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Entrepreneurship and environments of international crisis: a bibliometric analysis approach

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Abstract

Objectives Entrepreneurial spirit is considered a vital resource for the economy in various countries where entrepreneurs found businesses. It is thus crucial to analyze the relationship between entrepreneurship and global crises, as entrepreneurial initiatives can be affected by the economic instability that crises generate. This study uses bibliometric analysis to explore the topic of entrepreneurship in situations of global crisis.

Theoretical framework Starting from the structure of bibliometric analysis, we analyzed 1111 documents retrieved from the Scopus and WoS databases for the years 2000–2023.

Methodology We characterized the documents studied and analyzed citations, co-citations, co-words, and co-authorship using VOSviewer software.

Results/implications Our analysis produced results on networks among authors and countries. We also obtained significant results on the structure of the field studied and its projection for the future. Finally, we propose implications and opportunities for future lines of research.

Keywords Entrepreneurship, International crises, Covid-19, Bibliometric analysis

Introduction

Entrepreneurs have been recognized globally as engines of economic progress and growth. They are considered one of the driving forces for economic development, constituting a fundamental aspect of economic recovery in times of crisis [3, 27, 37]. Numerous studies have determined that entrepreneurial spirit is a fundamental component contributing to social value. They stress the need to understand how newly founded businesses contribute successfully to job creation, as well as the formulation and deployment of innovative technology [38, 88, 103, 108].

In the past decade, many studies of entrepreneurial spirit and economic growth have been performed in environments of economic stability [41, 56], but few empirical studies have analyzed entrepreneurship in situations of crisis and political and economic instability [4]. Conflicts and crises are considered one of the most critical challenges facing entrepreneurship today. Entrepreneurial spirit is crucial to such situations, as it provides a constructive perspective on changing circumstances [112], stimulating opportunity recognition [95]. Introducing new technologies, services, and innovative products provides new opportunities and jobs that contribute to growth [66, 75]. More specifically, various studies have demonstrated the importance of entrepreneurial spirit during a global crisis [25, 73, 93, 98], such as the crisis caused by the Covid-19 pandemic and the economic recessions expected to occur in the following years. At this point, it is worth mentioning social entrepreneurship

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as a subcategory, due to its importance to mitigate the consequences of global crises, in these circumstances. It becomes a fundamental tool for generating social and/or environmental change [85].

The existing literature has examined how new ventures have participated in productive recovery when facing the threat of international crises [8, 73, 79, 110], the relationship between entrepreneurial resilience and crisis in local economies [49, 50, 52], access to financing of start-ups in crisis situations [21], the effect of the (post-crisis) economic recession on entrepreneurship [44], the influence of the institutional environment on entrepreneurship [83], and new business dynamics due to the situation created by Covid-19 [43].

Understanding how entrepreneurs and their new initiatives overcome the adversities derived from the crisis is very important to determining the best way to manage crises and reduce their impact [18]. Entrepreneurs are currently facing an unprecedented new competitive environment to which their companies must adapt. In fact, the literature analyzed confirms that the impact of the Covid-19 crisis has created enormous challenges for new undertakings, requiring innovation and providing opportunities to identify new business models that enable these initiatives to survive the crisis [77]. This type of environment can, however, represent the opportunity for a paradigm shift, the unique characteristics of which have not received sufficient study.

The recent literature also stresses that few studies have adopted a holistic approach that examines the literature on entrepreneurship and international crises [23, 76, 112]. Such studies are needed to demonstrate how the literature on entrepreneurship has evolved during periods of international crisis. This approach can help us to determine the literature's limitations and propose future lines of study.

This analysis will provide a macroscopic view of a large body of the academic literature [29, 109]. This investigation can also be used to identify strengths and weaknesses in the field of entrepreneurship, and the most relevant authors, countries, and affiliations on this topic [96]. Furthermore, this type of study has been widely used to identify trends in research on crisis and entrepreneurship [39] and emphasize knowledge, institutions, and developmental changes in this field, which have important implications for future research and development [63, 64, 111]. All this information can help governments and public policy makers to develop strategic lines and subsidies to support entrepreneurs and new ventures in environments of global crisis.

