

Small Businesses, Big Roles: Exploring the Position of SMEs in Innovation Ecosystems through a Systematic Literature Review

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Abstract

Scholars have examined innovation ecosystems to understand how heterogeneous actors collaborate to drive technological, social, and sustainable change. Within this growing and consolidated body of research, small and medium-sized enterprises are often mentioned as beneficiaries or marginal components of these ecosystems. Their role, agency, and contributions are still to be investigated across the literature. To address this gap, this systematic literature review investigates how research has conceived SMEs' position within innovation ecosystems. The study reconstructs the state of the art in business and management and is based on a structured search of the Scopus database. A total of 21 peer-reviewed articles were included in the final dataset, following a screening process based on the PRISMA framework. The findings reveal three main clusters of interest: (1) theoretical and conceptual perspectives, including dominant concepts such as open innovation and resource-based views; (2) the evolving role and collaborative dynamics of SMEs, from peripheral actors to co-creators and micro-orchestrators in specific ecosystem configurations; and (3) the influence of policies, which remains a partial and uneven niche across contexts. While some studies highlight the active contribution of SMEs in fostering innovation and local resilience, others still treat them as passive recipients of support and resources. This review contributes to the academic discourse by providing a structured overview of current research directions and identifying key knowledge gaps. It stresses the need for more integrative and systemic approaches to study the strategic role of SMEs in innovation ecosystems, particularly in relation to sustainability transitions and complex collective challenges.

Keywords

Innovation Ecosystems; Small and Medium-Sized Enterprises; SSMEs; Sustainability; Systemic Innovation; Systematic Literature Review.

Introduction

Innovation ecosystems have been examined in literature as a prime example of how different actors, such as firms, institutions, and communities, interact to co-create value, innovate in local contexts, and address complex challenges (Granstrand & Holgersson, 2020). Within this topic, although the business literature recognizes the potential of small and medium enterprises as dynamic, flexible agents of change (Cunningham, 2011; Duarte, 2004; Hassan & Mohamed, 2014; Omowole et al., 2024), most academic contributions on ecosystems still focus primarily on large firms, start-ups, or institutional orchestrators. This leaves a shattered understanding of how SMEs act and contribute to these systems, especially in the context of digital transformation and sustainability transitions.

Recent research has started to shed light on the multidimensional role of SMEs in value creation and collaboration, despite the resource constraints they typically face. SMEs can influence knowledge ecosystems by accessing diverse, specialized resources, often supported by intermediaries, thereby acting as knowledge accelerators and capacity builders (Shahzad et al., 2025). From this perspective, innovation ecosystems facilitate both the integration of technological skills and platform-based partnerships, moving beyond initial funding access to more mature models of shared value creation as trust develops (Benitez et al., 2020). At a regional level, SMEs collaborate in ecosystem-driven business model development, while constantly balancing internal priorities with external commitments and managing knowledge flows across layered innovation dynamics (Radziwon et al., 2022). These are

the signals of the SMEs' significant transition from peripheral actors to strategic collaborators and, in some cases, ecosystem orchestrators.

By focusing on peer-reviewed articles in the business and management field, the study aims to uncover the main theoretical lenses, recurring themes, and emerging research trajectories of the topic. In doing so, it provides a more integrated understanding of how SMEs engage with innovation ecosystems to support transformation, resilience, and long-term value creation, responding to the following question:

RQ: "What are the main themes, theoretical approaches, and research trajectories emerging in the literature on the role of SMEs within innovation ecosystems?"

Literature review

Systemic innovations are considered large-scale transformations involving joint technologies, processes, institutions, and actors. Within these dynamics, according to literature, SMEs act with a combination of internal entrepreneurial capabilities with external relational positioning (Saunila, 2020).

Scholars found that SMEs are characterized by flexibility, responsiveness, and the capacity to achieve incremental innovation. This is particularly true under conditions of uncertainty or disruption, such as those posed by the COVID-19 pandemic. Empirical studies have shown that innovation practices among SMEs positively influence performance and resilience, especially when supported by external knowledge and resources (Adam & Alarifi, 2021). The mentioned capabilities enable SMEs to integrate new technologies and adapt business models in response to turbulent environments (Molina-Castillo et al., 2022), thereby contributing to both incremental and systemic innovation.

