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Navigating the crowdfunding landscape: a study of knowledge trajectories based on main path analysis

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Abstract

Purpose – Crowdfunding (CF) has become an increasingly popular means of financing for entrepreneurs and has attracted significant attention from both researchers and practitioners in recent years. The purpose of this study is to investigate the core content and knowledge diffusion paths in the CF field. Specifically, we aim to identify the main topics and themes that have emerged in this field and to trace the evolution of CF knowledge over time.

Design/methodology/approach – This study employs co-word clustering and main path analysis (MPA) to examine the historical development of CF research based on 1,528 journal articles retrieved from the Web of Science Core Collection database.

Findings – The results of the analysis reveal that CF research focuses on seven themes: sustainability, entrepreneurial finance, entrepreneurship, fintech, social entrepreneurship, social capital, and microcredits. The analysis of the four main paths reveals that equity CF has been the dominant topic in the past years. Recently, CF research has tended to focus on topics such as fintech, the COVID-19 pandemic, competition, Brexit, and policy response.

Originality/value – To the authors' best knowledge, this is the first attempt to explore knowledge diffusion dynamics in the CF field. Overall, the study offers a structure for analyzing the paths through which knowledge is diffused, enabling scholars to effectively manage a large volume of research papers and gain a deeper understanding of the historical, current, and future trends in the development of CF.

Keywords Crowdfunding, Entrepreneurship, Sustainability, Fintech, Main path analysis

Paper type Literature review

1. Introduction

In today's highly competitive business environment, entrepreneurs and innovators are increasingly seeking creative solutions to secure financing for their projects. The contemporary economic landscape is marked by strong globalization and diversification, which has expanded

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the search for financing sources beyond national borders and necessitates an in-depth understanding of these sources. Among the alternatives, crowdfunding (CF) has emerged as a modern financing option with a rapidly growing influence (Bargoni *et al.*, 2022; Camilleri and Bresciani, 2022; St John *et al.*, 2022). According to a report by Statista, global CF volumes are expected to reach $28.92bn by 2028, up from $13.64bn in 2021 (Statista, 2023). This represents a compound annual growth rate (CAGR) of 11.2% over the forecast period. Another report by Allied Market Research predicts that the global CF market will grow at a CAGR of 14.3% between 2022 and 2031, driven by the increasing number of startups and small and medium enterprises (SMEs) (Allied Market Research, 2023). Thus, the recent statistics and predictions indicate that CF is expected to continue its growth trajectory in the coming years, driven by factors such as increasing demand for alternative financing sources (Keliuotyte-Staniuleniene and Kukarenalte, 2020), increasing technology adoption rates (Mariyono, 2019), and the rise in the number of startups and SMEs (Gal-Or *et al.*, 2019).

Conceptually, CF represents a collective effort by consumers to pool their money together, usually through the Internet, in order to invest and support endeavors initiated by other individuals or organizations (Ordanini *et al.*, 2011). As an emerging trend, CF is helping to expand the role of consumers in investment activities. Kirby and Worner (2014) have categorized CF as an umbrella term that refers to the use of small amounts of money gathered from a large number of individuals or organizations to finance projects, personal loans, businesses, and other needs through an online web-based platform. The authors also identified four subcategories: donation CF, reward CF, peer-to-peer (P2P) lending, and equity CF. In donation CF, backers donate funds to a project without the expectation of receiving anything in return. This is mostly appropriate for ventures that are in their pre-setup stage because, at this point, entrepreneurs are still in the process of creating a workable business plan that aligns with the preferences and demands of consumers (Alva *et al.*, 2021). Consequently, the level of risk involved is high, and committing to providing rewards may not be feasible. Reward CF enables entrepreneurs to offer backers a reward usually tied to the project or product they are seeking to fund (Felips *et al.*, 2022). The reward can take different forms, such as a pre-order of the product, access to exclusive content, or a thank-you note (Buerger and Kleinert, 2021). The reward serves as an incentive for backers to contribute to the project and can help to mitigate the risk involved in the venture. In reward CF, the entrepreneur or project has no obligation to repay the funds received since the transaction is essentially a sale of the reward or a pre-order of the product.

P2P lending involves a loan transaction between two parties, wherein the lender lends money to the borrower with the expectation of receiving repayment of the principal amount plus interest over a predetermined period (Au *et al.*, 2020; Basha *et al.*, 2021). According to Pierrakis (2019), P2P lending has emerged as a method for facilitating unsecured personal loans between individuals without the need for borrowers to provide collateral to protect the lender against default. Finally, equity CF is an innovative method for financing that combines features of private and public equity (Cummings *et al.*, 2020). This funding model allows for a large number of investors, including individuals, to invest relatively small amounts of money in exchange for an ownership stake in a business. Equity CF does not require businesses to go through the lengthy and expensive process of an initial public offering (IPO) to raise capital from a large pool of investors (Alalwan *et al.*, 2022; Buttice *et al.*, 2022; Cummings *et al.*, 2020). Instead, the process is conducted through online platforms that connect investors with businesses seeking funding. As a result, this unique approach to entrepreneurial finance has the potential to democratize investment opportunities and level the playing field for small businesses seeking to raise capital.

Recently, CF research has emerged as a vibrant and rapidly growing field, encompassing a wide range of topics and disciplines. In recent years, several studies have been conducted that systematically examine the entire domain (see Table 1). For example, Gil-Gomez *et al.*

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Table 1.
A summary of review studies in the CF field

No.	Study	Scope	Time span	Number of reviewed papers	Review method	Contributions
1	Mochkabadi and Volkmann (2020)	Equity CF	2012–2017	113	Systematic literature review	• Explore the landscape of equity CF research, focusing on its scientific progress and classifying relevant contributions into five areas: capital market, entrepreneur, institutional, investor, and platform • Conduct a thematic analysis to identify the main themes and sub-themes in each of the five areas • Identify potential avenues for further research and advancements in the field of equity CF
2	Shneor and Vik (2020)	CF success	2010–2017	88	Systematic literature review	• Investigate the factors influencing the success of online CF campaigns and suggest future research directions
3	Cai *et al.* (2021)	CF and social capital	2010–2019	108	Systematic literature review	• Explain how social capital affects CF campaign dynamics • Develop a conceptual model describing the impact of external and internal social capital on CF campaigns • Propose future research directions related to the negative and causal effects of social capital on CF
4	Salido-Andres *et al.* (2021)	Donation CF for charitable causes	2002–2017	92	Systematic literature review	• Conduct a systematic literature review on donation CF for charitable causes and identify prevailing themes and research gaps • Suggest a conceptual framework to direct further studies on donation CF
5	Wehnert and Beckmann (2021)	CF	2013–2019	78	Systematic literature review	• Discuss important decision-making factors for individuals seeking to use CF for sustainability projects • Propose ideas and a plan for future research on sustainability and CF
6	Böckel *et al.* (2021)	CF and sustainability	2011–2018	83	Systematic literature review	• Analyze the literature at the nexus of CF and sustainability • Explain the role of this interplay in fostering sustainable development

(*continued*)

Table 1.

No.	Study	Scope	Time span	Number of reviewed papers	Review method	Contributions
7	Serwaah (2021)	CF and gender	2011–2021	47	Systematic literature review	• Analyze the literature on the relationship between CF and gender • Assess whether CF has increased the involvement and financial inclusion of women
8	Alegre and Moleskis (2021)	Donations and rewards	2011–2017	63	Systematic literature review	• Conduct a comprehensive and interdisciplinary review of CF in the forms of donations and rewards • Study the factors affecting the behavior and motivations of the crowd, as well as the determinants of funding and success after funding • Provide a summary of the key results in the literature and combine the various theoretical interpretations of how the crowd makes decisions
9	Camilleri and Bresciani (2022)	CF, small businesses, and startups	2017–2021	72	Systematic literature review	• Assess the theoretical foundations used in prior research on the use of CF platforms by small businesses and startups • Analyze the advantages and disadvantages of using these innovative technologies for CF
10	Chaudhary *et al.* (2022)	CF and new ventures	2016–2022	58	Systematic literature review	• Explore the difference between CF and other funding sources • Examine the challenges facing entrepreneurs when managing CF campaigns • Develop a conceptual framework to explain the factors affecting CF outcomes and emphasize the need for further research in the growing field of CF for new ventures
11	Mazzocchini and Lucarelli (2022)	Equity CF	2015–2022	127	Systematic literature review	• Establish a comprehensive framework to facilitate the comprehension of the causes behind successful and unsuccessful equity CF
12	Martínez-Climent *et al.* (2018)	Financial return CF	1994–2017	148	Bibliometric analysis	• Investigate CF as a financial tool, with a specific focus on P2P lending and equity CF that yield a financial return

(*continued*)

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Table 1.

