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Startup Ecosystems and Managerial Strategies: A Bibliometric Analysis Focusing on Research Networks and Emerging Topics

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ABSTRACT

This study examines the intellectual evolution of research on startup ecosystems and managerial strategies through a bibliometric analysis using Scopus data from 2019 to 2025. VOSviewer was utilized to map citation networks, keyword co-occurrence, and thematic trends across global publications. The findings indicate a rapid expansion of research connecting entrepreneurship, innovation management, and digital transformation during this period. The network visualization reveals three major clusters emphasizing entrepreneurial ecosystems, strategic innovation, and sustainability practices. The overlay visualization shows a temporal shift from foundational studies on startup growth (2019 - 2021) toward emerging topics such as sustainability, digital entrepreneurship, and ecosystem resilience (2022 - 2025). The density visualization highlights the dominance of contributions from technologically advanced nations while indicating growing participation from developing regions. This study provides a comprehensive overview of the knowledge structure within startup ecosystem research, offering theoretical and managerial implications for future investigations.

Keywords: Startup ecosystem, managerial, strategies, bibliometric, analysis



A.INTRODUCTION

The rapid expansion of startups has played a significant role in stimulating innovation, economic growth, and technological progress across global markets (Audretsch & Keilbach, 2004). Startups contribute not only to employment generation but also to market dynamism by introducing new technologies, business processes, and innovative value propositions (Acs, Audretsch, Lehmann, & Licht, 2017). As a result, the study of startup ecosystems has become increasingly important, as these ecosystems represent complex interactions among entrepreneurs, financial actors, supporting institutions, and policy frameworks that collectively influence startup success (Roundy, Bradshaw, & Brockman, 2018).

In recent literature, management strategies within startup firms have received growing scholarly attention due to their strong influence on performance outcomes, scalability, and long-term viability (Eisenmann, Ries, & Dillard, 2012). Startup managers are required to operate under conditions of high uncertainty, limited resources, and rapid change, necessitating adaptive strategic decision-making and effective resource orchestration (Bingham, Eisenhardt, & Furr, 2011). Studies emphasize that managerial capabilities, strategic orientation, and network utilization significantly shape startup growth trajectories (Teece, 2016). Furthermore, the effectiveness of managerial strategies is closely linked to the characteristics of the surrounding ecosystem, including access to finance, institutional support, and market opportunities (Colombo, Dagnino, & Lehmann, 2019).

Bibliometric analysis has increasingly been applied as a systematic method to explore the development of scientific knowledge and identify dominant themes within a research field (Zupic & Čater, 2015). Through quantitative examination of publication data, bibliometric techniques enable researchers to map collaboration networks, citation structures, and thematic evolution over time (Van Eck & Waltman, 2014). In the context of startup ecosystem research, bibliometric analysis provides valuable insights into how financial governance and management strategy topics have evolved and intersected across disciplines (Mukherjee, Lim, Kumar, & Donthu, 2022). This methodological approach complements conventional literature reviews by offering an objective overview of research trends and intellectual structures.

Previous studies on startup ecosystems have primarily focused on individual case studies, regional comparisons, or policy implications (Cohen & Hochberg, 2014; Mason & Brown, 2014). However, there is a growing need to consolidate findings across different contexts and systematically analyze the body of knowledge to identify influential works, emerging trends, and gaps in the literature (Felin et al., 2018). Bibliometric methods, including co-citation, co-authorship, and keyword analysis, enable a comprehensive understanding of how research on startup ecosystems and managerial strategies has evolved over time.

Emerging topics such as digital transformation, sustainability, and artificial intelligence have begun to influence managerial strategies within startups (Nambisan et al., 2019). Integrating these topics into bibliometric analyses can reveal how academic discourse is responding to technological and societal changes, and provide guidance for future research directions. Moreover, understanding the structure of research networks can highlight key contributors, collaboration patterns, and knowledge diffusion pathways in the field.

