



Uncovering the themes and trends in crowdfunding research using Latent Dirichlet Allocation

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Abstract

Crowdfunding (CF) has become a significant force in the entrepreneurial landscape, offering an innovative alternative to traditional financing channels for startups and projects. As the field expands, it is crucial to systematically analyze the existing literature to identify key themes, patterns, and emerging areas of interest. To achieve this goal, this study investigates the CF literature using latent Dirichlet allocation (LDA)-based topic modeling based on 1,678 publications extracted from the Scopus database. The review reveals significant growth in CF research, with top journals spanning diverse disciplines. Eight main topics are identified, including CF campaign success and financing, donation-based CF, social effects of CF, entrepreneurial projects and rewards in CF, financial and fintech aspects of CF, CF project success and performance, P2P lending models and credit risk assessment, and equity CF and venture capital. Several research directions are suggested for each topic to advance the CF field. The theoretical and practical implications are also discussed. To the authors' best knowledge, this study represents the first systematic analysis of the CF literature using the LDA approach, offering a comprehensive and up-to-date overview of this field and highlighting emerging areas of interest and potential research directions.

Keywords Crowdfunding · Entrepreneurship · Equity crowdfunding · Fintech · Latent Dirichlet Allocation

1 Introduction

Since its inception in 2008, crowdfunding (CF) has revolutionized fundraising by enabling innovators to source small investments from a wide online audience, which is a shift from traditional larger investments from a few (Hussain et al. 2023; Cillo

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et al. 2023; Mora-Cruz and Palos-Sanchez 2023). According to Short et al. (2017), CF represents the act of pooling capital from numerous funders, thereby circumventing traditional financial routes and addressing funding gaps in early-stage ventures exacerbated by financial crises (Mollick 2014; Belleflamme et al. 2014; Moritz and Block 2016). Beyond funding, CF offers entrepreneurs feedback, project legitimacy, market validation, and networking opportunities (Mollick and Kuppuswamy 2014; Frydrych et al. 2014).

The primary aim of this research is to analyze the landscape of CF research by identifying the key themes and patterns within the literature, including emerging and niche areas. This is achieved through the use of topic modeling based on latent Dirichlet allocation (LDA). The study of CF has recently blossomed into a burgeoning and fast-expanding subject that spans diverse topics and scientific disciplines. Although some attempts have been made to consolidate previous CF research (Rejeb et al. 2023b), there is still a lack of studies that comprehensively covers the CF field using Latent Dirichlet Allocation. This study seeks to fill this gap by offering a novel approach to understanding the breadth and depth of CF research.

For instance, Buttice and Ughetto (2021) review the characteristics of authors and published works, methodologies, thematic areas, journals, and the degree of diversity within the academic community active in CF research to gain insight into the current state and future directions of the CF domain. Gil-Gomez et al. (2023) perform a bibliometric study to offer a quantitative view of CF research and highlight the most prolific and prominent academic research sources. Likewise, a bibliometric study and meta-analysis of the academic literature pertaining to CF and P2P lending was conducted by Rabbani et al. (2022), who found a sharp increase in the number of articles published on both subjects since 2013. Neuhaus et al. (2022) use a literature review to investigate the relationship between personality factors and CF success and Bauer et al. (2023) find that startups have varying monetary and non-monetary needs that depend on their stage in the life cycle. Baber and Fanea-Ivanovici (2022) perform a bibliometric study using data from 1,951 journal publications to assess the most recent CF research statistically. Various facets of CF research are examined, including annual paper output, subject areas, citation patterns, the most often influential scholars and studies, the most prolific authors, and the countries where CF research originates. In addition to bibliometric analyses, scholars have conducted systematic literature reviews of CF research, providing a comprehensive and in-depth understanding of the state-of-the-art knowledge in this field. For example, Wehnert and Beckmann (2021) review 78 relevant articles on the role of CF in fostering sustainability and conclude that the sustainability orientation of innovation affects the dynamics of the CF system's constituents via the two primary processes of informational and motivational impacts. Similarly, Böckel et al. (2021) review 83 journal articles to examine the relationship between CF and sustainability and analyze the potential of this connection in promoting sustainable development. Mochkabadi and Volkman (2020) and Mazzocchini and Lucarelli (2022) review the literature related to equity CF, while Salido-Andres et al. (2021) and Alegre and Moleskis (2021) systematically analyze previous studies on donation CF. Finally, Chaudhary et al. (2022) investigate the difference between CF and alternative fundraising sources and

the challenges encountering entrepreneurs during CF campaigns by reviewing 58 articles.

While previous bibliometric analyses and systematic literature reviews have provided valuable insights into CF research, they have certain limitations. For example, bibliometric analyses tend to focus on quantitative metrics, such as citation counts, and may not capture the nuances of the underlying research topics (Taddeo et al. 2019; Ye et al. 2020; Rejeb et al. 2022a, b). Similarly, while offering a comprehensive understanding of the state-of-the-art knowledge in a field, systematic literature reviews are often limited by the researchers' subjective interpretation of the literature (Rejeb et al. 2021). Moreover, they often rely on a limited sample of articles and may not fully capture the breadth and depth of the field. As a result, scholars may overlook emerging or niche areas and fail to provide a nuanced understanding of the relationships among different CF topics. To overcome these limitations, the current study employs a topic modeling technique to provide a more objective and exhaustive analysis of CF research trends and directions.

The article is structured as follows. After the introduction, Sect. 2 delves into the conceptual background of CF research. Section 3 presents the research methods used. Section 4 presents the findings of the review. A discussion of the results and future research directions is provided in Sect. 5. Finally, the paper concludes by highlighting the research implications and limitations.

2 Conceptual background

In recent years, the popularity of CF has skyrocketed as a means to solicit funds from a large group of people through the use of Internet-based platforms (Moritz and Block 2016; Block et al. 2021). This innovative financing approach opens up new avenues for project and entrepreneurial fundraising, particularly for innovative start-ups, without relying on the typical channels for obtaining financing, such as banks, venture capital firms, and businesses. Internet-enabled CF platforms act as a reliable and trusted mechanism, facilitating interaction between fundraisers (i.e., creators or campaigners) and funders (i.e., backers or supporters), thereby enabling them to work together seamlessly in an alliance (Böckel et al. 2021). Generally speaking, CF campaigns can be broken down into four distinct types depending on the nature of the contributions made by backers: equity-based CF, reward-based CF, donation-based CF, and loan-based CF. Equity-based CF projects involve equity shares, while reward-based CF projects offer non-monetary rewards, products, or services (Giudici et al. 2018). Donation-based CF projects offer no monetary or tangible benefit, and loan-based CF provides a specific interest rate (Kgoroadira et al. 2019; Gafni et al. 2021). CF has proven to be a game-changer for entrepreneurs, drastically reducing their dependence on conventional financing routes (Eldridge et al. 2021; Buttice and Useche 2022). By leveraging the power of the internet, CF has enabled individuals and ventures to bypass the stringent requirements and limitations of traditional funding sources. This has paved the way for new fundraising avenues, especially for those who would otherwise struggle to obtain financing for their innovative ideas (Bargoni et al. 2022; Camilleri and Bresciani 2022). CF platforms have democratized the

fundraising process, making it more accessible and inclusive for everyone, regardless of background, experience, or financial status. As such, CF has revolutionized the entrepreneurial landscape and has become an integral part of the modern startup ecosystem.

The emergence of the first online CF platform, ArtistShare, in 2001 marked the beginning of a new area in fundraising. Two years later, users began creating CF projects, and since then, Massolution (2015) reports that nearly 1,250 CF platforms have emerged worldwide. Notable among them are the 2009- and 2008-founded Kickstarter and IndieGoGO (Brown et al. 2017; Ahsan and Musteen 2021). In spite of the prevalence of these CF sites, not every project posted on CF platforms has been able to raise the necessary funds. In the case of Kickstarter, the platform follows the “All-or-Nothing” model, which means that entrepreneurs receive nothing unless they reach their funding targets (Barros et al. 2020; Ahsan and Musteen 2021). Platforms that use the “Keep-it-All” model, such as GoFundMe and IndieGoGo, make it possible for creators to get funding even if their initiatives fail to reach their targets (Huang et al. 2022). All parties involved in CF projects, including project developers, supporters, and platforms, are invested in achieving CF success. CF project developers hope to accomplish funding goals to operate their enterprises (Dai and Zhang 2019). Backers of the CF project aspire to provide support to profit monetarily or spiritually in return (Hagawe et al. 2023). Successful projects provide payments and fees for CF platforms, which boost the platform’s standing and reputation in the industry (Belleflamme et al. 2015).