No.	Study	Scope	Time span	Number of reviewed papers	Review method	Contributions
13	Butticè and Ughetto (2021)	CF	2010–2018	213	Bibliometric analysis	• Investigate the current status and trends in CF research • Analyze the most productive authors, the main thematic areas, the methodologies used, the relevant journals, and the degree of dispersion of the academic community in the CF domain
14	Rabbani *et al.* (2022)	CF and P2P lending	2010–2021	1,742	Bibliometric analysis	• Synthesize research at the intersection of CF and P2P
15	Baber and Fanea-Ivanovici (2022)	CF	2006–2021	1,951	Bibliometric analysis	• Analyze CF research according to annual research output, subject areas, citation records, influential authors and publications, active authors and countries • Categorize related keywords, identify developing trends, and track the evolution of thematic keywords over four time periods
16	Bargoni *et al.* (2022)	CF and innovation	2010–2022	150	Bibliometric analysis	• Provide a bibliometric review of CF and innovation
17	Gil-Gomez *et al.* (2023)	CF	1978–2018	521	Bibliometric analysis	• Provide a quantitative analysis of CF research by examining the most significant publications in the field • Identify the most prolific and leading sources contributing to CF research
	This study	CF	1999–2022	1,528	Bibliometric analysis	• Investigate the core content of CF research through co-word analysis • Explore the knowledge diffusion trajectories in the CF field • Highlight future research directions • Apply MPA to study the historical formation of CF research

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(2023) employ a bibliometric analysis to provide a quantitative perspective on the study of CF. Their primary aim is to ascertain whether CF is truly a growing area of interest and to identify the most productive and influential sources of scholarly research in this domain. Butticè and Ughetto (2021) explore the current state and emerging trends in the CF literature considering a range of key factors, including the characteristics of authors and publications related to CF, the thematic areas, the methodologies applied, the primary outlets disseminating research findings, and the diversity of the scientific community engaged in the study of CF. Similarly, Baber and Fanea-Ivanovici (2022) conduct a bibliometric analysis to quantitatively evaluate the latest CF studies. Based on 1,951 journal articles, they analyze various aspects of CF research, such as the number of papers produced each year, the categories in which CF studies were classified, citation records, highly cited authors and papers, most productive authors, and the originating countries of CF research. Finally, Rabbani *et al.* (2022) conduct a bibliometric review and meta-analysis to analyze the academic research on CF and P2P lending. The authors' findings indicate that there has been significant growth in publications on this topic since 2013, with the highest number of citations observed in 2014. While the existing reviews and bibliometric analyses offer valuable insights into CF research, none of the prior works has used the main path analysis (MPA) technique to investigate knowledge trajectories in the CF domain. MPA has been extensively applied in other fields, as shown in studies conducted by Rejeb *et al.* (2022b), Fu *et al.* (2019), and Yu and Sheng (2020). This study aims to bridge this gap by exploring the knowledge formation and progress of the CF domain using MPA.

The objective of this study is to provide a comprehensive understanding of the CF field by combining co-word analysis and MPA. These quantitative techniques enable the effective analysis of a large number of papers to identify topics and knowledge diffusion paths in the CF literature, while minimizing subjective analysis biases. By examining the historical development of CF and identifying current and future research directions, these methods can both motivate scholars and enhance their understanding of the CF domain.

The study makes two significant contributions. Firstly, the use of co-word analysis in combination with MPA is novel in CF research. Secondly, the MPA method enables a comprehensive interpretation and analysis of the CF research domain through various approaches, including local (forward and backward), global, and key-route main paths. The visualization of the relationships between seminal articles in the research domain allows one to easily track and trace the evolution of CF and its core topics. Additionally, this study identifies research hotspots and highlights recently active research areas.

The paper is structured as follows. In the following section 2, we present details on data collection and the research methods being used. Section 3 discusses the results of the co-word clustering analysis, followed by an in-depth description of the MPA method in Section 4. Section 5 presents a discussion as well as implications for academics and practitioners, followed by a brief conclusion in Section 6.

2. Methodology

2.1 Data collection

We chose the Web of Science (WoS) Core Collection database as the data source for this study, due to its high standing within academia. According to Xiao *et al.* (2014), WoS is widely recognized as a premier academic database that encompasses a plethora of impactful journals. Its high quality and wide-ranging coverage have made it a preferred choice for MPA and bibliometric research (Mostafa, 2020; Rejeb *et al.*, 2022b). A detailed description of our review process is presented in Figure 1.

We used the following search string for the review: Topic Search (TS) = ("crowdfund*" OR "crowd invest*" OR "online peer lend*" OR "crowdinvest*" OR "crowd fund*" OR "peer-

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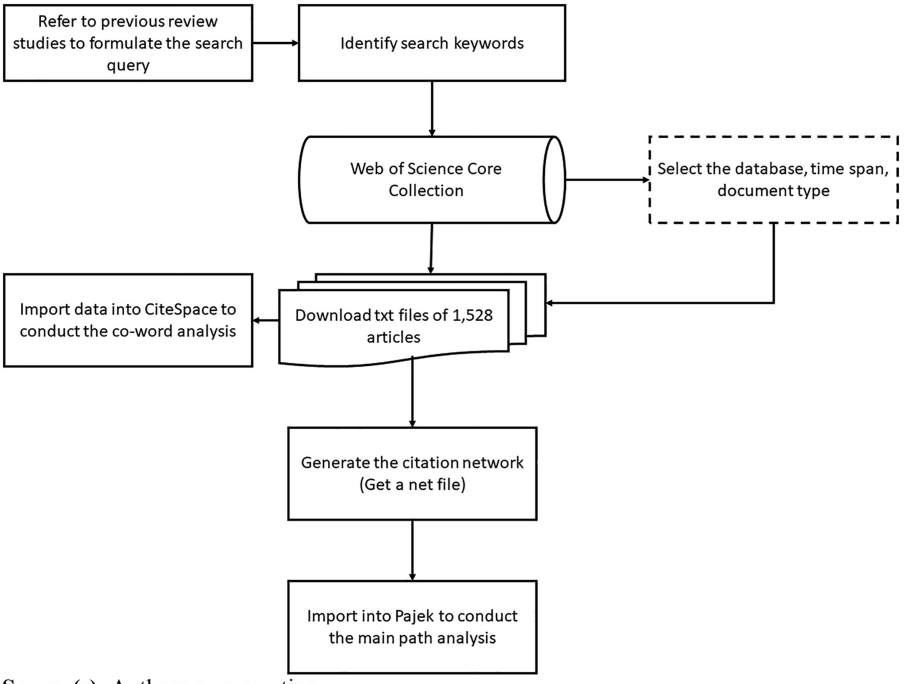

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Figure 1.
Review process

to-peer (P2P) lending" OR "P2P lend*" OR "peer-to-peer lend*" OR "micro lend*" OR "microlend*" OR "micro-lend*" OR "microfinanc*") (Cai *et al.*, 2021; Chaudhary *et al.*, 2022). To conduct the review, we used four sub-databases from the WoS: Social Science Citation Index (SSCI), Science Citation Index Expanded (SCI-EXPANDED), Emerging Sources Citation Index (ESCI), and Art and Humanities Citation Index (A&HCI). The time frame of the review spans from 1970 to 2022, and the data was collected on February 23, 2023. The final analysis only included journal articles written in the English language. The subject areas were limited to business and management to ensure consistency in research results and improve systemization and generalizability, while still ensuring the comprehensive exploration of the CF field (Rejeb *et al.*, 2022d). To promote transparency and clarity, the search query used to retrieve publications is given in Appendix 1. Following a manual review of all article metadata to remove irrelevant publications, a total of 1,528 documents were obtained from the database, which were subsequently used to generate a citation network. Finally, the program package Pajek was used for the network analysis and visualization.

2.2 Research method

In the realm of scientometric research, CiteSpace, a pioneering software application, facilitates the elucidation of intellectual landscapes by employing co-word analysis (Li *et al.*, 2022; Liu *et al.*, 2015). This analytical method enables the discernment of latent thematic structures and topical trends within a corpus of scholarly publications, thereby providing insights into the evolution of scientific domains (Li and Chu, 2017; Li *et al.*, 2020a). By extracting and juxtaposing salient terms from titles, abstracts, and keywords, co-word analysis in CiteSpace engenders a comprehensive network representation that encapsulates

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the interrelationships between concepts, signifying their relative importance. Consequently, this intricate approach fosters the identification of nascent research avenues, expedites interdisciplinary synergies, and ultimately contributes to the advancement of human knowledge. Several fields have successfully utilized co-word analysis (Liu *et al.*, 2011; Ouyang *et al.*, 2018; Rejeb *et al.*, 2023; Rejeb *et al.*, 2022a), giving credence to the assumption that the chosen keywords can effectively encapsulate the primary content of papers. Consistent with previous research (Yu and Sheng, 2021), we performed co-word analysis to comprehend the research paradigm of the CF knowledge domain.