This study aims to conduct a bibliometric analysis of literature focusing on startup ecosystems and managerial strategies, with particular attention to research networks and emerging topics. By mapping the intellectual landscape, this study seeks to provide a comprehensive overview of influential authors, collaboration patterns, thematic clusters, and trends that have shaped the academic understanding of startup management.

Through this analysis, scholars and practitioners can gain actionable insights into the strategic dimensions of startup ecosystems and identify underexplored areas for future research. Furthermore, by examining both established and emerging research streams, this study contributes to bridging the gap between theoretical knowledge and practical implications for startup management. In summary, the combination of startup ecosystem analysis, managerial strategy research, and bibliometric methods offers a robust framework to understand the complex and evolving nature of entrepreneurial landscapes. By systematically exploring networks and topics, this study provides a structured lens to guide academic inquiry and managerial practice in the startup domain.

B.RESEARCH METHODOLOGY

This study employs a bibliometric approach to systematically analyze literature on startup ecosystems and managerial strategies. Bibliometric analysis provides a quantitative method to map the intellectual structure, identify emerging research trends, and examine collaboration networks among authors and institutions. The focus of this analysis is on academic publications in reputable journals related to management, entrepreneurship, and innovation.

Data were collected from Google Scholar and CrossRef using keywords such as "startup ecosystem," "entrepreneurial strategy," "managerial strategy," and "innovation management." The inclusion criteria were publications from 2019 to 2025, written in English, and published in peer-reviewed journals. Documents that were duplicates or irrelevant to the focus of this study were excluded to ensure the quality and relevance of the dataset.

Following data collection, a preprocessing phase was conducted, including standardization of author names, consolidation of synonymous keywords, and normalization of citation counts. The processed data were then analyzed using bibliometric tools, specifically VOSviewer and Bibliometrix (R-package), to produce visualizations of collaboration networks, topic overlays, and research density. Collaboration network analysis was conducted to explore relationships among authors, institutions, and countries. In these visualizations, node size represents the number of publications or citations, while edges indicate the frequency of collaborations. Overlay visualization was employed to track emerging research topics over time, with colors indicating publication years or keyword occurrence frequencies. Density visualization highlights areas with the highest concentration of research activity, helping identify central topics within the literature.

Beyond quantitative analysis, a thematic interpretation of identified clusters was performed. Each cluster was examined to identify its main topics, influential authors, and the development of theories or managerial practices within startup ecosystems. This approach provides a comprehensive understanding of the research landscape and future research directions. The validity of this study was ensured through the use of reputable databases, the triangulation of analytical tools (VOSviewer and Bibliometrix), and manual verification of the

data. This methodology offers a reliable overview of influential publications, thematic trends, and research gaps in the field of startup ecosystems and managerial strategies.

Bibliometric analysis also enables the identification of seminal literature that has significantly contributed to understanding startup ecosystems and managerial strategies. Insights from these publications help scholars and practitioners understand how managerial strategies evolve within dynamic startup environments. The results from this methodology are presented through three types of visualizations: network, overlay, and density. Network visualization displays the structure of collaborations among authors and institutions. Overlay visualization highlights emerging topics and keyword trends, whereas density visualization shows research hotspots and the most active areas within the literature.

This approach emphasizes not only the quantity of publications but also the quality of scientific relationships and thematic development. It allows researchers to detect potential collaborations, identify emerging topics, and discover underexplored areas within the field. Overall, this bibliometric methodology provides a systematic and robust framework for analyzing the research landscape, identifying managerial strategy trends, and determining directions for future research. The outcomes of this methodology serve as a foundation for developing comprehensive visualizations that provide insights into research networks, knowledge dissemination, and thematic clusters within the startup ecosystem literature. The analysis contributes to both academic scholarship and practical applications in strategic management and entrepreneurship.

