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Startup Funding and Venture Capital: A Bibliometric Analysis of Trends and Concept Evolution

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ABSTRACT

This study presents a bibliometric analysis of the scholarly literature on startup funding and venture capital to uncover the intellectual structure, thematic trends, and evolution of concepts within the field. Drawing from 1,102 Scopus-indexed documents published between 2000 and 2024, the analysis employs VOSviewer to visualize keyword co-occurrence, author collaboration networks, temporal trends, and country-level contributions. Results indicate that core themes such as "venture capital," "investments," "startups," and "entrepreneurship" dominate the literature, while newer topics like "crowdfunding," "entrepreneurial finance," and "disruptive innovation" are emerging as areas of interest. Author network analysis highlights key contributors such as Lerner, Gompers, and Kaplan, with the United States leading in publication volume and global collaboration. Overlay and heatmap visualizations reveal a shift from traditional finance-oriented research to more diverse, interdisciplinary topics aligned with technological change and global entrepreneurship. The findings offer valuable insights for academics, investors, and policymakers to better understand the dynamics of startup financing and inform future research directions.

Keywords: *Startup funding, Venture capital, Entrepreneurial finance, Bibliometric analysis.*

INTRODUCTION

In the last two decades, startup ecosystems have transformed global economies by fostering innovation, creating jobs, and redefining traditional business models. Central to the growth and scalability of startups is access to adequate funding, which enables entrepreneurs to develop products, build teams, and enter markets. Among various funding mechanisms, venture capital (VC) has emerged as a dominant source of finance, particularly in high-growth and technology-driven sectors [1], [2]. The VC model offers more than just financial support—it provides strategic mentorship, market access, and credibility that accelerates business development. The rising importance of startups in both developed and emerging economies has attracted significant scholarly attention, resulting in a growing body of literature on startup funding and venture capital dynamics [3].

Venture capital is a subset of private equity, typically invested in early-stage, high-potential companies. Unlike conventional bank loans, VC investments are characterized by high risk and high return expectations, with investors often taking equity stakes and an active role in governance [4]. In recent years, the structure and strategy of venture capital have evolved, reflecting broader shifts in technology, regulation, and globalization. For instance, the emergence of corporate venture capital, crowdfunding, and government-backed VC programs demonstrates the diversification of startup financing channels [5]. These trends indicate that the field of startup funding is dynamic, necessitating a systematic analysis to capture its evolution.

The academic interest in startup funding and venture capital has expanded across multiple disciplines including finance, management, entrepreneurship, and innovation studies. However, due to the interdisciplinary nature of the subject, the literature has become fragmented, with research themes dispersed across journals and conceptual frameworks. Bibliometric analysis offers a robust

approach to synthesize these scattered insights, map intellectual structures, and identify emerging themes [6]. Through a systematic mapping of scientific publications, researchers can gain clarity on the development trajectories of concepts, key contributors, collaborative networks, and thematic shifts in the field.

Moreover, global economic crises, technological disruptions, and policy reforms have significantly influenced the flow of venture capital and the resilience of startup ecosystems. The COVID-19 pandemic, for example, altered risk perceptions and investment strategies among venture capitalists, while simultaneously accelerating digital adoption and the emergence of new startup domains such as health tech and remote work tools [7]. Understanding how such events shape academic discourse on startup funding is essential for both scholars and practitioners. A longitudinal bibliometric perspective can reveal how the field has responded to these external shocks and what conceptual tools have been developed or modified in response.

As innovation ecosystems become more interconnected globally, comparative studies and cross-border investments are gaining prominence. Regions such as Southeast Asia, Latin America, and Africa have seen a surge in venture capital activity, prompting research interest in regional characteristics and investor behavior [8]. These developments suggest that startup funding research is not only expanding in volume but also diversifying in scope and geography. A comprehensive bibliometric analysis is thus timely to capture these broad transformations and offer a consolidated overview of conceptual evolution in startup funding and venture capital literature.

Despite the growing volume of research in startup funding and venture capital, there is a lack of comprehensive synthesis regarding how the core concepts, research themes, and scholarly networks have evolved over time. Previous reviews tend to be narrative or limited to specific regions or themes, offering fragmented perspectives. Consequently, stakeholders, ranging from scholars and policy-makers to investors, face difficulties in accessing structured knowledge and identifying gaps or emerging frontiers in the literature. There is an evident need to map the intellectual landscape and thematic progression in a systematic, quantitative manner to inform future research and practical decisions. This study aims to conduct a bibliometric analysis of the scholarly literature on startup funding and venture capital to identify publication trends, influential authors and journals, co-authorship networks, and the evolution of key themes and concepts over time.

