
CONCEPTUAL EVOLUTION OF INNOVATION AND ENTREPRENEURSHIP IN SME SUSTAINABILITY RESEARCH: A BIBLIOMETRIC ANALYSIS



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Abstract

This systematic literature review examines the role of innovation and entrepreneurship in advancing sustainability within small and medium-sized enterprises (SMEs). A total of 62 articles were analyzed to identify key themes, emerging trends, and research gaps concerning the interplay among innovation, entrepreneurship, and sustainability. The findings indicate that innovation encompassing technological, process, and social dimensions serves as a critical driver of resource efficiency and environmentally responsible practices. Entrepreneurial mindsets and behaviors further support the identification and pursuit of sustainable business opportunities that balance economic, social, and environmental objectives. The review also highlights several barriers, including limited financial capacity, restricted access to technology, and risk aversion. Conversely, supportive policy frameworks, stakeholder engagement, and knowledge networks strengthen the implementation of sustainability practices. Contextual factors such as industry characteristics, firm size, geographic location, and institutional settings significantly influence sustainability outcomes. Overall, this review underscores the importance of innovation and entrepreneurship as essential foundations for SMEs in achieving long-term sustainability.

Keywords: SMEs, Innovation, Entrepreneurship, Sustainability

INTRODUCTION

In recent years, sustainability has emerged as a central concern for businesses worldwide. As societies and economies confront escalating environmental and social challenges, the role of small and medium-sized enterprises (SMEs) in advancing sustainable development has gained increasing attention (Kraus, Fink, & Röhm, 2018). Despite their resource constraints, SMEs play a critical role in economic growth, job creation, and local development. The concept of sustainability encompasses multiple dimensions, including environmental stewardship, social responsibility, and economic viability. Integrating sustainable practices into SME operations can generate various benefits, such as cost savings through resource efficiency, enhanced reputation and customer loyalty, improved access to new markets and financing opportunities, and greater resilience to external shocks (Kuckertz & Wagner, 2010).

Innovation and entrepreneurship have long been recognized as pivotal drivers of sustainability in the SME sector. Their contribution to promoting sustainable practices is widely regarded as a vital pathway for addressing the complex environmental, social, and economic challenges faced by modern businesses (Kickul & Lyons, 2012). SMEs, in particular, possess structural advantages such as organizational agility, rapid decision-making, and close relationships with customers and local communities that enable them to experiment with and implement innovative approaches more readily than larger firms. These capabilities allow SMEs to introduce new ideas, technologies, products, services, and business models that embody sustainability principles and support the achievement of broader sustainable development goals (Welter & Xue, 2014). Moreover, innovation and entrepreneurship within SMEs often emerge from context-specific pressures and opportunities, including market demand for greener products, regulatory shifts, community expectations, and competitive pressures. As noted by Amadiou and Viviani (2010), the dynamics of firm behavior including governance structures, resource allocation, and strategic orientation play a critical role in shaping innovation outcomes. Understanding how these internal and external mechanisms interact to influence sustainable innovation and entrepreneurial activities requires rigorous, systematic inquiry.

Consequently, a systematic examination of the existing scholarly literature is essential to uncover the mechanisms, pathways, and conditions that shape sustainability-oriented innovation and entrepreneurship in SMEs. Such an analysis provides clearer insights into how SMEs can leverage their unique characteristics to drive impactful and enduring sustainability outcomes.

A systematic literature review (SLR) provides a rigorous approach to synthesizing available evidence, identifying key themes, trends, research gaps, and theoretical perspectives. An SLR on innovation, entrepreneurship, and their contribution to sustainability in SMEs aims to deliver a comprehensive overview of current knowledge and empirical findings. It explores the interconnections among these concepts and examines how they collectively support sustainable outcomes in SME contexts (Schaltegger & Wagner, 2011).

By systematically analyzing a wide range of scholarly publications including academic journals, conference proceedings, and relevant reports this review seeks to identify the conceptual frameworks, methodologies, and empirical findings surrounding innovation, entrepreneurship, and sustainability in small and medium-sized enterprises (SMEs). Furthermore, the review aims to uncover contextual factors, barriers, enablers, and mechanisms that shape the adoption and effectiveness of sustainable innovation and entrepreneurial practices within SMEs (Ulhoi, & Madsen, 2016). It examines the role of supportive ecosystems, policy frameworks, stakeholder engagement, financial resources, knowledge

networks, and collaborative arrangements in facilitating sustainable business practices and outcomes.