However, typical issues such as limited access to financing, skills, or limited R&D infrastructure can impede innovative outputs. It is recognized that, in fact, creativity, leadership, and institutional collaborations enable SMEs to expand their potential beyond structural limitations (Colclough et al., 2019; Castillo-Vergara et al., 2021).

A growing stream of literature has focused on sustainable innovation and readiness of SMEs, looking at their potential to align their activities to environmental goals (Schrack & Kijkasiwat, 2024). SMEs have demonstrated an increasing engagement with green innovation, particularly through product and process improvements in manufacturing sectors (Klewitz & Hansen, 2011; Dasgupta, 2021). Determinants include firm-level characteristics, external pressures, and the presence of ecosystem enablers (Carfora et al., 2022). Moreover, innovation and export capabilities have been shown to reinforce each other, becoming mutually relevant in dynamic positioning within both local and global ecosystems (Love & Roper, 2015).

Despite these ongoing research trends, innovation ecosystems are mainly discussed in relation to startups, large firms, and institutional orchestrators. The positioning of SMEs within these configurations is often treated marginally rather than being systematically theorized. Few managerial studies examine how SMEs face ecosystem complexity or use partnerships for sustainable transformation. Value chain studies suggest a strong operational focus in SMEs' innovation (Dasgupta, 2021), but less is known about how SMEs interact at the ecosystem level to coordinate innovation strategies, share risks, or influence governance structures.

More recent studies have begun to stress the transformative potential of SMEs within sustainability-driven innovation ecosystems, particularly in the context of what has been called "twin transformation" (Christmann et al. 2024; Graf-Drasch et al., 2023), which refers to the simultaneous pursuit of digital and sustainability transitions. Leipziger et al. (2025) argue that innovation ecosystems enable SMEs to overcome structural limitations and participate more actively in digital green value-creation pathways. However, many SMEs remain peripheral actors due to fragmented ecosystem coordination and insufficient access to strategic capabilities. Building on this, Singh and Anees (2025) identify key structural barriers, including technological inertia, leadership gaps, and the

lack of integrative support mechanisms, that hinder the sustainable digital transformation of small firms. These challenges are especially pronounced in emerging economies and call for multi-stakeholder collaboration to create enabling environments for SMEs to thrive.

May et al. (2025), focusing on African agri-food systems, highlight the role of SMEs in promoting locally embedded innovation practices that support inclusive, adaptive, and environmentally resilient business models. Their findings emphasize that when supported through tailored ecosystem interventions, SMEs can act as drivers of sustainability transformation at the community and regional levels.

Finally, Latief and Arindra (2025) underscore the importance of institutional ecosystems and governance mechanisms in fostering green innovation among SMEs. Their work shows that open innovation practices, coupled with clear regulatory incentives, are essential to scale up sustainability-oriented practices in traditional sectors. Together, these contributions reinforce the notion that SMEs are not merely passive recipients of ecosystem dynamics but can become central orchestrators and innovators—provided that systemic conditions are conducive to participation, experimentation, and learning.

Methodology

The study adopts a systematic literature review (SLR), and it follows the PRISMA 2020 framework (Page et al., 2021) to ensure a research protocol characterized by methodological transparency and reproducibility. Considered a rigorous approach to synthesizing existing research (García-Peñalvo, 2022), the SLR investigates how the academic literature conceptualizes the role and positioning of SMEs within innovation ecosystems, particularly in relation to system-level innovation.

The initial data collection was conducted in Scopus, chosen for its extensive coverage of peer-reviewed scientific publications in Business and Management literature.

The query string combined three main conceptual set of keywords connected with Boolean Operators: (i) *small and medium-sized enterprises* ("*SMEs*" OR "*small and medium enterpris**" OR "*small and medium-sized enterpris**"), (ii) *innovation ecosystems* ("*entrepreneurial ecosystem**" OR "*innovation ecosystem**" OR "*ecosystems of innovation*"), and (iii) filters for subject area, document type, and language. Specifically, the search was limited to articles published in the subject area "Business, Management and Accounting", to ensure disciplinary relevance; to "Article" as document type; and to publications in English. This initial search resulted in 332 records.