3 Methodology

The current study utilizes the latent Dirichlet allocation (LDA) approach, which is, according to Blei et al. (2003), a three-tiered hierarchical Bayesian model. Conceptually, LDA represents a generative probabilistic machine learning toolbox for latent topic modeling and a suite of algorithms for discovering and annotating massive archives of texts with thematic information (Li et al. 2016). LDA’s core tenet is that texts should be seen as stochastically mixed across a set of latent topics, with each topic being defined by a particular distribution over words (Blei et al. 2003; Blei 2012). By providing “K” topics and a collection of documents with words from a vocabulary (V), the model of LDA can generate K topics β_K (K-plate), which is a multinomial probability distribution over terms. The latent themes are revealed to the analyst in the form of keywords. Through inductive analysis, the LDA approach can uncover the underlying topics connecting the keywords (Rejeb et al. 2023a). Based on previous studies (Moro et al. 2015; Guo et al. 2017), we choose to employ LDA for this investigation since this approach allows for reproducible and objective analysis of a vast number of documents. To conduct the analysis, R and Python software were used to facilitate statistical computing, generate graphics, and execute natural language processing (NLP) tasks, including data preprocessing, topic modeling, and visualization.

3.1 Literature collection

To conduct this study, CF-related publications were the unit of analysis. Considering the extensive volume and varied content of full texts, conducting LDA on them is impractical due to the significant preprocessing required and the computational resources needed. Similar to prior studies applying LDA (Sun and Yin 2017; Rejeb et al. 2023a; Kaushik et al. 2023), we focused on the examination of the publications' abstracts. Abstracts provide a comprehensive summary of a study's content, making them a practical resource for LDA to identify key themes and concepts (Hartley and Betts 2009). This focused approach avoids the complexities of full-text analysis, which often includes extraneous information (e.g., references, appendices) that can detract from the core topics being analyzed. This approach is also substantiated by the work of Kaushik et al. (2023), who successfully applied LDA to abstracts within the field of social entrepreneurship, demonstrating the method's effectiveness in a domain closely aligned with CF.

The Scopus database was consulted to collect the relevant literature pertaining to CF due to its popularity in bibliometric studies and its ability to provide high-quality journal articles using text-based search queries (Fahimnia et al. 2015). On 13 February 2024, we searched Scopus for publications containing the keywords ("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 "crowdlend*") to identify the relevant publications in the CF field. The search was limited to English-language journal articles and conference proceedings to ensure high-quality and academically rigorous material that is up-to-date with current research trends (Ramos-Rodríguez and Ruíz-Navarro 2004). Overall, the query returned 1,915 publications selected for the final analysis. We have implemented rigorous checks to ensure that each publication is unique and have excluded conference proceedings in cases where subsequent journal articles by the same authors exist.

3.2 Corpus preparation

Before conducting the unsupervised analysis using the LDA approach, the collected texts need to be prepared. The initial phase of the analysis involves eliminating special characters, punctuation, new line characters, and URL addresses. Next, the text was refined and polished using Genism, which is an open-source Python library that can process large quantities of documents and eliminate unnecessary words (stopwords), such as adverbs, adjectives, and verbs (Řehůrek and Sojka 2011; Richert 2013). To increase the accuracy of the analysis, the stopwords included in the Gensim library were combined with other words not crucial to the process, such as finding, result, period, and article. Finally, using the Gensim package, we reduced the sentences to a list of words and then assigned unique identifiers (IDs) to each of those words. This procedure makes it possible to track down where and how often words appear in the texts, as well as the relative importance of those words.

3.3 LDA model configuration and determination of optimal K number of topics

The development of an effective vocabulary for the LDA model is a critical task for building the model and extracting the topics from the given texts. Analysts can automate this process by generating a vectorized “bag-of-words” using the Gensim library “id2word” feature. Subsequently, the Mallet software was used to create the LDA model (McCallum 2002). In particular, the software is a versatile toolkit that offers functionalities such as document classification, clustering, and topic modeling, making it well suited for analyzing and deriving insights from datasets with smaller samples. Setting numerous topics is required for the modeling process. In the current study, the Mallet software has been used to run many simulated LDA models with a range of topic numbers. The coherence scores were computed to determine the optimal number of topics. By definition, the coherence score is a measure of how semantically coherent a topic is based on the relationship between the words in the topic. This metric calculates a numerical score for each topic, indicating the degree to which the words within that topic are related and form a coherent theme. A higher coherence score implies that the words in a topic are more closely related and contribute more to the overall topic theme, which is desirable for accurate topic modeling. Figure 1 depicts the coherence scores determined by the unsupervised learning algorithm. Based on the definition of the coherence score, it is reasonable to select the LDA model with the highest and most stable score since this indicates a stronger semantic coherence among the words within each topic. The results show that after processing eight topics, the model settles down to a mean value of 0.3914. That is, adding more than eight topics does not improve the analysis. Consequently, the model with eight topics was determined to be the most appropriate option for analysis based on the coherence scores obtained through the LDA modeling process. Coherence scores are shown in Table 1 for all topic numbers tested.

Fig. 1 Plot of coherence scores

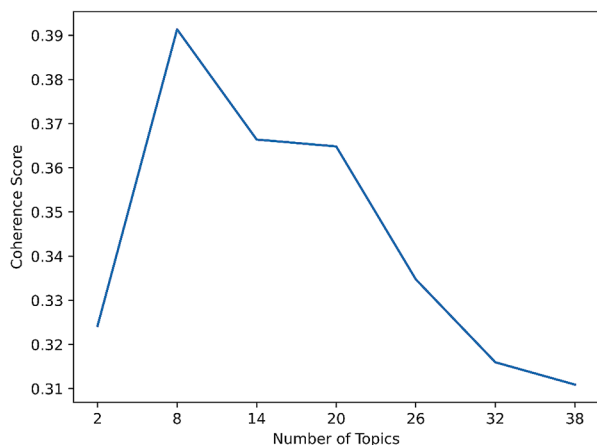
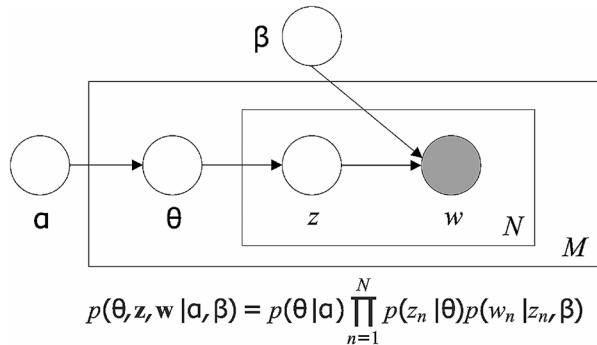


Table 1 The value of coherence scores

| Number of topics | Coherence score |
|------------------|-----------------|
| 2 | 0.3242 |
| 8 | 0.3914 |
| 14 | 0.3664 |
| 20 | 0.3648 |
| 26 | 0.3348 |
| 32 | 0.3160 |
| 38 | 0.3109 |

Fig. 2 Representation of the LDA model (Blei et al. 2003)



3.4 Generation of topics

The LDA model is a generative probabilistic model used to represent texts as a combination of latent topics, where each topic consists of a collection of words (Blei et al. 2003). The model is graphically shown in Fig. 2, where the rectangles (plates) represent replicates. M stands for the set of publications and N for the inner box that depicts how often the same topics are used in each publication. The observed words, represented by w, are distributed according to the topic distribution, which is represented by z. The latent parameter beta is the distribution of words across topics. The distribution of topics over documents is represented by theta, whereas the distribution of words over topics is shown by alpha. In conclusion, the LDA model reveals the document-specific latent topics, the relative importance of those topics, and the frequency with which they appear across texts. This study utilized the LDA model to pinpoint the seven most commonly discussed topics in the CF research field. The analysis involved determining the frequency of these topics within the selected documents, as well as identifying the most pertinent publication for each topic. The researchers also used the semantic coherence approach, measuring how certain topic-related keywords appear in each abstract (Mimno et al. 2011). Essentially, two research team members used the semantic coherence score as the basis for an inductive procedure to select a group of publications for each topic.