Chen *et al.* (2019) highlight the prevalence of citation-based analyses such as co-citation analysis, bibliographic coupling analysis, and MPA in identifying the intellectual structure and development paths of a domain through the information contained in citations. Bibliographic coupling analysis investigates the shared intellectual background of publications by examining the references common to them, under the assumption that the greater the number of shared references, the stronger the common intellectual foundation (Zupic and Čater, 2015). Co-citation analysis, on the other hand, explores the dynamics, structure, and paradigm shifts of a knowledge domain by examining co-cited works and identifying the uniformity of references and concepts that relate to the research area (Arroyo-Machado *et al.*, 2020). Highly co-cited publications in a co-citation network highlight well-studied concepts and ideas in a particular research field. To capture the flow of knowledge between articles, Hummon and Dereian (1989) proposed MPA, which relies on direct citation relationships. The effectiveness of MPA has led to its adoption in social network analysis (Hummon and Carley, 1993) and conflict resolution research (Carley *et al.*, 1993). Batagelj (2003) later introduced the search path count algorithm (SPC) and Liu and Lu (2012) suggested several refinements, including the key-route main path. Current main path techniques include local main paths (forward and backward) and global main paths. Conceptually, the local main path refers to the most frequently co-cited articles within a specific cluster, while the global main path refers to the most highly cited articles across the entire network. By analyzing these main paths, researchers can gain insights into the most influential ideas and concepts within a particular research field (Yu and Sheng, 2021). This study used a citation network technique explained by Liu and Lu (2012) to construct the main path and weight the citation network.

To illustrate our approach, Figure 2 depicts a citation network consisting of nodes and arrows that represent articles and the dissemination of ideas, respectively. The network has three types of nodes: sources (blue), intermediates (green), and sinks (yellow). Sources are

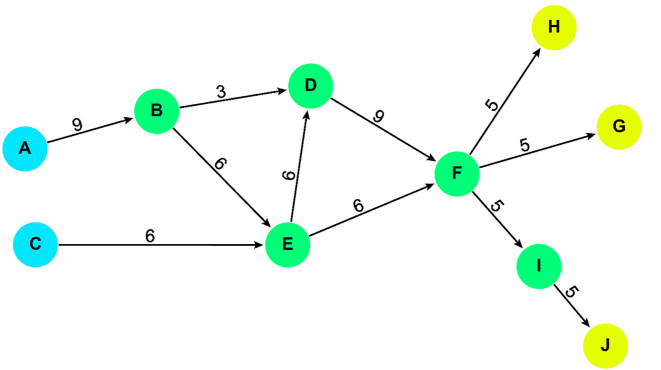

Figure 2.
Typical citation network

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nodes that are only cited, sinks are nodes that only cite, and intermediates both cite and are cited by other nodes. The SPC of each link is calculated by counting the number of times the link is traversed by paths from sources to sinks. For example, link B-D has an SPC of 3 because three paths traverse it, which are A-B-D-F-H, A-B-D-F-G, and A-B-D-F-I-J.

Once the links of the citation network have been weighted, the subsequent step is to use various algorithms to create main paths. The forward local main path starts from sources and ends at sinks and selects the largest SPC value of all links stemming from a node. For instance, let's assume that two links originate from node B: B-D and B-E. B-E is preferred since its SPC value is greater than that of B-D. After that, node E is selected as the starting point for the subsequent search. The search will stop when the sink is reached. The forward local main path can be formed, which consists of the trio of A-B-E-D-F-I-J, A-B-E-F-H, and A-B-E-F-G.

In contrast to the forward local main path, the backward local main path starts searching from the sink nodes to the source nodes, that is, from the latest articles to the earlier ones. There are a total of 9 links connected to the sink nodes H, G, J. Initially, the task is to select the links with the highest SPC, which in this case is 5. The search will terminate once any of the source nodes is reached. Consequently, the backward local main path in the citation network is the combination of the path A-B-E-D-F-I-J, C-E-D-F-G, and C-E-D-F-H. While the local main path focuses on the maximum value within a small area, the global main path seeks to achieve the maximum value over the entire network. Hence, the global main path is identified as the path that has the highest SPC value overall. In this case, the global main path is A-B-E-D-F-I-J as it has the largest cumulative SPC value out of all the paths from the source nodes to the sink nodes.

Although the local and global main paths have their benefits, they may not include all the links with the highest SPC values. Liu and Lu (2012) proposed a solution to this problem called the "key-route" main path. This method involves four steps. Firstly, the link with the highest SPC in the citation network is chosen as the key route. In this case, D-F is the key route. Secondly, a forward search is performed from the end node of the key route (F) until a sink node is reached, and a backward search is conducted from the start node of the key route (D) until a source node is reached. Either the local or global method can be used to obtain the key-route main path during this step. The number of top citation links in constructing the key-route main paths is arbitrary, and more key routes can be selected to present greater detail. For example, D-F and B-E can be chosen as the top two key routes and repeating the second step will identify the second key-route main path.

The integration of the local (forward and backward), global, and key-route main path analyses provides multiple perspectives to reveal and recognize the development patterns of a research field. The local main path approach highlights the most significant links at each conjecture and concentrates on the local maximum. However, it may not cover the path with the highest accumulated SPC value. To address this limitation, the global main approach is applied, along with the key-route main path, which takes into account all the most influential connections in the citation network. By utilizing these four main paths, the objective of this study is to comprehensively illustrate the development patterns of the CF domain. Consequently, this approach enables us to systematically understand the progression of CF research over the years and to identify the works that contributed significantly to the development of the CF knowledge body.

3. Results of co-word clustering analysis

Keywords summarize the content published in research, and analyzing them can enable researchers to detect emerging research frontiers and trending topics in a field (Rejeb *et al.*, 2020). In this study we use CiteSpace (Chen, 2006) to examine the thematic development of the

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CF domain. By applying the g-index as the criterion for keyword visualization, the final network includes 455 nodes and 951 links. The scaling factor k is directly proportional to the size of the network and, in this study, the default value of 25 was used. The cluster function in CiteSpace was employed to form a cluster with a modularity of 0.638. The high silhouette value (i.e., a metric for evaluating the quality of cluster analysis) of 0.856 confirms the validity and stability of the results. The clusters' labels were generated using Latent Semantic Indexing (LSI) (Shen and Ho, 2020) and will be described individually in the following sections. Figure 3 displays the horizontal timelines of the clusters, while the metrics and keywords of each cluster are summarized in Table 2. The bubbles, or nodes, in the visualization represent individual keywords, with the size of the bubble indicating that keyword's frequency of occurrence within the dataset. Larger bubbles correspond to keywords that appear more frequently in the publications analyzed, while smaller bubbles correspond to less frequent keywords. The lines, or edges, between the bubbles represent co-occurrence relationships between the keywords. The strength of the relationship between two keywords is indicated by the thickness of the line, with thicker lines representing stronger co-occurrence relationships.

3.1 Sustainability

Based on the number of keywords included in the cluster, the largest cluster (#0) is sustainability. More specifically, the cluster revolves around the intersection of sustainability, development, and CF, particularly in low- and middle-income countries (Böckel *et al.*, 2021; Motylska-Kuzma, 2018; Testa *et al.*, 2022). This cluster is characterized by a wide range of keywords, including "microfinance institutions", "sustainability", "female empowerment", "female entrepreneurship", "developing country", "Bangladesh", "blockchain", "efficiency", etc. The prominence of these keywords suggests a growing interest in the potential for CF to serve as an effective tool for promoting sustainability and empowering female entrepreneurs in developing countries (Groza *et al.*, 2020; Vismara, 2019). The geographical focus on countries such as Bangladesh, Malaysia, and Pakistan highlights the particular relevance of these issues in regions with high levels of poverty and economic inequality (Ab-Rahim and Shah, 2019; Akhter, 2018). Furthermore, the inclusion of keywords such as "blockchain" and "governance" indicates a growing interest in exploring decentralized platforms and transparent governance structures as means to enhance the efficiency and effectiveness of CF initiatives (Nguyen *et al.*, 2021). The keyword "microfinance institutions" suggests that CF is being examined as a potential complement or alternative to