The screening process involved multiple stages: after removing duplicates and out-of-scope subject areas, 140 records were screened for title and abstract relevance. Subsequently, 116 records were sought for retrieval and full-text evaluation. Of these, 32 records could not be retrieved because they were neither open access nor accessible, leaving 79 articles to be assessed for eligibility. Further records were excluded for the following reasons: thematic misalignment between the two fields ($n = 25$), lack of a strongly related SME or ecosystem focus ($n = 12$), or limited relevance to the research question ($n = 21$). After this structured process, 21 articles were included in the final review. The process is illustrated in Figure 1, which follows the PRISMA 2020 flowchart. The selected articles were then analyzed qualitatively and thematically to identify common theoretical approaches, recurring concepts, and emerging research trajectories.

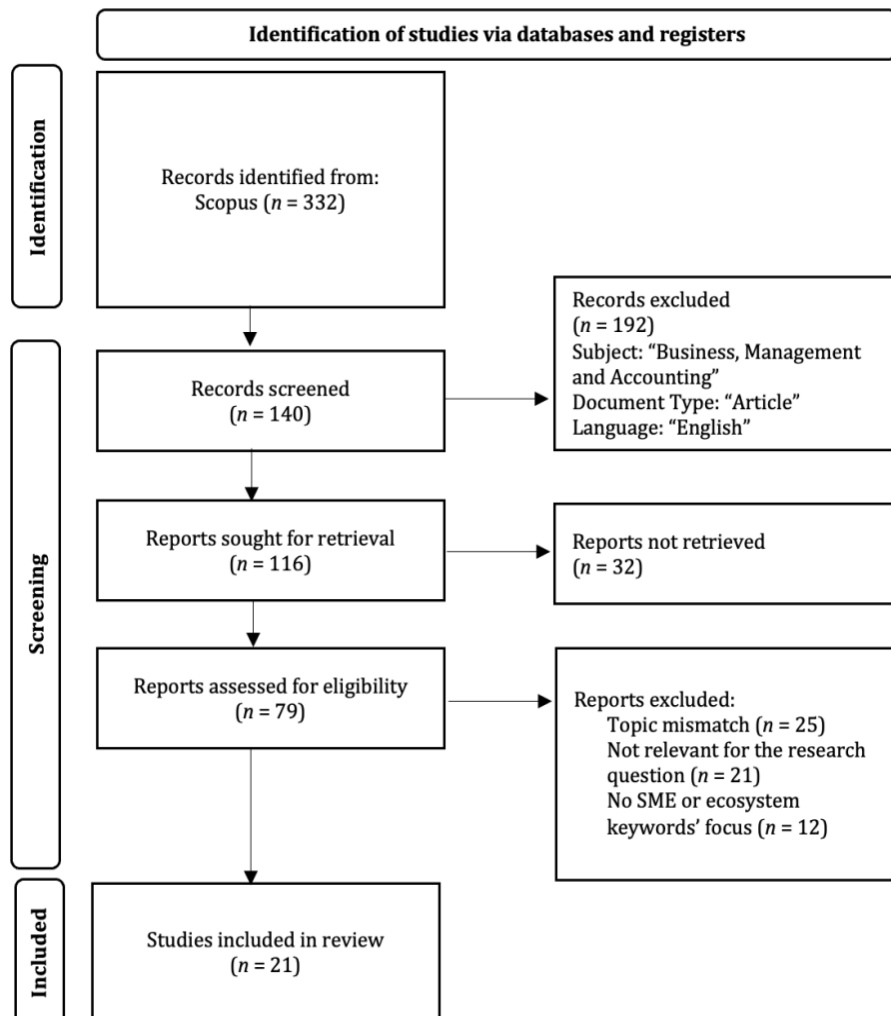


Figure 1. PRISMA Diagram Flow

Source: Authors' contribution based on PRISMA 2020 elaboration, 2026

Results and discussion

After a first overview of the screened, final dataset, some details emerge. Methodological dominance is represented by quantitative studies (over 50%), followed by qualitative and mixed methods. More than 55% of studies have been published since 2023. The geographical focus is mostly on China, Indonesia, and Brazil among emerging countries, while Europe is the most represented and consolidated region.