Through this systematic literature assessment, a comprehensive understanding of the current state of knowledge on innovation, entrepreneurship, and sustainability in SMEs can be established. The review contributes to identifying research gaps, theoretical advancements, and practical implications for policymakers, researchers, and practitioners seeking to promote sustainable entrepreneurship in SME contexts. It also highlights the importance of integrating sustainability considerations into innovation processes and entrepreneurial decision-making to ensure long-term organizational resilience and societal value creation.

Ultimately, the findings of this systematic literature review illuminate the potential of innovation and entrepreneurship to drive sustainability within SMEs. The insights derived from the review provide guidance on strategies, best practices, and evidence-based interventions that can strengthen the capacity of SMEs to act as catalysts for sustainable development (Kraus, Fink, & Röhm, 2018). By mapping the evolving landscape of research in this field, the review underscores the need for context-sensitive approaches and continued scholarly attention to accelerate the transition toward more sustainable SME ecosystems.

RESEARCH METHOD

To generate a precise assessment of sustainability and financial outcomes within SMEs, this study adopts a systematic literature review complemented by a bibliometric investigation, reflecting current advancements in bibliographic research (e.g., Caputo, Marzi, Pellegrini, & Rialti, 2018; López-Fernández, Serrano-Bedia, & Pérez-Pérez, 2016). The review began with an extensive search of the Thomson Reuters Web of Science Core Collection (WOS) a database widely regarded as the gold standard for bibliometric analysis. Keywords associated with innovation, entrepreneurship, and sustainability guided the search strategy, in accordance with established methodological recommendations (Ding, Rousseau, & Wolfram, 2014; Falagas et al., 2008; Gu, 2004).

From this initial search, 93 publications were retrieved and subsequently refined through a series of eligibility checks. Only English-language articles categorized under management, business, economics, ethics, business finance, and operations and management science were retained. A further screening process, informed by the title and abstract evaluation method proposed by Caputo, Pellegrini, Dabic, and Dana (2016), resulted in the exclusion of studies that did not align with the research scope. Through this systematic refinement, a final set of 62 articles published between 2015 and 2023 was identified for comprehensive review. The sequence of selection steps is depicted through a PRISMA model.

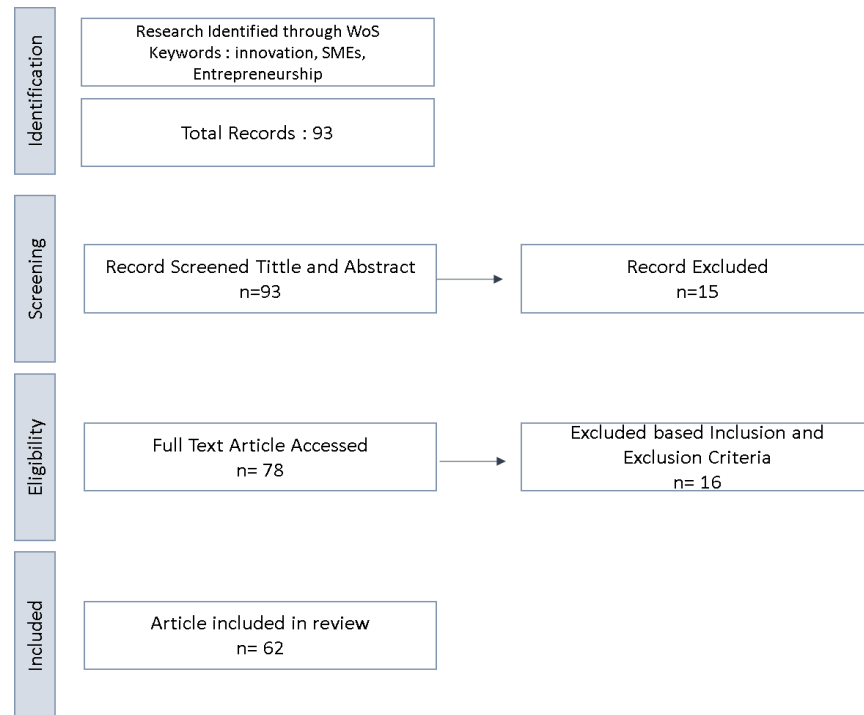


Figure 1. PRISMA Model

The second phase of the study centered on identifying thematic clusters through a bibliometric examination conducted with VOSviewer version 1.6.8, using bibliographic coupling as the primary method for consolidating data (Kessler, 1963). As a citation-based approach, bibliographic coupling assesses the similarity between two documents by determining how many references they share. The premise behind this technique is that a greater overlap in cited sources signals a closer alignment in research focus between the articles (Vogel & Güttel, 2013). Since an article’s list of references remains fixed once published, bibliographic coupling is unaffected by the timing of the analysis an attribute that distinguishes it from other bibliometric tools and enhances its reliability for guiding systematic literature reviews (e.g., Caputo et al., 2018).

