

ENTREPRENEURIAL FINANCE: A BIBLIOMETRIC ANALYSIS ON INTERNATIONAL SCIENTIFIC PUBLICATIONS

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Abstract

Entrepreneurial Finance, as an essential component of entrepreneurship, encloses the financial sources and strategies that entrepreneurs need to access to establish and grow their new ventures. The purpose of this study is to set the framework of historical development of Entrepreneurial Finance as a research field, and identify recent research trends in this field. For this reason, 2301 international publications from Web of Science (WoS) database in Entrepreneurial Finance field, published in between 1981-2025, is examined by using bibliometric analysis. The results show that research on Entrepreneurial Finance started 44 years ago, but gained momentum in the last eight years. Although the research on this topic still remains fragmented, terms such as “resilience”, “impact investing” and “sustainability” has been the main trends lately, with a focus on firm performance, growth and innovation.

Keywords: Entrepreneurship, Entrepreneurial Finance, Bibliometric Analysis, Systematic Literature Review, Web of Science

JEL Classification: G24, G32, L26, M13

GİRİŞİMCİLİK FİNANSMANI: ULUSLARARASI BİLİMSEL YAYINLAR ÜZERİNE BİBLİYOMETRİK BİR ANALİZ

Öz

Girişimciliğin önemli bir bileşeni olan girişimcilik finansmanı, girişimcilerin yeni işletmelerini kurmak ve büyütmek için erişmeleri gereken finansal kaynakları ve stratejileri kapsamaktadır. Bu çalışmanın amacı, bir araştırma alanı olarak girişimcilik finansmanının tarihsel gelişiminin çerçevesini çizmek ve bu alandaki son araştırma eğilimlerini belirlemektir. Bu nedenle, Web of Science (WoS) veri tabanından girişimcilik finansmanı alanında 1981-2025 yılları arasında yayınlanmış 2301 uluslararası yayın bibliyometrik analiz kullanılarak incelenmiştir. Sonuçlar, girişimcilik finansmanı üzerine araştırmaların 44 yıl önce başladığını, ancak son 8 yılda ivme kazandığını göstermektedir. Bu konudaki araştırmalar halen oldukça çeşitli olsa da, “esneklik”, “etki yatırımı” ve “sürdürülebilirlik” gibi terimler, firma performansı, büyüme ve inovasyon odağında son dönemin ana eğilimlerini oluşturmuştur.

Anahtar kelimeler: Girişimcilik, Girişimcilik Finansmanı, Bibliyometrik Analiz, Sistematik Literatür Taraması, Web of Science

JEL Sınıflaması: G24, G32, L26, M13

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1. Introduction

Entrepreneurship refers to the process through which individuals conceive, develop and manage a new business ventures aimed at introducing a product or service to the market, often under conditions of significant uncertainty. Entrepreneurs play a crucial role to recognize opportunities, take risks and mobilize the necessary financial, market and technological resources, and drive economic growth and development. An essential resource, financing, employ unique challenges for entrepreneurial activities, differing significantly from financial challenges faced by established firms.

Entrepreneurial Finance is a research field that focuses on examining the ways entrepreneurs raise, allocate and manage financial resources through their venture's lifecycle, while coping with financial challenges, such as illiquidity, information asymmetry and high level of uncertainty. Entrepreneurial Finance theoretical foundations have shifted from traditional finance principles and debt-based models to high-growth venture frameworks focusing on equity, evolving significantly through the years. Today, Entrepreneurial Finance has made crucial advancements in financial models, resulting with financial innovations such as venture capital, crowdfunding system and tokenized assets.

In order to fully capture the historical shifts and focal points of a specific subject, as well as to make evaluations and predictions regarding the subject, bibliometric analysis is an effective tool. Bibliometric analysis is a quantitative method that is used to analyze scientific literature for the purpose of understanding the research trends, characteristics of disciplines and current state of research. The method also evaluates the most influential researchers and the most cited research through a systematic literature review. The application of bibliometric analysis has substantially increased in recent years, providing detailed and quantitative information related to scientific literature.

For this reason, the study analyzes 2301 international publications, retrieved from Web of Science (WoS) database, by utilizing Bibliometrix, an RStudio package for designed for performance analysis and science mapping, and VOSviewer, a software tool for constructing and visualizing bibliometric networks. Analyzing the studies focusing on Entrepreneurial Finance within international publications could offer an important step in identifying prominent research and scholars in Entrepreneurial Finance field. Moreover, this kind of analysis may provide valuable insights into the theoretical advancements and trends over time, particularly in recent years.

The structure of this study is organized as follows: The theoretical foundations of Entrepreneurial Finance are laid out in the section, which is followed by the third section outlining the data and methods used in this research. The fourth section presents and discusses the findings of the bibliometric analysis. The final section provides a summary of the main findings, indicates the study's limitations, and makes recommendations for possible future research.

2. Theoretical Background

Entrepreneurship is a business activity, in which individuals pursue opportunities to increase their economic wealth, while taking creative initiatives with limited resources in an uncertain environment (Shane and Venkataraman, 2007). Entrepreneurs are seen as economic agents who contribute to job creation, innovation, and economic progress across various industries. Entrepreneurial activities are essential for modern market economies, due to creating dynamism with the establishment of new ventures, fostering competition and economic growth (Friedrich et al., 2006).

A critical limited resource, financing, is fundamental to entrepreneurship, because it addresses crucial constraints, such as resource mobilization, risk management and investment alignment (Welpé and Grichnik, 2006). Entrepreneurial Finance plays a vital role on new ventures to flourish, grow and keep sustainable (Owers and Sergi, 2019). One of the most crucial setbacks for entrepreneurial firms is facing insufficient equity and financing problems (Shane and Cable, 2002). As a research topic, Entrepreneurial Finance deals with financing ways and sources of entrepreneurial activities and looks for answers to essential issues such as potential financing resources, amount of capital to be raised, timing of engaging in financing efforts, structure of optimal contracts, and decisions on exit or liquidation strategies.

Entrepreneurial Finance had been an understudied research field until the early 1990s, limited number of studies focusing on this subject and no established connection between entrepreneurship and corporate finance (Denis, 2004). The development of this research field sets its foundations to financial growth theory by Berger and Udell (1998). Their study claims that new ventures' financing sources and strategies are dynamic over the venture's lifecycle, needs for funding increasing and information uncertainty decreasing as the venture matures. A number of studies supported this theory through the years, showing that new ventures initially rely on insider capital (such as personal savings) and move to external equity (such as venture

capital, angel investors) and debt (such as bank loans) in the later stages (Robb and Robinson, 2019; Cotei and Farhat, 2017).