METHOD

This study employed a quantitative bibliometric analysis approach to systematically evaluate and visualize the structure, development, and thematic evolution of the scholarly literature on startup funding and venture capital. Bibliometric analysis is a robust method for examining large volumes of academic publications to identify patterns, influential contributors, and emerging trends in a particular field of research [6]. The analysis focused on both performance indicators (e.g., publication and citation counts) and science mapping techniques (e.g., co-citation, co-authorship, and keyword co-occurrence analysis).

The bibliometric data were extracted from the Scopus database, chosen for its extensive coverage of peer-reviewed literature across multidisciplinary domains, including business, management, and economics. To ensure relevance and comprehensiveness, a combination of keywords was used in the search query, including: ("startup funding" OR "venture capital" OR "startup investment" OR "seed funding" OR "early-stage financing") AND ("entrepreneurship" OR "innovation" OR "new ventures"). The search was limited to journal articles, conference papers, and reviews, published in English, with a publication timeframe from 2000 to 2024 to capture a longitudinal perspective. The search was conducted in May 2025, yielding an initial dataset of 1,235 documents. After removing duplicates and irrelevant results through manual screening of titles and abstracts, a final dataset of 1,102 documents was retained for analysis.

To perform bibliometric mapping and visualization, the study utilized VOSviewer (version 1.6.x), a widely used software tool for constructing and visualizing bibliometric networks [9]. The

tool enabled the creation of network maps based on co-authorship, citation and keyword co-occurrence. The minimum threshold for inclusion in the visual maps (was set based on the data distribution to balance detail and interpretability. For example, in the keyword analysis, only terms that appeared at least 10 times across the dataset were included in the final map.

RESULT

Keyword Co-Occurrence Analysis

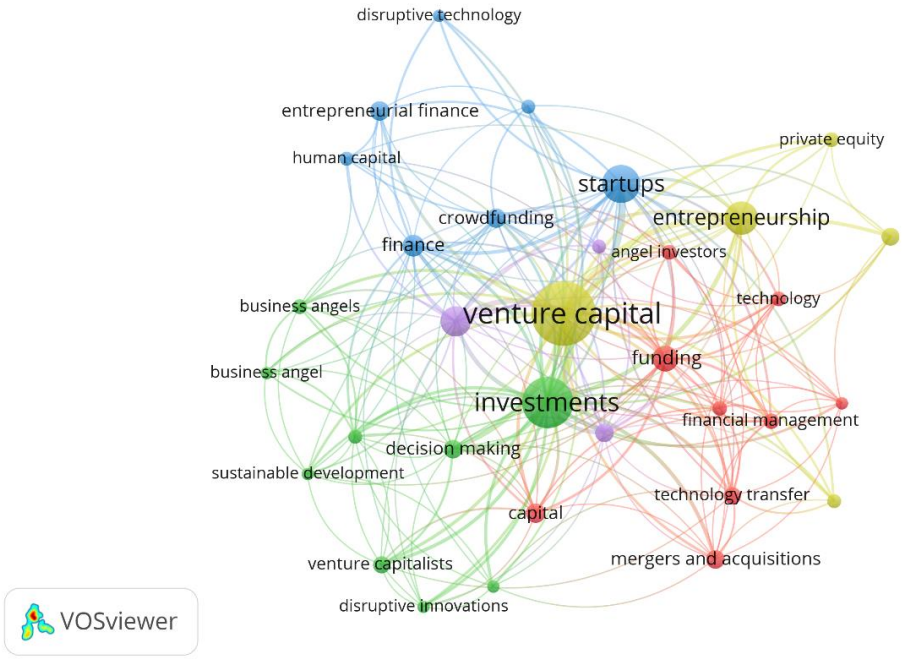

Figure 1. Network Visualization
Source: Data Analysis

The visualization above presents a keyword co-occurrence network that maps the intellectual structure of scholarly publications related to startup funding and venture capital. Each node represents a keyword, and the size of the node indicates its frequency of occurrence in the dataset. The lines connecting nodes illustrate co-occurrence relationships, meaning that the keywords often appear together in the same documents. Different colors represent distinct thematic clusters that have emerged from the analysis. At the center of the map lies the term "venture capital", which forms the densest and most interconnected hub, suggesting its foundational role in this research field. Closely linked to it are terms like "investments", "startups", "entrepreneurship", and "funding", indicating that these concepts frequently co-occur in scholarly discussions. This central cluster underscores the integrative nature of venture capital as a bridge between entrepreneurial activity and financial investment. The prominence of these nodes suggests that research in this area revolves around understanding how capital flows influence the formation and success of new ventures.