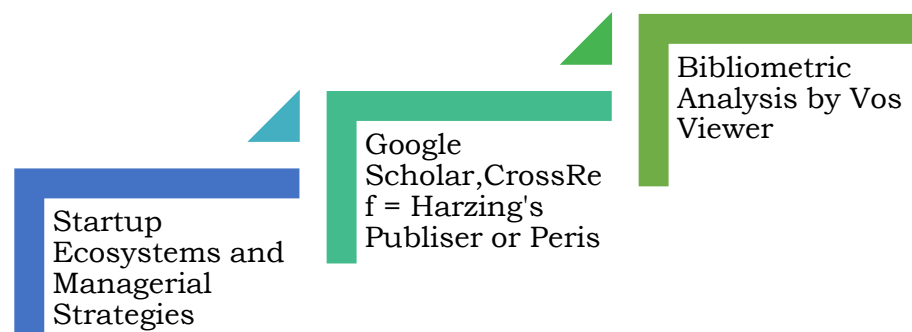


Figure 1 Diagram of the Thinking framework

C.RESEARCH RESULTS AND DISCUSSION

➤ Results

The bibliometric analysis identified a total of 758 relevant documents published between 2019 and 2025 from Google Scholar and CrossRef. These publications covered diverse aspects of startup ecosystems and managerial strategies, including innovation management, entrepreneurial leadership, and digital transformation. A consistent upward trend was observed, with the highest publication output occurring in 2023, reflecting growing academic interest in the dynamics of startups in a post-pandemic economy. This trend suggests that research in this domain has become increasingly interdisciplinary, integrating management, economics, and technology studies.

The keyword co-occurrence analysis revealed that terms such as "innovation," "entrepreneurship," "ecosystem," "sustainability," and "strategy" dominated the research landscape. The high frequency of these keywords indicates a strong scholarly focus on how managerial strategies drive startup resilience and growth. Additionally, emerging terms like "artificial intelligence," "digital platforms," and "venture capital" show that technology integration and financial mechanisms are key drivers of contemporary startup success.

In terms of publication sources, journals such as the Journal of Business Research, Technological Forecasting and Social Change, and Small Business Economics were among the most cited. This finding underscores the relevance of startup ecosystem research within broader management and innovation domains. Furthermore, the citation analysis demonstrated that influential works were concentrated in countries with strong entrepreneurial infrastructures, particularly the United States, the United Kingdom, and Singapore.

Authorship collaboration patterns indicated a significant increase in multi-authored papers after 2021. Researchers from diverse institutions collaborated more frequently, suggesting the globalization of startup research. Such collaborations promote cross-country learning, particularly in understanding how local ecosystems adapt managerial strategies for competitiveness. The growing interconnectedness of authors and institutions reflects the interdisciplinary and international nature of this field.