Table 1. Frequency analysis

Cluster	No.
Theoretical and Conceptual Framing	5
Mechanisms and Collaborative Practices	6
Policy, Regional Factors, and Transitions	10

Methodology	No.
Quantitative	10
Conceptual or SLR	5
Qualitative	3
Mixed methods	3
Geographic focus	No.
Europe	8
Indonesia	4
Multiple countries or general	3
Brazil	2
China	2
Kuwait / Middle East	1
Africa	1
Publication period	No.
2024-2025	8
2020-2021	6
2022-2023	6
2018-2019	1

From the final set of contributions, three main research streams emerged, describing the recurring thematic patterns in the academic debate. The three streams are not mutually exclusive but rather complementary, as each represents additional dimensions of the evolving role of SMEs within innovation ecosystems. The results are in the following thematic areas: (1) the theoretical and conceptual framing of SMEs within innovation ecosystems, (2) the mechanisms and collaborative practices describing how SMEs act in these specific contexts, and (3) the policy and regional factors influencing SMEs' engagement.

Theoretical and conceptual framing

The first cluster collects conceptual studies that analyze the role of SMEs within innovation ecosystems through normative, theoretical, or system-level lenses. These studies are less focused on immediate empirical validation and more oriented toward offering new models, typologies, and critiques of existing ecosystem frameworks (see Table 2).

A recurring theme of the cluster is the ambiguity in the definition and structure of innovation ecosystems when it comes to the roles of SMEs. According to researchers, dominant ecosystem narratives, as stated before, that focus on large firms, platforms, and orchestrators tend to marginalize SMEs in both scholarly reviews and policies (Jiang & Wang, 2024; Hakala et al., 2020). This leads to a conceptual underrepresentation of SMEs and their agency, despite the recognized centrality in regional, digital, and niche innovation contexts.

Many studies of the collection propose theoretical frameworks aimed at repositioning SMEs within innovation ecosystems. For example, Wei et al. (2021) explore the multilevel dependencies within digital business ecosystems, stressing that SMEs need to balance autonomy with strategic following of ecosystem norms and standards. Benitez et al. (2020) suggest a layered theoretical model to position SMEs in Industry 4.0-related ecosystems. Their analysis focuses on how value co-creation mechanisms emerge over time, moving from isolated firm-level innovation to collaborative, platform-based processes. Importantly, this paper also highlights trust, mutual commitment, and systemic governance as key ingredients for long-term innovation outcomes, issues that are often overlooked in models built on firm size or capabilities alone.

Another theoretical contribution comes from Adel et al. (2020), who apply institutional theory and entrepreneurial marketing perspectives to examine how SMEs behave in volatile environments through hybrid strategies that blend market orientation and innovation-driven conduct. Their work underscores how ecosystem participation is shaped not just by network access but also by cultural and institutional alignment.

Themes	Author(s)	Method	Methodological Approach	Research Aim	Key Findings
SMEs' integration in ecosystem; Ecosystem Dependency vs. Autonomy	Jiang et al. (2024)	Quantitative	Survey-based empirical study with statistical analysis	To explore how integration into innovation ecosystems influences the development of SMEs, investigating both enabling and inhibiting mechanisms	- Integration into innovation ecosystems can both facilitate and hinder SME development. - The level of autonomy and absorptive capacity of SMEs mediates these effects. - Excessive dependency on ecosystem orchestrators may reduce internal innovation dynamics.
Network development	Dvouléty (2023)	Quantitative	Survey	To assess whether participation in a business plan competition affects the entrepreneurial process and outcomes	- Participation in the competition positively influenced the development of business networks, but no significant effect was found on firm profitability or employment growth in the short term. - Start-up competitions primarily act as ecosystem facilitators for early-stage entrepreneurs rather than direct performance boosters.
SME Internationalization	Ferreira et al. (2023)	Quantitative	Survey and structural equation modeling	To investigate the impact of entrepreneurial ecosystem components on the internationalization of SMEs.	- Institutional support and knowledge infrastructure significantly influence SME internationalization. - Networking and cultural support are less impactful than expected. - SMEs benefit most from well-functioning ecosystems that combine multiple supportive dimensions.
Platform-based innovation participation; SME behavior; Ecosystem design	Wei et al. (2021)	Quantitative	Survey and structural equation modeling	To examine behavioral factors influencing SMEs' participation in platform-based innovation ecosystems	- SME participation is influenced by perceived benefits, ease of use, and social influence. - Ecosystem platforms must reduce complexity and provide clear value propositions.
Entrepreneurial marketing; Institutional environment; Performance	Adel et al. (2020)	Quantitative	Survey and regression analysis	To assess the impact of entrepreneurial marketing and institutional environments on SME performance in Egypt	- Entrepreneurial marketing mediates the effect of institutional pressures on performance. - Supportive institutions enhance the marketing-performance link in SMEs.
Value co-creation; Industry 4.0; Innovation ecosystem evolution	Benitez et al. (2020)	Qualitative	Multiple case study	To analyze how value co-creation processes evolve in Industry 4.0 innovation ecosystems	- Ecosystems evolve through phases: resource sharing → collaboration → platform integration. - Trust and commitment are key enablers for ecosystem maturation.