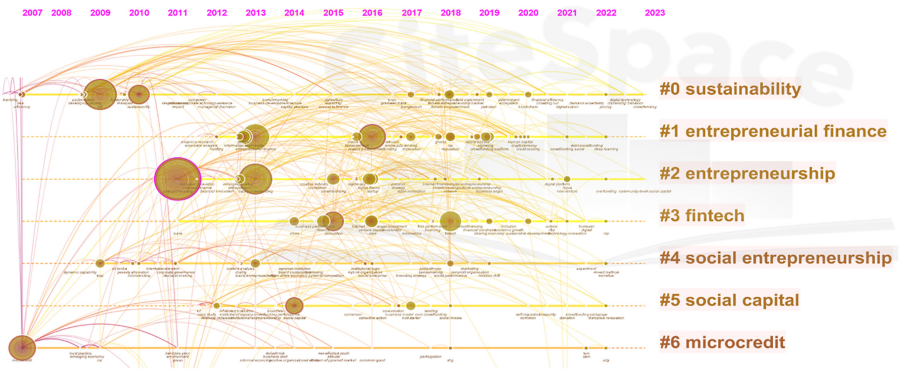

Figure 3.
Co-word clustering

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Cluster ID	Size	Silhouette	mean(Year)	Label (LSI)	High-frequency keywords
0	56	0.855	2015	sustainability	microfinance institutions; sustainability; female empowerment; female entrepreneurship; developing country; Bangladesh; blockchain; efficiency; performance; Malaysia; data envelopment analysis; financial performance; Pakistan; governance
1	48	0.740	2017	entrepreneurial finance	reward-based CF; entrepreneurial finance; information asymmetry; gender; motivation; social network; initial coin offering; CF platform; regulation; e-commerce; signaling
2	46	0.878	2016	entrepreneurship	entrepreneurship; equity CF; startup; crowdsourcing; signal theory; entrepreneur; emerging market; fuzzy-set qualitative comparative analysis; new venture; network
3	44	0.746	2018	fintech	fintech; innovation; small and medium enterprises; venture capital; finance; China; bank; technology innovation; sustainable development; sharing economy
4	38	0.901	2014	social entrepreneurship	social entrepreneurship; bop; decision-making; social enterprise; corporate governance; microlending; social performance; charity
5	32	0.871	2015	social capital	social capital; kickstarter; financial inclusion; case study; business model; collective action; social media; donation
6	29	0.851	2013	microcredit	microcredit; corporate social responsibility; sustainable development goals; emerging economy; social venture; technology acceptance model; structural equation modeling; self-help group

Source(s): Authors own creation

Table 2.
Keyword clusters

traditional microfinance institutions, particularly in the context of promoting sustainability and development in developing countries. Finally, the inclusion of "data envelopment analysis" as a keyword implies that researchers are employing rigorous methodologies to assess the efficiency and performance of CF platforms in achieving their sustainability and development goals (Al-Awlaqi and Aamer, 2019; Chauhan, 2021). Overall, Cluster #0 suggests a strong and growing interest in the potential for CF to promote sustainability and empower female entrepreneurs in developing countries, with a focus on the role of blockchain technology, governance, microfinance institutions, and rigorous evaluation methodologies.

3.2 Entrepreneurial finance

The co-word analysis reveals a distinct cluster focused on the nexus of entrepreneurial finance and CF, with a particular emphasis on reward-based CF. The keywords that comprise this cluster include terms such as "reward-based CF", "entrepreneurial finance", "information asymmetry", "gender", and "motivation". The high frequency of these keywords in the

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literature suggests a growing interest in exploring the potential of CF to support entrepreneurial ventures (Brown *et al.*, 2018; Drover *et al.*, 2017; Thies *et al.*, 2019), particularly in the context of reward-based CF. This cluster's focus on information asymmetry, gender, motivation, and social networks suggests a growing interest in examining the factors that influence the success of CF campaigns (Agrawal *et al.*, 2015; Alegre and Moleskis, 2021; Bapna and Ganco, 2021; Courtney *et al.*, 2017). Keywords such as "initial coin offering" and "CF platform" highlight a particular interest in investigating emerging forms of CF, including those that use blockchain technology (Bogusz *et al.*, 2020; Nguyen *et al.*, 2021). The inclusion of the keyword "regulation" in the cluster also suggests a growing concern with ensuring the safety and legitimacy of CF platforms, particularly in the face of emerging forms of CF and the potential for fraud and abuse (Baucus and Mitteness, 2016; Siering *et al.*, 2016). The keyword "e-commerce" indicates a possible connection between CF and online marketplaces, which could have significant implications for the role of CF in supporting the growth of small and medium-sized enterprises (SMEs). Finally, there is an emphasis on the use of signals or cues that communicate quality and credibility to potential funders, which might help to address concerns about the legitimacy and safety of CF platforms and increase the likelihood of success for CF campaigns (Bogusz *et al.*, 2019; Chen, 2023).

3.3 Entrepreneurship

Cluster #2 discusses entrepreneurship, featuring a diverse range of keywords such as "entrepreneurship", "equity crowdfunding", "startup", "crowdsourcing", and "signal theory". Generally, the entrepreneurial process represents a topical area in CF, and there is a growing interest in exploring the ways in which CF can support the development and growth of new ventures (Arora *et al.*, 2020; Chaudhary *et al.*, 2022). The presence of "equity crowdfunding" and "startup" within the cluster underscores a particular focus on using CF to support the financing stage of early-stage startups, especially through the insurance of equity-based CF campaigns. Moreover, CF is related to broader collaborative and network-based approaches to innovation and entrepreneurship. In the cluster, the high frequency of the keyword "signal theory" is noteworthy, pointing to a growing interest in the role of information signaling in the context of CF campaigns. Ahlers *et al.* (2015) argue that potential funders are more likely to invest in a CF campaign when the campaign's creators are able to signal their quality, expertise, and credibility through certain indicators or cues. By bringing quality and credibility, CF campaigns can attract a larger number of funders and secure the necessary funding to bring their ideas to fruition. Further keywords suggest a particular interest in examining the potential for CF to support entrepreneurship in "emerging markets" (Ault and Spicer, 2022; Li *et al.*, 2021; Liu *et al.*, 2023) and the use of "fuzzy-set qualitative comparative analysis" as a methodological approach for understanding the complex and context-specific factors that influence CF outcomes (De Crescenzo *et al.*, 2020; Li *et al.*, 2021).

3.4 Fintech

Cluster #3 of CF research centers around the intersection of CF and financial technology (fintech), as reflected by the presence of the following keywords: "fintech", "venture capital", "bank", and "technology innovation". This implies a growing interest from scholars in examining the potential of CF as a means to support innovation and technology development in the financial sector, particularly in emerging markets such as China (Huang *et al.*, 2018; Xie *et al.*, 2019). One area of focus within this cluster is the role of fintech in supporting sustainable development (Ahern, 2021; Darmansyah *et al.*, 2021; Dospinescu *et al.*, 2021). Keywords such as "sustainable development" and "sharing economy" show a recognition of the potential for fintech to promote more sustainable and equitable economic practices, particularly for SMEs.

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By providing alternative sources of funding to traditional bank loans or venture capital investments, CF can help to promote greater financial inclusion and reduce the reliance on traditional financial institutions that may not always be accessible or willing to lend to SMEs (Bongomin *et al.*, 2020; Fraser, 2019). Similarly, researchers have focused on the potential of CF to support technological innovation within the financial sector (Cummings *et al.*, 2020; Elliot *et al.*, 2018). CF therefore provides a means for innovative fintech startups to access the necessary capital to develop and bring their products or services to market. This can lead to the emergence of new, disruptive business models and technologies that help drive greater efficiency, accessibility, and inclusivity in the financial sector (Ault and Spicer, 2022). Therefore, CF can help increase financial inclusion, reduce reliance on traditional banking systems, and promote the development of innovative fintech solutions.

3.5 Social entrepreneurship

The focus of Cluster #4 is on social entrepreneurship and its potential role in promoting positive social and environmental impact. Examples of main keywords in the cluster include "social entrepreneurship", "base of the pyramid" (i.e., the poorest two-thirds of the population), and "social enterprise". Scholars have explored the role of CF in supporting social entrepreneurship and promoting its expansion in developing nations where traditional sources of funding are limited (Chandna, 2022; Hoos, 2022). Another area of focus within this cluster is the decision-making processes of social enterprises in the CF context. Scholars such as Mair and Martí (2006) note that social enterprises can face unique challenges in balancing their social and economic objectives when seeking funding from investors or donors. The keywords "decision-making" and "corporate governance" indicate a recognition of these issues and a heightened interest in analyzing how social enterprises can effectively navigate them. Additionally, "microlending" and "charity" often occur in the CF literature, indicating the possibility of using CF to fund microfinance and charity projects in underdeveloped regions (Luo *et al.*, 2022; Marakkath and Attuel-mendes, 2015). Several researchers (e.g., Ab-Rahim and Shah, 2019; Bongomin *et al.*, 2020) have claimed that microfinance and other kinds of social entrepreneurship can be effective means of fighting poverty and fostering long-term growth. CF can provide a means for these initiatives to access the necessary capital to realize their objectives. Finally, the appearance of the keyword "social performance" suggests a focus on the measurement and evaluation of social impact. For example, Beisland *et al.* (2021) assess the factors that drive the social performance ratings of microfinance institutions (MFIs) and the importance of social indicators (e.g., outreach, social objectives, staff commitment) in adhering to both financial and social demands. Gupta and Mirchandani (2020) explore the impact of ownership structure and corporate governance on the social performance of microfinance institutions and highlight their role in MFIs' mission for social impact. Therefore, CF can provide an opportunity for enterprises to showcase their social impact to a wider audience and to build a community of supporters who are invested in their success.