The resulting LDA model was analyzed with the help of other Python libraries. We used PyLDAvis to find the average distance between topics and the 30 most important words in the model dataset. We also utilized the Matplotlib library to plot the results of our investigation.

3.5 Bibliometric analysis

A bibliometric study was carried out on the accumulated scientific publications to better understand the significance of academic journals. Following the recommendations of Aria and Cuccurullo (2017), the research team used the bibliometric R package to perform the bibliometric study. This package enables the identification of the connections between different sets of scientific works, which can be used to better comprehend interconnected networks and themes. This study serves two main aims using bibliometric techniques: performance analysis and science mapping. As per Caputo et al. (2021), performance analysis allows for an in-depth look at the performance of scholars and academic organizations, while science mapping helps researchers understand the development and dynamics of a particular scientific field.

Table 2 Main bibliometric information of the selected sample

| Main information about data | |
|--------------------------------------|-----------|
| Timespan | 2008:2023 |
| Sources | 591 |
| Documents | 1,915 |
| Average years from publication | 4.17 |
| Average citations per documents | 31.34 |
| Average citations per year per doc | 4.621 |
| References | 96,749 |
| Document types | |
| Journal article | 1,660 |
| Conference paper | 197 |
| Review | 58 |
| Document contents | |
| Keywords Plus (ID) | 3,315 |
| Author's keywords (DE) | 4,399 |
| Authors | |
| Authors | 3,685 |
| Author appearances | 5,421 |
| Authors of single-authored documents | 205 |
| Authors of multi-authored documents | 3,480 |
| Authors collaboration | |
| Single-authored documents | 249 |
| International co-authorships % | 33.6 |
| Documents per author | 0.52 |
| Authors per document | 1.92 |
| Co-authors per documents | 2.83 |
| Collaboration index | 2.09 |

4 Findings

4.1 Descriptive analysis

The purpose of this bibliometric analysis was to learn more about the significance of the journals active in the CF field. Table 2 provides a summary of the information related to the selected dataset. According to the data, most of the documents were articles published in academic journals. The CF field exhibited an annual growth rate of 36.8%. Compared to the crisis-led venture capital (CVC) field, which saw a 505% growth in literature from 2009 to 2022 (Pandey et al. 2023), CF's annual growth appears to be robust. Both fields have seen a substantial increase in research activity following economic crises, which suggests a heightened academic and practical interest in financial innovations and alternatives during and after periods of economic stress.

Furthermore, the average number of citations per CF document stands at 31.34, which is higher than the 15.36 average citations per document in private equity research (Sharma et al. 2023). This difference could indicate that CF research has a broader or more immediate impact on the academic community. This trend is supported by the higher rate of collaborative research in CF, with an average of 2.83 co-authors per document, compared to sustainable investment research, which has seen a decline in single authorship from over 40% in 1988–2003 to just 18% in recent years (Beisenbina et al. 2023). In terms of author collaboration, the 33.6% international co-authorships of CF research exceed that of the sustainable investment field, where the most common publications are by two or three authors (Beisenbina et al. 2023). This suggests a more global and interdisciplinary approach in the CF field, which may be due to its novelty and the complexity of issues that require diverse expertise (Cai et al. 2021; Abdeldayem and Al Dulaimi 2022). Overall, these comparisons provide a clearer picture of the position of CF within the landscape of academic research, demonstrating its rapid growth and high engagement in comparison to other fields. It suggests that the findings in CF research, particularly the growth and citation rates, are not only field-specific but also indicative of the field's current dynamism and global reach.

Figure 3 shows the annual evolution of CF research. CF publications have steadily increased since 2008, with a notable acceleration since 2014, demonstrating a faster growth rate when compared to the more gradual increase observed in the CVC literature over a similar period (Pandey et al. 2023). The compound annual growth rate for the period 2008–2023 is approximately 37%, indicating a strong growth rate for CF research publications. The peak in publications in 2021 and 2022 can be related to the COVID-19 pandemic, which led to a surge in online CF as a means of raising funds for individuals and organizations affected by the pandemic (Cumming et al. 2022b; Cumming and Reardon 2022). The increase in publications over time reflects a growing interest in the various aspects of CF, including the motivations of CF participants, the impact of CF on entrepreneurship and innovation, and the legal and regulatory issues surrounding CF. This mirrors the trends in sustainable investment and private equity research, where there is also a notable increase in publications addressing emerging financial models and practices. Overall, these findings suggest that CF rep-

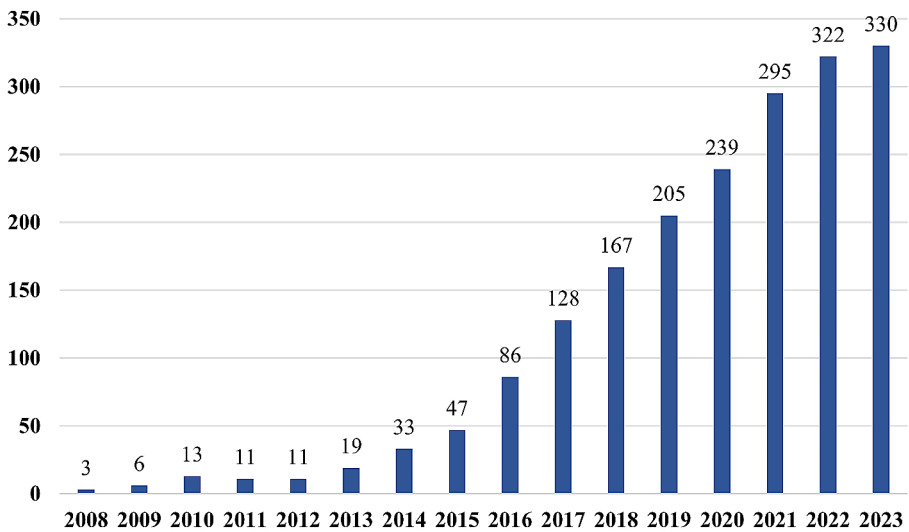


Fig. 3 Annual distribution of publications

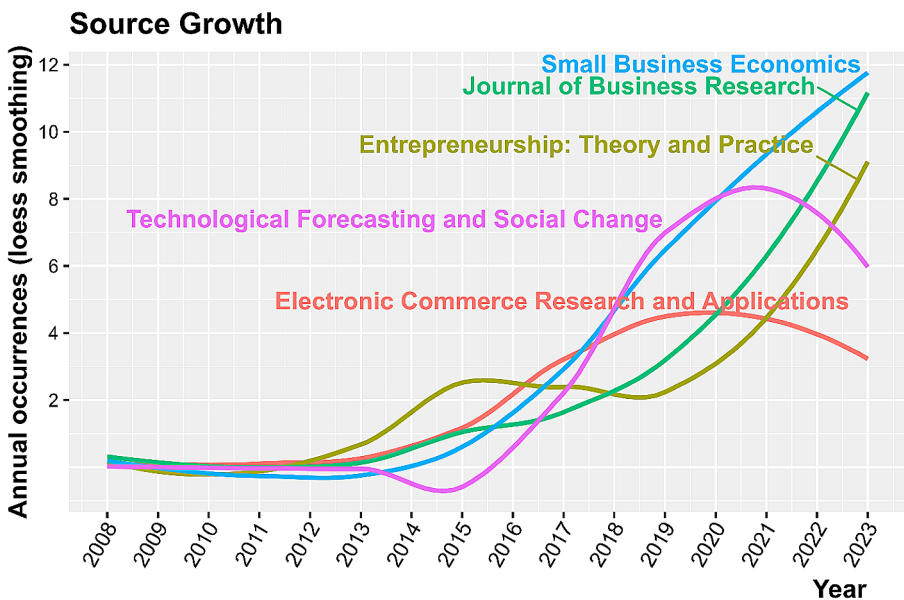


Fig. 4 The top five most productive journals in the CF field

resents an important and growing area of research and that researchers are increasingly interested in understanding the phenomenon of CF and its various implications.

Figure 4 depicts the top five most productive academic journals in the CF field. *Small Business Economics* is the most productive journal in the CF field, with 56 articles. This suggests that *Small Business Economics* is a highly respected and

influential journal in the field of entrepreneurship and innovation, which are closely related to CF. *Technological Forecasting and Social Change* comes in second with 46 articles, followed by *Journal of Business Research* with 41 publications, *Entrepreneurship Theory and Practice* with 36 articles, and *Electronic Commerce Research and Applications* with 33 articles. These results indicate that CF is a multidisciplinary area of research, with contributions from economics, technology, business, and electronic commerce. It is also noteworthy that these journals are all highly respected in their respective fields, suggesting that CF research is gaining recognition and acceptance in academia. Therefore, the journal-wise distribution of publications highlights the growing importance of CF as a research topic and the diversity of perspectives that scholars are bringing to this area of study.