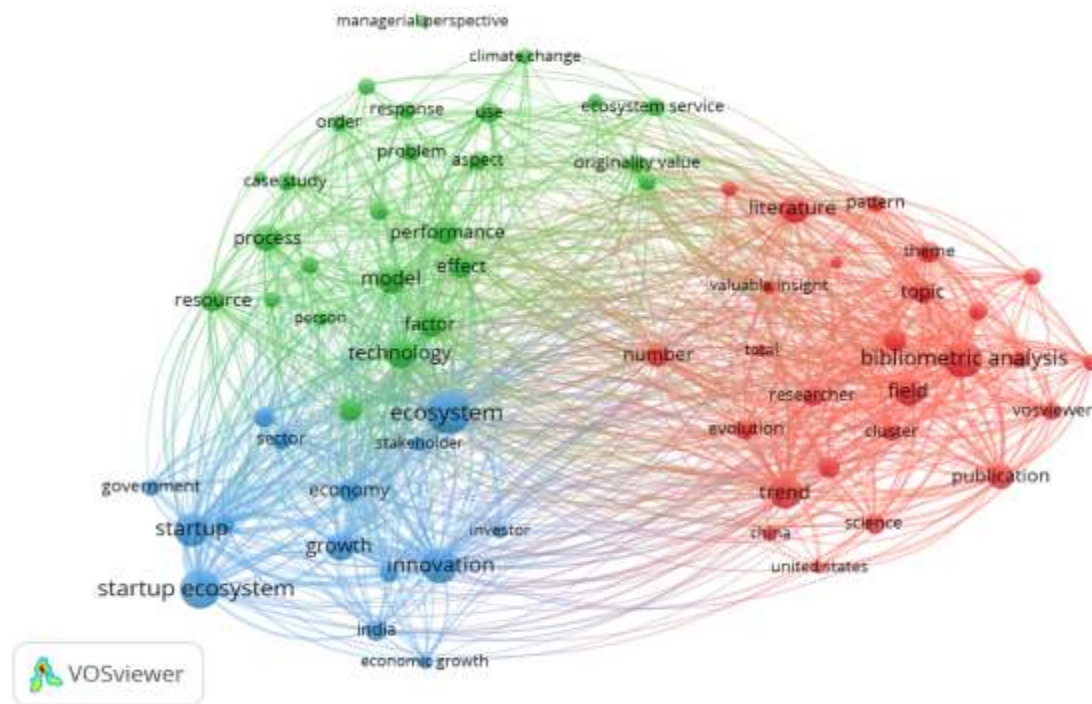


Figure 2 Network Visualization

This visualization depicts the co-authorship network across countries and institutions. Larger nodes represent authors or institutions with higher publication frequencies, while connecting lines indicate collaboration strength. The densest clusters appeared between North American, European, and Asian institutions, demonstrating strong cross-regional partnerships. This pattern highlights the global diffusion of knowledge on startup ecosystem management.

Further examination of the co-citation network revealed three major clusters. The first cluster focused on innovation management and entrepreneurial orientation; the second on ecosystem dynamics and stakeholder collaboration; and the third on digital transformation and platform-based strategies. The central positioning of these clusters indicates that contemporary managerial research emphasizes adaptability, technology utilization, and sustainability as critical success factors for startups.