Table 2. A sample of the Systematic Literature Review evidence

Source: Author's contribution

Mechanisms and collaborative practices

The second research stream concentrates on the relational and organizational mechanisms that SMEs are involved in to collaborate and pursue innovation within ecosystems. These studies examine how SMEs co-create value with public institutions, universities, community stakeholders, and other firms while navigating structural challenges posed by limited resources and skills.

An emergent theme across the literature is the role of intermediaries and orchestrators in facilitating SMEs' access to the ecosystems. For instance, Figueiredo and Bendelá (2024) examine equity crowdfunding as a possible mechanism to enable SME participation in Brazil's entrepreneurial ecosystems. Their findings highlight how alternative financing platforms can be a crucial entry point for early-stage firms, promoting financial democratization and reducing entry barriers, particularly in contexts where traditional financing is limited. Besides, Mohammadparast Tabas et al. (2023) add that the relational dynamics between actors introduce a typology of roles (e.g., influencers, facilitators, orchestrators) that shape and determine how efficiently knowledge flows and collaborations are solidly structured.

One of the relationship models emerging in the cluster is the Triple Helix framework: Noya et al. (2023a; 2023b) find a positive correlation between collaboration among universities, government bodies, and SMEs, and performance and information accessibility improvement. They also identify mass media as a mediating actor that shapes how information is disseminated to SMEs, particularly in peripheral or under-resourced regions. These findings suggest that different stakeholder engagement and visibility, such as media, can be as relevant and impactful as traditional resource-based relationships.

Sulastrı et al. (2023) add to this by proposing a Resilience Acceleration Model, which shows that SMEs' capacity to innovate and adapt can be strongly influenced by digital transformation efforts. Their study confirms that co-innovation practices, especially when they involve cross-sector partnerships, enable SMEs to respond more effectively to external shocks, such as the COVID-19 pandemic, by reinforcing strategic agility.

The common trait of the cluster's studies is the relevance given to ecosystem governance structures, which are enhanced through platforms and trust-building mechanisms. While co-innovation clearly improves SME innovation outcomes, the literature also points to persistent challenges: power asymmetries, a lack of long-term collaboration vision, and misaligned incentives can negatively influence ecosystem effectiveness. Moreover, capacity gaps in SMEs, for instance, limited strategic foresight or weak standardized routines, constrain their ability to engage in co-creation processes fully.

Overall, this stream confirms that SMEs' integration into innovation ecosystems dynamics depends not only on the quality of relations and access to external resources but also on the presence of a supportive institutional environment, knowledge intermediaries, and inclusive governance mechanisms.

Policy, regional factors, and transitions

The third cluster found that public policy, regional ecosystems, and sustainability transitions shape the capacity of SMEs to effectively bring innovation. Contributions in this stream cross with policy studies, economic geography, and transition management. The studies demonstrate the importance of place-based systems for enabling SMEs to collaboratively address complex challenges, such as green and digital local transitions (e.g., Latief & Arindra, 2025; May et al., 2025).

