medium-sized enterprises across diverse industries such as manufacturing, agriculture, and services. These studies detailed various CE initiatives and their impacts, ranging from waste management practices to the implementation of closed-loop systems. Although PRISMA methodology typically includes a risk of bias assessment per individual study, this SLR does not focus on using the results of the reviewed articles to form a theory but instead analyses the frequency and themes of RBP discussed throughout the article. We thus deemed it inappropriate to conduct a risk of bias assessment per individual study. However, we have summarised the selected articles including their year of publication, study

design, country of data collection, industry type, sample type and size, study focus, and main findings in Appendix B, to ensure transparency and a comprehensive overview of the selected studies.

4.2 Main Results and Co-occurrence Analysis

To answer SQ1 (identify the limitations of existing CE definitions), we explored how CE is defined within the 47 studies. Out of the 47 articles, only one article included a CE definition that mentioned the word 'regeneration' in a net-positive context. The rest of the articles were split between those with nonregenerative CE definitions but mention regeneration in a net-zero context (23) and non-regenerative CE definitions that do not mention regeneration (23). The fact that only one out of 47 articles specifically includes a CE definition that highlights regeneration in a net-positive context indicates a significant gap in the current literature. This suggests that most of the CE research does not prioritize RBPs, which, while not prerequisites for circularity, have the potential to play a critical role in supporting MSMEs' transitions toward more net-positive futures. The focus remains predominantly on resource efficiency and waste reduction, which, while important, do not fully capture the transformative potential of regenerative approaches. The remaining 46 articles are split evenly between those that mention regeneration in a net-zero context and those that do not mention it at all. This division reflects a broader trend in CE research where many studies acknowledge the concept of regeneration but do not emphasise it sufficiently to incorporate it into their core definitions and frameworks. The net-zero context implies a focus on balancing impacts without necessarily contributing positively to ecological restoration or enhancement. Figure 3 presents this distribution and the total number of quotes per individual code.

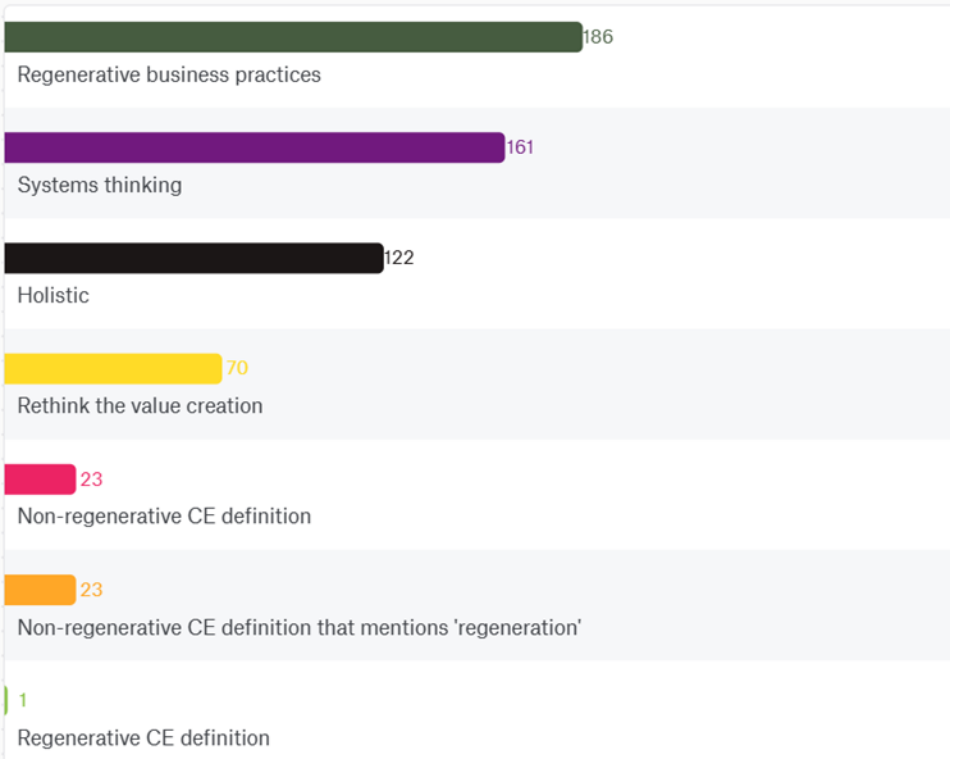

Figure . Number of Quotes per Individual Code. (Note: Figure generated in Atlas.ti)

To answer SQ2, a co-occurrence analysis was conducted to understand the interrelationships between different CE definitions and 'regenerative mentions'. This analysis grouped documents by their CE definition categories and calculated the percentage of documents within each category that mentioned specific codes within the 'regenerative mentions' category (see Figure 4).