3.6 Social capital

The keywords in Cluster #5 suggest that researchers are interested in understanding how CF can promote financial inclusion through the use of social media and collective action (Battisti *et al.*, 2022; Bongomin *et al.*, 2019; Claus *et al.*, 2020). A focus on social capital is also evident in this cluster, with researchers looking at how CF can build relationships and networks among individuals and organizations (Abdeldayem and Al Dulaimi, 2022; Buttice *et al.*, 2017). The keyword "kickstarter" is notable in this cluster since it represents a popular CF platform that has enabled thousands of creative projects to be funded. Scholars are likely interested in studying the success of Kickstarter campaigns and how they have been able to mobilize a

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large number of donors to support a wide range of products (Blaseg *et al.*, 2021; Chen *et al.*, 2016). The focus on social capital is also reflected in the keyword "collective action". By leveraging the power of social networks, CF platforms can enable individuals to pool their resources and support causes that they care about (Angulo-Ruiz *et al.*, 2020; Battaglia *et al.*, 2022; Cai *et al.*, 2021). Through CF, people can come together to create positive social change at a range of different scales.

3.7 Microcredits

The final cluster of CF research features keywords such as "microcredit", "sustainable development goals", and "corporate social responsibility". This cluster demonstrates that scholars are curious about the potential of CF to foster economic growth and social development in emerging economies (Atiase *et al.*, 2020; Chen and Yuan, 2021). The keyword "microcredit" has a high occurrence frequency, referring to a type of financing that provides small loans to individuals who lack access to traditional banking services (Bhuiyan and Ivlevs, 2019; Jebarajakirthy and Lobo, 2015; Selvaraj *et al.*, 2019). Microcredits via CF can be used to assist small business owners and entrepreneurs in poor countries in expanding their operations and better supporting their livelihoods. Sustainable development goals and corporate social responsibility are also part of this set of related search terms, reflecting the interest of academics in studying the role of CF in contributing to broader social and environmental goals (Li *et al.*, 2020b; Mastrangelo *et al.*, 2020; Sierra and Rodriguez-Conde, 2021). For example, CF can be used to support social ventures that aim to address social and environmental challenges, such as climate change or poverty (Anglin *et al.*, 2022; Do *et al.*, 2022; Moser and Gonzalez, 2015). Furthermore, researchers in this cluster are also committed to systematically evaluating the effect of CF on a variety of outcomes, including financial performance and social impact, as evidenced by their use of advanced statistical methods and theoretical frameworks such as structural equation modeling and technology acceptance models. The inclusion of "self-help group" as a keyword indicates that scholars are keen to learn how CF can assist individuals and communities in taking responsibility for their own economic development (Ernesto Amoros *et al.*, 2019; Siddhartha *et al.*, 2022).

4. Results of MPA

In this section we analyze various main paths, including local (forward and backward), global, and key-route main paths. Typically, a path displays each article as a node, labeled with the lead author and publication year, with the arrow indicating the direction of knowledge flow. The thickness of the arrow also indicates the strength of the flow. Figure 4 depicts the complete citation network of the selected articles, comprising 1,528 nodes and 12,699 links. In the figure, the first category of nodes consists of the 1,357 nodes in the largest subnetwork, which forms the hub of the whole network. This subnet contains the most important citation linkages among articles and hence provides the major paths under consideration. The second category comprises nodes that have few citations, link to few other articles in the network, and are found mostly on the perimeter of the network. Nodes completely cut off from the rest of the network constitute the third category.

4.1 Local main paths

Using the lead authors' names and year of publication for identification, Figures 5 and 6 show the local main paths of the CF domain, comprising 33 and 24 articles, respectively. The two local paths share the 13 green colored articles in common, while the nodes displayed as yellow were unique to that path. Galak *et al.* (2011) and Herzenstein *et al.* (2011a) were the first articles on the forward local main path, initiating the development of the CF research field. Galak *et al.*

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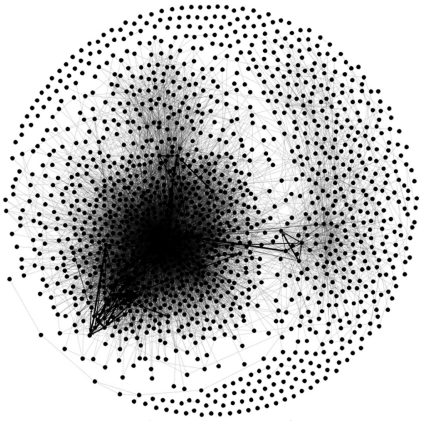

Source(s): Authors own creation

Figure 4.
The full citation network of the selected articles

Source(s): Authors own creation

Figure 5.
Forward local main path

(2011) investigate the characteristics of borrowers that lend through Kiva, an online microfinance platform which has emerged to address world poverty. They find that lenders prefer to lend to individual borrowers over groups and to borrowers who are socially proximate to themselves. Herzenstein *et al.* (2011a) look at the herd mentality of investors in

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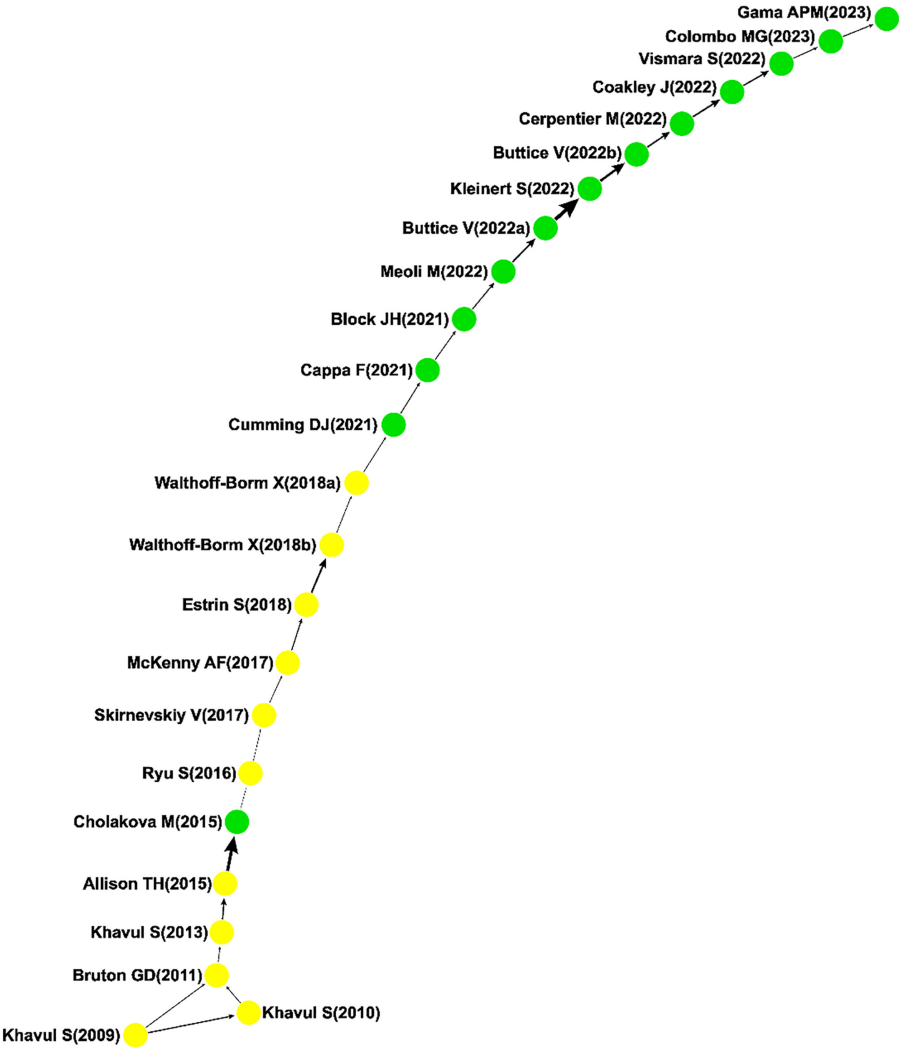

Figure 6.
Backward local main path

Source(s): Authors own creation

P2P loan auctions on Prosper.com. Their findings reveal intentional herding behavior on the part of lenders, who prefer to participate in auctions that have already attracted several bids. This trend, however, begins to fade once an auction has reached its financial goal. Galak *et al.* (2011) and Herzenstein *et al.* (2011a) merge into the paper from Herzenstein *et al.* (2011b), which explores the impact of identity claims in borrower narratives on lender decisions regarding unsecured personal loans.