Subsequently, Agency Theory and Pecking Order Theory have further contributed to Entrepreneurial Finance field. Agency Theory explains the issues of moral hazard and adverse selection between entrepreneurs and financing sources (Brophy and Shulman, 1992; Pare et al., 2009; Mitter and Kraus, 2011), while Pecking Theory brings additional interpretation to financial growth theory by showing entrepreneurs' funding preferences are ranked as internal funds, debt and equity (Robb and Robinson, 2009). A detailed historical development timetable of Entrepreneurial Finance as a research field is presented in Table 1.

Table 1. Historical Development of Themes and Theories in Entrepreneurial Finance

| Time Period | Themes and Theories in Entrepreneurial Finance |
|---|--|
| Early Foundations: <i>Pre-1990s</i> | <ul style="list-style-type: none"> • Early research applied corporate finance theories on entrepreneurship, such as asymmetric information and agency dilemma (Brophy and Shulman, 1992). |
| Emergence of Equity Models and Lifecycle Frameworks: <i>1990s</i> | <ul style="list-style-type: none"> • Financial Growth Cycle Theory connected venture lifecycle stages with different financing sources (self-financing – angel investors/Venture Capital – bank loans – Initial Public Offering) (Berger and Udell, 1998). • Literature identified Venture Capital as an alternative debt source for new ventures (Winton and Yerramilli, 2008). |
| Theory Consolidation: <i>2000s</i> | <ul style="list-style-type: none"> • Empirical studies tested financial growth cycle theory and pecking order theory, highlighting the impact of maturity and information asymmetry on financing sources (Fluck et al., 1998). |
| Alternative Financing Models: <i>2010s</i> | <ul style="list-style-type: none"> • Crowdfunding, accelerators and Initial Coin Offerings emerged as alternative methods for financing entrepreneurial activities (Bellavitis et al., 2016). • Behavioral finance and cultural/geographical differences became another focus point for entrepreneurial research (Cumming and Johan, 2017). |
| New Trends - Digitalization: <i>2020s</i> | <ul style="list-style-type: none"> • Digitalization and new types of investors (such as Environmental Social and Governance-focused investors) along with Venture Capital became hot topics of entrepreneurial finance research (Konga and Ramaiah, 2023; Manigart and Khosravi, 2023). |

Source: Elaborated by the author

In addition to the entrepreneurs themselves, the financing sources for new ventures can be categorized as follows (Owers and Sergi, 2019):

- Personal networks, including family and friends,
- Government agencies or specialized funding programs,
- Angel investors,
- Digital platforms, such as crowdfunding and Initial Coin Offerings (ICOs),
- Institutional investors, including Venture Capital (VC) Funds, Private Equity Funds, and Hedge Funds,
- Initial Public Offerings (IPOs) of shares.

The financing sources for entrepreneurs are significantly different from financing of established firms, as one can easily understand from the table above. The following factors may help us to understand the reasons behind these differences, and the crucial role of entrepreneurial financing on entrepreneurship.

First, new ventures are often unable to rely on traditional financing models, such as bank loans, since they are characterized by high levels of uncertainty and lack of collateral. Entrepreneurial Finance provides these mechanisms, via venture capital, crowdfunding, ICO, which allow entrepreneurs access the necessary capital (Frimanslund et al., 2022).

Another issue faced by the entrepreneurs involves non-diversifiable risks, because they rely on only one product or business model. These risks increase the financial stress level of the entrepreneur, considering their personal finances are solely tied to their new venture. Entrepreneurial Finance helps the entrepreneurs deal with these risks appropriately, increasing the chances of their success and survival (Jang et al., 2015). Moreover, Entrepreneurial Finance provides theoretical models to give entrepreneurs a better insight while making choices between different financing sources, such as trade-offs between debt and equity (Fourati and Affes, 2013).

Theoretical concepts, such as Signaling Theory, contributes to entrepreneurs aligning with investors in Entrepreneurial Finance. In addition, Entrepreneurial Finance offers solutions such as staged financing and convertible debt structures, to help mitigate agency problems and moral hazard (Bruton et al., 2015). Entrepreneurial financing mechanisms, crowdfunding, peer-to-peer lending, democratize access to capital for startups in diverse sectors and geographies (Bellavitis et al., 2016). Lastly, the emerging behavioral finance model within Entrepreneurial

Finance help entrepreneurs to overcome decision-making biases, and improve decision-making process (Ang, 2018).

Recent research in entrepreneurial finance has increasingly focused on digital, inclusive, and impact-oriented funding mechanisms rather than exclusively on traditional venture capital and bank lending. One major stream examines equity crowdfunding and token-based offerings, highlighting how platform design, disclosure, and investor communities shape funding outcomes, follow-on financing, and venture development (Block et al., 2020; Howell et al., 2020). A second stream explores fintech-enabled debt and marketplace lending, analyzing how alternative data and machine-learning-based credit scoring affect the allocation of credit to small and entrepreneurial firms, documenting both expanded access and novel risks or biases (Berg et al., 2020; Fuster et al., 2019). A third line of studies focus on inequality in entrepreneurial finance, particularly gender-based disparities in early-stage funding. (Ewens & Townsend, 2020). In addition, ESG-oriented Entrepreneurial Finance has emerged as a distinct research domain, examining how impact investors and ESG-focused capital providers structure contracts, select ventures, and trade off financial returns against social or environmental objectives (Barber et al., 2021).

3. Method

This study seeks to investigate the historical development and current trends in Entrepreneurial Finance research, as outlined earlier. To achieve this, bibliometric analysis—a quantitative research method—is employed. This approach is selected since it allows to detect the developmental trajectories of a research field in question, to demonstrate the interconnections among the studies and to reveal the intellectual structure of the field by the application of various mathematical and statistical techniques.

By applying the bibliometric analysis, the study aims to address the following research questions:

- What are the types and the numbers of studies conducted in the field of Entrepreneurial Finance?
- How are the studies on Entrepreneurial Finance distributed by year?
- What are the journals with the most studies published on Entrepreneurial Finance?
- What are the countries where the most Entrepreneurial Finance studies have been conducted?

- Which are the ten most cited publications on Entrepreneurial Finance and who are their authors?
- Who are the most cited authors in Entrepreneurial Finance field, and what are their number of publications?
- What are the most frequently used keywords in studies on Entrepreneurial Finance and their development by time?
- What are the social, intellectual and conceptual structures of studies conducted in the field of Entrepreneurial Finance?