RESULTS AND DISCUSSION

Bibliometric

VOSviewer facilitates the graphical representation of co-occurrence patterns derived from the dataset, with co-occurrence measured through the presence, frequency, and spatial proximity of shared cited references (van Eck & Waltman, 2014). The software produces a visual map in which density variations are expressed through shading intensity darker regions reflecting lower density levels. The spatial distance between documents on this map serves as an indicator of how closely related they are in terms of shared citations. Articles positioned within the same cluster exhibit strong relational ties, signalling that each cluster corresponds to a distinct research domain or thematic trajectory within the broader field.

The following figure presents the VOSviewer visualization generated from the co-occurrence relationships among the cited references in this study:

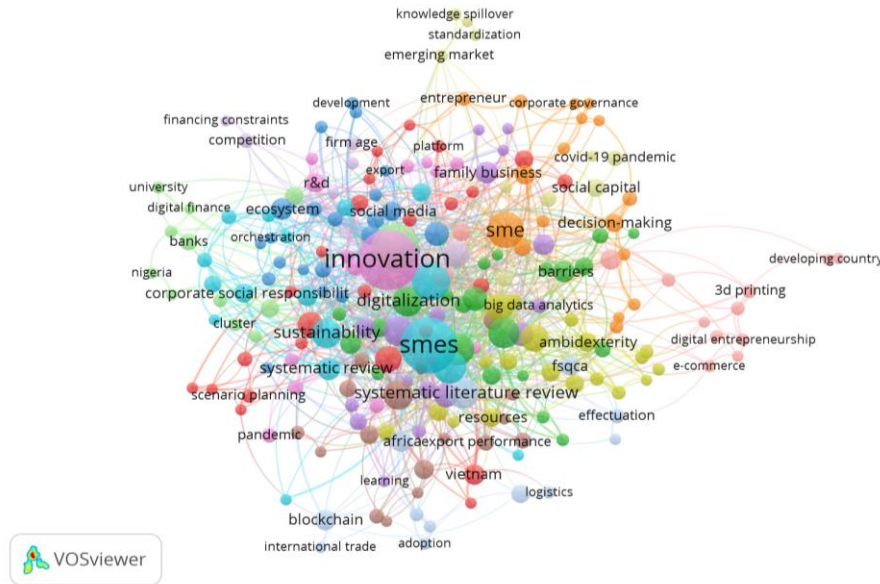


Figure 2. VOSviewer Visualization

By integrating visualization, network analysis, gap identification, and keyword analysis, the results generated through VOSviewer provide a comprehensive overview of the field of innovation, entrepreneurship, and sustainability in SMEs. The overlay visualization (Figure.2) reveals a clear evolution in the intellectual landscape of research on innovation, entrepreneurship, and SME sustainability, indicating a shift from static, resource-centered perspectives toward more dynamic, technology-enabled, and behaviorally grounded approaches. At the core of the network, innovation, SMEs, and sustainability emerge as dominant and well-established themes, reflecting a mature body of literature largely grounded in the resource-based view and dynamic capability theory. These studies predominantly conceptualize sustainability as an outcome of firms' ability to mobilize internal resources, enhance performance, and maintain competitiveness, particularly within the context of developing economies. However, the density and centrality of these nodes also suggest a degree of theoretical saturation, implying limited novelty when innovation is treated merely as a direct antecedent of SME sustainability.

More recent research trajectories, as indicated by newer overlay colors, demonstrate a growing emphasis on digitalization and data-driven innovation. Keywords such as big data analytics, digital entrepreneurship, e-commerce, platforms, and advanced manufacturing technologies signal a paradigmatic transition in which sustainability is increasingly understood as a function of SMEs' capacity to leverage digital infrastructures and analytics for strategic decision-making. This stream highlights innovation not only as a technological outcome but as an adaptive capability that enables SMEs to respond to market volatility, resource constraints, and competitive pressure. Despite its rapid growth, this literature remains fragmented, particularly regarding the mechanisms through which digital capabilities translate into long-term sustainability outcomes.