Distinct thematic clusters also emerge in the network. The green cluster emphasizes decision-making, sustainable development, venture capitalists, and business angels, reflecting a stream of literature concerned with the roles and behaviors of investors and their impact on startup sustainability. The blue cluster, centering on entrepreneurial finance, crowdfunding, and human capital, represents a focus on alternative financing mechanisms and the non-monetary factors (e.g., skills, networks) essential to startup success. The red cluster, which includes keywords like technology transfer, financial management, and mergers and acquisitions, points to a body of research focused on corporate finance, exit strategies, and the technological commercialization

aspects of venture investment. The spatial layout and connectivity of the nodes also provide insights into how research themes are evolving and interlinked. Keywords such as "disruptive technology", "technology transfer", and "private equity" are slightly more peripheral but still well-connected, suggesting emerging intersections between innovation management, technological entrepreneurship, and startup funding. These areas may represent newer or more specialized research niches within the broader venture capital literature.

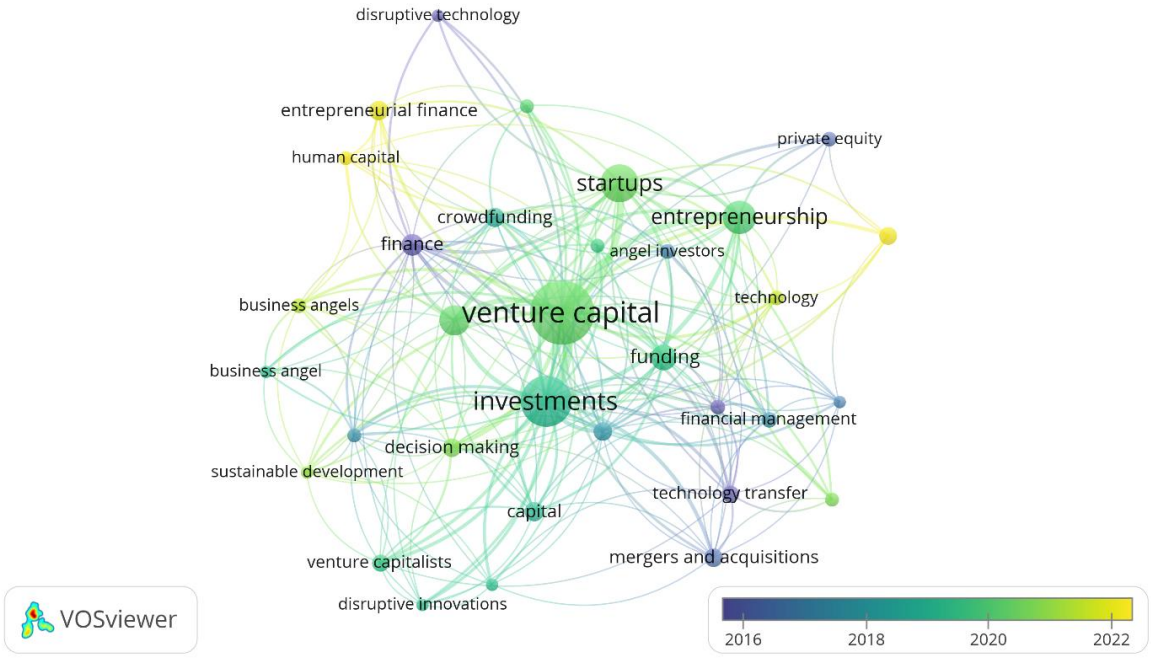

Figure 2. Overlay Visualization
Source: Data Analysis

The overlay visualization above illustrates the temporal evolution of keyword usage in the domain of startup funding and venture capital. The color gradient, ranging from blue (older publications, ~2016) to yellow (recent publications, ~2022), reveals how research themes have shifted over time. Central keywords such as "venture capital", "investments", "startups", and "entrepreneurship" appear in green, indicating they have been consistently prominent throughout the analyzed period. These keywords form the backbone of the field, anchoring various thematic developments from both earlier and more recent research. Notably, keywords in blue and purple tones such as "finance", "financial management", "technology transfer", and "decision making" are