The data for the analysis is gathered from Web of Science (WoS) database, which covers over 15,000 scientific journals and 90 million scientific documents (Forliano et al., 2021). The following command, ""entrepreneur* financ*" or "entrepreneur* funding"" is used in the subject field to gather the dataset from the WoS database on December 29th, 2024. Consequently, 2301 publications, published in a period of 1981 and 2025, focusing on Entrepreneurial Finance has been gathered. The data is analyzed by using VOSviewer, developed by N.J. van Eck and L. Waltman, and Bibliometrix package in R, developed by M. Aria and C. Cuccurullo.

4. Findings and Discussion

The general characteristics of publications in the field of Entrepreneurial Finance are summarized in Tables 2 and 3. A total of 2301 publications, authored by 4381 scholars, have been identified between 1981 and 2025. With a mean citation count of 19.39 and an average publication age of 6.33 years, these publications underscore the fact that Entrepreneurial Finance is a relatively recent and an emerging area of research. Notably, 2031 of these publications (88% of the total) are research articles, underscoring the field's strong emphasis on empirical and theoretical contributions.

Table 2. Type and Number of Publications

| Time Interval | 1981 - 2025 |
|------------------------|--------------------|
| Number of Publications | 2301 |
| Times Cited | 44590 |
| Average Times Cited | 19.39 |
| H-Index | 93 |
| References | 88204 |
| Authors | 4381 |
| Document Average Age | 6.33 |
| Keywords | 4217 |

Table 3. Type and Number of Publications

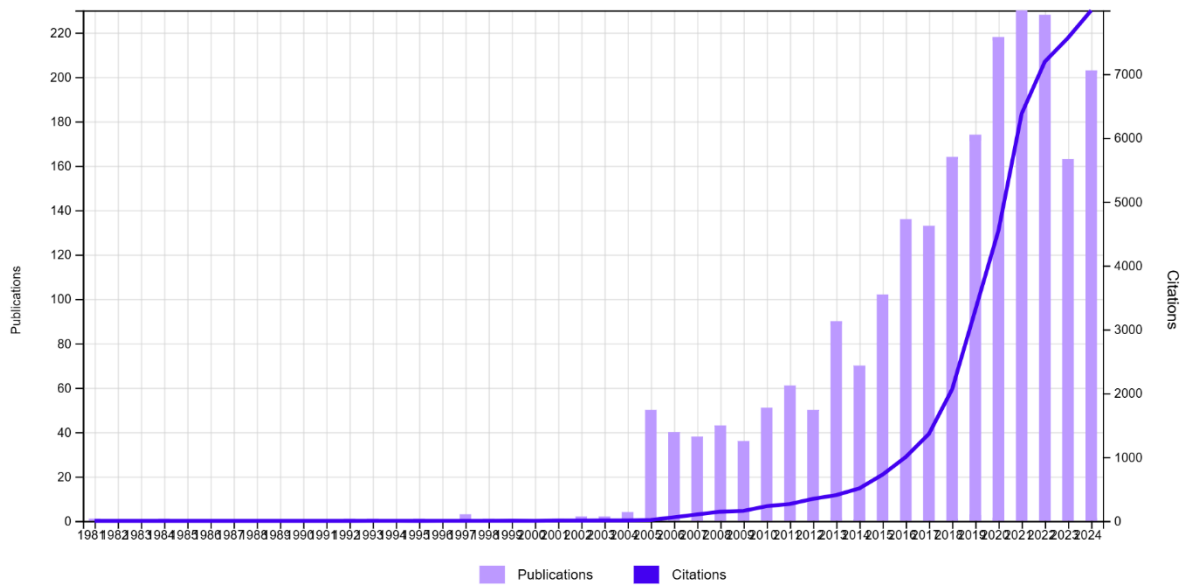
| Document Types | Count | Document Types | Count | Document Types | Count |
|-----------------------|--------------|-----------------------|--------------|-----------------------|--------------|
| Article | 2031 | Editorial Material | 75 | Correction | 4 |
| Book Chapter | 109 | Review | 71 | Letter | 3 |
| Proceedings Paper | 97 | Book Review | 20 | Retracted Publication | 2 |
| Early Access | 83 | Book | 5 | Meeting Abstract | 1 |

Table 4 and Graph 1 illustrate the annual distribution of publications and citations in Entrepreneurial Finance research. The first publication in the field appeared in 1981, but the annual publication did not reach two digits until 2004. A significant surge in the number of publications began in 2015, peaking in 2021 with 230 publications. Although a temporary decline occurred in 2023, research activity gained its upward trend back in 2024. This decline in 2023 may be attributed to the rising interest rates and inflationary pressures, which likely led to investors becoming more risk-averse and avoiding financial investments, such as funding entrepreneurial ventures.

Table 4. Number of Publications by Years

| Publication Years | Count | Publication Years | Count | Publication Years | Count | Publication Years | Count |
|-------------------|-------|-------------------|-------|-------------------|-------|-------------------|-------|
| 2025 | 2 | 2017 | 133 | 2009 | 36 | 2001 | 1 |
| 2024 | 203 | 2016 | 136 | 2008 | 43 | 1998 | 1 |
| 2023 | 163 | 2015 | 102 | 2007 | 38 | 1997 | 3 |
| 2022 | 228 | 2014 | 70 | 2006 | 40 | 1995 | 1 |
| 2021 | 230 | 2013 | 90 | 2005 | 50 | 1993 | 1 |
| 2020 | 218 | 2012 | 50 | 2004 | 4 | 1992 | 1 |
| 2019 | 174 | 2011 | 61 | 2003 | 2 | 1984 | 1 |
| 2018 | 164 | 2010 | 51 | 2002 | 2 | 1981 | 1 |

Graph 1. Times Cited and Publications over Time



Source: Web of Science.

Table 5 represents a Bradford’s Law analysis applied to the field of Entrepreneurial Finance, as suggested by Garfield (1972). In his seminal work, Garfield explains Bradford’s Law of Scattering, the idea that a small core of journals accounts for the majority of significant papers in a field, and uses it to justify the creation of the Science Citation Index (SCI). The analysis ranks journals or sources by their frequency of citations or publications. Here, count represents the number of articles per journal, while cumFreq is the running total used to categorize these journals into Zones based on their research productivity. This classification identifies the highly

specialized “core” journals versus the more peripheral sources according to Bradford’s Law of Scattering. *Strategic Change-Briefings in Entrepreneurial Finance* dominates the dataset as the sole occupant of Zone 1, accounting for approximately 64% of the total cumulative frequency with 801 entries. Following this journal, there is a sharp drop-off in frequency, leading into Zone 2 where high-impact journals like *Venture Capital* and *Small Business Economics* reside. This distribution pattern suggests that while the research is spread across various disciplines—including corporate finance, sustainability, and technological forecasting—the vast majority of specialized discourse is centralized within one primary publication, making it the essential starting point for any bibliometric study in this domain.