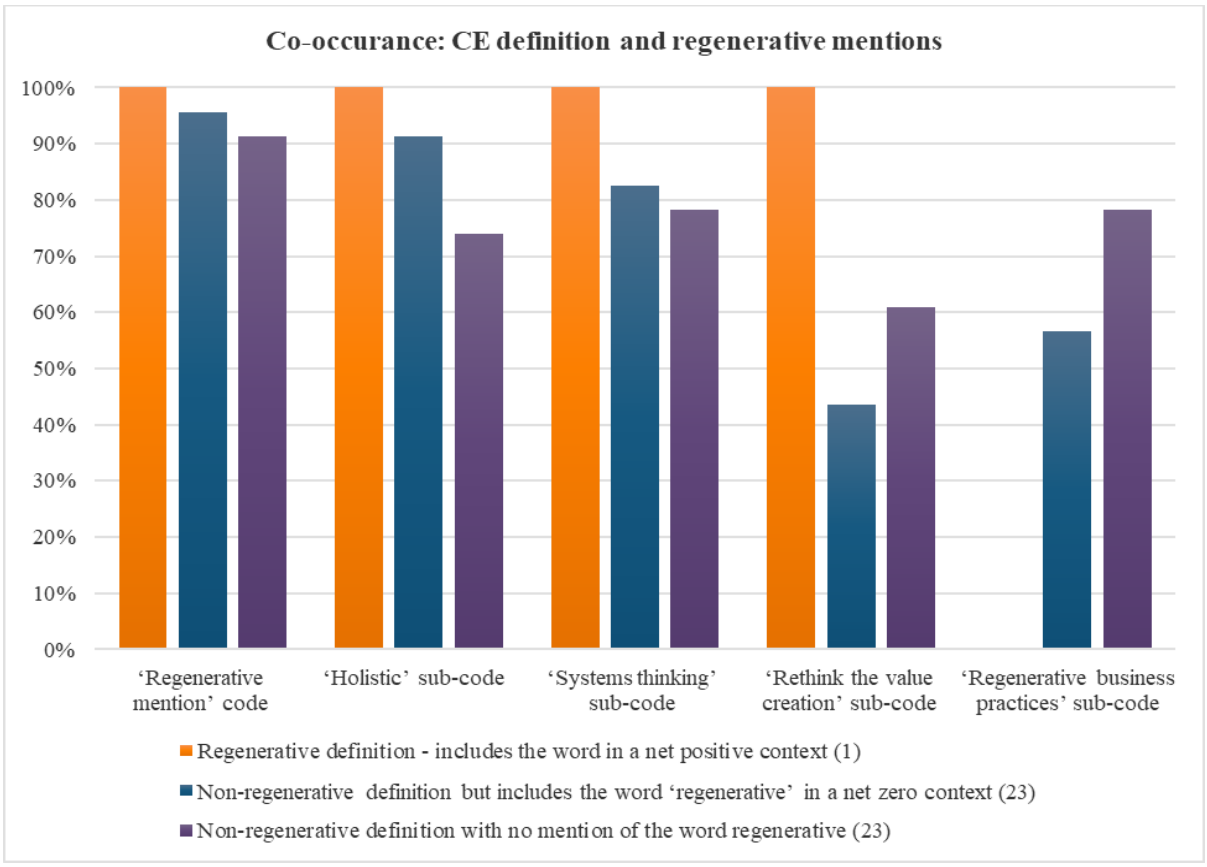

Figure 4. Co-occurrence Between Article CE Definition and Codes in the 'Regenerative Mentions' Category

In the regenerative CE definition category, the singular article exhibited a 100% co-occurrence with codes for 'holistic,' 'systems thinking,' and 'rethink the value creation,' but it surprisingly did not mention 'regenerative business practices.' In contrast, in the non-regenerative but includes the word 'regenerative' in a net-zero context category (23 articles), 91.3% mentioned 'holistic', 82.61% mentioned 'systems thinking', while 56.52% discussed 'regenerative business practices,' and 43.48% discussed 'rethink the value creation'. The non-regenerative category (23 articles) showed that 78.26% mentioned 'systems thinking' and 'regenerative business practices', 73.91% mentioned 'holistic,' and 60.87% discussed 'rethink the value creation'.

4.3 Themes in Regenerative Business Practices

The above code prevalence rates were analysed quantitatively. However, to gain a more in-depth understanding of RBPs and the conditions in which they occur across the selected CE literature, we conducted a thematic coding analysis using an inductive approach. This method involved highlighting all mentions of RBPs within the literature using Atlas.ti software. By systematically coding these mentions, we created an organised typology of RBPs mentioned in these articles (See Appendix C).

Using an inductive approach allowed themes to emerge organically from the data rather than imposing predefined categories. This process began by reviewing the RBP codes individually and identifying recurring patterns in their contextual application. Each instance of an RBP mention was examined for similar characteristics, which allowed us to observe commonalities in how certain regenerative concepts were discussed. For example, we noted frequent references to concepts such as 'holistic approaches' and 'leadership' in relation to RBPs, as well as specific language around 'collaboration' and 'innovation'.

After highlighting and coding RBP mentions, we manually grouped these codes based on thematic similarities, which led to the emergence of five key themes listed below. This grouping process involved iteratively refining and collapsing related codes until they formed coherent, meaningful themes that accurately reflected the range of RBPs observed. By allowing the codes and themes to emerge from the data, we ensured that our analysis remained grounded in the actual language and concepts used in the existing literature, capturing an authentic portrayal of how

RBPs are understood within the context of a CE. Table 4, outlines the overview of RBP typology, and the following five RBP themes emerged through our observations:

- Collaboration: Engaging and collaborating with all stakeholders, both internal and external, was seen as essential for fostering RBPs. This included co-creating with firms, customers, and employees, as well as cooperative inter-firm exchanges. Knowledge sharing and mutual learning were considered pivotal, as was investing in major innovation projects together.
- Connection: Building strong, meaningful, diverse, and rich relationships or networks was a recurring practice. This included deepening human-nature relationships (e.g., with land, rivers and other beings), embedding culturally within communities, and aiding socially vulnerable groups. Strengthening existing relationships and developing new ways of working together were also seen as crucial.
- Holistic approaches: Embracing a whole-systems approach and holistic responses to challenges was another prominent practice. This involved new business strategies as well as a shift in mindsets that focus on long-term sustainability rather than short-term profits. It included designing and evaluating the entire value chain holistically to integrate CE initiatives.
- Leadership and ethical practices: Strong ethical leadership and active communication were mentioned as vital ingredients for successfully adopting RBPs. Top management commitment to sustainability goals and embedding an organisational purpose that goes beyond profit maximisation were noted as key factors.
- Innovation and dynamic capabilities: Investing in technological innovations and dynamic capabilities was included as an essential practice for MSME transitions. This included redesigning production processes to move away from scarce resources and integrating new knowledge by reconfiguring business practices. Firms were recommended to focus on reducing resource use, creating long-lasting products, and implementing product-service models to ensure sustainability.

An overview can be seen below in Table 4 and a more detailed breakdown per study in Appendix C.

Table 4. Overview of RBP Typology from Literature

Theme	Regenerative business practices
Collaboration	Engage and collaborate with all stakeholders
	Co-creation with firms, customers, and employees
	Cooperative inter-firm exchanges
	Knowledge sharing (good practices, mutual learning)
	Invest in major innovation projects together
Connection	Build strong, meaningful, diverse and rich relationships/networks
	Deepening Human-Nature relationships with land, rivers, other beings
	Cultural embeddedness within communities
	Aid socially vulnerable groups
	Enrich existing relationships
Holistic approaches	Embrace a whole-systems approach
	Holistic responses to challenges
	Shift in mindset from short to long-term thinking
	New business strategies/models (business model innovation)
	Holistically evaluate and design the entire value/supply chain
	Integration of CE initiatives
Leadership and ethics	Ethical leadership
	Active communication
	Top management commitment
	Be an ‘organisation with a purpose’

Innovation and dynamic capabilities	Technological innovations
	Redesign production process (move away from scarce resources)
	Dynamic capabilities (sensing, seizing, reconfiguring)
	Reduce resource use
	Create long-lasting products
	Product-service model
	Streamlining processes
	Local sourcing
	Business model changes
	R&D

In our co-occurrence analysis, we observed that the five recurring themes listed above identified in RBP focused articles contrast meaningfully with themes found in non RBP articles within our dataset. Notably, only three articles utilised a non-regenerative CE definition and did not mention RBPs or regeneration. Among these, two articles included limited regenerative mentions, such as 'holistic,' 'systems thinking,' and 'rethinking the value creation,'. By comparison, articles with a non-regenerative CE definition that do mention regeneration (12 articles) typically referenced regenerative concepts like 'systems thinking,' 'holistic,' and 'rethinking the value creation.'

This analysis reveals that, while non-RBP articles occasionally reference regenerative concepts, the depth and intentionality of these themes are more explicitly developed in RBP-focused literature. This suggests that RBP articles offer a more holistic perspective on CE by emphasizing ecological and social restoration as central to value creation. However, interpretations of 'regeneration' vary, with some definitions encompassing all identified themes and others emphasizing specific aspects, such as ecological restoration. This variability highlights the need for greater conceptual clarity in future research. Nevertheless, the prominence of regenerative themes within RBP-focused literature provides MSMEs with a robust framework to support their transition toward a net-positive CE, a perspective less emphasized in non-RBP CE literature.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study aimed to explore the limitations of current CE definitions and how RBPs can enable MSMEs to transition to a net-positive CE. Using the PRISMA methodology, 47 studies were reviewed, revealing critical insights into strategies that support MSMEs' integration of RBPs.