Building on Herzenstein *et al.* (2011b), Zhang and Liu (2012) investigate the funding dynamics of borrower listings on Prosper.com and find evidence of rational herding as well as the impact of publicly observable borrower characteristics on herding momentum. The authors also demonstrate that assumptions of rational herding perform better than irrational

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herding in forecasting loan performance. Later, Burtch *et al.* (2013) study the social influence of crowd-funded marketplace journalism projects by analyzing the antecedents and consequences of the contribution process. The findings confirm a crowding-out effect and a positive association between the duration of funding, exposure of the pitch, and readership upon publication of the story. Overall, the papers at the beginning of the forward local main path analyze behaviors and decision-making in alternative lending markets, including CF, by examining the impact of factors such as contribution patterns, narratives, herding behavior, and rational decision-making.

The backward local main path begins with five different studies to those revealed by the forward local main path. Two articles, Khavul *et al.* (2009) and Khavul (2010), study microfinance in emerging markets, with the former exploring the establishment and evolution of family firms in East Africa and the latter discussing the potential for microfinance to boost economic growth in developing nations. These studies merge at Bruton *et al.* (2011), who explore the behavior of microloan recipients in international business by analyzing qualitative case studies conducted in Guatemala and the Dominican Republic. Subsequently, Khavul *et al.* (2013) analyze the process of institutional change in microfinance, which moves through several stages and is influenced by the interplay between institutional entrepreneurs and established organizational fields. Allison *et al.* (2015) examine how the linguistic framing of entrepreneurial narratives affects fundraising outcomes for microloans garnered from CF and how this framing impacts prosocial lending. According to the authors, framing entrepreneurial narratives as an opportunity to help others, rather than solely as a business opportunity, leads to more positive fundraising outcomes. Overall, the common focus of the articles at the start of the backward local main path is microfinance and microlending, with specific attention given to prosocial lending, informal businesses in emerging economies, institutional change, and poverty alleviation.

The two paths converge at the research of Cholakova and Clarysse (2015), who investigate the drivers of investment in equity-based CF platforms and examine the influence of financial and non-financial motivations on the decision to invest or pledge. After this point, the two paths begin to diverge by leading different articles. In the forward local main path, Ahlers *et al.* (2015) examine the effectiveness of signals used by entrepreneurs to attract financial resources from small investors through equity CF and find that successful fundraising in equity CF can be influenced by effective signals, such as retaining equity and providing comprehensive information concerning risks. The two papers which follow, Vismara (2016, 2018), also focus on equity CF, with the first examining equity retention and social capital's impact on investors and the second studying information cascades among individual investors. Next, Block *et al.* (2018) explore the effects of updates posted during equity CF on crowd participation and investment amounts. The authors find that posting updates has a positive effect on crowd participation, particularly if they are brief, simple to understand, and filled with exciting new information about the startup. Building on these findings, Hornuf and Schwienbacher (2018) and Hornuf *et al.* (2018) examine the factors that affect crowd participation and the success of equity CF campaigns, as well as the determinants of follow-up funding and firm failure after such campaigns have taken place. In short, the focus of these six studies unique to the forward local main path is on various aspects of equity CF, including signaling, updates, follow-up funding, firm failure, equity retention, and information cascades among investors.

Meanwhile, the backward local main path heads towards six different studies. Ryu and Kim (2016) develop a typology of four types of CF sponsors based on their motivations for participating in a project and the consequences of these funding motivations. Skirnevskiy *et al.* (2017) explore the development of internal social capital between project creators and backers on CF platforms and its potential spillover effects on external online communities. McKenny *et al.* (2017) identify the most promising questions and theories involving CF by

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surveying key thought leaders in the entrepreneurship field and proposing a cross-disciplinary research agenda to inform scholarly efforts. The next three papers, Estrin *et al.* (2018), Walthoff-Borm *et al.* (2018a), and Walthoff-Borm *et al.* (2018b), concentrate on the impact of equity CF on entrepreneurial finance and firm performance, as well as the factors driving firms to seek equity CF as a funding option. These six studies in the backward local main path provide additional insights into different facets of equity CF, such as its development, uptake, sponsor types, shareholder structures, and firm performance.

After Walthoff-Borm *et al.* (2018a,b), the backward local main path includes twelve papers which also appear in the forward local main path. Four articles focus on equity CF and its impact on the reputation of follow-on venture capital investors, as well as the impact of market timing on the capital structure of private firms that raise the initial equity through CF (Buttice *et al.*, 2022; Buttice and Vismara, 2022; Cerpentier *et al.*, 2022; Cumming *et al.*, 2019). Cappa *et al.* (2021) and Kleinert and Mochkabadi (2022) study the dynamics and critical success factors of CF, while Block *et al.* (2021) and Meoli *et al.* (2022) focus broadly on the governance and regulatory environment of CF. These studies culminate in the recent study by Coakley *et al.* (2022), which focuses on the strategic entrepreneurial choice between the UK Big 3 equity CF platforms and finds that larger and more heterogeneous teams are more likely to choose the co-investment model and raise funds using campaigns involving professional investors. Two streams emerge from Coakley *et al.* (2022) on the forward local main path. One stream deals with the impact of CF on the economy and entrepreneurship, the factors affecting the success of CF campaigns (Yasar *et al.*, 2022), the effect of competition and external events such as COVID-19 and Brexit (Cumming and Reardon, 2022; Cumming *et al.*, 2022; Vu and Christian, 2023), as well as the consequences of overfunding early-stage ventures with excessive capital (Murray and Fisher, 2023; Weber *et al.*, 2023). The second stream contains studies with a focus on the factors that contribute to the success of equity CF, including community-level social capital (Barbi *et al.*, 2023), third-party signals (Gama *et al.*, 2023), internal social capital among immigrant entrepreneurs (Buttice and Useche, 2022), and the impact of corporate finance perspectives and valuation on entrepreneurial ventures (Colombo *et al.*, 2023). This second stream contains the final three articles of the backward local main path.

4.2 Global main path

The citation network analysis identifies the two local paths based on local influential links, while the global main path is identified as the path with the strongest overall influence. This path comprises 26 relevant articles and is depicted in Figure 7. The strongest SPC value belongs to the connection between Buttice and Vismara (2022) and Kleinert and Mochkabadi (2022), followed by the connection between Allison *et al.* (2015) and Cholakova and Clarysse (2015), and then the connection between Kleinert and Mochkabadi (2022) and Buttice *et al.* (2022). Overall, these studies focus on equity CF and its potential for democratization and inclusion, the effect of gender stereotypes on quality signals, and the correlation between a successful campaign and the attraction of venture capital investors. The citation linkages were significantly thinner at the start of the global main path than they were at the end, suggesting that the publications at the end of the path garnered more attention and recognition than the earlier published works. The appearance of these articles at the end of the path raises questions about whether this truly reflects their significance in the CF field, or whether the result can be largely explained by the trend of increasing interest in the field in general. Consequently, the influence of these articles must be reevaluated when new research is published.