Table 5. Bradford’s Law Analysis for Entrepreneurial Finance Publications

| Title | Count | cumFreq | Zone | Title | Count | cumFreq | Zone |
|---|-------|---------|------|---|-------|---------|------|
| Strategic Change Briefings in Entrepreneurial Finance | 801 | 801 | 1 | International Journal of Entrepreneurial Venturing | 16 | 1125 | 2 |
| Venture Capital | 78 | 879 | 2 | Management Science | 16 | 1141 | 2 |
| Small Business Economics | 57 | 936 | 2 | International Journal of Entrepreneurial Behavior Research | 15 | 1156 | 2 |
| Journal of Corporate Finance | 34 | 970 | 2 | Journal of Risk and Financial Management | 15 | 1171 | 2 |
| Journal of Business Venturing | 32 | 1002 | 2 | Research Policy | 15 | 1186 | 2 |
| Entrepreneurship Theory and Practice | 25 | 1027 | 2 | Contemporary Developments in Entrepreneurial Finance: An Academic and Policy Lens on the Status Quo Challenges and Trends | 14 | 1200 | 2 |
| Entrepreneurial Finance and Accounting for High Tech Companies | 23 | 1050 | 2 | FGF Studies in Small Business and Entrepreneurship | 14 | 1213 | 2 |
| Technological Forecasting and Social Change | 21 | 1071 | 2 | Advances in Entrepreneurial Finance with Applications from Behavioral Finance and Economics | 13 | 1226 | 2 |
| Sustainability | 20 | 1091 | 2 | Cogent Business Management | 13 | 1239 | 2 |
| Entrepreneurial Financial Management: An Applied Approach 3rd Edition | 18 | 1109 | 2 | Journal of Applied Corporate Finance | 13 | 1252 | 2 |

Table 6. Top Publishing Countries

| Country | Count | Country | Count | Country | Count | Country | Count |
|---------|-------|-----------|-------|-------------|-------|---------|-------|
| England | 554 | Italy | 162 | Netherlands | 79 | Wales | 36 |
| USA | 447 | India | 118 | Spain | 73 | Sweden | 32 |
| China | 314 | Canada | 98 | Scotland | 56 | Ireland | 31 |
| France | 249 | Australia | 93 | Portugal | 42 | Russia | 28 |
| Germany | 219 | Belgium | 81 | Switzerland | 39 | Norway | 26 |

Table 6 lists the countries with the highest number of publications in Entrepreneurial Finance. Interestingly, England emerges as the leading contributor, surpassing academic powerhouses such as the USA and China. This prominence may be attributed to the strong research programs in Finance, Economics, and Entrepreneurship in England, London' status as being one of the global financial hubs, and British government's active support for entrepreneurship through policies, grants, and tax incentives such as the Enterprise Investment Scheme (EIS) and Seed Enterprise Investment Scheme (SEIS).

Table 7 highlights the most cited publications in Entrepreneurial Finance field. The publications in the table covers a wide range of topics, including crowdfunding, entrepreneurship, gender, intellectual property rights, and international entrepreneurship. This diversity indicates a broad interest in different facets of Entrepreneurial Finance and innovation. The publication by Mollick, E. (2014) stands out with 2087 citations, highlighting its significant impact on crowdfunding research. The ranking also shows the impact level of S. Vismara in the field, with various publications that are among the top cited publications. Additionally, the balance between theoretical and empirical studies in the list underscores the field's methodological diversity.

Table 7. The Most Cited Ten Publications

| Author(s) | Publication Date | Name of Publication | Citations | Publishing Journal |
|--|-------------------------|--|------------------|--------------------------------------|
| Mollick, E. | 2014 | The Dynamics of Crowdfunding: An Exploratory Study | 2087 | Journal of Business Venturing |
| Audretsch, D.B.; Lehmann, E.E.; Paleari, S.; Vismara, S. | 2016 | Entrepreneurial Finance and Technology Transfer | 505 | The Journal of Technology Transfer |
| Marlow, S.; Patton, D. | 2005 | All Credit to Men? Entrepreneurship, Finance, and Gender | 471 | Entrepreneurship Theory and Practice |
| Bruton, G.; Khavul, S.; Siegel, D; Wright, M. | 2015 | New Financial Alternatives in Seeding Entrepreneurship: Microfinance, Crowdfunding, and Peer-to-Peer Innovations | 457 | Entrepreneurship Theory and Practice |
| Richardson, J. | 2008 | The Business Model: An Integrative Framework For Strategy Execution | 439 | Strategic Change |
| Vismara, S. | 2016 | Equity Retention and Social Network Theory in Equity Crowdfunding | 429 | Small Business Economics |
| Bernstein, S. | 2015 | Does Going Public Affect Innovation? | 371 | The Journal of Finance |
| Fang, L.H.; Lerner, J.; Wu, C.P. | 2017 | Intellectual Property Rights Protection, Ownership, and Innovation: Evidence from China | 343 | The Review of Financial Studies |
| Terjesen, S.; Hessels, J.; Li, D. | 2016 | Comparative International Entrepreneurship: A Review and Research Agenda | 342 | Journal of Management |
| Block, J.H.; Colombo, M.G.; Cumming, D.J.; Vismara, S. | 2018 | New Players in Entrepreneurial Finance and Why They Are There | 327 | Small Business Economics |