Simultaneously, the emergence of concepts such as effectuation, ambidexterity, and entrepreneurial decision-making reflects a notable micro-level turn in the field. These studies foreground the cognitive and behavioral foundations of sustainability, emphasizing how

entrepreneurs navigate uncertainty through non-linear, opportunity-driven logics rather than purely rational planning models. This perspective reframes SME sustainability as a process shaped by entrepreneurial judgment, learning, and strategic flexibility, thereby extending beyond structural or technological determinism. Nevertheless, empirical integration between these behavioral frameworks and digital innovation capabilities remains underdeveloped, representing a critical gap in current scholarship.

The visualization also underscores the growing contextualization of SME sustainability within environments of systemic disruption, particularly in relation to the COVID-19 pandemic, financial constraints, and institutional barriers in developing countries. Here, sustainability is increasingly conceptualized as organizational resilience, with innovation serving as a key mechanism for survival and recovery rather than solely for growth. This shift reinforces the need for longitudinal and context-sensitive analyses that capture how SMEs reconfigure capabilities over time in response to external shocks.

Finally, the prominence of systematic literature reviews and bibliometric analyses signals a reflexive phase in the field, indicating increasing scholarly efforts to consolidate knowledge, identify theoretical fragmentation, and articulate future research agendas. While such studies confirm the maturity of the domain, they also reveal unresolved tensions between macro-level structural explanations, meso-level technological capabilities, and micro-level entrepreneurial behavior. Collectively, these patterns suggest that the current state of the art lies in integrative frameworks that connect digital innovation, entrepreneurial cognition, and adaptive capabilities to explain SME sustainability in dynamic and uncertain environments.

Innovation, Resources, and Organizational Capabilities as Drivers of Sustainable SME Performance

This first sub-theme brings together studies that emphasize how innovation, entrepreneurial strategy, and resource configurations shape sustainability and competitive advantage within SMEs. Much of this literature is grounded in the resource-based view (RBV) (Wernerfelt, 1984), which provides the theoretical foundation for understanding how distinctive and hard-to-replicate resources support long-term competitiveness. Rangone's (1999) seminal work offers one of the clearest RBV-driven frameworks for analyzing sustainable competitive advantage in SMEs, later extended by Leonidou et al. (2017) and Reyes-Rodriguez et al. (2016, 2017), who showed that SMEs can adopt sustainability-oriented strategies when they frame environmental concerns as opportunities.

Complementing this perspective, Halme and Korpela (2014) demonstrate the importance of resource combinations such as research partnerships, networks, and organizational reputation in generating responsible innovations. Amadiou and Viviani (2010) further refine this view by integrating RBV with market orientation theory, finding that intangible assets may reduce short-term financial returns but strengthen broader commercial performance.

Human resource systems and organizational learning also emerge as essential pillars of sustainability. Alonso and Austin (2018) highlight knowledge assets as central to sustained advantage, while Lechuga Sancho et al. (2018) show that socially responsible HR practices directly enhance competitiveness, strengthened by employee commitment and relational marketing. Upstill-Goddard et al. (2016) add that communication and training facilitate adoption of sustainability standards, though SMEs tend to embrace such standards only when

clear financial benefits are expected. López-Pérez et al. (2017b) argue that sustainability education across all educational levels is necessary to support long-term managerial capacity-building.

A growing body of evidence from developing economies strengthens this sub-theme. Sok et al. (2016) conceptualize product innovation and marketing capabilities as strategic assets, showing that their synergy improves financial performance. Ahmad and Ramayah (2012) find that ethical and socially responsible practices enhance both financial and non-financial outcomes within Malaysian SMEs. Studies in China (Xie et al., 2013), Indonesia (Ratnawati et al., 2018), Pakistan (Rasheed et al., 2017), and Uganda (Venter et al., 2014) consistently show that innovation drivers, HR structures, customer loyalty, reputation, and stakeholder trust collectively reinforce SME competitiveness.