4.2 Latent Dirichlet Allocation

The main focus of the current research is the generation of the LDA model. To analyze the model's suggested eight topics, the researchers retrieved ten keywords and their relative weights from the corpus. An analysis was carried out through inductive reasoning to determine topics associated with the retrieved words. The study uncovered eight topics reflecting distinct research trends and prevailing areas of interest in publications related to CF (Table 3). *CF project success and performance* (labeled as 6), which focused on exploring the dynamics of successful CF projects and the factors contributing to their success and performance, is the most significant topic, followed by *Equity CF and venture capital*, *Entrepreneurial projects and rewards in CF*, *Financial and fintech aspects of CF*, *P2P lending models and credit risk assessment*, *CF campaign success and financing*, *Donation-based CF*, and *Social effects of CF*. The interest in equity CF and venture capital as a significant topic of study reflects the growing importance of these financing mechanisms in the entrepreneurial and business landscapes. Equity CF allows individuals to invest in early-stage companies in exchange for equity, while venture capital typically involves more substantial investments from specialized investors or funds into high-potential startups or growth-stage companies.

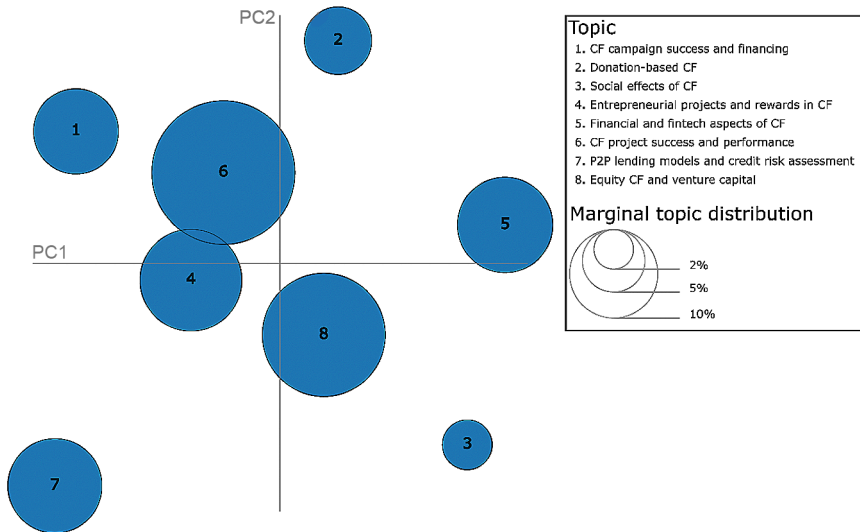
The importance of the selected topics' weights in the LDA model can be visually understood with the help of the Python library PyLDAvis, which was created by Sievert and Shirley in 2015 (Sievert and Shirley 2014). The generated two-dimensional map (shown in Fig. 5) depicts each topic as a colored circle. The topic of *CF project success and performance* is the most impactful among the topics, as can be shown by visually comparing the relative sizes of the circles. The overlap of the connected circles also serves to emphasize the close connection between the sixth topic (*CF project success and performance*) and the fourth topic (*Entrepreneurial projects and rewards in CF*). The overlap between these topics indicates that the rewards and incentives are likely a crucial factor in the success and performance of CF projects. This could imply that the quality, type, and structure of rewards can significantly impact the amount of funding a project receives. It also suggests that successful entrepreneurial projects in CF are those that effectively understand and leverage the relationship between the project's offerings and the backers' expectations. The remaining topics are distinct from one another since they do not overlap

Table 3 Results of the LDA model

| Topic | Keywords | Trends |
|-------|---|---|
| 1 | 0.027*"campaign" + 0.026*"crowdfunding" + 0.016*"project" + 0.015*"platform" + 0.014*"success" + 0.012*"financing" + 0.011*"backer" + 0.011*"creator" + 0.011*"signal" + 0.010*"quality" | CF campaign success and financing |
| 2 | 0.031*"crowdfunding" + 0.022*"platform" + 0.021*"donation" + 0.018*"donor" + 0.017*"campaign" + 0.011*"online" + 0.010*"intention" + 0.008*"social" + 0.007*"analysis" + 0.006*"factor" | Donation-based CF |
| 3 | 0.009*"social" + 0.009*"legitimacy" + 0.007*"crowdfunding" + 0.006*"entrepreneurship" + 0.006*"platform" + 0.006*"effect" + 0.006*"business" + 0.005*"auction" + 0.005*"strategy" + 0.005*"student" | Social effects of CF |
| 4 | 0.051*"crowdfunding" + 0.017*"entrepreneur" + 0.010*"reward" + 0.010*"project" + 0.008*"funding" + 0.008*"product" + 0.007*"platform" + 0.007*"campaign" + 0.006*"effect" + 0.006*"performance" | Entrepreneurial projects and rewards in CF |
| 5 | 0.022*"financial" + 0.019*"fintech" + 0.013*"finance" + 0.011*"platform" + 0.009*"market" + 0.009*"ico" + 0.008*"industry" + 0.008*"business" + 0.008*"development" + 0.008*"service" | Financial and fintech aspects of CF |
| 6 | 0.044*"crowdfunding" + 0.033*"project" + 0.016*"social" + 0.015*"success" + 0.012*"campaign" + 0.012*"platform" + 0.011*"funding" + 0.010*"information" + 0.009*"effect" + 0.008*"factor" | CF project success and performance |
| 7 | 0.055*"lending" + 0.049*"p2p" + 0.035*"loan" + 0.023*"borrower" + 0.020*"platform" + 0.018*"model" + 0.018*"lender" + 0.016*"risk" + 0.016*"credit" + 0.012*"information" | P2P lending models and credit risk assessment |
| 8 | 0.030*"crowdfunding" + 0.017*"investor" + 0.017*"ecf" + 0.014*"business" + 0.011*"entrepreneur" + 0.010*"investment" + 0.009*"venture" + 0.009*"platform" + 0.009*"capital" + 0.008*"model" | Equity CF and venture capital |

and are placed at separate locations. This indicates that the CF field has different sub-fields that have been studied independently. In other words, there are several dimensions to CF that can be explored in depth, each with its own unique set of factors, challenges, and implications.

The additional output provided by the “pyLDAvis” tool is an inventory of the most important terms used to define topics. In this study, we focused on identifying the 30 most significant terms for our analysis. Figure 6 provides a summary of the findings. The words “crowdfunding”, “project”, and “platform” emerged as crucial,

Intertopic Distance Map (via multidimensional scaling)**Fig. 5** Topic distance visualization

highlighting how the concept of CF is closely linked to specific projects or platforms. The prominence of these terms suggests that they play a central role in shaping the discourse around CF and may have implications for how CF is understood and practiced. The presence of “project” and “platform” also highlights the practical aspects of CF, such as the importance of identifying a specific project to fund or choosing an appropriate platform to host the campaign (Cowden and Young 2020). These terms suggest that there are key factors contributing to the success of a CF campaign, such as the clarity and feasibility of the project and the effectiveness of the platform in reaching potential backers (Martínez-Cháfer et al. 2021).