The findings reveal significant variability in CE definitions. While the term 'regenerative' has gained traction in recent years (Kirchherr et al., 2023), most articles still adhere to non-regenerative CE definitions. Interestingly, many articles with non-regenerative definitions mention RBPs, indicating their growing application despite the absence of explicitly regenerative frameworks. For example, within the nonregenerative CE definition category (23 articles), 11 articles mention RBPs without linking them to 'rethink the value creation,' reflecting a focus on resource efficiency rather than fundamental shifts in business models. In contrast, some articles (8) connect RBPs with value rethinking, suggesting gradual progress toward transformational approaches. These findings highlight the current limitations of CE definitions (answering SQ1), echoing critiques of its focus on shallow leverage points (Meadows, 1999).

The co-occurrence analysis also uncovered that the single article using a regenerative CE definition mentions 'holistic,' 'systems thinking,' and 'rethink the value creation' but omits explicit references to RBPs. This suggests a potential gap in practically applying regenerative principles, even when regenerative language is adopted. Meanwhile, articles that combine RBPs and 'rethink the value creation' within nonregenerative definitions represent a transitional phase where regenerative concepts are acknowledged but not yet fully operationalized. Given that MSMEs often face resource constraints, the selective adoption of RBPs and value creation rethinking in non-regenerative frameworks could reflect pragmatic constraints. Thus, supporting MSMEs in bridging the gap between theoretically regenerative CE principles and operational practices might accelerate their transition to a more net-positive CE.

Finally, five recurring RBP themes were identified (answering SQ2): collaboration, connection, holistic approaches, leadership and ethical practices, and innovation and dynamic capabilities. Collaboration emerged as a fundamental strategy for fostering stakeholder engagement, while connection emphasizes strengthening ties with communities and ecosystems. Holistic approaches are essential for addressing systemic challenges, requiring long-term thinking and integration of CE initiatives across value chains. Leadership drives organizational commitment and ensures ethical practices, while innovation enables MSMEs to develop regenerative business models and rethink value creation. These findings illustrate how emergent RBPs (H2) could potentially support MSMEs to move towards the emerging, net-positive future of H3. By engaging with RBPs, MSMEs are not only addressing immediate challenges but also contributing to the broader systemic shift envisioned within the Three Horizons Framework, ultimately enabling a net-positive CE transition.

5.2 Recommendations for Future Research

While this review addresses its original objectives, it also reveals several gaps in the existing literature, indicating potential directions for future research. First, there is a need for more empirical studies that quantify the impact of RBPs on the financial, social and ecological impact of MSMEs. While qualitative insights are valuable, quantitative data would provide a stronger basis for advocating the adoption of these practices. Secondly, the relationship between specific RBPs and their long-term sustainability impacts requires further exploration. Future research should aim to conduct longitudinal studies that track the performance of MSMEs over time to understand the enduring effects of implementing RBPs. This will be instrumental in ensuring that companies do not aim for a net-positive CE by simply compensating for damage as noted by Drupsteen & Wakkee (2024), but instead, actively work towards creating positive social and ecological values.

Thirdly, there is a notable lack of research on the role of digital technologies in facilitating the application of RBPs for MSMEs to transition to a net positive CE. Future studies should investigate how and which digital tools can enhance the efficiency and traceability of RBPs across the whole system, thereby supporting MSMEs in their transition efforts. Additionally, there is a need for more sector-specific studies that examine how RBPs can be tailored to the unique challenges and opportunities within different industries. This would provide more targeted recommendations and support for MSMEs operating in various sectors, for instance fashion and textiles, manufacturing, agriculture, built environment, and services.

Fourthly, a significant body of research emphasises that policy frameworks, including regulations, standards, and incentives, play a crucial role in serving as a catalyst for MSMEs toward adopting circular economy (CE) practices. For example, Al-Awlaqi & Aamer (2022, pg. 9) recommend “establishing a new national policy toward enforcing higher levels of CBM adoption” in MSMEs by pitching them as low risk investments, while Caldera et. al. (2019, pg. 586) suggest policy makers to “develop schemes and financial support through incentives, seed-funds or low interest loans, to facilitate MSMEs to engage in business optimisation measures through lean and green thinking”. Furthermore, Chowdhury et. al. (2022, pg. 371) advocate “government policy makers to develop a framework and onboarding plan” to assist MSME leaders in developing a better understanding about the CE concepts, practices and strategies. As such, future research should specifically explore how these policy frameworks and governmental support impacts the adoption of RBPs among MSMEs. Understanding the impact of different policy interventions can help in designing effective policies that encourage the widespread adoption of net-positive CE principles.

Finally, as noted in the state of the art and underscored by this paper, one of the biggest limitations of the CE literature is that it focuses on shallow leverage points such as material flows, subsidies, taxes, rules etc. that are easier to modify but tend to yield limited or short-term impact on the overall system structure or behaviour (Meadows, 1999). Instead, we need more empirical research focusing on deeper leverage points such as mindset shifts, cultural beliefs, openness to multiple perspectives and deepening human-nature relationships, that are more challenging to influence but can lead to transformative, long-lasting change

5.3 Practical Implications for MSME Entrepreneurs, Managers and Leaders

For entrepreneurs, the findings of this study highlight the importance of fostering collaboration and building strong networks to support the transition of MSMEs to a net positive CE. Firstly, they should prioritise engaging with stakeholders across their value chains and communities to co-create innovative solutions. This collaborative engagement is not only essential for overcoming barriers and limitations but also for fostering shared ownership of

sustainable initiatives. By involving other stakeholders in cooperative exchanges, MSMEs can leverage a collective pool of knowledge and resources that significantly enhances their capacity for innovation and adaptation.

Secondly, embracing a holistic approach to business operations and committing to ethical leadership practices are also critical for shifting mindsets and achieving long-term net-positive goals. MSMEs should assess the broader implications of their actions, not just in terms of resource efficiency but also considering social and environmental dimensions. This approach can help identify opportunities for more RBPs and enhance their resilience against external shocks. Ethical leadership is vital here, ensuring that top management sets the tone by embedding net-positive goals within the organisation's core mission and values. Leaders must go beyond profit maximisation and embrace their role as stewards of positive ecological and societal impact, driving ethical decision-making throughout the organisation. Thirdly, investing in innovation and dynamic capabilities will enable MSMEs to remain competitive while reducing their environmental footprint. This requires not only the adoption of technological advancements but also the development of dynamic capabilities such as sensing market shifts, seizing new opportunities, and reconfiguring business operations to integrate more RBPs. By redesigning production processes and adopting new regenerative business models that rethink value creation, MSMEs can move away from reliance on scarce resources and contribute positively to a net-positive CE.

Lastly, rethinking value creation means that businesses should explore different ways to generate multiple values (beyond just economical value) such as co-creating experiences with different stakeholders, engaging consumers in educational activities or collaborating with local communities to replenish the soil health or biodiversity in their area. This will help shift the focus from single (financial) benefit to generating long-term societal and ecological benefits.