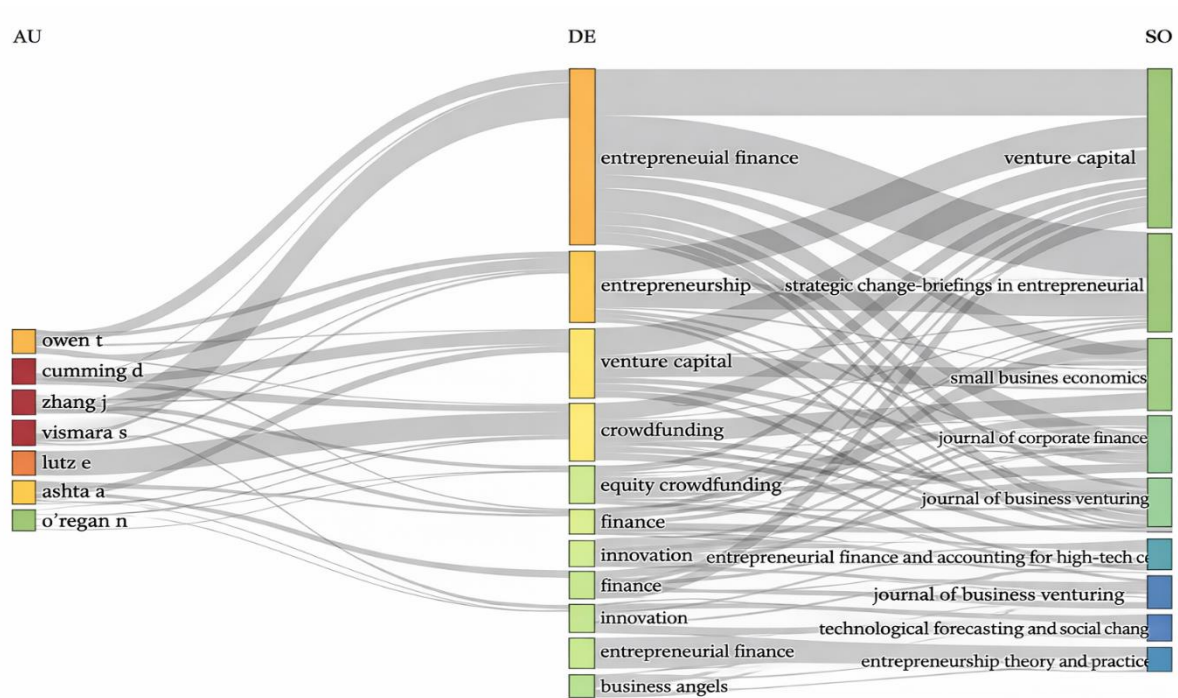
The relevance of a researcher within a particular field should be evaluated based on their scholarly productivity and the impact of their contributions to the literature. Table 8 ranks the most influential researchers in Entrepreneurial Finance field, based on their publication count, citation metrics and h-index scores. D. Cumming leads with 40 publications, while S. Vismara has the highest citation count (3435 citations), reflecting their substantial impact in the Entrepreneurial Finance field. The h-index distribution across the list identifies a core group of “world-class” authorities like Lerner (114) and Wright (112) whose foundational work anchors the field. Simultaneously, the presence of scholars with high citation-to-publication ratios, such as Mollick and Vismara, highlights the rapid academic expansion and high impact of modern Entrepreneurial Finance research.

Table 8. The Most Cited Authors, Their Number of Publications and h-index Scores

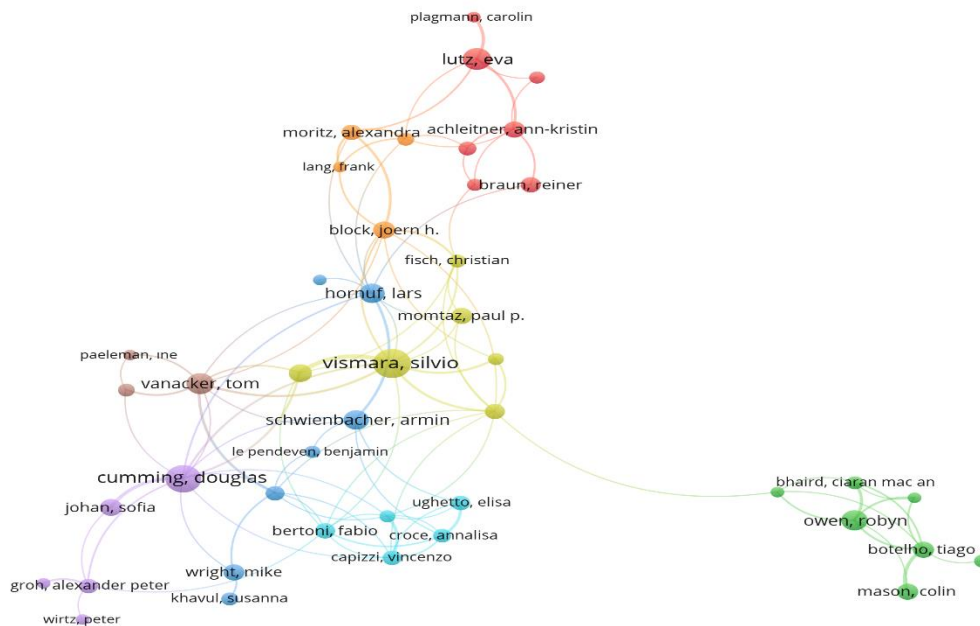
| Author | Publications | Citations | h-index | Author | Publications | Citations | h-index |
|------------------|--------------|-----------|---------|---------------|--------------|-----------|---------|
| Vismara, S. | 34 | 3435 | 42 | Zhang, H. | 6 | 677 | 17 |
| Zhang, J. | 34 | 2166 | 60 | Block, J.H. | 12 | 671 | 58 |
| Cumming, D. | 40 | 2025 | 78 | Wang, Z. | 5 | 626 | 14 |
| Wright, M. | 11 | 1205 | 112 | Meoli, M. | 13 | 586 | 46 |
| Hornuf, L. | 15 | 962 | 29 | Colombo, M.G. | 10 | 582 | 72 |
| Schwiebacher, A. | 15 | 883 | 44 | Lee, C. | 7 | 554 | 24 |
| Khavul, S. | 7 | 761 | 25 | Du, A.T. | 5 | 549 | 10 |
| Lerner, J. | 6 | 708 | 114 | Ashta, A. | 35 | 531 | 25 |
| Yang, J. | 7 | 695 | 24 | Wang, C. | 12 | 525 | 36 |
| Vanacker, T. | 18 | 694 | 36 | Parry, G. | 17 | 521 | 42 |

Graph 2 uses a three-field plot to illustrate the most influential researchers, their research topics and the sources in which they publish. The prominences of D. Cumming and S. Vismara are noticeable, as their work spans multiple research topics and relevant publications in different sources. The plot also provides useful insights for researchers to explore the thematic focus of key journals.

Graph 2. Three Field Plot – Authors, Keywords, Sources



Graph 3. Co-citation Analysis



Graph 3 represents a co-citation analysis, revealing five distinct clusters of researchers in Entrepreneurial Finance. The yellow cluster, centered on S. Vismara, focuses on financing mechanisms for entrepreneurial ventures. The purple cluster, led by D. Cumming, examines crowdfunding and regulatory impacts in Entrepreneurial Finance. The red colored upper cluster around E. Lutz, explores innovation and global aspects of Entrepreneurial Finance. The green

cluster, which is distinctively further from other clusters, is centered on R. Owen, investigates social entrepreneurship, impact investing, and gender dynamics in Entrepreneurial Finance. The researchers in this cluster study the influence of non-financial goals in entrepreneurial funding decisions. Lastly, the blue cluster addresses niche areas of Entrepreneurial Finance, such as alternative finance, financial technologies and regional studies. It should be noted that only researchers with minimum five publications and ten citations in Entrepreneurial Finance field are included in this analysis.