To achieve this goal, our study performs a two-level analysis: bibliometric and content analysis. It describes the intellectual structure of the literature on

entrepreneurship and international crisis, which includes various paradigms, and the dominant logic of each paradigm, as well as its possible limitations.

Our analysis thus tackles two research questions. First, it seeks to determine the structure of the literature linking entrepreneurship to situations of international crisis. This information can help to clarify the evolution of studies performed during periods of global crisis—that is, the structure of academic knowledge—and the intensity of this research field. The second research question this study seeks to answer is the direction in which the literature on entrepreneurship and environments of crisis should evolve.

In this study, content analysis enables us to classify words into various categories related to “entrepreneurship” and “international crises and/or Covid-19 crisis.” The results showed five different categories: “challenges for entrepreneurs,” which shows the consequences and mechanisms used by entrepreneurs in times of crisis; “social entrepreneur” as a subcategory of entrepreneur who plays an important role in the maintenance of economic prosperity and brings benefits to society in times of crisis [106], “entrepreneurial financing” considering the economic climate in a crisis environment; “support policies” which refers to support services for entrepreneurs as an alternative for facing crisis in developed economies and “resilience” as the capacity for or outcome of successful adaptation despite challenging or threatening circumstances [72].

The study's goal is to contribute to various challenges these environments pose to new ventures and to the economies of different countries in which these new firms are established.

Another important implication of this study is that it shows possible changes in the development of the field of entrepreneurship with significant implications for future research and development [63, 64, 111].

This analysis contributes to the literature by providing an updated review of the entrepreneurship topics analyzed and their relationship to the Covid-19 crisis. This information can help other researchers conduct studies on various topics related to the pandemic. Such analysis can also help to identify new research questions that facilitate the survival of start-ups in global environments of crisis.

To achieve the proposed research goals, our study is organized as follows. The first section analyzes the review articles on entrepreneurship in crisis situations. The aim of this section is to identify and analyze different topics covered in the articles, not to delve into the typology of the entrepreneur.

Second, the study analyzes the data sources and methodologies used. Subsequently, it presents the results

obtained and the main conclusions and future lines of study.

Review studies on entrepreneurship and international crises

Following Elo and Kyngäs [33], our study's content analysis has been implemented as a systematic objective method to describe and quantify a phenomenon [30, 91]. Based on the assumption that words, phrases, etc. classified into the same categories share the same meaning [19], our research includes inductive analysis of the literature reviews found in which the topics "entrepreneurship" and "international crises and/or Covid-19 crisis" come together. Therefore, content analysis in this study enables us to classify words into various categories related to content. This method lets us find five categories: "challenges for entrepreneurs," "social entrepreneur" (a subcategory of entrepreneur that gains more strength in times of crisis), "entrepreneurial financing," "support policies," and "resilience."

Challenges for entrepreneurs in environments of crisis

On this point, our study analyzed six published literature reviews. We began with Liñán and Jaén [65], which demonstrates the main consequences of and mechanisms by which the Covid-19 crisis affects entrepreneurship, as well as different effects to be expected for each stage and type of entrepreneur.

First, the analysis reviews the main disruptions that can affect entrepreneurial spirit, including decrease in demand, effects of the crisis on consumers' normal activity, change in more apprehensive and fearful people, and other effects, such as financing by business angels or venture capital, and possible problems of supply and ability to ensure supply.

Second, the authors review changes in the entrepreneurial dynamic for potential, nascent, and new entrepreneurs. They compare the pattern these individuals followed in different countries during the global crisis to analyze possible broader patterns that may have occurred during the Covid-19 crisis.