Recent works conclude that multi-level governance and institutional support mechanisms need to go beyond generic SMEs' programs. Scholars identified the need for targeted interventions tailored to regional specificities, existing industrial structures, and ecosystem maturity levels (Khatami et al., 2024; Reynolds & Uygun, 2018). The twin transition paradigm also emerges as a further theme to

consider, with SMEs positioned as both beneficiaries and enablers of systemic change, tied to sustainable development and digitalization (Christmann et al. 2024; Graf-Drasch et al., 2023). Indeed, barriers such as limited digital readiness, regulatory fragmentation, and a lack of financial instruments can impact SMEs' participation effectively in ecosystem logic. In this specific stream, two clearly emerging gaps are the insufficient involvement of SMEs in policy co-design and the lack of studies on the effectiveness of ecosystem-based interventions to support SMEs.

As anticipated in the previous paragraphs, in this cluster, the role of public policy, regional ecosystems, and contextual factors in enabling SMEs' participation in innovation processes is also analyzed in the context of green transitions and crisis responses.

Some scholars explore the structural dimensions of regional ecosystems, particularly in relation to the smart product economy. Khatami et al. (2024) provide a cross-national empirical quantification of the components and drivers of innovation ecosystems supporting SMEs in 21 European countries. Findings reveal that ecosystem effectiveness is linked to technological infrastructure, organizational readiness, and the intensity of collaboration, with substantial variance across geographical contexts. Moreover, Reynolds and Uygun (2018) examine the case of Massachusetts and find a positive correlation among institutional coordination, workforce development, and regional innovation infrastructure, enabling the strategic integration of SMEs into advanced manufacturing ecosystems.

As for policy interventions and public support schemes in crisis scenarios, Alkharafi et al. (2024) instead compare sponsored and non-sponsored SMEs in Kuwait during the COVID-19 pandemic, showing that government-backed firms were significantly more resilient, better connected to support networks, and faster to adapt to uncertainty. These findings resonated in Thukral's (2021) study, which underlines policy agility, digital adoption, and creativity of SMEs as relevant factors that helped ecosystems to overcome crises. The public intervention role is configured here as a facilitator and enabler of entrepreneurial resilience and innovative responses.

Speaking to the strategic perspective of crisis responses, da Paixão de Oliveira et al. (2023) analyze four empirical cases during the COVID-19 pandemic to show how ecosystem-level strategic alignment and shared goals can significantly improve SME resilience. Meanwhile, Radicic et al. (2020) provide quantitative evidence of the effectiveness of policy tools in promoting inter-firm cooperation, particularly within traditional manufacturing sectors in Europe. The studies mentioned suggest that targeted public support increases the intensity of cooperation and contributes to systemic innovation, especially when aligned with regional development priorities and strategic goals.

Overall, in this cluster, it is evident that SMEs' integration into innovation ecosystems is not automatic or adaptive alone, but is highly influenced by factors such as enabling environments, public policies, regional structures, and the quality of multi-stakeholder coordination. However, a consistent gap across studies is the limited theorization of how SMEs negotiate and can exert real influence on governance dynamics within ecosystems, especially when public policymakers are stronger counterparts and actors in the environment.

Conclusions

The findings suggest that, while SMEs are emerging as significant contributors to ecosystem value creation in the literature, scholars' understanding of their specific functions, constraints, and strategic orientations remains limited. By identifying three thematic clusters of studies, this review bridges a gap in a niche field. It proposes a more integrated reading of how SMEs operate within dynamic multi-actor ecosystems.

The first cluster, *Theoretical and Conceptual Framing*, comprehends conceptual contributions that critique firm-centric, orchestrator-dominated narratives (Hakala et al., 2020), configuring SMEs not as passive actors but as potential system-level contributors. Drawing mainly on institutional theory, resource-based views, and network theory, this stream identifies a consistent gap in the literature: the lack of integrative studies that capture the multilevel realities of SMEs, governance mechanisms, and

innovation outputs. While new typologies and conceptual models are proposed, they often lack empirical testing and practical application, as noted by Colclough et al. (2019) and Saunila (2020).