associated with earlier publications, reflecting the initial focus of the literature on traditional financial theory, investment mechanisms, and firm-level strategic processes. These foundational themes laid the groundwork for understanding how venture capital operates and integrates with corporate and innovation finance. Over time, however, attention has shifted toward more dynamic, contemporary themes. Emerging themes, highlighted in yellow include "entrepreneurial finance", "private equity", "human capital", and "disruptive technology", suggesting a growing interest in new financing models, talent-driven investment dynamics, and technological disruption in the entrepreneurial landscape. These terms represent the cutting edge of research, often in response to post-2020 developments such as digital transformation, platform-based startups, and evolving investor behavior.

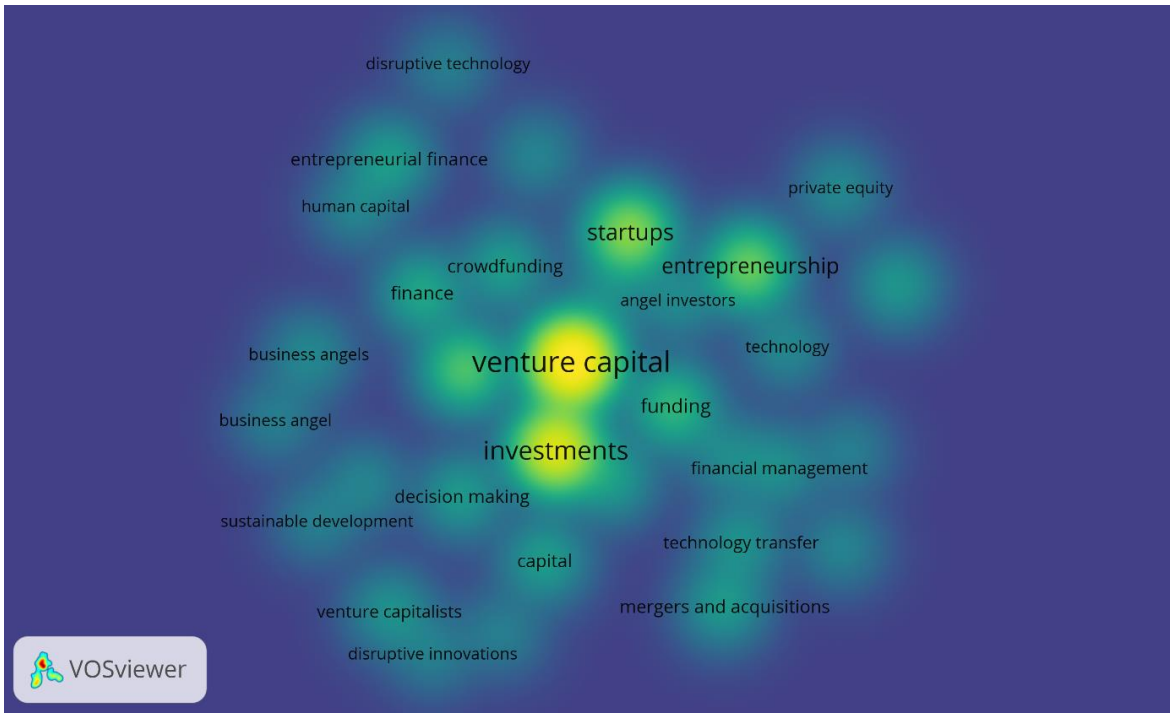

Figure 3. Density Visualization
Source: Data Analysis

The heatmap visualization above, generated using VOSviewer, represents the density of keyword occurrences within the research domain of startup funding and venture capital. The intensity of color, ranging from dark blue (low frequency) to bright yellow (high frequency), indicates the concentration of studies around particular keywords. The brightest areas are centered around “venture capital”, “investments”, “startups”, and “entrepreneurship”, signifying these as the most frequently discussed and co-occurring terms in the literature. These terms form the conceptual core of the field, reflecting a dominant research focus on how capital flows into entrepreneurial ventures and the mechanisms by which startups secure financing. In contrast, the outer regions of the heatmap, such as those containing “disruptive innovations”, “human capital”, “technology transfer”, and “mergers and acquisitions”, show lighter green or bluish shades. These keywords are still part of the intellectual structure but occur less frequently or are more peripheral in focus. However, their presence suggests emerging or niche areas of inquiry, indicating directions for future research.