Finally, they review different areas proposed for analysis based on study of each area. Some examples are the evolution of entrepreneurial intentions and perceptions following the Covid-19 crisis and the institutional context.

Next, Callegari and Feder [17] propose that extensive analysis of and integrated response to the Covid-19 crisis must consider both the short- and the long-term impact of the epidemic.

Their article takes a step in this direction by reviewing the existing literature on the business reactions triggered by current and prior epidemics from a combined

Schumpeterian–Kirznerian theoretical perspective. To develop this study, they chose 52 articles published in June and July 2020 to provide a full and detailed account of all contributions analyzed.

Third, the study by Kuckertz and Brändle [54] analyzes how an exogenous economic variable like the Covid-19 pandemic affects entrepreneurial activity. To perform this study, the researchers identify 34 empirical studies that answer this question. Thematic analysis of the sample suggests that uncertainty, resilience, and entrepreneurial opportunity are the issues to be considered when analyzing how the crisis affects entrepreneurship.

For the authors, these effects involve issues that should be considered as a whole, not separately, because a holistic view of the literature enables definition of entrepreneurship in times of crisis as creative reconstruction that goes beyond mere focus on resilience.

Fourth, Abebe [1] performs in-depth analysis of the crisis suffered by refugee entrepreneurs in 2010. This article systematically reviews the literature in multiple disciplines to provide a transparent impartial representation of the research on refugee entrepreneurs. Starting from 131 articles published 1986–2020, the author performs a descriptive classification and analysis of the publications. The analysis produces various themes or clusters that help to determine future lines of research.

The analysis by Lee et al. [59] systematically reviews 106 articles, spanning different types of crisis in the entrepreneurship literature, as well as the similarities and differences between these articles. This study thus deepens knowledge of the relationship between entrepreneurship and crisis situations. Its results shed light on different perspectives, such as:

- Analysis of the 2007–2008 financial crisis, with in-depth focus on issues such as survival, variation in firm creation by country, and ways entrepreneurs face the crisis situation based on type of enterprise.
- Analysis of the 1997 Asian financial crisis, reviewing studies that examined the factors influencing entry and survival of firms operating in developing countries during this time, as well as factors that affect revitalization of family entrepreneurship.
- Study of articles related to local economic collapse, analyzing in depth 8 articles on micro- and meso-level factors that influence entrepreneurial spirit.
- Review of studies related to the Covid-19 crisis that analyze issues such as its influence on nascent and new entrepreneurs' decision to start a business, challenges and opportunities that small firms faced during the pandemic, the role of digital capabilities in newly created firms, and effect of the institutional environment.

- Analysis of the literature on environmental disasters. The four studies on environmental disasters in this review show that business spirit has the potential to catalyze restoration of the community, even in the most affected areas.
- Study of articles published on political conflicts, which analyze small business creation in areas with persistent conflict, with special attention to hostile environments.

Finally, the systematic literature review by Yunus et al. [113] analyzes 42 studies published 2020–2023. This analysis shows the value of the most significant changes experienced by small- and medium-sized enterprises (SMEs) in Indonesia during the Covid-19 pandemic. More specifically, it reveals the strategies these firms developed to survive and prosper in the crisis situation.

Social entrepreneurship in crisis situations

Given the nature of the research topic, we tackled this point by analyzing two articles on the challenges and implications of social entrepreneurship in situations of international crisis. In this section, social entrepreneurship is considered a subdiscipline.

First, the literature review by Duque et al. [31] studies analyses and literature reviews indexed in the Web of Science (hereinafter WoS) and Scopus databases for the years 2000–2020, using bibliometric methods and tools. These authors' analysis of 1297 publications analyzes the main perspectives, schools, authors, journals, countries, and institutions in this field.