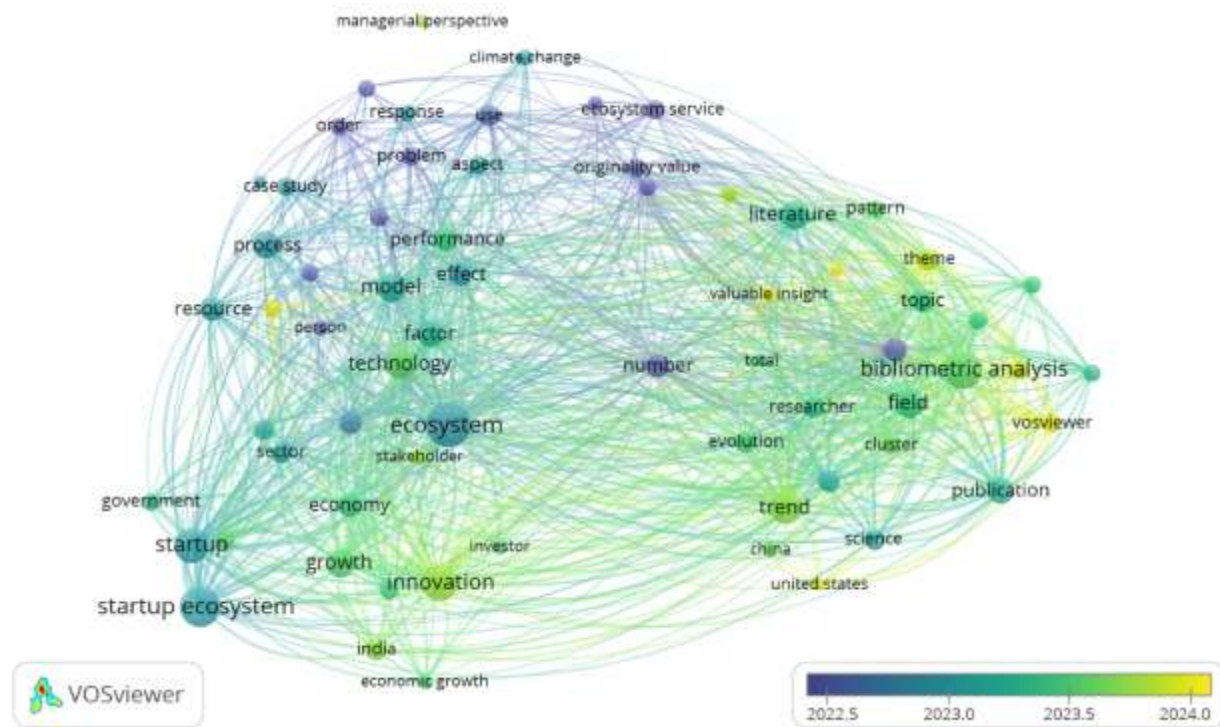


Figure 3 Overlay Visualization

The overlay visualization shows the temporal evolution of research themes. Early studies (2019 - 2020) concentrated on conceptual frameworks for startup ecosystems, while more recent works (2023 - 2025) focused on digital innovation, sustainability, and artificial intelligence. The color gradient demonstrates that topics such as “green entrepreneurship” and “strategic agility” have emerged as new focal points in the latest literature. This transition reflects the evolving priorities of the startup community in adapting to technological disruptions.

The thematic evolution analysis further revealed that managerial strategies are increasingly aligned with digital business models. Clusters that initially focused on traditional entrepreneurship are now connected to themes of smart technologies, data analytics, and agile management. This transition underscores how startups are reconfiguring their strategic models to remain competitive amid digital transformation. The convergence of sustainability and innovation themes reflects an emerging orientation toward responsible entrepreneurship.

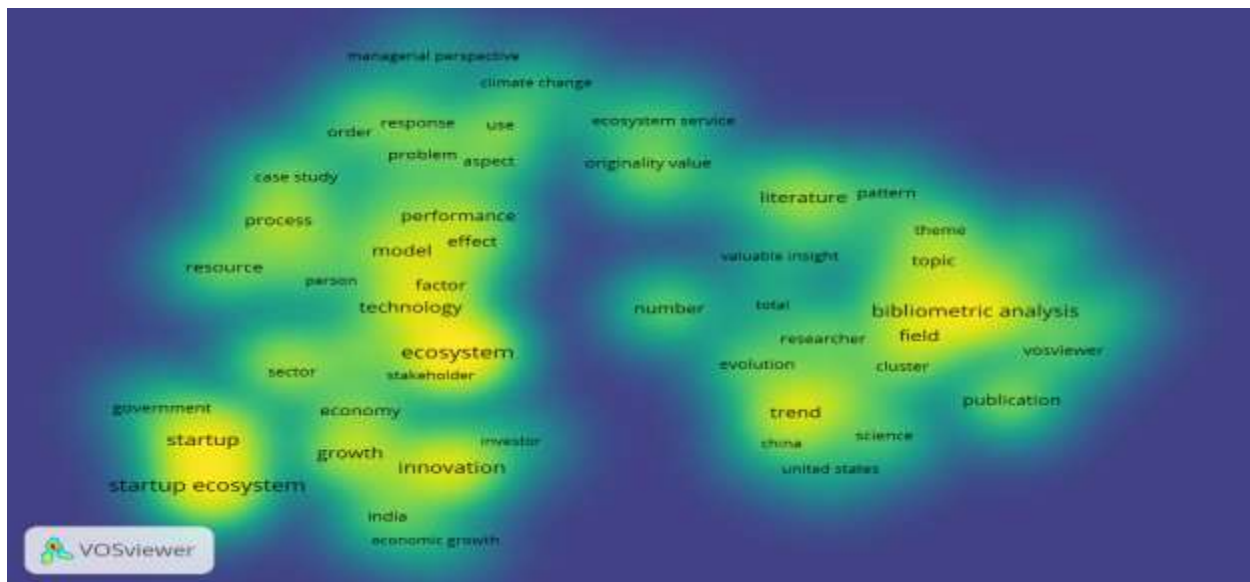


Figure 4 Density Visualization

The density visualization illustrates the concentration of research activity within the bibliometric map. Areas with high density indicate research hotspots, particularly around "innovation management," "entrepreneurial ecosystems," and "strategic leadership." These regions appear in warm colors, signifying their dominance in scholarly attention. Peripheral areas, shown in cooler tones, represent underexplored topics such as "cross-cultural startup models" and "rural entrepreneurship."