“Campaign”, “social”, “success”, and “model” are among the highly frequent terms in the abstracts of the publications dealing with CF. The presence of these words indicates their centrality in understanding the CF phenomenon. For instance, the term “campaign” reflects the idea that CF is often organized around a specific project or goal and that a concerted effort is needed to mobilize support and secure funding. This also highlights the importance of effective marketing and communication strategies in CF, as well as the need for clear and compelling project proposals that can capture the attention of potential backers (Defazio et al. 2021; Davies and Giovannetti 2022). Besides its financial transactional nature, CF represents a social activity that involves building relationships and engaging with a community of supporters (Butticè and Noonan 2020). This is consistent with Cai et al. (2021), who argue that CF activities create social capital that can play a significant role in determining the success of a campaign. As a result, social networks and social media platforms are necessary to establish a sense of community and share purpose among backers. The importance of achieving funding goals in CF is also reflected in the high frequency of the word “success”, which suggests that success is a key measure of the effectiveness of a CF campaign (Yin et al. 2019). Consequently, careful planning and

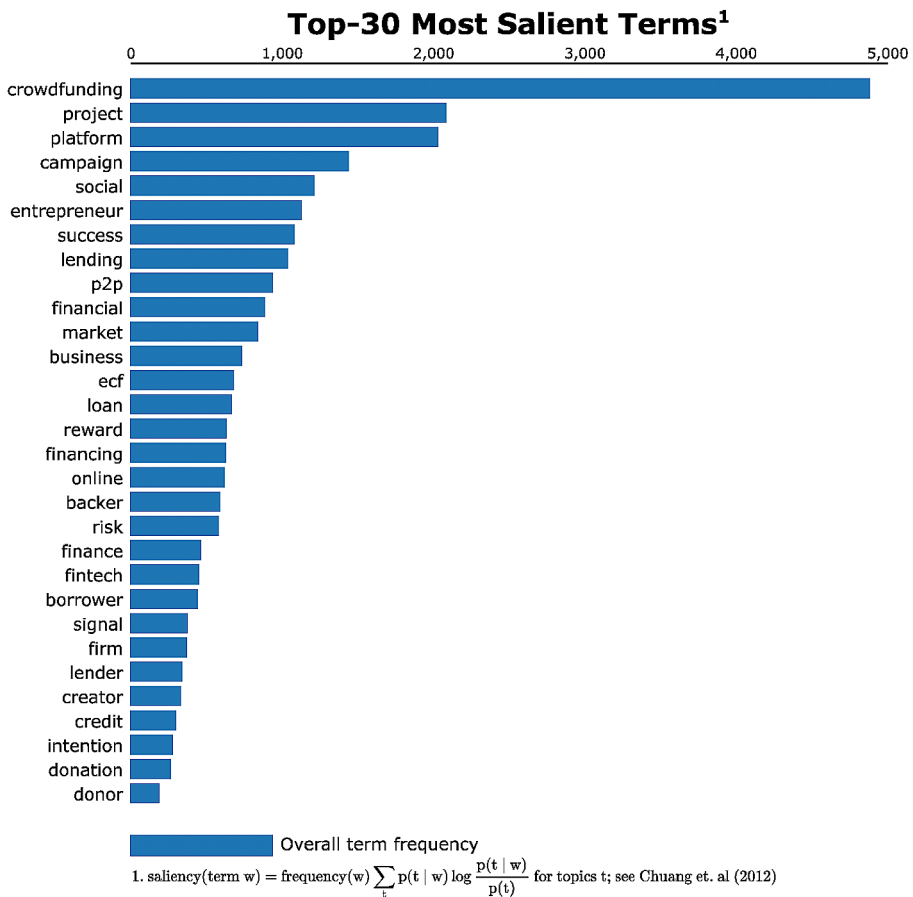


Fig. 6 Top 30 most frequent terms in the abstracts of the selected publications

management are required to establish clear and achievable funding goals, as well as effective strategies for engaging and retaining backers over the course of a campaign. Finally, the inclusion of the word “entrepreneur” may indicate that researchers are interested in understanding the role and impact of the individual initiator behind the CF campaigns. This suggests a focus on exploring the various characteristics, strategies, and behaviors of entrepreneurs that influence CF outcomes and how these entrepreneurial actions interact with crowdfunding mechanisms and investor perceptions (Kaminski and Hopp 2020; Song et al. 2022).

An algorithm has been utilized to analyze topic prevalence in selected articles, revealing that each identified topic in CF research is addressed by at least 100 publications. Notably, the topic of CF project success and performance stands out, being the main subject of 1,051 papers, indicating its pivotal role in assessing the feasibility of CF endeavors (Song et al. 2022; Murray and Fisher 2023). This focus underscores the need to comprehend the elements driving successful CF initiatives for better decision-making among researchers, entrepreneurs, and investors.

Conversely, the topic concerning the social effects of CF is less represented, which may not necessarily reflect its relevance but could be attributed to the greater challenges associated with researching this area, particularly in terms of data collection, compared to topics such as financial crowdfunding success where data is more readily accessible from crowdfunding platforms (Kaartemo 2017; Lin et al. 2020). The documents analyzed showed a varied topic distribution, with a median of 665 and a mean of 641.25 documents per topic, reflecting the multifaceted nature of CF research (Gerber et al. 2014; Korzynski et al. 2021). The use of Mallet LDA software corroborated the dominance of topics related to CF project success and venture capital, underlining their foundational status in CF literature. (see Fig 7).

However, 12% of the documents dealt with the least performing topic (*Social effects of CF*). This topic is less of interest to researchers, practitioners, and investors in the CF space, either because it is viewed as being less important to the core goals of CF, such as raising capital, promoting innovation, or supporting entrepreneurship (Butticè and Noonan 2020; Bargoni et al. 2022) or simply because the data collection process is more challenging (i.e., primary data collection vs. retrieving financial data from crowdfunding platforms). It is also possible that the focus on more commercial or financial aspects of CF has overshadowed the potential social benefits that can be derived from CF initiatives. As a final metric, we can observe that there is a high degree of consistency between the search query and the current content of the selected publications, as indicated by the mean value of the topic contribution being 33.5%.

The distribution of topics across journals has been determined by comparing the bibliometric analysis and the findings of the LDA model. Table 4 summarizes the findings by presenting a breakdown of the topics by the five journals found to be most related to each topic. *Small Business Economics* and *Technological Forecasting and*

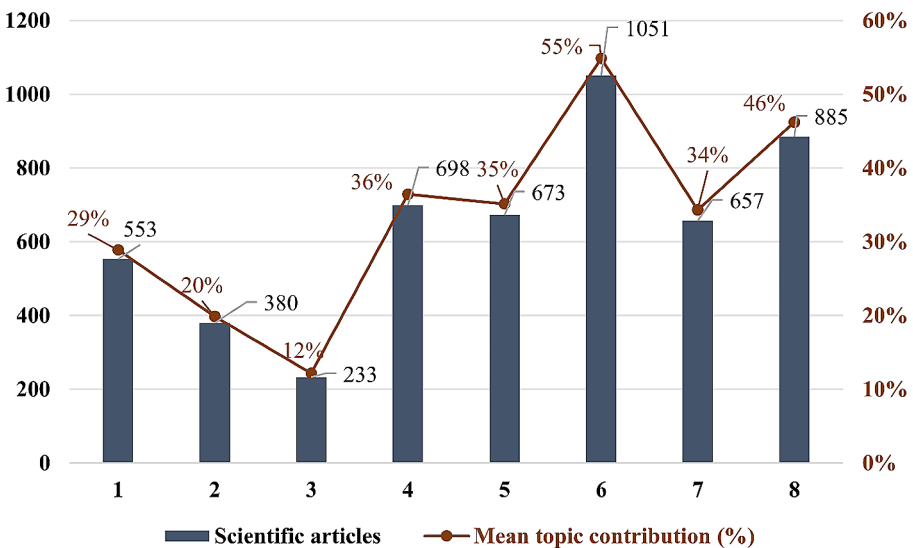


Fig. 7 Topics distribution amongst documents

Table 4 Distribution of sources per topic

| | Topic | | | |
|----------------|--|---|--|---|
| | 1 | 2 | 3 | 4 |
| Sources | Small Business Economics (23) Entrepreneurship: Theory and Practice (16) Journal of Risk and Financial Management (16) Technological Forecasting and Social Change (15) Journal of Business Research (13) | Technological Forecasting and Social Change (9) Journal of Business Research (9) MIS Quarterly: Management Information Systems (9) Business Economics (8) Journal of Philanthropy and Marketing (8) | Management Science (8) Small Business Economics (7) Entrepreneurship: Theory and Practice (5) IEEE Transactions on Engineering Management (5) Journal of Risk and Financial Management (5) | Journal of Business Research (20) Small Business Economics (15) Technological Forecasting and Social Change (15) Information Systems Research (15) Entrepreneurship: Theory and Practice (14) |
| | Topic | | | |
| | 5 | 6 | 7 | 8 |
| Sources | Small Business Economics (16) Financial Innovation (14) IEEE Transactions on Engineering Management (12) Technological Forecasting and Social Change (11) Electronic Commerce Research and Applications (11) | Journal of Business Research (28) Technological Forecasting and Social Change (27) Small Business Economics (26) Entrepreneurship: Theory and Practice (21) Journal of Business Venturing (20) | Electronic Commerce Research and Applications (23) Financial Innovation (19) Information Systems Research (16) Management Science (15) MIS Quarterly: Management Information Systems (10) | Small Business Economics (37) Technological Forecasting and Social Change (25) Journal of Business Research (19) European Journal of Management (17) IEEE Transactions on Engineering Management (15) |

Social Change are the most relevant sources for 75% of the topics. *Journal of Business Research* ranks third in terms of relevance (5 topics out of 8). On the other hand, eight articles from *Management Science* discuss topic 3, and twenty articles from *Journal of Business Research* cover topic 4. The fourth position is held by *Entrepreneurship: Theory and Practice*. Subsequently, *IEEE Transactions on Engineering Management* occupy the fifth position. This suggests that these two journals are still highly regarded within the field but are not as focused on the specific topics covered in the study compared to the other journals mentioned. While *Electronic Commerce Research and Applications* covers topic 7, *Financial innovation* covers topic 5 and topic 7. Overall, the findings suggest that the distribution of topics across journals in the CF field is not evenly spread and that certain journals have a stronger focus on specific areas of research.