5.4 Limitations of this Research

This research has several limitations. Firstly, the review relied on available studies, which may have introduced selection bias, as not all relevant studies might be published or accessible. Secondly, the predominance of qualitative data limits the generalisability of findings, and the lack of longitudinal studies makes it difficult to assess long-term impacts. Thirdly, the focus on English-language publications may exclude valuable insights from non-English research. Lastly, the complexity of measuring the effectiveness of RBPs means some benefits may not be fully captured, necessitating further empirical and quantitative studies.

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DECLARATIONS

Competing interests The authors declare no competing interests.

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Appendix A

Table showing the reason for each article excluded at full-text review stage based on predetermined parameters.

Author (year)	Document Type	Language	Journal Name (JCI)	Circular Economy definition?	Focus on MSME's transitioning to CE?
Akinwale (2023)	Article	English	African Journal of Science Technology Innovation & Development (0.25)	N/A	N/A
Alfazzi (2023)	Article	English	Academy Review (0.01)	N/A	N/A
Arsawan et al. (2023)	Article	English	International Journal of Productivity and Performance Management (0.73)	N/A	N/A
Awan & Sroufe (2022)	Article	English	Applied Sciences-Basel (0.57)	N/A	N/A
Bag et al. (2022)	Article	English	Journal of Business Research (2.32)	Y	N
Branca & Perelll (2020)	Article	English	Journal of Cleaner Production (1.53)	N	N/A
Brendzel-Skowera (2021)	Article	English	Sustainability (0.67)	N/A	N/A
Briguglio et al. (2021)	Article	English	Sustainability (0.67)	N/A	N/A
Cantu et al. (2021)	Article	English	Sustainability (0.67)	N/A	N/A
Chaurasia et al. (2020)	Article	English	Journal of Knowledge Management (1.97)	N	N/A
D'Amato et al. (2020)	Article	English	Forest Policy & Economics (1.23)	Y	N
Darmandieu et al. (2022)	Article	English	Business Strategy and the Environment (2.52)	Y	N
De La Cuesta-Gonzalez & Morales-Garcia (2022)	Article	English	Journal of Environmental Planning & Management (0.86)	N/A	N/A
Derhab & Elkhwesky (2023)	Review	English	Environmental Science & Pollution Research (0.91)	N/A	N/A
Farace & Tarabella (2023)	Article	English	British Food Journal (Not retrievable)	N/A	N/A
Fortunati et al. (2020)	Article	English	Agricultural Economics (1.05)	Y	N
Garces-Ayerbe et al. (2019)	Article	English	International Journal of Environmental Research & Public Health (0.93)	N/A	N/A
Gatto & Re (2021)	Article	English	Sustainability (0.67)	N/A	N/A
Gennari (2023)	Article	English	Journal of Management & Governance (0.63)	N/A	N/A
Ghenta & Matei (2018)	Article	English	Amfiteatru Economic (0.65)	N/A	N/A
Ghisetti & Montresor (2020)	Article	English	Journal of Evolutionary Economics (0.63)	N/A	N/A
Greer et al. (2020)	Article	English	Journal of Cleaner Production (1.53)	Y	N
Henry et al. (2023)	Article	English	Business Strategy and the Environment (2.52)	N	N/A
Herbst (2023)	Article	English	Sustainability (0.67)	N/A	N/A
Huynh (2022)	Article	English	International Journal of Productivity and Performance Management (0.73)	N/A	N/A
Kafel & Nowicki (2023)	Article	English	Sustainability (0.67)	N/A	N/A
Katz-Gerro & Lopez Sintas (2019)	Article	English	Business Strategy and the Environment (2.52)	Y	N
Khan et al. (2022)	Article	English	Management Decision (1.13)	Y	N
Kuik et al. (2023)	Review	English	Sustainability (0.67)	N/A	N/A
Kumar et al. (2023)	Article	English	Sustainability (0.67)	N/A	N/A
Kumble (2019)	Article	English	Sustainability (0.67)	N/A	N/A
Le et al. (2022)	Article	English	Management Decision (1.13)	Y	N
Levicky et al. (2022)	Article	English	Entrepreneurship & Sustainability Issues (0.42)	N/A	N/A
Min et al. (2021)	Review	English	International Journal of Environmental Research & Public Health (0.93)	N/A	N/A
Negri et al. (2021)	Review	English	Sustainability (0.67)	N/A	N/A
Oliveira Rosa & de Oliveira (2023)	Article	English	Revista Brasileira de Gestão de Negócios (0.2)	N/A	N/A
Pangarso et al. (2022)	Review	English	Etikonomi (0.2)	N/A	N/A
Pesce et al. (2020)	Article	English	Sustainability (0.67)	N/A	N/A
Piller (2023)	Article	English	Journal of Fashion Marketing (0.81)	N/A	N/A
Prieto-Sandoval et al. (2021)	Article	English	Journal of Industrial Engineering & Management - JIEM (0.34)	N/A	N/A
Razminiene (2019)	Article	English	Equilibrium - Quarterly Journal of Economics & Economic Policy (1.88)	Y	N
Razminiene & Tvaronaviciene (2018)	Article	English	Terra Economicus (0.37)	N/A	N/A
Ren & Albrecht (2023)	Article	English	Ecological Economics (1.57)	Y	N
Rincon-Moreno et al. (2020)	Article	English	Sustainability (0.67)	N/A	N/A
Salvioni et al. (2022)	Article	English	Sustainability (0.67)	N/A	N/A
Santolin et al. (2023)	Article	English	Resources Conservation & Recycling Advantages (Not retrievable)	N/A	N/A
Scipioni et al. (2021)	Article	English	Sustainability (0.67)	N/A	N/A
Sehnem et al. (2023)	Article	English	Environment Development & Sustainability (0.72)	N/A	N/A
Sharma et al. (2023)	Article	English	Environment Development & Sustainability (0.72)	N/A	N/A
Singh et al. (2018)	Article	English	Resources Conservation & Recycling (1.66)	Y	N
Subramanian & Suresh (2022)	Article	English	Learning Organization (0.5)	N/A	N/A
Suchek & Franco (2023)	Review	English	Journal of the Knowledge Academy (0.91)	N/A	N/A
Toker & Gorener (2023)	Article	English	Environment Development & Sustainability (0.72)	N/A	N/A
Torres-Guevara et al. (2021)	Article	English	Sustainability (0.67)	N/A	N/A
Troise et al. (2023)	Article	English	Journal of Management & Organisation (0.94)	N/A	N/A
Unal et al. (2019)	Article	English	Resources Conservation & Recycling (1.66)	Y	N
Villegas et al. (2021)	Article	English	Sustainability (0.67)	N/A	N/A
Zuofa et al. (2023)	Article	English	Building Research & Information (0.7)	N/A	N/A