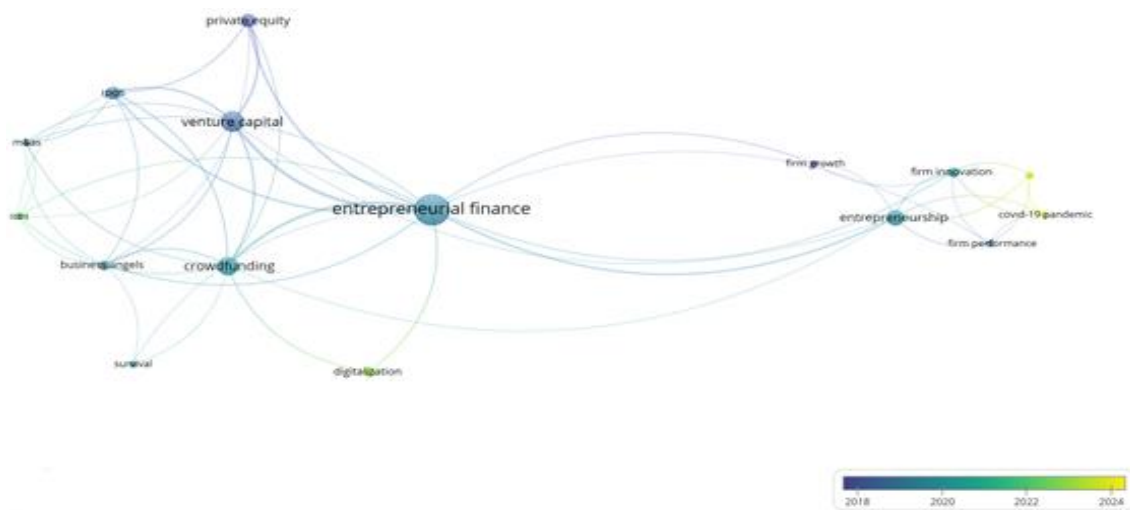
Graph 4. Co-occurrence Keyword Analysis



Graph 4 visualizes the analysis of co-occurrence of keywords over time in publications (with minimum two occurrences) indexed in Social Sciences Citation Index (SSCI). The figure visualizes the relationships between various concepts related to Entrepreneurial Finance research. Unsurprisingly, Entrepreneurial Finance is positioned as the central node, indicating that it connects various research topics. Keywords such as “venture capital”, “private equity” and “crowdfunding” have the strongest links to Entrepreneurial Finance, suggesting that these are the core focus points in this research field. One can claim there are two main clusters: Finance related concepts on the left cluster, and entrepreneurship related concepts on the right cluster. The concepts on the finance cluster reflect different financial mechanisms and outcomes associated with Entrepreneurial Finance. For instance, “venture capital” and “private equity” are early-stage forms of funding for entrepreneurial ventures, whereas “IPOs”, “M&As” and “ICOs” are later-stage forms of financial activities. In this cluster, “survival” and “digitization”

might represent outcomes or strategies influenced by financial support. The cluster on the right hand side, entrepreneurship cluster, represents the operational and external aspects of Entrepreneurial Finance. The concepts in this cluster generally takes the outcomes of entrepreneurial financing, such as “firm growth”, “firm innovation” and “firm performance” into center. In addition, the cluster also focuses on the influence of external factors such as the COVID-19 pandemic.

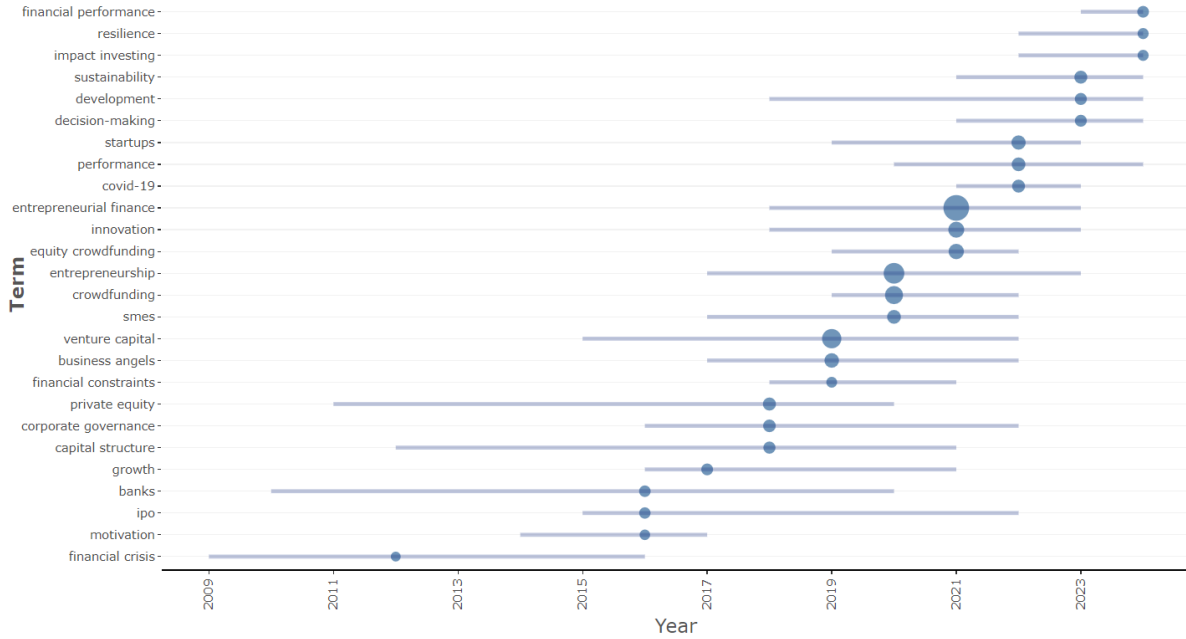
Graph 5. Co-occurrence Keyword Analysis over Time



The outcome of co-occurrence of keywords analysis on publications (with minimum two occurrences) indexed in Social Sciences Citation Index (SSCI) from a longitudinal perspective, is visualized in Figure 5. This graph provides an overview of how research in Entrepreneurial Finance has evolved over time, highlighting key areas of focus and emerging trends. Whereas early research has concentrated on financing sources such as venture capital, private equity and initial public offerings (IPOs), the latest keywords in the illustration, such as “firm innovation”, “COVID-19 pandemic” and “firm performance” proves that there has been a significant shift on Entrepreneurial Finance research. One reason behind this shift may be growing need to measure the effectiveness of financial investments on entrepreneurial activities, as more funding mechanisms like venture capital and private equity have matured. Furthermore, the rise of impact investing and sustainability in business and economics research have led to a great emphasis on not only financial returns, but also social and environmental outcomes of financing entrepreneurial activities. Another reason for the shift is the rapid pace of technological change has made entrepreneurial ventures mostly relying on innovations to attract funding and investors prioritizing innovative firms. In addition, the technological change has accelerated

shift towards digitalization, increasing research on how Entrepreneurial Finance supports digital innovation and transformation.