4.3 Key-route main path

To further understanding of how CF research has evolved, we also detected a key-route main path using the local method. To promote comprehensiveness in the analysis, the key route was

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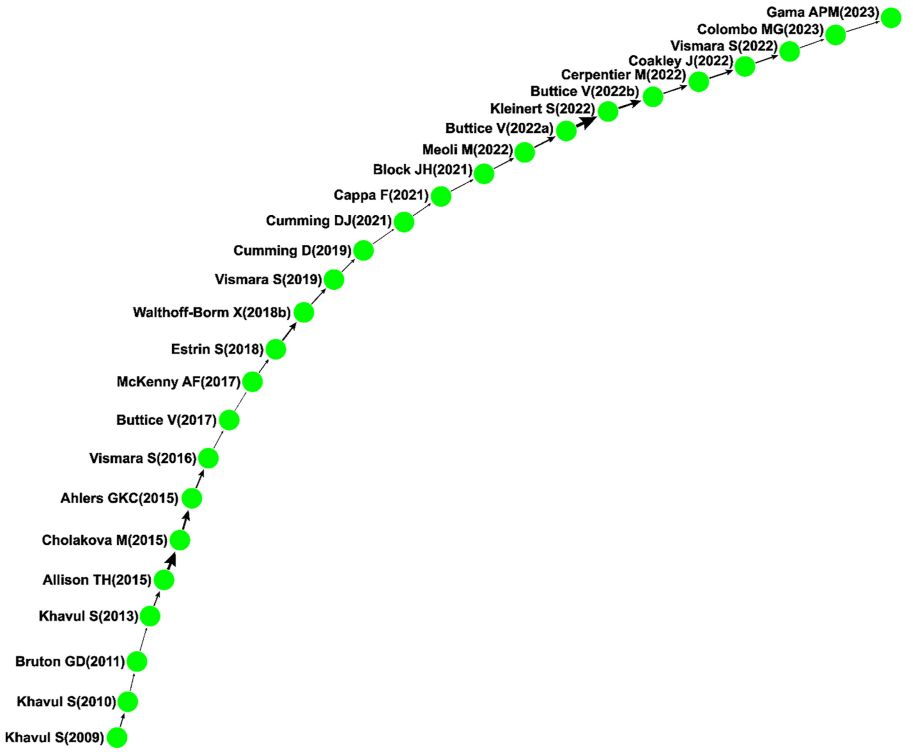

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Figure 7.
Global main path

set to 19. As can be seen in Figure 8, the CF domain has both converging and diverging knowledge diffusion cycles. All articles on the key-route main path also feature on the local main paths. The initial section of the key-route main path reveals a divergence-convergence structure with three notable findings. Firstly, during the initial phases of CF research, the focus lay on microfinancing and entrepreneurship in developing economies, predominantly in East Africa and South America. Microfinance has been shown to have positive effects on economic development and poverty reduction, and earlier studies emphasize this potential while also stressing the significance of analyzing the cultural, social, and economic context in which microfinancing programs are implemented. The focus then transitions away from evaluating microloan and CF markets to investigating the behavior of lenders and crowd funders in these markets and examining the efficacy of signals employed by entrepreneurs. The earlier studies on the path converge at Cholakova and Clarysse (2015), who investigate the motivations behind investing or pledging in CF campaigns. This study serves as a pivotal point for further studies focused on equity CF and related topics, including the behavior of CF sponsors, the significance of social capital in terms of CF success, the effect of updates on CF participation, and the impact of equity CF on business outcomes. Entrepreneurial finance and sustainability in equity CF are among the other themes covered. From 2021 onward, research has concentrated on CF as a source of capital for startup businesses. Market structure, success factors, governance, capital structure, and the influence of gender bias and stereotypes are the core topics that are examined. CF has also been studied in relation to a variety of contextual circumstances, including the COVID-19 pandemic, competition, Brexit, and policy response. Overall, recent studies aim to

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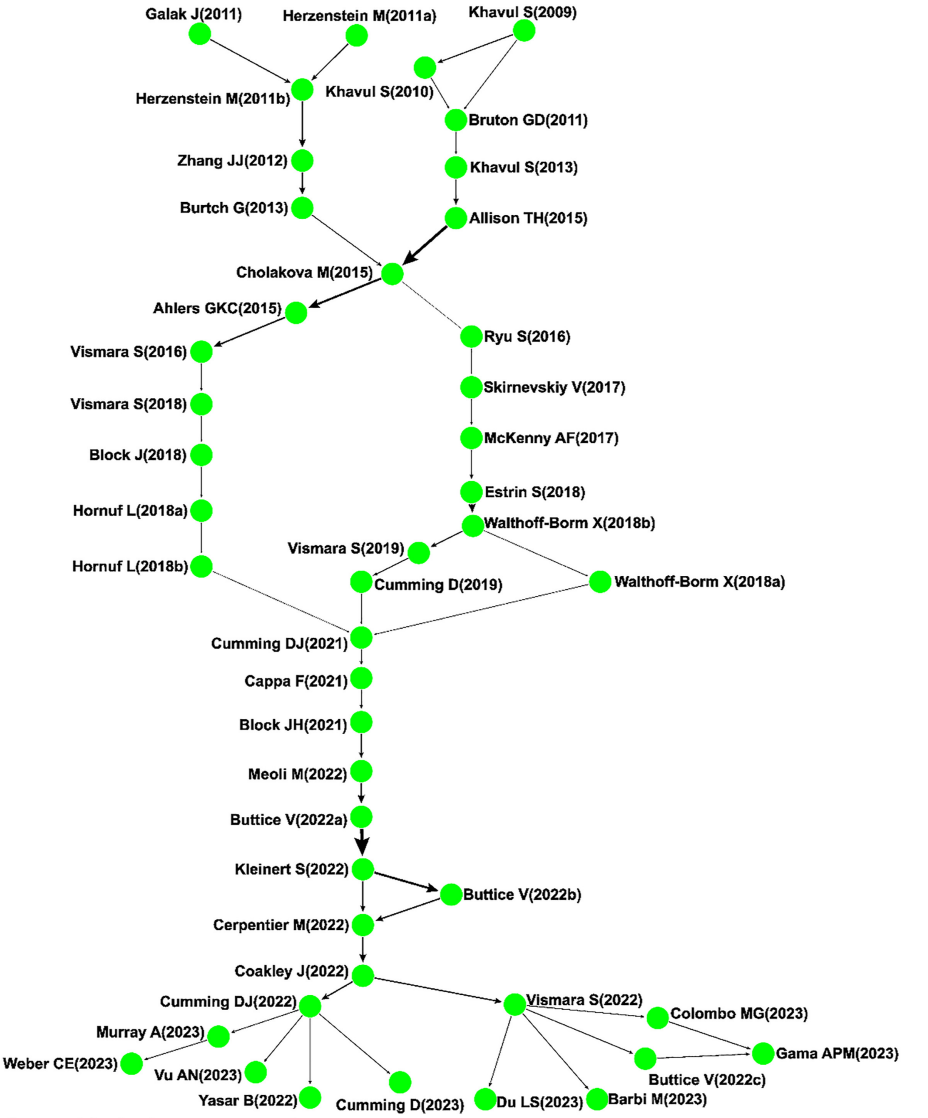

Figure 8.
Key-route main path

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offer a better understanding of CF, its potential as a source of finance for startups, and the elements leading to its success and failure.

5. Discussion and implications

This research has examined the topics that have been discussed in the domain of CF by analyzing the co-word clusters and citation network of 1,528 articles. Taking into account the largest subnetwork, our study has identified four main paths that show the diffusion of

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knowledge in the CF field from different perspectives. The analysis of local main paths enables researchers to visualize the historical evolution of the CF domain. The global main path and the key-route main path were used to identify the most influential and comprehensive structures of the CF field.

According to the analysis of co-occurrence clusters, CF research has mainly focused on sustainability, entrepreneurial finance, entrepreneurship, fintech, social entrepreneurship, social capital, and microcredits. Among these, the role of CF in fostering sustainability has received a significant amount of attention in recent years. The keywords related to economic sustainability, such as efficiency, performance, financial performance, and governance, indicate its importance. The results also reveal entrepreneurial finance as one of the most topical areas in the CF field. Studies on this topic have examined several aspects of entrepreneurial finance, including the effect of gender on CF results, the impact of information asymmetry and signaling in reward-based CF, and the impact of social networks. Meanwhile, the analysis of the four main paths reveals that equity CF has been the dominant topic in the past years. In the forward local main path, the earlier studies focus on understanding the behavior and decision-making of investors and borrowers in CF. Specifically, researchers looked at how factors such as contribution patterns, narratives, herding behavior, and rational decision-making impact the performance and success of CF markets.

In contrast, the backward local main path detected an emphasis in earlier research on microfinance and microlending, in an attempt to comprehend the significance of financial inclusion in poverty reduction and economic growth. The particular focus on prosocial lending and informal businesses in developing countries underlines the potential for microfinance to empower underrepresented and marginalized groups through access to capital. An additional focus on institutional change implies the need for legislative frameworks and infrastructure that facilitate the expansion of microfinance institutions and advance financial inclusion. Overall, earlier works in the backward local main path shed light on the progress of microfinance research and its contribution to broader development agendas.

The local main paths reveal that equity CF has emerged as a novel form of financing that has gained popularity over the last few years. As equity CF has grown more prevalent, scholars have shifted their attention from exploring its basics to studying more nuanced aspects of CF. One area of focus has been on the different signals that investors use when deciding whether or not to invest in a business through equity CF. These signals allude to the quality of the company's management team, its financial projections, and its business strategy as a whole. Moreover, research indicates that company updates can shape investor behavior, with businesses that provide regular updates to their investors having a greater chance of receiving follow-up funding. Further areas of research focus on the relationship between equity CF and firm failure as well as the founders' ability to retain equity. As equity CF implies that company shares are sold to investors, founders may end up owning a smaller percentage of the business than they would have if they had pursued more conventional financing methods. In addition, several studies have looked at the ways in which information cascades can occur among investors in equity CF. This can happen when early investors attract more investors to the company by sharing positive information about their experiences with the investment.