The density map suggests that while digital and urban startup ecosystems dominate the discourse, there remains significant potential for research diversification. Future studies could explore non-metropolitan entrepreneurial dynamics, social innovation networks, and sustainable managerial models. These underrepresented areas may provide new insights into inclusive and adaptive entrepreneurship frameworks.

The analysis of citation impact revealed that the most influential papers were not necessarily the most recent, indicating that foundational theories continue to inform current research. Seminal works published between 2019 and 2021 continue to serve as conceptual anchors, especially in defining ecosystem governance and strategic alignment. However, post 2022 publications increasingly emphasize data-driven and sustainability-oriented strategies.

In comparing countries, the United States led in publication volume and citation impact, followed by the United Kingdom and India. Asian countries such as Indonesia, China, and Malaysia showed rapid growth in publications after 2022, demonstrating expanding academic engagement in entrepreneurship and innovation. This reflects a shifting global balance where emerging economies contribute significantly to managerial innovation literature.

Overall, the bibliometric analysis revealed that the field of startup ecosystems and managerial strategies is in a state of dynamic evolution. There is a clear movement from conceptual to empirical and data-driven studies, emphasizing sustainability, collaboration, and technological integration. This finding suggests that academic inquiry increasingly mirrors real-world transformations within entrepreneurial environments.

The visualization outcomes collectively illustrate the interconnectedness, evolution, and intensity of research within this domain. Network visualization exposes collaboration patterns, overlay visualization reveals thematic shifts, and density visualization identifies core and emerging areas. Together, these findings offer a comprehensive overview of how scholarly efforts are shaping the global understanding of startup ecosystems and managerial strategies.

➤ Discussion

The bibliometric analysis of startup ecosystems and managerial strategies reveals a dynamic and rapidly evolving field that reflects the shifting paradigms of entrepreneurship in the digital era. The increasing publication trend between 2019 and 2025 demonstrates a growing global interest in understanding how startups sustain competitive advantage through strategic innovation and ecosystem collaboration. This evolution signifies a transition from early conceptual discussions to empirically driven and technology-oriented research approaches that better reflect the complexities of modern startup environments.

A major implication of the findings is the increasing interdependence between startup ecosystems and managerial capabilities. The strong presence of keywords such as “innovation,” “digital transformation,” and “strategic agility” suggests that effective managerial practices are crucial to navigating uncertainty and fostering resilience. Startups are now positioned not only as business entities but also as learning organizations capable of adapting through continuous

experimentation. This aligns with the idea that innovation ecosystems are built upon collaborative and knowledge-intensive interactions among firms, academia, and government institutions.

The visualization of collaboration networks further emphasizes that global partnerships are a defining feature of startup research and practice. Scholars from developed and developing countries increasingly cooperate, suggesting the diffusion of entrepreneurial knowledge across contexts. Such collaborations enhance methodological diversity and encourage comparative studies, enriching theoretical perspectives on startup management. This trend also mirrors the globalization of entrepreneurial ecosystems, where digital connectivity and open innovation transcend geographical boundaries.

Overlay visualization highlights a significant thematic transition within the literature—from general discussions on entrepreneurship and strategy to focused analyses on sustainability, artificial intelligence, and digital ecosystems. This shift reflects broader societal transformations and technological disruptions that redefine managerial decision-making. Startups are increasingly integrating environmental and social considerations into their business models, supporting the emergence of “green entrepreneurship” as a research frontier. This evolution signals that managerial strategy is no longer solely performance-oriented but also ethically and socially responsible.

The density visualization underscores that innovation management and entrepreneurial ecosystems remain the most concentrated areas of study. However, the emergence of peripheral yet promising topics such as rural entrepreneurship and cross-cultural management indicates a diversification of research interests. These less explored areas may contribute new insights into how local contexts shape startup success. Scholars are encouraged to expand their analyses beyond high-tech urban settings to understand how ecosystem dynamics function in diverse socio-economic environments.