5 Discussion of topics

In the following sections, we discuss each of the eight emerging topics in detail. We not only include seminal literature to illustrate current research streams but also outline potential research avenues that can help to advance the current state of the art for the respective topics.

5.1 CF campaign success and financing

The topic of CF campaign success and financing has been explored by several scholars (Butticè et al. 2017; Block et al. 2018; Borello et al. 2019; Ralcheva and Roosenboom 2020). For example, Janků and Kučerová (2018) examine the fundamental drivers of successful CF campaigns and suggest that the success rate of a CF project campaign drops when it is launched on the weekend or in a month with plenty of other recently launched projects. Butticè et al. (2018) investigate the impact of information asymmetry on the relationship between serial CF and campaign success, finding that serial CF have greater advantages for campaigns with high information asymmetries due to their prior experience in reducing asymmetry in the community. Carradini and Fleischmann (2023) study the impact of multimodal elements on the success of CF campaigns on Kickstarter and find that successful campaigns are more likely to include images, gifs, links, as well as project videos. In addition, dos Santos Felipe and Franca Ferreira (2020) identify that financial goal, advisor participation, venture category, type of equity offered, and campaign duration are significant positive predictors of success for startup financing campaigns in Brazil's equity CF market.

Therefore, studies related to the first topic demonstrate the various factors that can impact the success of CF campaigns and financing. To advance future research on this topic, scholars can explore these factors further and investigate how they interact with each other to influence CF success. Moreover, there is a need for research on how to effectively leverage these factors to improve campaign success rates (Mochkabadi and Volkmann 2020; Tafesse 2021), taking into account cultural, geographic, and demographic differences in CF markets (Cai et al. 2021; Shneor et al. 2022). Additionally, future research can focus on the role of emerging technologies, such

as artificial intelligence and blockchain, in enhancing the success of CF campaigns (Baber 2019; Xu et al. 2022). Another potential direction for future research is the study of the psychological aspects of campaign backers, such as the motivations, decision-making processes, and the role of trust in their willingness to support CF campaigns. This could involve analyzing the impact of different marketing strategies and communication styles on backers' engagement and investment behavior, as well as examining the potential of personalized approaches to improve campaign outcomes (Foa 2019).

5.2 Donation-based CF

Donation-based CF has emerged as a significant topic within the broader context of CF research. "Crowdfunding" and "platform" are central terms in the topic, signifying the importance of online spaces in facilitating the connection between fundraisers and potential donors. Several studies explore different aspects of donation-based CF. For example, Snyder et al. (2023) examine the relationship between news media coverage of donation-based health-related CF campaigns and the subsequent impact on donor behavior, donations, and total amount raised. Behl and Dutta (2020) investigate the potential of donation-based CF platforms for disaster relief operations. In the context of disaster relief, these platforms can serve as essential vehicles for mobilizing resources and coordinating support from a global community. Moreover, the role of social media as a means for supporting donation-based CF and fundraising by nonprofit and voluntary organizations is examined in the study of Xue and Zhou (2022). More specifically, the authors look into how various Facebook fundraising posts affect donor engagement, paying special attention to the role of social impact elements such as the immediacy of need, relationship strength, and the number of donations. Zhou and Ye (2019) identify the most important aspects of successful donation-based CF campaigns and find that viral network and marketing, persuasive narratives, personal stories, low-risk solutions, and demonstrations of organizational competence are all linked with campaign success. Finally, Argo et al. (2020) explore the "completion effect" in charitable CF, which occurs when donors give more money to a cause in order to help them reach their own personal fundraising goals. Their results indicate that this effect is driven by the donor's own personal gain from completing campaigns rather than by uncertainty about the recipient's ability to reach the goal.

In conclusion, donation-based CF has emerged as a significant area of research, with studies exploring various aspects such as the impact of news media coverage on donor behavior, the potential of CF for disaster relief, the role of social media in donor engagement, and the factors linked to campaign success. Future research directions on this topic include examining the psychological factors that motivate donors in different demographic groups (Jaziri and Miralam 2019), assessing the long-term impact of a successful campaign on beneficiaries, and exploring the potential of emerging technological developments (e.g., artificial intelligence, blockchain technology, big data analytics) to enhance the efficiency and transparency of donation-based platforms (Behl et al. 2023). Additionally, scholars may delve into the role of government policies and regulations in shaping the adoption of a donation-based

CF (Gao et al. 2021; Behl et al. 2023) and examine cross-cultural differences in donor behavior and preferences (Bagheri et al. 2019; Liu et al. 2022). By expanding the scope of donation-based CF research, researchers can contribute to a more comprehensive understanding of this phenomenon and facilitate its growth as a vital fundraising tool.

5.3 Social aspects of CF

Based on the LDA output, the third topic appears to concentrate on the social aspects of CF, with the most significant keywords being “social”, “crowdfunding”, “platform”, effect, etc. Specifically, this topic could be related to studies that examine the role of CF platforms in fostering social connections (Gao et al. 2021), their influence on fundraising strategies, and the ways in which these platforms shape various aspects of entrepreneurial and philanthropic endeavors (Bajde 2013). In the context of philanthropy, Wade (2022) examines the evolution of GoFundMe, a CF platform dedicated to social causes, and its efforts to capture the charitable giving market. Similarly, Wade et al. (2022) investigate the social and cultural drivers behind the extraordinary fundraising success of Sir Captain Tom Moore. Sadabadi and Arami-pour (2022) offer a solution for the transformation of charitable donations using social innovation to provide sustainable solutions to social problems. Burtch and Chan (2019) explore the role of medical CF in alleviating personal bankruptcy rates due to medical expenses and the presence of a digital divide among different patient populations. Their study also underscores the potential for CF platforms to perpetuate existing social inequalities, providing a substantive foundation to explore how CF platforms impact social inequality and access for disadvantaged groups.

The role of CF platform in promoting social responsibility and sustainable development has also been noticed in the literature. For example, Testa et al. (2022) adopt an institutional logic perspective to understand how different resolution strategies impact sustainable development outcomes. Hiller and Shackelford (2018) analyze the emergence of benefit corporations and their impact on corporate governance, business ethics, and decision-making. Drawing on these discussions, and to extend the third topic’s scope, we propose that future research should examine the potential impact of CF platforms on social inequality and the extent to which disadvantaged groups are able to access and benefit from these platforms. This is particularly pertinent given the highlighted role of CF in social dynamics and the gaps identified in current literature regarding its equitable reach.

Furthermore, studies are needed to determine how CF platforms might be used to improve environmental conditions and promote sustainability (Dossa and Kaeufer 2014). Research might look at how CF platforms affect people’s propensity to donate, as well as what motivates people to make donations online. The interconnectedness of these areas with CF platforms’ roles in promoting entrepreneurship and innovation in social and environmental causes (Salido-Andres et al. 2022) further justifies this focused line of inquiry.