Finally, the analysis of the key-route main path reveals that recent research has focused on the factors that contribute to the success and failure of CF campaigns for startups. These factors include market structure, capital structure, governance structure, and the influence of gender bias and stereotypes. CF has also been studied in relation to other phenomena, such as the COVID-19 pandemic, competition, Brexit, and policy response. These contextual factors can impact the success or failure of CF campaigns and thus require further investigation.

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5.1 Theoretical implications

The analysis presented in the paper plots the evolution of CF research and highlights its multidimensional implications. Theoretical implications emerge from understanding the interconnectedness of various research themes and their impact on the CF landscape. The emphasis on sustainability, entrepreneurial finance, and financial inclusion suggests that CF has the potential to not only drive economic growth but also to promote social and environmental objectives. The growing interest in equity CF and the in-depth analysis of investor behavior, signals, and information cascades reflect the maturation of the field, as researchers seek to better understand the intricacies of this innovative financing method. Furthermore, the study of contextual factors such as the COVID-19 pandemic, Brexit, and policy responses adds another layer of complexity to CF research, highlighting the need for a more dynamic approach to understanding the impact of these external factors on the success and failure of CF campaigns. Additionally, the emphasis on institutional change in the context of microfinance underlines the importance of establishing enabling environments for financial inclusion and the expansion of microfinance institutions. This suggests that researchers should consider the interplay between regulatory frameworks, market forces, and individual behaviors to gain a comprehensive understanding of the CF domain. Based on the findings of the co-word analysis and MPA, this study suggests several future research directions in the CF field:

(1) Exploration of novel forms of CF: While equity CF has gained significant popularity in recent years, other forms of CF (e.g., reward-based CF, donation-based CF, debt-based CF, and hybrid CF models) that have yet not been substantially explored may also hold promise. Researchers could investigate alternative models of CF and their differential impacts on startups and small businesses.

(2) Further investigation of the relationship between CF and sustainability: The findings of the paper suggest that CF has played a significant role in fostering sustainability. Future research could explore the mechanisms through which CF can contribute to sustainable development and the effectiveness of such approaches. This could involve assessing the success of CF models that concentrate on sustainability, such as those that support projects linked to renewable energy, waste reduction, or other environmentally beneficial efforts (Bento *et al.*, 2019). The role of CF in resolving issues of social and economic sustainability is another area that could be studied. CF could, for instance, be studied for its ability to bolster small enterprises in underdeveloped nations or finance initiatives that advance social cohesion and economic opportunity in underserved areas (Bongomin *et al.*, 2020).

(3) Examination of the impact of CF on firm failure: As the popularity of CF continues to grow, there is a need to understand the factors that contribute to firm failure in CF campaigns. Researchers could investigate the impact of CF on premature scaling and other forms of mismanagement that can lead to failure. Such research could help identify strategies to mitigate these risks and increase the likelihood of success for CF campaigns. Additionally, future studies could explore the effectiveness of different types of CF campaigns (e.g., reward-based, equity-based CF) in reducing the risk of failure for small businesses and startups.

(4) Investigation of the role of narratives and updates in CF campaigns: The paper highlights the importance of narratives and company updates in shaping investor behavior in CF campaigns. Further research could explore how companies can effectively use narratives and updates to attract more investors and increase the success of their campaigns. Research could also look at the effects of other factors on investor behavior, such as social proof (Bapna, 2019), reputation, and perceived

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trustworthiness, as well as different types of rewards and incentives, such as debt, equity, or product discounts. Furthermore, researchers could explore the possibility of using machine intelligence and machine learning algorithms to analyze and predict investor behavior in CF campaigns. This could help businesses tailor their narratives and updates to better appeal to investors and increase the likelihood of success.

(5) Examination of the impact of institutional change on microfinance institutions: The study emphasizes the need for legislative frameworks and infrastructure that facilitate the expansion of microfinance institutions and advance financial inclusion. Future research could explore the impact of institutional change on the sustainability and success of microfinance institutions.

(6) Study of the influence of contextual factors on CF campaigns: The analysis of the key-route main path reveals that CF has been studied in relation to various contextual factors, such as the COVID-19 pandemic, competition, Brexit, and policy responses. Researchers could investigate how these factors influence the success or failure of CF campaigns and their implications for startups and small businesses. Similarly, future studies could explore how CF can be used as a tool for economic development and job creation, particularly in underserved communities. This may involve investigating the role of CF in supporting minority-owned and women-owned businesses, as well as startups in rural areas.

5.2 Practical implications

This study reveals the applicability of CF to a wide diversity of real world situations. Understanding the diffusion of knowledge in the CF domain can assist practitioners in making well-informed decisions and developing tailored strategies to maximize the benefits of CF initiatives. One important practical implication is the role of CF in promoting sustainability, which can help businesses and entrepreneurs align their financial strategies with environmental and social goals. By leveraging CF platforms, organizations can demonstrate their commitment to sustainability, attract investors who share their values, and secure funding for initiatives that positively impact society and the environment. Another practical implication relates to the growing importance of equity CF as an alternative financing method for startups and small businesses. Entrepreneurs can capitalize on the insights derived from research on investor behavior, signaling, and information cascades to optimize their campaigns and increase their chances of securing funding. This includes effectively communicating the quality of their management teams, providing accurate financial projections, and maintaining regular communication with investors.

The focus on financial inclusion and microfinance in the CF research domain emphasizes the potential for CF to empower underrepresented and marginalized groups. As a result, managers and practitioners are advised to design CF platforms and campaigns that cater to the unique needs of these communities, fostering financial literacy, and supporting the growth of informal businesses in developing countries. This can contribute to poverty reduction and inclusive economic growth, particularly when combined with institutional change and supportive legislative frameworks. Finally, the examination of contextual factors such as the COVID-19 pandemic, Brexit, and policy response in CF research underscores the importance of adapting CF strategies to evolving market conditions and external influences. These understandings can aid practitioners in developing financing models that are more resistant and adaptable to economic crises while also capitalizing on emerging opportunities.

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6. Conclusions and limitations

As an effective approach to raising funds for projects or ventures, CF has a garnered a lot of attention from academics and practitioners. Using a sample of 1,528 journal articles extracted from the Web of Science Core Collection database, this study employs quantitative techniques including co-word analysis and MPA to reveal the most important subjects and influential works that have significantly impacted CF evolution and knowledge diffusion over the last years. The co-word analysis shows that sustainability, entrepreneurial finance, and entrepreneurship are the primary focus of the CF field. The analysis of local main paths enables a comprehensive description of the CF domain, indicating the dominance of equity CF-related research in the CF domain. According to the global main path, the most important linkages in the evolution of CF are those connecting the works of Buttice and Vismara (2022), Kleinert and Mochkabadi (2022), and Allison *et al.* (2015). The knowledge dissemination structure in the CF domain is also depicted with the help of the key-route main path.

To the best of the authors' knowledge, this is the first study to combine co-word analysis and MPA to examine the knowledge diffusion trajectories of the full CF domain. By combining four distinct types of main paths, researchers are given a complete picture of CF research's dynamic growth over the last decade. This study offers fresh insights into the examination of the CF domain that differ from the standard review approach and bibliometrics. One positive aspect of this quantitative approach is its simplicity in identifying the most important contributions in the history of the CF domain and uncovering the knowledge diffusion paths comprehensively and intuitively. Additionally, several research directions are proposed based on the findings of the analysis, which will help researchers broaden the scope of their investigations.

While the results of this study are valuable, there are some limitations that should be noted. This study only employed the Web of Science Core Collection as its research sampling database, where only a fraction of all papers published on CF is represented. To bolster the findings, scholars could use Scopus to collect publications and replicate the analysis. Additionally, other publication types such as book chapters or conference proceedings might be included in the analysis. The MPA results are subject to change when additional studies are included. Moreover, this study has disregarded discrepancies between the importance of citing articles and cited articles by treating them as equally relevant, which they are not. Therefore, future studies are recommended to account for the relevance of papers within the citation network.

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Appendix

Search: ("crowdfund*" OR "crowd invest*" OR "online peer lend*" OR "crowdinvest*" OR "crowd fund*" OR "peer-to-peer (P2P) lending" OR "P2P lend*" OR "peer-to-peer lend*" OR "micro lend*" OR "microlend*" OR "micro-lend*" OR "microfinanc*") (Topic) and English (Languages) and Article or Review Article (Document Types) and Retracted Publication or Data Paper or Proceeding Paper or Book Chapters (Exclude – Document Types) and Management or Business (Web of Science Categories).

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