The second cluster, *Mechanisms and Collaborative Practices*, is oriented to study the operational dimensions of SMEs' collaboration and behavior within ecosystems. Studies here are mainly qualitative or mixed-method, and they examine how intermediaries (e.g., incubators, triple helix actors, crowdfunding platforms) can impact co-innovation, capability development, and amplify the voice of SMEs in the environment. These studies also underline the critical role of trust and effective relational dynamics in driving real innovation (Castillo-Vergara et al., 2021; Love & Roper, 2015; Shahzad et al., 2025). Nevertheless, a recurrent issue is the asymmetry between SMEs and dominant actors, which can make it more difficult to sustain collaboration and ensure SMEs are heard. Despite a significant focus on collaboration mechanisms, limited attention is given to the governance structures needed to achieve equitable value distribution, underscoring the tendency in the ecosystem literature to assume synergies rather than to interrogate coordination.

The third cluster, *Policy, Regional Factors and Transitions*, shows that regional ecosystems, public policy, and institutional actors can impact SMEs' transformative capacity significantly (Radicic et al., 2020; Thukral, 2021). The present literature review, in fact, positions itself in studies on systemic innovation and twin transitions (Christmann et al., 2024; Leipziger et al., 2025), demonstrating that regulatory clarity, institutional density, and policy coherence shape inclusive ecosystem participation for often underrepresented actors such as SMEs themselves.

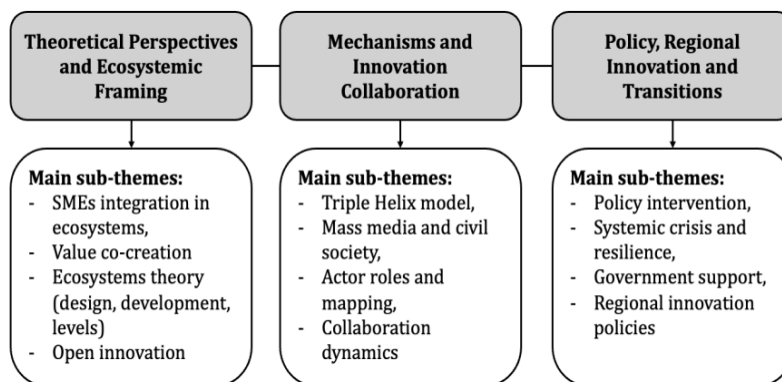


Figure 1. Conceptual framework of the three research streams' clusters.

Source: Authors' contribution based on PRISMA 2020 elaboration

It emerges, however, that the replicability of studies on ecosystem models across different geographical areas and contexts remains limited. Also, only a few studies empirically examine how SMEs' participation in such ecosystems affects their long-term strategic orientation.

Taken together, the three clusters reveal persistent fragmentation in the field: conceptual works lack empirical support; practical studies, in turn, often lack theoretical replicability, and finally, policy-focused research rarely considers firm-level, smaller dynamics. These tensions reflect literature criticisms of the absence of unified models to explain SMEs' systemic roles (Carfora et al., 2022; Saunila, 2020). Moreover, across all clusters, the analysis of sustainability transitions is underexplored. Despite some integration of environmental and digital concerns (e.g., Schrank & Kijkasiwat, 2024), comprehensive accounts of how SMEs navigate twin transformations through ecosystemic engagement are still to be defined.

Overall, this research contributes to the debate by mapping an underdeveloped niche at the intersection of systemic innovation, sustainability, and SME participation. The conceptualization of SMEs shifts from adaptive, marginal actors to orchestrators and knowledge brokers, with implications for policy and practice. Policymakers should design governance frameworks that consider the roles and features of SMEs, reinforcing their influence in ecosystem dynamics to improve their contributions and benefit from accelerating innovation capacities and exchanges. At the same time, managers are encouraged to cultivate dynamic capabilities and adopt ecosystem-sensitive strategies. Intermediaries, such as media, should have more space on platforms and in their dynamics to bridge information asymmetries and support collaborative infrastructure.

The review is restricted to 21 peer-reviewed articles in the Scopus-indexed business field, excluding adjacent disciplines and grey literature. The use of thematic synthesis, while appropriate for conceptual mapping, limits the study's statistical generalizability.

Future research should address these limitations by integrating a wider database, comparative analyses across regions and sectors, and multilevel studies of SMEs ecosystem flow. Special attention should be given to custom or hybrid governance mechanisms that enable SMEs to serve as effective orchestrators, particularly in sustainability transitions and digital innovation.

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