Co-Authorship Analysis

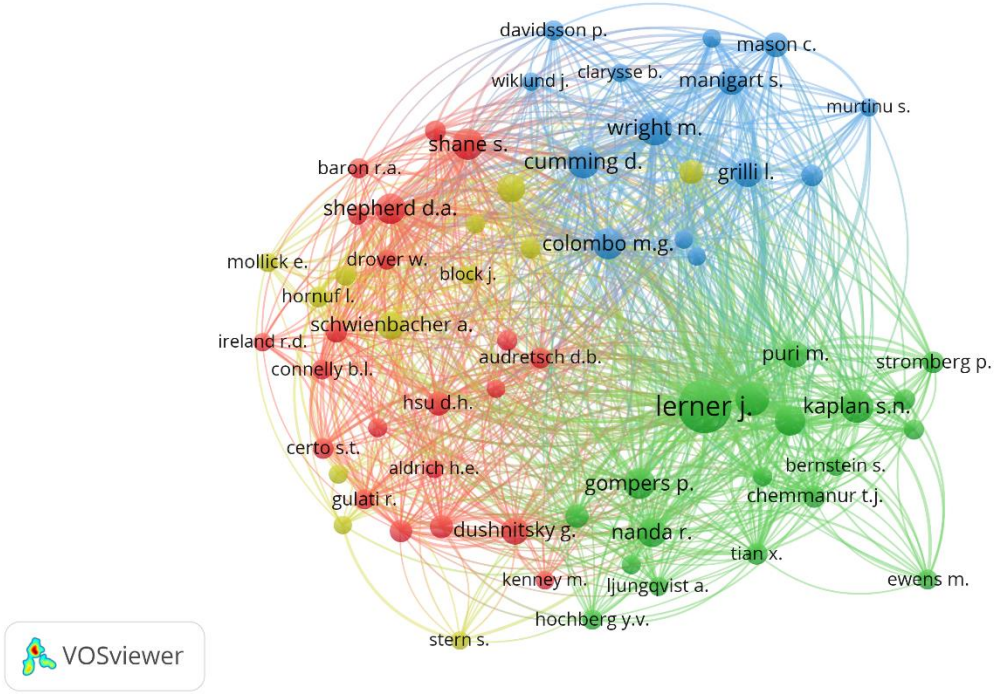

Figure 4. Author Visualization
Source: Data Analysis

The co-authorship network visualization above maps the intellectual collaboration among the most prolific and influential authors in the field of startup funding and venture capital. Each node represents an author, and the size of the node reflects the number of publications or citation strength. The thickness of connecting lines indicates the strength of co-authorship ties. The map reveals three major clusters: the green cluster prominently featuring Lerner J., Kaplan S.N., Gompers P., and Nanda R., representing a dominant group focused on empirical financial analysis and venture capital economics; the red cluster around Shepherd D.A., Shane S., and Audretsch D.B., associated with entrepreneurship theory and strategic management; and the blue cluster including Cumming D., Wright M., and Mason C., reflecting strong contributions to international venture capital and innovation policy.