Sustainability Practices, Environmental Collaboration, and SME Responses to Crisis

The second sub-theme focuses on how SMEs integrate sustainability practices particularly environmental responsibility and how these practices influence financial performance and resilience during crises. A significant portion of this literature examines the interaction between social responsibility, environmental management, and financial outcomes. Torugsa et al. (2012, 2013) provide influential evidence from Australian SMEs that responsible practices enhance long-term financial viability. O'Donohue and Torugsa (2016) show that HR management moderates these effects, amplifying the financial benefits of environmental initiatives. López-Pérez et al. (2017a, 2017b) demonstrate that sustainability practices improve corporate reputation, brand image, and financial value effects that intensify as firms grow in size.

Environmental collaboration and sustainable supply chain practices also contribute positively to performance. Mafini and Muposhi (2017) and Epoh and Mafini (2018) show that ecological partnerships and green supply chain practices lead to measurable financial gains. Meanwhile, service-sector SMEs particularly in tourism receive limited attention but show similar patterns: pro-environmental strategies enhance competitiveness (Iraldo et al., 2017), while environmental policy adoption improves financial performance (Bagur-Femenias et al., 2015).

Despite innovation literature often emphasizing internationalization, only two studies in this cluster examine the topic directly. Hilmersson (2014), focusing on SME international expansion under market instability, finds that scope and speed of expansion, not scale, positively influence financial performance.

A notable insight from this cluster is the scarcity of research on SME responses to economic crises. The few studies addressing this topic converge on the importance of strategic repositioning as a mechanism enabling SMEs to survive and recover from disruption (Mayr, Mitter, & Aichmayr, 2017; Panwar et al., 2015). This indicates a clear gap: while sustainability and innovation drivers are well-documented in stable environments, far fewer studies explore resource-based and strategic mechanisms that help SMEs withstand economic shocks.

CONCLUSION

Innovation and entrepreneurship play a crucial role in advancing sustainability within small and medium-sized enterprises (SMEs). Through sustainable innovation and entrepreneurial practices, SMEs can contribute to environmental preservation, social well-

being, and economic growth. This conclusion is supported by several key findings. Integrating sustainability principles into business models, products, services, and operations can yield multiple benefits for SMEs (Hilmersson, 2014). These benefits include enhanced brand reputation, improved operational efficiency, reduced environmental impact, greater access to financing, and increased competitiveness.

SMEs also possess strong potential to drive sustainable innovation by developing and adopting new ideas, processes, products, and services. Such innovations can address environmental challenges, improve resource efficiency, and generate positive social outcomes. Within this context, an entrepreneurial mindset enables SMEs to identify and capitalize on opportunities that align economic success with environmental and social well-being. Sustainable entrepreneurship involves pursuing business models and strategies that balance profit generation with responsible and sustainable practices (Ratten & Jones, 2019).

However, SMEs face several barriers, including limited financial resources, restricted access to technology, and risk aversion, that may hinder their ability to innovate and adopt sustainable practices. Supportive ecosystems, policy frameworks, stakeholder engagement, and knowledge networks can serve as critical enablers that strengthen sustainable innovation and entrepreneurship within SMEs.

In conclusion, innovation and entrepreneurship function as essential drivers of sustainability in SMEs. By adopting sustainable practices, developing innovative solutions, and leveraging entrepreneurial opportunities, SMEs can achieve financial success while contributing to environmental and social well-being. It is therefore vital for policymakers, researchers, and practitioners to recognize and support the role of innovation and entrepreneurship in fostering sustainability within SMEs, as these efforts hold substantial potential for advancing a more sustainable future.

Implications for Future Research

Future research on innovation, entrepreneurship, and SME sustainability should move beyond treating innovation as a direct and static determinant of sustainable outcomes and instead focus on the mechanisms through which different forms of innovation—particularly digital, social, and data-driven innovation—are transformed into long-term sustainability capabilities. Greater attention is needed to the micro-level foundations of sustainability by integrating entrepreneurial cognition perspectives, such as effectuation, ambidexterity, and decision-making under uncertainty, with organizational and technological capabilities, as empirical studies linking these dimensions remain limited. In addition, future studies should adopt more context-sensitive and longitudinal research designs to capture how SMEs in different institutional settings, especially in developing economies and crisis environments, reconfigure resources and strategies over time in response to external shocks. Finally, there is a strong need for integrative conceptual frameworks that bridge macro-level institutional conditions, meso-level organizational and digital capabilities, and micro-level entrepreneurial agency, in order to reduce theoretical fragmentation and advance a more holistic understanding of how innovation and entrepreneurship jointly drive SME sustainability in dynamic and uncertain environments.

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