Appendix B

Table showing the characteristics of the final selection of studies

Study ID			Population			Further details	
Author/s (year)	**Document type**	**Study design**	**Country**	**Industry**	**Sample type & size**	**Study focus**	**Main findings**
Agyabeng-Mensah et al. (2023)	Article	Survey; quantitative	Ghana	Manufacturing MSMEs	122 managers of SMEs	Circular transition; leadership, supply chains	Ethical leadership drives circular supply chain practices; this positively affects corporate sustainability performance. Environmental orientation is a positive moderator.
Al-Awlaqi & Aamer (2022)	Article	Questionnaire; quantitative	Yemen	Various MSMEs	361 small business owners	Circular transition; business models, individual entrepreneurial factors	Risk taking & innovativeness of individual entrepreneurs positively impacts the adoption of CBMs. Self efficacy & proactiveness do not influence CBM adoption.
Baral et al. (2023)	Article	Survey; quantitative	India	Various MSMEs	296 responses	CE capability; antecedents	CE adoption improves firm performance due to waste reduction. Environmental commitment, sustainable supply chain design improve CE capability. More awareness is needed from managers/firms.
Caldera et al. (2019)	Article	Semi-structured interviews; qualitative	Australia (Queensland)	Manufacturing MSMEs	30 senior decision-makers in 13 SMEs	Sustainability transition; business practices, 'lean' and 'green' lens	4 enablers & 6 barriers to sustainable business practices. Need targeted interventions to address these. 'Lean' & green thinking strategies enables.
Carissimi et al. (2023)	Article	Literature review, internet-based multiple case study; qualitative multi-method	Italy	Various MSMEs	100 SMEs	Circular transition; CE practices, supply chains	Recycling & extraction of biochemical feedstock are the most implemented CE practices. Financial, bureaucratic & regulatory are main barriers for implementation.
Centobelli et al. (2021)	Article	Survey; quantitative	Multinational (Europe)	Various MSMEs (belonging to CE networks)	212 SMEs	CE capability; sustainable supply chain management	Need to holistically evaluate & design the entire value chain. Supply chain relationship management & sustainable supply chain design can improve CE capabilities of SMEs. Most necessary are: social pressure, green economic incentives &

Study ID			Population			Further details	
Author/s (year)	**Document type**	**Study design**	**Country**	**Industry**	**Sample type & size**	**Study focus**	**Main findings**
							environmental commitment.
Cheffi et al. (2023)	Article	Survey; quantitative	UAE	Various MSMEs	111 SMEs	Circular transition; leadership, management control systems	Ethical leadership & management control systems (mediator) are important driving mechanisms for enabling MSMEs to transition to CE effectively.
Chowdhury et al. (2022)	Article	Survey; quantitative	Vietnam	Various MSMEs	205 SMEs' employees	Circular transition; influencing factors	Organisational leadership aids developing culture/innovation capability to adopt CE practices
Despoudi et al.(2023)	Article	Semi-structured interviews; mixed-method analysis	India	Food sector	15 experts in food SMEs	Circular transition; enablers and barriers to Industry 4.0 adoption (that could facilitate)	Industry 4.0 is key to implement CE in MSMEs in emerging economies. Specific enablers/barriers must be addressed to ensure competitive advantage.
Dey et al. (2020)	Article	Survey, focus group and case studies; mixed-methods approach	UK	Manufacturing	130 SMEs	Circular transition; CE fields of action, sustainability performance	Only 'make' & 'use' fields are related to environmental & social performance. Details enablers/ barriers/ strategies/ resources for implementing CE in MSMEs.
Dey et al. (2022)	Article	Survey, focus group and case studies; mixed-methods approach	Multinational (EU)	Manufacturing	100 SMEs per country (4 countries)	Circular transition; CE fields of action, CE practices, impact on environmental, social, economic & sustainability performance.	Customers' pressure increases SME CE adoption. MSMEs in the participating countries are likely to achieve higher environmental performance through CE adoption, but economic/social is not fully assured.

Study ID			Population			Further details	
Author/s (year)	**Document type**	**Study design**	**Country**	**Industry**	**Sample type & size**	**Study focus**	**Main findings**
Elf et al. (2022)	Article	Longitudinal interview-based; qualitative	UK	Fashion	26 fashion enterprises	Circular transition; dynamic capabilities, impact on creating a viable, resilient business	MSMEs dynamic capabilities enable them to be agile/resilient. Importance of close business-customer interactions/engagement to transition to CE, as opposed to just conventional/technology-focused approaches
Ghosh et al. (2023)	Article	Literature review, interviews, multiple case study; quantitative	India	Manufacturing	40 experts, 4 SMEs	Circular transition; readiness factors	6 cause (financial assistance from govs/ external agency; management willingness; competitor pressure) & 9 effect groups (adopting new business models, for implementing CE practices; stakeholder motivation, training and awareness; capacity to deal with uncertainty).
Howard et al. (2022a)	Article	Multiple case study; qualitative	UK	Agri-food	9 SMEs across 2 counties in the UK	Circular transition; multilevel challenges, whole system approach, place-based system dynamics	SMEs who recognise the role of placed-based societal identities & ecosystems become more resilient. Their considerations for community welfare & labour are intertwined with geographic-specific natural capital & CE.
Howard et al. (2022b)	Article	Multiple case study; qualitative	Multinational (Europe)	Various	6 SMEs	Circular transition; current CE adoption status, how to further it beyong waste reduction.	Current management tools such as value mapping, life cycle assessment, modelling & simulation, & capability maturity can assist SMEs towards becoming more circular & sustainable. Need to encourage MSMEs connection with social/ environmental contexts not just waste reduction.

Study ID			Population			Further details	
Author/s (year)	**Document type**	**Study design**	**Country**	**Industry**	**Sample type & size**	**Study focus**	**Main findings**
Kayikci et al. (2021)	Article	Survey, multiple case study; mixed-methods analysis	Turkey	Automotive	5 experts	Circular transition; barriers	Problems of ownership issues in an eco-cluster, lack of governmental support & administrative burden, & lack of effective execution of environmental regulations are found as causal barriers that are difficult to change. Co-operation between supply chain partners is a solution to adopting CE.
Khan et al. (2022)	Article	Literature review, survey; quantitative	Multinational (Europe)	Tourism	256 SMEs	Circular transition; determinants of intention/behaviour, effects on performance, barriers	Employing dynamic capabilities will address intention-behaviour gap & could improve success of CE adoption.
Von Kolpinski et al. (2022)	Article	Interviews; qualitative	Germany	Various	12 founders of SMEs with a sustainable circular business model	Circular transition; enablers, barriers, business models	Decision-making/commitment, leadership, values, culture, communication are all enablers to implement CE.
Kondala et al. (2023)	Review Article	Systematic literature review; qualitative	-	-	79 articles	Circular transition; implementation, impact	Explains the significance of adopting CE & potential research questions for others.
Luthra et al. (2022)	Article	Brainstorming session, questionnaire; mixed-methods approach	India	Various	11 experts & 162 responses	Circular transition; operational behavioural factors	Details operational behavioural factors that are crucial for successful transitioning (causal group factors, key influential factors).
Maher et al. (2023)	Article	Multiple case study; qualitative multi-method	Australia (queensland)	Textiles, organics, construction	3 SMEs	Circular transition; programme & framework	4 broad barriers: technological, cultural, market, policy. Recommend developing CE programmes for SMEs.