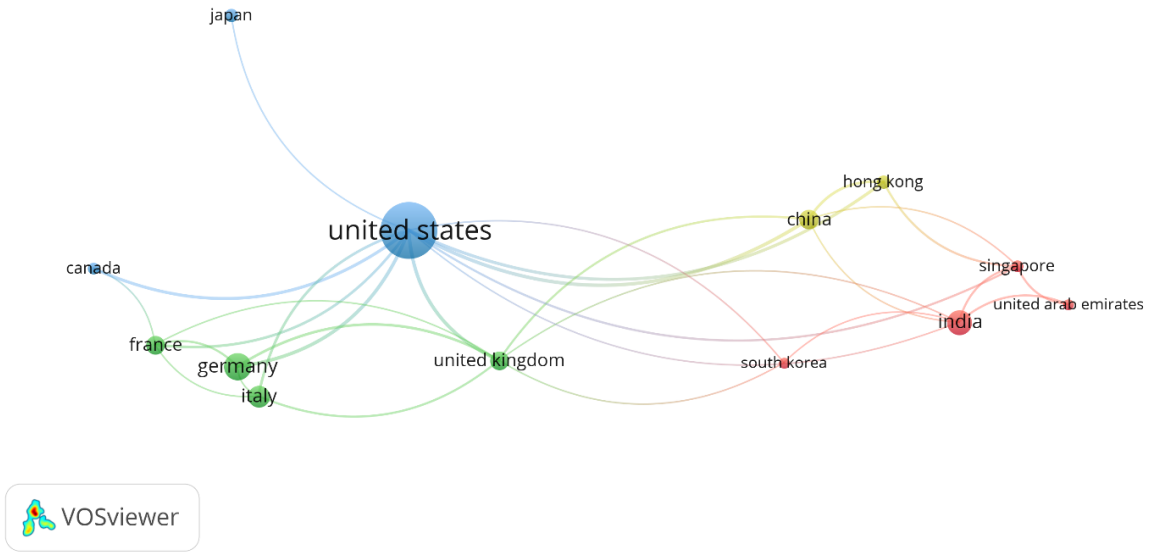

Figure 5. Country Visualization
Source: Data Analysis

The country collaboration network depicted in the visualization highlights the global distribution and interconnectivity of scholarly research on startup funding and venture capital. The United States dominates the landscape, represented by the largest node and the highest number of international co-authorship links, indicating its central role in producing and disseminating research in this field. Strong collaborations are visible between the U.S. and countries like the United Kingdom, Germany, China, and India, suggesting robust transatlantic and Asia-Pacific scholarly exchanges. European countries such as France, Germany, and Italy form a closely connected cluster, while India, Singapore, and the United Arab Emirates form another active regional group in Asia. The network illustrates the increasing globalization of research on venture capital, with both Western and Asian countries contributing to and benefiting from shared knowledge and collaboration.

Citation Analysis

Table 1. Most Cited Article

Citations	Author and Year	Title
567	[2]	Venture capital financing and the growth of startup firms
281	[10]	Better together? signaling interactions in new venture pursuit of initial external capital
255	[11]	Gender gap in entrepreneurship
206	[12]	A woman's place is in the… startup! Crowdfunder judgments, implicit bias, and the stereotype content model
191	[13]	The Best of Both Worlds: The Benefits of Open-specialized and Closed-diverse Syndication Networks for New Ventures' Success
168	[8]	Signaling by early stage startups: US government research grants and venture capital funding
160	[14]	Fostering digital entrepreneurship from startup to scaleup: The role of venture capital funds and angel groups
133	[15]	Funding new business ventures: Are decision makers biased against women entrepreneurs?
124	[16]	Limited attention and the role of the venture capitalist

113	[17]	Informal risk capital investors: Investment patterns on the East Coast of the U.S.A.

Source: Scopus, 2025

DISCUSSION

Central Themes and Conceptual Core

The keyword co-occurrence network identified "venture capital", "investments", "startups", and "entrepreneurship" as the dominant and most central concepts within the literature. These terms not only had the largest node sizes reflecting high frequency of use but also occupied the densest cluster in the network map, suggesting their centrality to the field's intellectual structure. The prominence of these terms aligns with the foundational theory of entrepreneurial finance, where access to capital, innovation, and firm formation are tightly interconnected [8], [18]. Surrounding these core terms are other significant yet slightly less central concepts such as "angel investors", "crowdfunding", "financial management", and "technology transfer", indicating the diversification of funding channels and the growing complexity of financing mechanisms available to startups. The presence of "disruptive innovations" and "sustainable development" also suggests that researchers have begun to explore how venture capital intersects with broader technological and societal changes.

Temporal Trends and Emerging Themes

The overlay visualization (color-coded by publication year) provided further nuance by indicating how the field has evolved over time. Earlier research (2016–2018), represented in darker tones, focused on traditional themes like finance, capital, technology transfer, and financial management. These reflect foundational studies in the field, which explored the mechanics of investment evaluation, risk-return profiles, and early-stage firm valuation. More recent years (2020–2022), shown in yellow hues, have seen a shift toward topics such as entrepreneurial finance, human capital, disruptive technology, and private equity. This shift indicates that the field is increasingly engaging with newer paradigms such as platform economies, digitization, and the role of non-financial capital (e.g., skills, networks) in startup success. For instance, research on human capital in the context of venture capital now considers how founders' educational background, experience, and social capital influence funding success and firm performance [19]. The rising interest in crowdfunding and alternative finance reflects a democratization of startup funding, where non-institutional actors play a growing role. These developments are particularly relevant in emerging markets, where traditional venture capital may be scarce. Thus, the literature is shifting from a capital-centric view to a more ecosystem-based understanding of entrepreneurial finance.