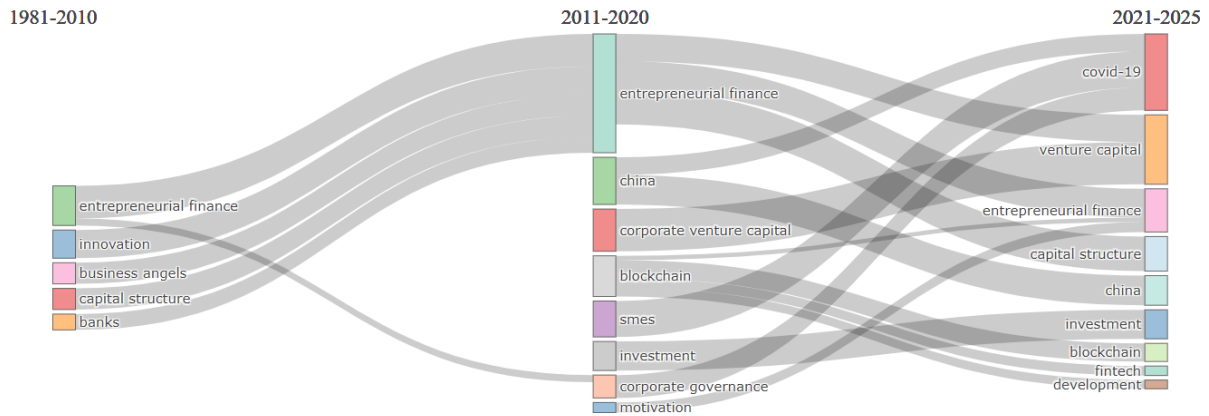
Graph 6. Trending Topics over Time



Graph 6 highlights the trending topics in Entrepreneurial Finance from 2009 to 2024. Traditional financing sources such as “banks”, “venture capital” and “private equity” have remained relevant for an extended period, suggesting the importance in these areas over the years, but are gradually declining in prominence in recent period. In contrast, emerging themes as “resilience”, “impact investing” and “sustainability” have gained interest particularly after 2020. Unsurprisingly, the term “financial crisis” peaked in relevance after 2009, reflecting the aftermath of the 2008 financial crisis, but its prominence diminished in subsequent years.

Graph 7 illustrates the thematic evolution of Entrepreneurial Finance research. Initially focused on key financial themes, the field has diversified its focus, with the inclusion of technology (e.g., blockchain), geographic focus (e.g., China), and governance structures, since the 2010s. The emergence of blockchain and fintech as key topics in the 2020s highlight the growing importance of digitalization of Entrepreneurial Finance.

Graph 7. Thematic Evolution over Time



5. Results and Recommendations

Entrepreneurial Finance, an interdisciplinary research field that stands at the intersection of Entrepreneurship and Finance, has gained importance in the scientific literature over the last decade. As a crucial determinant for an entrepreneurial activity to flourish and survive, Entrepreneurial Finance is a very fragmented research subject, ranging from Psychology to Strategy. This fragmentation gives rise to high diversity of issues that the discipline focuses on, evolving research trends over time. This study aims to capture the historical evolution and the current trends in Entrepreneurial Finance research by applying a number of bibliometric analysis techniques, and evaluating its conceptual, social, and intellectual structures. The study also offers valuable insights for future research directions, enabling scholars to address gaps and explore new avenues more effectively.

The analysis is based on a sample of 2301 publications from the Web of Science database, covering the period from 1981 to 2025. Utilizing VOSviewer and Bibliometrix, the preliminary findings show a significant increase in the volume of Entrepreneurial Finance publications since 2016. Although this upward trend experienced a temporary slowdown in 2023, likely due to increasing interest rates and a risk-averse market environment—given the inherently risky nature of financing entrepreneurial activities—it rebounded to previous levels in 2024. The most frequently cited research in this field predominantly addresses themes such as technology, innovation, intellectual property rights and crowdfunding, the latter identifying a novel source of entrepreneurial financing.

Keyword co-occurrence analysis indicates that early research primarily focused on financing sources for entrepreneurial activities, including venture capital, angel investors, initial public offerings (IPOs) and mergers and acquisitions (M&A). In contrast, recent studies have shifted

toward analyzing the impact of entrepreneurial financing on outcomes such as firm growth, performance, and innovation. A similar outcome is further shown in the common words analysis over time: Latest research gives higher emphasis on research themes, such as performance, innovation and development. Furthermore, one can also realize that the latest research trends in business and finance research, such as sustainability, resilience and impact investing, are also influencing Entrepreneurial Finance field. In conclusion, these research areas is likely to be under spotlight for Entrepreneurial Finance researchers in the near future.

Nevertheless, this research is not free from any limitations. First, the analysis is restricted to the Web of Science database. Inclusion of other databases, such as Scopus or Google Scholar, may provide additional insights on future avenues for Entrepreneurial Finance research. Moreover, co-occurrence keyword analysis is limited to the Social Sciences Citation Index (SSCI) indexed publications to obtain higher-quality results. However, this limits the number of publications analyzed. An analysis covering all indexed publications may provide better comparability and align with the research questions of this study.

References

- Ang, J. S. (2018). Toward a corporate finance theory for the entrepreneurial firm. *The Journal of Entrepreneurial Finance*, 20(1). <https://doi.org/10.57229/2373-1761.1323>
- Aria, M. & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, 11(4): 959-975. <https://doi.org/10.1016/j.joi.2017.08.007>
- Barber, B. M., Morse, A., & Yasuda, A. (2021). Impact investing. *Journal of Financial Economics*, 139(1), 162–185. <https://doi.org/10.1016/j.jfineco.2020.07.008>
- Bellavitis, C., Filatotchev, I., Kamuriwo, D. S. & Vanacker, T. (2016). Entrepreneurial finance: new frontiers of research and practice: Editorial for the special issue Embracing entrepreneurial funding innovations. *Venture Capital*, 19(1–2), 1–16. <https://doi.org/10.1080/13691066.2016.1259733>
- Berg, T., Burg, V., Gombović, A., & Puri, M. (2020). On the rise of fintechns: Credit scoring using digital footprints. *Review of Financial Studies*, 33(7), 2845–2897. <https://doi.org/10.1093/rfs/hhz099>
- Berger, A. & Udell, G. (1998). The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle, *Journal of Banking & Finance*, 22(6-8), 613-673. [https://doi.org/10.1016/S0378-4266\(98\)00038-7](https://doi.org/10.1016/S0378-4266(98)00038-7)
- Block, J. H., Colombo, M. G., Cumming, D. J., & Vismara, S. (2020). New players in entrepreneurial finance and why they are there. *Small Business Economics*, 54(2), 297–320. <https://doi.org/10.1007/s11187-018-0089-6>