Study ID			Population			Further details	
Author/s (year)	**Document type**	**Study design**	**Country**	**Industry**	**Sample type & size**	**Study focus**	**Main findings**
Malik et al .(2022)	Article	Multiple case study; qualitative multi-method	India	Various	14 interviewees in 10 SMEs	Circular transition; change management, leadership	Policy: all levels should raise awareness of CE risk/benefits, develop new legislation/tax incentives. Managerial: CBM developed/applied, new routines/rituals/recitals must be employed & a new culture created.
Marrucci et al. (2021)	Article	Multiple case study; qualitative	Italy (Tuscany)	Horticulture	Top management & Project managers in 6 SMEs	Circular transition; absorptive capacity, identifying & incorporating CE business opportunities	Insights into the role of acquisition, assimilation, transformation & exploitation capabilities in the successful implementation of CE practices.
Mathivathanan et al. (2022)	Article	Survey; qualitative	India (Tamil Nadu)	Textile, automotive, electronics, tourism	78 industrial-academic experts	Circular transition; drivers, interactions between them	Urbanisation, funding availability & resource consumption support the successful adoption of CE.
Mishra et al. (2022)	Article	Survey; quantitative	India (NCR)	Various	269 MSMEs	Circular transition; barriers, scale to evaluate them	Details a set of CE adoption barriers in the context of MSMEs (claimed this is underexplored); knowledge & skills barriers, technological barriers, cultural barriers, financial barriers, strategic barriers, government & regulatory barriers, & market barriers.
Mondal et al. (2023a)	Article	Literature review, expert opinions; mixed-methods approach	India	Manufacturing	13 experts of Indian manufacturing organisations.	Green entrepeneurship; enabling factors, help develop CE practices	17 enablers to MSMEs transitioning to CE. Technological infrastructure, clear visibility of economic benefits & waste management are identified as essential enablers of green entrepreneurship. Green entrepreneurship not only develops a CE but also helps develop a new business model.

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Author/s (year)	**Document type**	**Study design**	**Country**	**Industry**	**Sample type & size**	**Study focus**	**Main findings**
Mondal et al. (2023b)	Article	Literature review, interviews, case study analysis; mixed-methods approach	India	Manufacturing	15 MSME managers	Circular transition; enablers, sustainable business practices	7 main category enablers & 29 sub-category enablers identified. Among the main categories: technology-, organisational-, economic- and financial-related enablers are top. Among the sub-categories: top management, organisational coordination, attitudes towards digitalisation & CE, & having technology infrastructure for cleaner & sustainable production.
Mura et al. (2020)	Article	Interviews, surveys, focus groups; mixed-methods approach	Italy	Various	254 SMEs	Circular transition; current adoption status, actions to exploit benefits & overcome challenges of CE	CE implies a systemic approach to company's value creation. Higher costs are the main barrier to CE for early adopters.
Neri et al. (2023)	Article	Semi-structured interviews; qualitative	Italy	Manufacturing	15 managers in 10 SMEs	Circular transition; technology	Digital technology are an enabler of CE practices but MSMEs usually adopt for production-reasons only later realising they can foster CE transition.
Nudurupati et al. (2022)	Article	Literature review, focus group workshops, multiple case study; qualitative	India	Manufacturing & process-based	Case study: 12 SMEs	Circular transition; drivers, barriers, resource-based view	Lack of business process analysis, skills & expertise, digital transformation & multi-stakeholder cooperation within the supply chain inhibits CE adoption. Government initiatives, competitive advantage, environmental regulation, & customer pressure are the drivers.
Ormazabal et al. (2018)	Article	Survey; quantitative	Spain (Navarre and the Basque Country)	Various	95 SMEs	Circular transition; barriers, opportunities	Predominantly short-term vision; financial advantage plays a huge role, struggle to implement strategies to 'return and enrich materials and energy in the system'.

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Author/s (year)	**Document type**	**Study design**	**Country**	**Industry**	**Sample type & size**	**Study focus**	**Main findings**
Pereira et al. (2022)	Article	Literature review, multiple case study; mixed-methods approach	India	Ayurveda Industry	2 SMEs	Circular transition; adoption of CE practices	They engage & contribute to CE in a more aware way. Unique drivers, motivations & insights; blend modern tech & indigenous practices for easy integration.
Prieto-Sandoval et al. (2018)	Article	Literature review, focus group; qualitative	Multinational (EU)	Various	12 experts (researchers, sustainable industrial SMEs, consultancy firms)	Circular transition; benefits, antecedents according to six fields of action	CE framework divided into three categories. Recover *'field of action'* most important. SMEs should participate in *industrial eco parks/symbiosis* but sharing infrastructure should not be used to diagnose the level of implementation of CE. However, eco-innovation should be measured. No consensus on the importance of *environmental management certifications* in the implementation of the CE.
Prieto-Sandoval et al. (2019)	Article	Survey (Delphi panel); mixed methods approach	Spain	Universities, sustainable industrial SMEs, consultancy firms	11 experts from different universities & consultancy firms	Circular transition; assessing current adoption status, strategies, industrial symbiosis, eco-labels	Proposed strategies/activities for SMEs in each CE field of action (take, make, distribute etc.). Identified useful dynamic capabilities for CE implementation in SMEs.
Rodríguez-Espíndola et al. (2022)	Article	Survey; quantitative	Mexico	Various	165 decision-makers in SMEs	Circular transition; influencing factors, sustainable-oriented innovation, sustainable performance	Governmental support & customer pressure positively impacts the adoption of CE. CE significantly influences sustainability-oriented innovation /sustainable performance. Governmental support important for the transition of SMEs toward digital transformation.
Saharan et al. (2023)	Article	Literature review, brainstorming session, questionnaire; mixed-methods approach	India (Sonipat region)	Various	14 experts from academics, industry & policy-making	Circular transition; entrepreneurial barriers, business models, measures to overcome	"Financial barrier" as the top barrier & "lack of access to funding and capital" as a top sub-barrier for entrepreneurs in adopting CBM in SMEs in emerging economy.

Study ID			Population			Further details	
Author/s (year)	**Document type**	**Study design**	**Country**	**Industry**	**Sample type & size**	**Study focus**	**Main findings**
Sawe et al. (2021)	Article	Literature review, questionnaire; mixed-methods approach	Tanzania, India	Various	-	Circular transition; people-driven factors, supply chains, business strategies, environmental perspectives	Most siginificant people-driven factors are: training & knowledge sharing, employee participation, leadership & management, strategic alignment
Schmidt et al. (2021)	Article	Survey; quantitative	Germany	Various	121 SMEs	Circular transition; closed-loop orientation, market orientation	Market orientation is translated into closed-loop orientation to spur CE practice implementation. Closed-loop orientation positively mediates the relationship between market orientation & internal environmental management & eco-design.
Sehnem et al. (2022a)	Article	Multiple case study; qualitative	Brazil	Foodtech	15 start-ups	Circular transition; (antecedents to) technological innovation	Senior management endorsement of sustainability assumptions/perpetuity important. Creation of an original typology of CE assumptions & technological innovations adopted by food tech startups.
Sohal & de Vass (2022)	Article	Multiple case study; mixed-methods approach	Australia	Various	16 existing SME case studies	Circular transition; drivers, critical success factors	Insights into SME transformation to CE by relating 3R & 10R frameworks. Key to success is identifying leaders' vision & collaboration with external partners.
Sohal et al. (2022)	Article	Multiple case study, secondary data; qualitative	India	Manufacturing	4 SMEs	Circular transition; current adoption status	Identifies opportunities, challenges, enablers & drivers for MSMEs to adopt CE. Need for collaboration between multiple stakeholders.
Soni et al. (2023)	Article	Semi-structured interviews; qualitative	India	Manufacturing	30 process-intensive SME managers	Circular transition; distributive leadership, enablers	Distributed leadership important. Identifies conditions to facilitate innovation/creative organisational culture. showing how CE can be adopted in emerging market MSMEs.