5.4 Entrepreneurial projects and rewards in CF

The fourth topic identified by the LDA model revolves around the concept of entrepreneurial projects and rewards in the CF context. Key terms in this topic include crowdfunding, project, entrepreneur, reward, platform, funding, etc. The main studies in this cluster explore different aspects of CF, from marketing strategies to the role of rewards and from the perspective of entrepreneurs and investors. For example, Panneerselvam and Joe Arun (2022) examine the influence of behavioral biases in CF adoption and identify factors that motivate biased investors to invest in CF campaigns. The findings indicate that understanding and leveraging these cognitive biases can aid marketers in developing effective strategies for CF campaigns, ultimately leading to their success. Ilves et al. (2020) provide recommendations for an online marketing strategy for CF, emphasizing the importance of a strong marketing effort, transparent communication, and the use of social media to spread CF campaigns. The unique challenges faced by CF campaigns, such as the need for innovative and proactive marketing measures, are also highlighted.

Moreover, Kedas and Sarkar (2023) scrutinize the role of consumption value offered by rewards in restaurant CF campaigns using a sample of over 3000 restaurant campaigns on Kickstarter. The authors find that utilitarian value and participatory value play critical roles in determining CF success, while socio-emotional value does not. Finally, Abdeldayem and Aldulaimi (2022) study the economic success of CF in the Gulf Cooperation Council (GCC) region and the impact of entrepreneurial finance principles on CF platforms and entrepreneurs' ability to access financial resources. The findings illustrate that CF has a positive impact on economic fundraising success and that CF platforms are effective financial technology (fintech) tools for financing entrepreneurs in the GCC.

Overall, the fourth topic offers valuable contributions to the understanding of the CF process and clarifies the success of CF campaigns as well as the development of more effective strategies for financing and entrepreneurial ventures. Accordingly, investigating the effects of different reward structures on the effectiveness of CF campaigns can be a promising avenue for future research. As such, scholars should examine the specific design features of rewards that lead to successful CF campaigns (Chen 2021). For example, what types of rewards are most effective, and how can reward levels and tiers be optimized to maximize campaign success (Dai and Zhang 2019; Yang et al. 2020). Since the success of CF campaigns can be greatly affected by the quality of the project being supported, future studies should examine how project quality is evaluated by CF investors and how entrepreneurs can enhance the quality of their projects to maximize their chances of success (Huang et al. 2022).

5.5 Financial and fintech aspects of CF

The fifth topic, as identified by the LDA model, focuses on the financial and fintech aspects of CF. This topic encompasses keywords such as financial, platform, fintech, finance, behavior, entrepreneurial, etc. The main studies within this cluster analyze various elements of CF, from the application of blockchain technologies to the role of financial literacy and the emergence of initial coin offerings (ICOs). For example,

Subramanian (2020) highlights the potential of blockchain technology and smart contracts to transform existing financial instruments, such as Simple Agreement for Future Equity (SAFE), by boosting efficiency and eliminating information asymmetry. Similarly, Walia and Raghwa (2022) highlight the relevance of blockchain-based decentralization for social media networks. Blockchain offers increased data privacy and security while also fostering ledger-based CF, e-commerce, smart contracts, and smart apps.

The integration of blockchain and smart contracts supports ICOs, which offer new opportunities for fundraising and investment in CF, with the potential to transform existing financial tools and increase the efficiency and transparency of CF transactions. In this regard, Alshater et al. (2023) review and consolidate existing empirical studies on ICOs, offering insights into the benefits, challenges and various contexts of ICOs. These include technologies, pricing, regulatory frameworks, and fraud. Finally, Milian et al. (2019) examine the concept of fintech by conducting a systematic literature review, explaining areas of fintech activities and proposing a classification of this literature. The research results point to a thorough definition of fintech as financial technology firms that are pioneers in the fields of communication, the internet, and automated information processing. The relevance of technology adoption or network externalities, blockchain, and security in fintech research, as well as the risks of financial loss are also stressed.

Therefore, one potential direction for future research is to explore the impact of blockchain on CF. Although blockchain technology has been identified as a potentially transformative technology in the CF space (Baber 2019; Coffie and Zhao 2021), its true impact remains largely unknown. Future researchers should examine the extent to which blockchain has actually improved transparency, security, and efficiency in CF transactions (Nguyen et al. 2021), as well as its implications for regulatory frameworks. Another possible research avenue is to explore the role of fintech startups in the CF ecosystem (Dospinescu et al. 2021). As fintech companies continue to disrupt conventional financial institutions, they are also changing the way CF operates. As a result, future studies should investigate how fintech startups are influencing CF in terms of the type of projects that are funded, the strategies used by entrepreneurs to raise funds, and the overall financial viability of CF platforms. Finally, the role of fintech in promoting financial inclusion by enabling a wider range of individuals to participate in CF deserves further attention, given the increasing use of blockchain technology, mobile payments, and other innovative financial technologies (Nguyen et al. 2021).

5.6 CF project success and performance

The sixth topic focuses on CF project success and performance. The main keywords associated with this topic are crowdfunding, project, social, funding, success, platform, information, effect, etc. Several studies have examined the factors influencing CF success. For example, Wan Mohamad Nazarie and Williams (2021) explore the relevance of language style and gender match in establishing initial trust among potential donors in CF projects and achieving funding success. The results show that language style is more important than gender when evaluating a project and highlight

the need for project developers to learn about the preferences of their audience and adapt their language appropriately in order to boost the success rate of CF initiatives. In his study, Pinkow (2022) analyzes the factors contributing to overfunding in reward-based CF projects and finds that while previous research determined hygiene factors necessary for success, motivating factors remain unobserved and subjective factors may play an important role.

Huang et al. (2022) evaluate how various signals of entrepreneurs' credibility and project quality interact in various signaling settings to achieve CF success in reward-based CF. The findings indicate entrepreneurs' credibility and project quality signals can complement each other in a variety of ways to achieve CF success and that exhibiting failure experience is also crucial to the campaign's success. Therefore, information quality and communication constitute critical factors in CF as they help establish trust and credibility between project creators and potential backers (Zhengchi et al. 2022; Behl et al. 2023). In other words, projects that provide high-quality information and effective communication are more likely to attract and retain backers, which increases the likelihood of CF success.

Future research directions related to CF project success and performance could focus on exploring the impact of social influence and network effects on CF and investigating the role of CF platforms in shaping the success of CF initiatives (Liu et al. 2021; Wang et al. 2023). Furthermore, scholars should examine the effect of different types of information on CF success, such as visual vs. textual information (Netzer et al. 2019; Kaminski and Hopp 2020). The impact of cultural and linguistic factors on CF success is also another possibility of future research (Moss et al. 2018; Koh et al. 2020). Additionally, there is a need to explore the impact of different types of rewards and incentives on CF success, such as tangible vs. intangible rewards or social vs. monetary incentives. Finally, researchers should provide additional insights into the role of project creators' personal characteristics, including passion and commitment, in driving CF success (Mamonov and Malaga 2018).

5.7 P2P lending models and credit risk assessment

The seventh topic in the LDA model revolves around P2P lending models and credit risk assessment. This topic focuses on the lending process, P2P platforms, loans, borrowers, lenders, risk assessment models, credit evaluation, and market dynamics. Related to this topic, several studies have explored the use of advanced techniques to enhance credit risk assessment and default risk prediction in P2P lending. For example, Cuiqing et al. (2020) develop a collaborative training model TRICMV based on semi-supervised learning to enhance the performance of default risk evaluation in P2P online lending by embedding the rejection inference process into the default risk evaluation process. The findings indicate that the TRICMV model significantly outperforms other default risk evaluation models. Machado and Karray (2022) propose a hybrid method by combining supervised and unsupervised machine learning algorithms to enhance the accuracy of predicting customer-adjusted risk metrics in P2P lending. The empirical analysis shows that the hybrid models outperform individual models in both predictive performance and processing time.

Babaei and Bamdad (2020) design an investment recommendation model for P2P lending that integrates supervised learning and optimization algorithms, compares different artificial neural network models to forecast net present value as the return variable, and computes the probability of default of loans of risk evaluation. The proposed model is proven to make more effective decisions concerning risk and return. Furthermore, previous studies also investigate the factors influencing lending decisions, such as borrowers' track records, repayment performance, and demographic biases such as sexism and ageism, as well as proposing new research frameworks for loan allocation strategies in P2P lending (Kim 2020a; Rong et al. 2023). Empirical evidence from various regions, such as China, Malaysia, and Korea, is provided to offer a comprehensive understanding of the market dynamics and platform performance (Kim 2020b; Khan and Xuan 2022).