- Brophy, D. J. & Shulman, J. M. (1992). A finance perspective on entrepreneurship research. *Entrepreneurship Theory and Practice*, 16(3), 61-72. <https://doi.org/10.1177/104225879201600304>
- Bruton, G., Khavul, S., Siegel, D. & Wright, M. (2015). New financial alternatives in seeding entrepreneurship: Microfinance, crowdfunding, and peer-to-peer innovations. *Entrepreneurship Theory and Practice*, 39(1), 9-26. <https://doi.org/10.1111/etap.12143>
- Cotei, C. & Farhat, J. (2017). The evolution of financing structure in U.S. startups. *The Journal of Entrepreneurial Finance*, 19(1). <https://doi.org/10.57229/2373-1761.1307>
- Cumming, D. & Johan, S. (2017). The problems with and promise of entrepreneurial finance. *Strategic Entrepreneurship Journal*, 11, 357-370. <https://doi.org/10.1002/sej.1265>
- Denis, D. J. (2004) Entrepreneurial finance: an overview of the issues and evidence. *Journal of Corporate Finance*, 10(2), 301–326. [https://doi.org/10.1016/S0929-1199\(03\)00059-2](https://doi.org/10.1016/S0929-1199(03)00059-2)
- Ewens, M., & Townsend, R. R. (2020). Are early stage investors biased against women? *Journal of Financial Economics*, 135(3), 653–677. <https://doi.org/10.1016/j.jfineco.2019.07.002>
- Fluck, Z., Holtz-Eakin, D. & Rosen, H.S. (1998). Where does the money come from? The Financing of Small Entrepreneurial Enterprises. NYU: Economics Working Papers.
- Forliano, C., De Bernardi, P. & Yahiaoui, D. (2021). Entrepreneurial universities: A bibliometric analysis within the business and management domains. *Technological Forecasting and Social Change*, 165. <https://doi.org/10.1016/j.techfore.2020.120522>
- Fourati, H. & Affes, H. (2013). The capital structure of business start-up: Is there a pecking order theory or a reversed pecking order? Evidence from the panel study of entrepreneurial dynamics. *Technology and Investment*, 4, 244-254. <https://doi.org/10.4236/ti.2013.44029>
- Friedrich, C., Glaub, M., Gramberg, K. & Frese, M. (2006). Does training improve the business performance of small scale entrepreneurs?: An evaluation study. *Industry and Higher Education*, 20(2), 75-84. <https://doi.org/10.5367/000000006777699847>
- Frimanslund, T., Kwiatkowski, G. & Oklevik, O. (2022). The role of finance in the literature of entrepreneurial ecosystems. *European Planning Studies*, 31(2), 372–391. <https://doi.org/10.1080/09654313.2022.2055962>
- Fuster, A., Goldsmith-Pinkham, P., Ramadorai, T., & Walther, A. (2019). Predictably unequal? The effects of machine learning on credit markets (Federal Reserve Bank of New York Staff Report No. 916). Federal Reserve Bank of New York. <https://doi.org/10.2139/ssrn.3072038>
- Garfield, E. (1972). Citation analysis as a tool in journal evaluation. *Science*, 178(4060), 471–479. <https://doi.org/10.1126/science.178.4060.471>
- Howell, S. T., Niessner, M., & Yermack, D. (2020). Initial coin offerings: Financing growth with cryptocurrency token sales. *Review of Financial Studies*, 33(9), 3925–3974. <https://doi.org/10.1093/rfs/hhz131>
- Jang, B. G., Lee, H. & Park, S.. (2015). Entrepreneurial business plan under undiversifiable idiosyncratic risk. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2596490>

- Konga, Y. & Ramaiah, K. (2023). The economics of startup business finance: an investigation through the lens of financial growth cycle theory. *Bulletin of Monetary Economics and Banking*, 26(2), Article 7. <https://doi.org/10.59091/1410-8046.2071>
- Manigart, S. & Khosravi, S. (2023). Unanswered questions in entrepreneurial finance. *Venture Capital*, 26(1), 1–29. <https://doi.org/10.1080/13691066.2023.2178349>
- Mitter, C. & Kraus S. (2011). Entrepreneurial finance – issues and evidence, revisited. *International Journal of Entrepreneurship and Innovation Management*, 14:2-3, 132-150. <https://doi.org/10.1504/IJEIM.2011.041728>
- Owers, J.E. & Sergi, B.S. (2019). The evolution of financing entrepreneurship. Sergi, B.S. and Scanlon, C.C. (Ed.) *Entrepreneurship and Development in the 21st Century (Lab for Entrepreneurship and Development)*, Emerald Publishing Limited, Leeds, 161-170. <https://doi.org/10.1108/978-1-78973-233-720191011>
- Pare, J.L., Rédis, J. & Sahut, J. (2009). The development of entrepreneurial finance research. *International Journal of Business*, 14, 283. <https://doi.org/10.26905/jkdp.v22i3.2096>
- Robb, A. & Robinson, D. T. (2019). The capital structure decisions of new firms. *The Review of Financial Studies*, 27(1), 153-179. <http://dx.doi.org/10.2139/ssrn.1345895>
- Shane, S. & Cable, D. (2002). Network ties, reputation, and the financing of new ventures. *Management Science*, 48(3), 364–381. <https://doi.org/10.1287/mnsc.48.3.364.7731>
- Shane, S., Venkataraman, S. (2007). The Promise of Entrepreneurship as a Field of Research. In: Cuervo, Á., Ribeiro, D., Roig, S. (eds) *Entrepreneurship*. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-540-48543-8_8
- Van Eck, N. J., & Waltman, L. (2019). *VOSviewer Manual*. University of Leiden.
- Welpe, I. & Grichnik, D. (2006). Das wissenschaftsgebiet der entrepreneurial finance – eine bestandsaufnahme in forschung und lehre. *ZfKE*, 54(2):141–165.
- Winton, A. & Yerramilli, V. (2008). Entrepreneurial finance: Banks versus venture capital. *Journal of Financial Economics*, 88(1), 51-79. <https://doi.org/10.1016/j.jfineco.2007.05.004>