Study ID			Population			Further details	
Author/s (year)	**Document type**	**Study design**	**Country**	**Industry**	**Sample type & size**	**Study focus**	**Main findings**
Takacs et al. (2022)	Article	Semi-structured interviews; qualitative	Switzerland	Food & beverage, textiles, logistics	59 SME managers	Circular transition; barriers	Identify 6 company-internal barriers: risk aversion, short-term orientation, economically dominated thinking, unwillingness to engage in trade offs, shortage of resources, lack of knowledge. Identify 4 levels of external barriers: tech, market, legislation, society & consumers.
Thorley et al. (2021)	Review Article	Comprehensive literature review	-	-	-	Circular transition; change readiness, barriers	Develops a conceptual model for CE/change readiness for MSMEs; 11 factors individual/collective barriers, 3 for structural/contextual.
Van Opstal & Borms (2023)	Article	Survey, semi-structured interviews	Belgium (Flanders)	Start-ups	Survey: 165 entrepeneurs (start-ups) Interviews: 9 with 11 experts	Circular transition; circular strategies, personal & company characteristics, barriers	Young startup entrepreneurs: inner circle strategies Older: outer or none Female: less inclined to combine strategies B2B & B2G: frontrunners for CBM Migrant background: more optimistic to have profitable circular business
Virmani et al. (2022)	Article	Literature review, questionnaire; quantitative	India	MSMEs	15 experts in MSMEs	Circular transition; (interactions of) barriers, potential solutions	31 critical roadblocks and 14 solutions for Indian MSMEs CE adoption.
Zhu et al. (2022)	Article	Narrative & systematic review; qualitative	Multinational (ASEAN)	Studies from business setting, particularly from management field	174 articles, reports, books & news sources	Circular transition; multilevel perspective, transformative model for engagement	Maps transition and interactions at macro-, meso- & micro-levels across a four-stage transformative model for SMEs to CE.

Appendix C
Overview of each study's regenerative strategies, practices and overarching theme

Author/s (year)	Regenerative business practices	Theme(s)
Agyabeng-Mensah et al. (2023)	Interact with internal & external environment	Collaboration
	Environmental orientation	Connection
Al-Awlaqi & Aamer (2022)	-	-
Caldera et al. (2019)	Sustainable business practices	Holistic approaches
	Lean & green thinking	
	Slowing, closing & narrowing resource loops	Innovation & dynamic capabilities
	Learn & implement new initiatives	
	Develop a consolidated strategy for positive outcomes in operational & environmental performance	Holistic approaches
	Involve internal & external stakeholders	Collaboration
	Quality circles': joint problem solving (employees)	Collaboration
	Shared responsibilities (employees)	Collaboration
	Streamlining processes for transparency & traceability	Innovation & dynamic capabilities
	Knowledge sharing	Collaboration
Carissimi et al. (2023)	Close, slow & narrow resource loops in supply chains & natural ecosystem	Innovation & dynamic capabilities

Author/s (year)	Regenerative business practices	Theme(s)
Centobelli et al. (2021)	Improve the environmental performance of supply chains	Innovation & dynamic capabilities
	Pursue social & environmental outcomes together with financial ones	Holistic approaches
	Overall stakeholder collaboration	Collaboration
	Holistically evaluate & design the entire value chain	Holistic approaches
Cheffi et al. (2023)	Focus on collective goals	Collaboration
	Employ ethical leadership	Leadership and Ethics
	Forward-looking & active dialogue	Leadership and Ethics
Chowdhury et al. (2022)	-	-
Despoudi et al.(2023)	-	-
Dey et al. (2020)	Using regenerative materials	Innovation & dynamic capabilities
Dey et al. (2022)	Using regenerative materials	Innovation & dynamic capabilities
	Eco-design, additive manufacturing	Innovation & dynamic capabilities
	Lean approach	Innovation & dynamic capabilities

Elf et al. (2022)	Preserve value by slowing or closing loops & narrowing flows	Innovation & dynamic capabilities
	Employ dynamic capabilities (sensing, seizing & reconfiguring)	Innovation & dynamic capabilities
	Clear vision & purpose: commitment to sustainability	Leadership and Ethics
	Extended supply chain engagement & customer eco-engagement: active strengthening of the business-customer relationship	Holistic approaches
	Eco-effectiveness	Holistic approaches
	Rethink existing supply chain: Consider up- & down-stream actions	Holistic approaches
	Embrace systems approach	Holistic approaches
	Strategic collaboration	Collaboration
	Prioritise sustainability over conventional growth ambitions	Holistic approaches
	Recycling & alternative business models	Holistic approaches
	Knowledge creation (R&D) & experiential learning (trial & error)	Innovation & dynamic capabilities
	Co-creation & testing with customers	Collaboration
	Feedback loops with wider ecosystem actors	Holistic approaches
	Positive technology exploitation (Instagram etc.)	Innovation & dynamic capabilities
	New business models: direct-to-consumer, rental, sharing, swapping, resale	Holistic approaches

Author/s (year)	Regenerative business practices	Theme(s)
Ghosh et al. (2023)	-	-
Howard et al. (2022a)	Place-based systems approach: whole systems thinking	Holistic approaches
	Protecting natural capital, promoting biodiversity & acknowledging the benefits gained from ecosystem services	Holistic approaches
	Diversify and distribute business network, including greater reach to local community	Holistic approaches
	Strengthen connection with & between stakeholders & environment: embed in local social & environmental systems	Connection
	Systems resilience: enhance the structure of network interdependencies, a co-ordinated, multi-stakeholder approach	Holistic approaches
	Create connection with local/regional community: develop common interests in the region, raise awareness, create a multi-stakeholder knowledge 'hub' & offer work to vulnerable people	Connection/Holistic approaches Leadership and Ethics
	Encourage sustainable innovation	Connection
	Onsite water treatment, shared digester plants, donations to food charities	Collaboration/Connection
	Connect with variety of stakeholders: suppliers, customers, competitors, government & charities	Collaboration/Connection
	Knowledge sharing (clean technology, process design, local welfare issues) to overcome hurdles & tackle community-related challenges	Collaboration/Connection
	Consider societal value	Collaboration/Connection
Howard et al. (2022b)	-	-
Kayikci et al. (2021)	Connection, communication, coordination & collaboration among the supply chain	Collaboration/Connection
	Share success stories with multiple stakeholders	Collaboration