Furthermore, the results show a growing alignment between academia and practice. The emphasis on digital transformation and agile management reflects real-world shifts in startup operations, where technology-driven adaptability determines survival. The integration of managerial strategies with data analytics, platform-based business models, and innovation

ecosystems enhances strategic responsiveness. This alignment demonstrates that academic research increasingly supports practical decision-making processes in entrepreneurial contexts.

The citation network reveals that foundational studies from 2019 to 2021 continue to influence newer works, demonstrating intellectual continuity within the field. However, the emergence of new thematic clusters after 2022 suggests an ongoing theoretical expansion toward sustainability and data-driven governance. This balance between continuity and innovation signifies a healthy academic ecosystem, where established frameworks coexist with novel methodologies that address emerging challenges in startup management.

In sum, this discussion illustrates that the research on startup ecosystems and managerial strategies is characterized by multidimensional growth, thematic diversification, and increasing global collaboration. The convergence of technology, sustainability, and strategic management provides a fertile ground for future research. It reinforces the notion that startups operate within complex, adaptive systems where managerial foresight, innovation capability, and ecosystem engagement collectively determine success.

CONCLUSION AND SUGGESTIONS

➤ Conclusion

This bibliometric study on startup ecosystems and managerial strategies from 2019 to 2025 provides a comprehensive overview of the intellectual landscape, research trends, and collaboration patterns within this domain. The findings demonstrate that scholarly attention to startups has grown substantially, reflecting the increasing relevance of innovation, sustainability, and strategic adaptability in the modern entrepreneurial environment. The consistent rise in publications suggests that startups are no longer perceived merely as business ventures but as key drivers of economic transformation and digital innovation.

The analysis reveals that research on startup ecosystems is highly interdisciplinary, integrating insights from management, technology, and economics. The prominence of keywords such as “innovation,” “strategy,” and “digital transformation” underscores the strategic importance of managerial practices in shaping startup performance. Moreover, the global collaboration

network among authors and institutions indicates that knowledge about startup management has become increasingly internationalized, with cross-border partnerships promoting theoretical and methodological diversity.

The visualization outcomes network, overlay, and density collectively show the maturity and evolution of this research field. Network visualization highlights interconnected authors and institutions that drive collaborative knowledge creation. Overlay visualization shows the temporal shift toward contemporary themes such as sustainability and artificial intelligence, while density visualization identifies research hotspots in innovation and strategic leadership. Together, these analyses provide a detailed understanding of the evolution of startup-related scholarship and its expanding influence.

The study concludes that managerial strategies play a central role in the success and sustainability of startups. Effective strategies are increasingly characterized by agility, digital integration, and ecosystem collaboration. As startups operate within complex and rapidly changing environments, the ability of managers to navigate uncertainty through data-driven and adaptive decision-making has become a defining factor of long-term competitiveness.

➤ Suggestions

Future research should focus on expanding bibliometric analysis to include regional perspectives, particularly from emerging economies where startup ecosystems are still developing. Studies exploring the role of local culture, policy frameworks, and digital infrastructure could provide valuable insights into how contextual factors shape managerial strategy. This approach would deepen the understanding of how startups in diverse environments adopt and adapt global management practices.

Additionally, more empirical and longitudinal studies are needed to examine how managerial strategies evolve over time in response to technological disruptions. Researchers should also investigate the intersection between sustainability and innovation within startup ecosystems to address the growing importance of green and socially responsible entrepreneurship. This direction aligns with the global agenda for inclusive and sustainable economic growth.

From a methodological standpoint, integrating bibliometric approaches with qualitative content analysis could offer richer interpretations of theoretical developments. Combining quantitative mapping with narrative synthesis would enable scholars to capture not only publication trends but also the underlying conceptual shifts that shape the field. Such hybrid approaches are essential for advancing a holistic understanding of managerial dynamics in startup ecosystems. Finally, it is recommended that future research encourage stronger collaboration between academia, industry, and government. Establishing open data platforms and international research consortia could enhance knowledge exchange and foster innovation-driven ecosystems. This synergy will not only strengthen the academic foundation of startup research but also contribute to practical advancements in managerial strategy and entrepreneurship development.

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