Consequently, the studies dealing with the seventh topic highlight the importance of accurate credit risk assessment and effective lending strategies in the P2P lending market. On this basis, future research can examine the potential of incorporating alternative data sources, such as social media activity (Wolfe et al. 2021), online behavior (Du et al. 2019), and mobile data (Bertheau 2020) to improve credit risk assessment and lending decision-making in the P2P lending market. As AI and machine learning models become more complex, there is a growing need for explainable AI to understand the decision-making process behind these models (Ariza-Garzón et al. 2021). Researchers can focus on designing interpretable models that provide transparent and easy-to-understand explanations for credit risk evaluation in P2P lending. Challenges and possibilities of cross-border P2P lending, such as regulatory issues, currency risk management, and credit assessment across multiple jurisdictions, can be investigated in the future as financial markets become more globalized (Chiu 2017). Finally, future researchers can explore how expanding P2P lending platforms help marginalized groups get access to credit while encouraging ethical lending practices, therefore contributing to financial inclusion (Kimmitt and Muñoz 2017; Chen and Yuan 2021).

5.8 Equity CF and venture capital

The final topic focuses on equity CF and venture capital, with special emphasis on investors, entrepreneurs, capital investment, and the role of venture capital in the CF process. Related to this topic, several studies examine the relationship between CF strategies and their impact on innovation. For example, Xu et al. (2015) aim to identify the impact of crowdsourcing on a firm's performance by developing a model that relates CF, innovation distinctive competences, and its potential to create value in the firm. The authors find that firms that use crowdsourcing to capture customer knowledge and transform it into innovation competences can obtain better performance.

Similarly, Lerro et al. (2023) develop a knowledge-based framework for CF strategies, identifying potential knowledge assets and their management. Alalwan et al. (2022) investigate the impact of entrepreneurs' engagement in e-equity CF activities on knowledge acquisition and innovation performance. According to the authors, relationship marketing orientation, entrepreneurial alertness, system quality, and service quality have a positive influence on entrepreneurs' engagement in e-equity CF, which in turn predicts knowledge acquisition and innovation performance. Troise et

al. (2021) explore how equity CF can be used as an open innovation tool to overcome sustainability challenges and fine-tune sustainability-oriented innovations in agri-food systems. The findings show that agri-food companies successfully use knowledge-based crowd inputs for organizational innovation to foster social sustainability and product innovation to enhance economic and environmental sustainability.

Furthermore, the role of intellectual and social capital in the growth of equity-crowdfunded businesses has been highlighted in the literature. For instance, Troise et al. (2020) examine the impact of intellectual capital on the post-campaign growth of equity-crowdfunded companies and find that prior industry experience, product innovation, and equity offered are significant and positively related to growth. Alva et al. (2021), Modaffari et al. (2020), and Lehner (2014) explore how CF can support female entrepreneurs, facilitate the growth of startups, and promote the development of social ventures.

To advance the understanding of the eight topic, future studies can examine the impact of environmental, social, and governance factors on investment choices in equity CF (Chiu 2014; Gupta and Mirchandani 2020). This will provide an increased understanding of how the integration of these factors can encourage sustainable investment practices. Further studies are warranted to examine the potential of crowd due diligence (Cumming et al. 2022a) and harnessing collective intelligence (Ali-Hassan and Allam 2016) in evaluating the merits of investment ideas and reducing risks in equity CF. Another promising direction for future research would be to analyze the cross-cultural and cross-regional differences in equity CF practices, regulations, and investor behavior, thereby offering insights into the factors that lead to the success of equity CF across different contexts. Future studies may also benefit from assessing the long-term performance of equity-crowdfunded businesses, the factors contributing to their success or failure, and the different exit strategies followed by entrepreneurs and investors in equity CF (Cummins et al. 2020).

6 Conclusions

CF has emerged as a significant force in the modern entrepreneurial landscape, providing an innovative and inclusive alternative to traditional financing channels for startups and projects. By harnessing the power of the internet, CF platforms have democratized the fundraising process and enabled a diverse range of entrepreneurs to access the resources they need to bring their innovative ideas to life. As the field of CF continues to expand, it is crucial to systematically analyze and grasp the existing literature to identify key themes, patterns, and emerging areas of interest. This study has leveraged latent Dirichlet allocation-based topic modeling to uncover and map the underlying themes in the CF literature, providing a comprehensive and nuanced understanding of the field.

The findings of the review indicate that CF has experienced remarkable growth in research publications over the past decade, with a notable acceleration since 2014, and is expected to continue growing. This highlights the increasing interest of researchers in the various aspects of CF and its implications for entrepreneurship, innovation, and regulation. The top five most productive journals in the CF

field are *Small Business Economics*, *Technological Forecasting and Social Change*, *Journal of Business Research*, *Entrepreneurship Theory and Practice*, and *Electronic Commerce Research and Applications*. This result shows that CF research is gaining recognition and acceptance across multiple disciplines, highlighting the growing importance of CF as a research field. The results of the LDA model indicate that CF research revolves around eight main topics: (1) CF campaign success and financing, (2) Donation-based CF, (3) Social effects of CF, (4) Entrepreneurial projects and rewards in CF, (5) Financial and fintech aspects of CF, (6) CF project success and performance, (7) P2P lending models and credit risk assessment, and (8) Equity CF and venture capital. The sixth topic, CF project success and performance, is identified as the most studied topic, while the third topic (social effects of CF) has relatively low performance.

This study has several theoretical implications for the CF field. Firstly, the research demonstrates that CF represents a multidisciplinary knowledge area, as evidenced by the diverse range of topics and the variety of academic journals publishing CF research. This implies that scholars need to consider multiple perspectives, including finance, technology, business, and sociology when studying CF phenomena. Secondly, the identification of the eight main topics discussed in the CF literature highlights the key areas of interest for scholars, offering a comprehensive overview of the current state of the field. This can serve as a starting point for future research and help scholars identify potential gaps and opportunities for novel contributions. Moreover, the LDA-based topic modeling approach provides a robust and systematic method for uncovering and mapping the underlying themes in the CF literature, which can be adapted and applied to other research fields to enhance the understanding of their key topics and relationships.

Regarding the practical implications, this study is relevant to various stakeholders involved in CF, such as entrepreneurs, platform operators, and policymakers. By understanding the key themes and patterns in the CF literature, these stakeholders can make more informed decisions and develop effective strategies for engaging with the CF ecosystem. The findings of our study can benefit entrepreneurs by elucidating specific aspects of CF success such as the importance of social media marketing, the creation of persuasive narratives, and the use of dynamic pricing strategies in campaign performance. These insights enable entrepreneurs to tailor their campaigns to enhance visibility and backer engagement, thus raising capital more effectively for their ventures. In addition, the diverse range of topics identified in the study emphasizes the potential of CF to solve financial, social, and entrepreneurial issues, motivating entrepreneurs to explore novel approaches to project development and fundraising. For example, by understanding the significant role of community building and social proof in CF success, entrepreneurs can focus on these areas to bolster their campaign strategies.

For platform operators, this study sheds light on the factors that drive the success of CF campaigns and the preferences of backers, such as the importance of user-friendly interfaces, transparent communication channels, and robust support systems. Additionally, platform operators can be guided to design and promote their platforms to attract entrepreneurs and investors from diverse backgrounds. Finally, policymakers can use the findings from the topic analysis to inform their decision-making. The

analysis underscores specific areas such as the need for regulatory frameworks that balance innovation with consumer protection, and the importance of supporting initiatives that increase CF's accessibility to underserved communities. This can inform the development of policies and regulations that support and promote the growth of the CF field while protecting the interests of investors and entrepreneurs. Also, understanding the social impacts of CF can aid policymakers in designing interventions to promote social entrepreneurship and address pressing societal challenges.

Despite the valuable insights provided by this study, there are several limitations that need to be acknowledged. First, the LDA-based topic modeling approach, while effective in uncovering underlying themes in the literature, may not capture all the nuances and subtleties of the research topics. The algorithm relies on the co-occurrence of words in the documents and might overlook some aspects of the research that are not explicitly mentioned in the text. Moreover, the selection of the number of topics is subjective and may affect the interpretation of the results. The search strategy did not include the term crowdfunding, potentially omitting pertinent studies on equity-based CF. The scope of the analysis is also limited to the articles included in the sample, which may not fully represent the entire body of CF literature. It is possible that some relevant publications were not captured in the dataset due to search limitations or the inclusion criteria applied. Given these constraints, future research should consider including a wider range of search terms. Thus, future studies should update the analysis to capture emerging trends and themes.

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Data availability The data will be available upon request from the authors.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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