Author Collaboration and Intellectual Structure

The co-authorship network revealed a well-defined structure of scholarly collaboration, with several prominent clusters. The green cluster, led by influential figures such as Lerner J., Gompers P., and Kaplan S.N., is centered on empirical studies of venture capital structures, investment outcomes, and governance mechanisms. These authors are highly cited and form the intellectual backbone of the field. The red cluster, featuring Shane S., Shepherd D.A., and Audretsch D.B., leans more toward strategic management and entrepreneurial behavior. Their research often bridges economics, sociology, and management, focusing on how individual and institutional factors shape entrepreneurial success and investor decisions. Meanwhile, the blue cluster including Cumming D., Wright M., and Mason C. represents a strong tradition of international research, particularly in Europe. Their work highlights policy frameworks, regional funding disparities, and institutional diversity in venture capital systems. These collaborations across clusters signify the interdisciplinary nature of the field and its growing integration of finance, management, innovation, and policy studies. Interestingly, despite the density of intra-cluster connections, there is also evidence of cross-cluster collaboration, particularly among leading scholars. This interdisciplinary

engagement strengthens the field's capacity to address complex, real-world issues, such as the design of inclusive financial systems or the impact of geopolitical risk on startup ecosystems.

Geographic Distribution and International Collaboration

The country collaboration map highlighted the United States as the epicenter of research in startup funding and venture capital. The U.S. not only dominates in volume but also serves as a key collaborator with almost every major region, especially Europe (UK, Germany, France, Italy) and Asia (China, India, Singapore). This reflects the global relevance of Silicon Valley as both a practical and theoretical reference point for entrepreneurial finance. European countries exhibit strong intra-regional collaboration, with Germany, France, Italy, and the UK forming a cohesive research bloc. Their contributions are often policy-oriented and contextualized within regional innovation systems. For example, the EU's Horizon funding initiatives and cross-border startup programs have spurred interest in how venture funding mechanisms differ across member states. Asia, especially India, China, Singapore, and the UAE, has emerged as a dynamic zone of growth. These countries are increasingly producing high-impact research and forming their own scholarly communities, often in collaboration with Western institutions. India's growing research activity, for instance, reflects the parallel rise of its startup ecosystem and government-backed VC initiatives like "Startup India". These geographic trends underscore a global diffusion of venture capital research, suggesting a transition from Western-centric models to more diverse, context-sensitive frameworks.

Implications for Future Research and Practice

The bibliometric patterns identified in this study point to several important directions for future research. First, while financial capital remains central, there is a need to further explore non-financial enablers of venture success, such as knowledge spillovers, policy environments, and human capital. Second, with increasing attention to sustainability and impact investing, researchers should examine how venture capital can be mobilized for social and environmental outcomes, not just financial returns. Third, the evolution of digital platforms, tokenized assets, and decentralized finance (DeFi) opens up new avenues for studying how technology is reshaping startup funding paradigms. How do blockchain-based financing models compare with traditional venture capital? How are investor decision-making processes changing in the presence of real-time analytics and machine learning tools? Practitioners can also benefit from this study. By understanding how academic discourse evolves, they gain a window into emerging best practices, investment trends, and institutional shifts. The bibliometric map can guide practitioners in identifying credible research streams and thought leaders, enhancing their strategic decision-making and policy formulation.

CONCLUSION

This study provides a comprehensive bibliometric analysis of the scholarly landscape surrounding startup funding and venture capital, revealing the conceptual structure, intellectual evolution, and global collaboration patterns in this field. The findings highlight that "venture capital," "investments," and "startups" remain central themes, while emerging topics such as "entrepreneurial finance," "crowdfunding," and "disruptive technology" reflect the dynamic expansion of the field in response to technological and market shifts. Collaboration networks show strong contributions from leading scholars like Lerner and Gompers, with the United States serving as the dominant hub of international research. Notably, Asia is gaining prominence with increased research output and regional partnerships. These insights underscore the importance of interdisciplinary approaches and global perspectives in understanding how startup funding mechanisms evolve. Future research should continue to explore alternative financing models, sustainability considerations, and digital innovations to enrich the theoretical and practical understanding of venture capital ecosystems worldwide.

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