Within its theoretical framework, this article identifies the contexts of crisis as a catalyst for consolidating the social economy, termed the tertiary sector by other authors because it is situated between public organizations and the traditional private sector [58]. Levitt [60] was the first to adopt the name tertiary sector in the USA to refer to the sector that drives micro- and macroeconomic activities that correct economic and social imbalances of the market and that have already been studied by the academic community [24, 99, 104].

Second, the bibliographic analysis by Trabskaia et al. [106] seeks primarily to understand the most significant trends in the development of social entrepreneurship, its ecosystem, and future lines of research, and the way the relationship between social entrepreneurship and the entrepreneurial ecosystem has been studied, with special emphasis on situations of international crisis. The authors analyzed 357 publications selected from the Scopus database for the period 2009–2022.

The study concludes that the publications in this line of study begin to be important in 2016. External events such as international crises can drive researchers' interest

and increase publications. For Trabskaia et al. [106], crises create new social problems and call attention to social entrepreneurship as a tool for solving these problems. Such stimuli in 2016 could be the long-term consequences of Brexit or, after 2020, of the crisis caused by Covid-19.

Entrepreneurial financing in crisis situations

Entrepreneurial spirit depends to a great extent on the economic climate and is thus significantly affected by crises [51]. Following Malach Pines et al. [69], we argue that international crises have a devastating effect on innovative entrepreneurs' opportunities to obtain financing. Their analysis thus believed it important to consider exploring this line of research in greater depth.

The literature review by Anagnostopoulos [5] examines the implications of fintech for financial institutions and regulation, especially when the technology poses a challenge for global banking. The review attempts to connect the academic research on the financial implications of a crisis environment to the literature directed by professionals. It proposes the Law of Financial Markets as a key topic, since regulation of these markets had negative consequences during the financial crisis.

From another perspective, the literature review and bibliometric analysis by Mora-Cruz and Palos-Sanchez [78] analyze the topic of financing associated with entrepreneurs in the environment of the Covid-19 crisis. Since both entrepreneurs and newly created firms have difficulty obtaining external financing, online crowdfunding platforms are increasingly common. This article thus analyzes the most significant aspects of 55 articles selected from the WoS and Scopus databases on crowdfunding platforms in Latin America 2020–2021. The authors conclude that platforms dedicated to participation in social capital are expected to grow rapidly as a means of financing for entrepreneurs. Further, entrepreneurs most often use financing platforms with rewards, as they involve lower risk of participating in social capital and are considered by investors as a means of social action.

Support policies in crisis situations

Traditionally, one of the most significant milestones in scenarios of international crisis is public aid to achieve moderate swings in economic activity, primarily by reducing interest rates and increasing public spending to stimulate demand and the economy. Various publications have thus focused on analyzing the theoretical framework associated with public aid.

First, the paper by Maza et al. [74] analyzes optimization of support services for entrepreneurs as an alternative for facing crisis in developed economies. This paper claims to take a first step toward establishing a useful

methodology to orient any entity supporting entrepreneurship. To develop this topic in greater depth, the authors first review the literature on the phenomenon of entrepreneurship and existing types of public support. The study provides a summary bibliographic review of the technical principles that attempt to search for and justify the reasons supporting significant differences between two groups of entrepreneurs, those who survive in the market and those who do not. The analysis is complemented by a sample of 2013 data on 1618 entrepreneurs from the region of Europe with the worst unemployment rates in the present decade (Andalusia). Its goal is to better determine the factors that influence survival and strengthen support services for entrepreneurship.

The study by Kubera [53] reviews the literature analyzing the legal regulations and directives put into effect, as well as the state aid granted during the Covid-19 crisis. More specifically, the study examines from the legal perspective the freedom European Union (hereinafter EU) member states have to design the type of intervention developed, as well as support measures used to help entrepreneurs face the effects of the Covid-19 pandemic.