Author/s (year)	Regenerative business practices	Theme(s)
Khan et al. (2022)	Employ dynamic capabilities: sensing, seizing & reconfiguring	Innovation & dynamic capabilities
	Adopt new technologies & best management practices	Innovation & dynamic capabilities
	Deploy resources to experiment with new ideas or to develop new services	Innovation & dynamic capabilities
	Encourage employees to apply new knowledge	Leadership and Ethics
Von Kolpinski et al. (2022)	Shift in industrial mindset: personal drivers and company mission prioritised over profit-maximisation Systems thinking	Holistic approach
	Clear & transparent communication with internal & external stakeholders	Holistic approach
	Knowledge sharing, openness & mutual learning	Leadership & ethics/ Collaboration
	Joint investment in innovative research projects (organisations)	Collaboration
	Joint problem solving (employees)	Collaboration
		Collaboration
Kondala et al. (2023)	Changes in design: products which can move between biological and technical cycle	Innovation & dynamic capabilities
Luthra et al. (2022)	Multi-stakeholder support	Collaboration
	Achieve sustainable development goals	Holistic approaches
Maher et al. (2023)	Slow & regenerate resource loops	Holistic approaches
	5R hierarchy': regenerating, reducing, reusing, recycling, and/or recovering resources	Holistic approaches
	New business models: natural & long-lasting products, reselling, cradle-to-cradle (on-site soil regeneration services for local farms, transforming waste into soil)	Holistic approaches
Malik et al .(2022)	Engage in local / community events	Connection
	Communicate in a way that is easily understood to locals: consider recitals, local rituals & customs	Connection

Author/s (year)	Regenerative business practices	Theme(s)
Marrucci et al. (2021)	Disseminate new knowledge amongst employees	Leadership and Ethics
	Learn from & with all stakeholders	Collaboration
	Integrate circular business models	Holistic approaches
	Joint problem solving & co-creation (employees & suppliers)	Collaboration
	Fostering sustainable culture & passing it on to customers & suppliers	Leadership and Ethics
Mathivathanan et al. (2022)	-	-
Mishra et al. (2022)	Reconsider operations strategy	Innovation & dynamic capabilities
	Redesign production processes	Innovation & dynamic capabilities
Mondal et al. (2023a)	-	-
Mondal et al. (2023b)	-	-
Mura et al. (2020)	-	-
Neri et al. (2023)	-	-
Nudurupati et al. (2022)	-	-
Ormazabal et al. (2018)	Recover the local environment	Connection/ Holistic approaches
Pereira et al. (2022)	Give back to local community	Connection
	Local sourcing	Innovation & dynamic capabilities
	Reuse of resources: water-treatment plant for filtration of used water	Innovation & dynamic capabilities
	Industrial symbiosis	Holistic approaches
Prieto-Sandoval et al. (2018)	Seek environmental regeneration through eco-innovative solutions & products that can be reintroduced in biological & technical cycles.	Innovation & dynamic capabilities
Prieto-Sandoval et al. (2019)	-	-

Author/s (year)	Regenerative business practices	Theme(s)
Rodríguez-Espíndola et al. (2022)	-	-
Saharan et al. (2023)	-	-
Sawe et al. (2021)	Eco-friendly & environmental objectives	Connection
Schmidt et al. (2021)	Design & development process changes: integrate stakeholder perspectives	Innovation & dynamic capabilities
	Less complex & less hierarchical structures	Leadership & ethics
Sehnem et al. (2022b)	New industrial mindset: helping those who are socially vulnerable, not just financial returns	Connection/Holistic approaches
	Mitigation, minimisation or elimination of pollution & waste	Holistic approaches
	Clear organisational purpose that connects with surroundings	Holistic approaches/ Leadership & ethics
	Generate harmony & cooperation between links in production chain	Leadership & ethics
	Human appreciation & empowerment	Leadership & ethics
	New production processes: durable products, reduce intermediaries, prioritise freshness, customisation	Innovation & dynamic capabilities
	Develop partnerships in the region, local sourcing/supplier, promote local improvements	Collaboration
	Industrial symbiosis facilitated with artificial intelligence	Innovation & dynamic capabilities
	Share knowledge & experiences	Collaboration
Sohal & de Vass (2022)	-	-

Author/s (year)	Regenerative business practices	Theme(s)
Sohal et al. (2022)	Make green investments a win-win for all	Collaboration
	Design changes: alternative environmentally-friendly approaches & materials	Innovation & dynamic capabilities
	New industrial mindset: long-term focus & strategy rather than short-term gains	Holistic approaches
	Research & co-create with stakeholders	Collaboration
Soni et al. (2023)	Managerial support: commit to collaboratively working with employees	Leadership & ethics
	Facilitate an open & collaborative environment: power-sharing, delegation, decision-making & authority-sharing	Leadership & ethics
	Leadership: disseminate workforce knowledge, accept own knowledge deficit	Leadership & ethics
	Enhance the psychological immunity of employees, their confidence & job satisfaction, to improve agileness & resilience	Leadership & ethics

Author/s (year)	Regenerative business practices	Theme(s)
Takacs et al. (2022)	Shift in management perspective & mindset: systems thinking, understand reciprocal interrelationships of the company & its business environment, understand risk more broadly	Connection/Holistic approaches/Leadership & ethics
	Establish a shared vision for sustainable change	Connection/Leadership & ethics Holistic approaches
	Long-term perspective	Leadership & ethics
	Tolerance for uncertainty	Innovation & dynamic capabilities
	Innovate & invest sustainably	Innovation & dynamic capabilities
	Employ dynamic capabilities (sensing, seizing & reconfiguring)	Collaboration
	Operate in networks, seek multi-stakeholder co-creation partnerships, knowledge share	Collaboration
	Clear, transparent & continuous communication & interactions with internal & external stakeholders	
Thorley et al. (2021)	Improve relationship management	Collaboration
	Knowledge share	Collaboration
	Develop shared values between stakeholders	Collaboration
	Multi-stakeholder collaboration: active engagement, cooperation & mutual understanding	Collaboration
	Facilitate continuous change readiness	Innovation & dynamic capabilities

Author/s (year)	Regenerative business practices	Theme(s)
Van Opstal & Borms (2023)	Sharing means of production & capital goods	Collaboration
	Changes in design: longer product use & lifetimes, additive manufacturing, modular parts	Innovation & dynamic capabilities
	Recuperation of waste through take-back systems	Innovation & dynamic capabilities
	Develop strong value-chain collaboration	Collaboration
	Ensure strong research & development skills & assets	Innovation & dynamic capabilities
	New business models: product-as-a-service	Holistic approaches
	Maintenance & repair	Holistic approaches
	Use renewable materials	Innovation & dynamic capabilities
Virmani et al. (2022)	-	-
Zhu et al. (2022)	Promote multi-stakeholder cooperation & collaboration	Collaboration
	Promote innovative culture & new technology adoption	Leadership & ethics/ Innovation & dynamic capabilities
	Preserve & increase natural capital	Holistic approaches
	Establish a community of practice in the regional / global ecosystem	Collaboration/Connection/ Holistic approaches
	Control use of natural resources & balance flow of renewable ones	Innovation & dynamic capabilities