Finally, Braunerhjelm [13] studies policies developed to help entrepreneurs, presenting a modified version of a more complete stabilization framework to counteract generalized large-scale crises. More specifically, the study stresses coherent alignment of macroeconomic aggregate demand policies with microeconomic supply-side policies. It also argues a well-designed strategy to stabilize the economy and improve long-term growth. For this author, incentives that foster knowledge, modernization of digitalization, sustainable production systems, and resilient internationalization structures are crucial elements in achieving this transformation. Such measures also strengthen competitiveness of employees and of the business sector and deepen the economy's knowledge base.

Resilience in environments of crisis

International crises—specifically, the crisis caused by the Covid-19 pandemic—have demonstrated the growing importance of improving entrepreneurial resilience and its capability to advance in the digital environment. In this category, we analyzed two literature reviews, one on the creation of a resilient entrepreneurial environment and another that analyzes the term resilience by studying how entrepreneurs adapt and pivot their business models in response to change.

First, Ratten's [89] review of the existing literature on the crisis caused by the Covid-19 pandemic analyzes management by entrepreneurs in this environment, focusing on specific types of entrepreneurship in terms of culture, lifestyle, and social change. The author stresses

resilience as an attribute enabling entrepreneurs to absorb impacts without compromising their firm's market position.

Second, Elia et al. [32] draw on their systematic literature review to present a synopsis of the main topics of reflection associated with the emergence of a digital society. This publication's systematic literature review followed a detailed process designed to minimize bias through exhaustive bibliographic searches to retrieve published studies and a guide for auditing reviewers' decisions, procedures, and conclusions. This analysis seeks to provide a transversal perspective on the entrepreneurial world and dimensions of the digital society. The analysis serves as the basis for identifying the elements that an incubator in the digital society should have. The proposed model identifies the actors, values, flows, and processes required to support construction of a resilient entrepreneurship ecosystem.

Methodology

This study includes analysis on two levels: content analysis and bibliometric analysis. An inductive methodology is used for the content analysis. We first select the units of analysis and then perform open coding of them. From this coding, we classify the category lists [14]. The goal of pooling the data is to reduce the number of categories, collapsing those that are similar or different into broader higher-order categories, [14, 26, 30]. Following Dey [26], categories have not been created simply by gathering observations that are similar or related. Rather, the data are classified as "belonging" to a particular group through comparison between these data and other observations that do not belong to the same category. The categories are created to describe the phenomenon, increase understanding, and generate knowledge [19]. When formulating categories through inductive content analysis, the researcher uses interpretation to reach a decision about what issues to practice in the same category [26]. Once the categorization is complete, we proceed to the abstraction phase. This phase is performed through general description of the research topic by generating categories [84]. Each category is named using content-characteristic words. Subcategories with similar events and incidents are grouped together as categories, and categories are grouped into main categories [26, 57].

Following this methodology, we obtained the five categories established in the research article (see "[Review studies on entrepreneurship and international crises](#)" section).

The empirical portion of our study is a bibliometric analysis that starts from quantitative analysis of the choice of studies and continues with various items that make up scientific mapping.

Documentation for our analysis was obtained from the Scopus database. We chose Scopus as a data source because it has a large number of research articles at global level and is a database used and recommended by researchers to perform this type of analysis [29, 102]. Still, to improve solidity and precision of the data, we compared the results to those of a similar database, WoS, another source of multidisciplinary data used extensively worldwide [36] for bibliometric analysis because it provides various benefits for such studies [81]. This comparison confirmed that the two databases yielded similar results.

The search terms used focused on “entrepreneurship” and “crisis” or “Covid-19.” We also used “*” to include words similar to these three in the title, abstract, and keywords.

We retrieved only peer-reviewed journal articles, as these criteria tend to yield reliable studies [12, 40]. After scanning the documents, we analyzed each in detail to exclude articles not directly related to the field of study. The bibliometric analysis was performed of 1111 articles chosen for this study.

Figure 1 shows the evolution of publications analyzed during the period January 2000 to January 2023. We observe an ascending trend from 2000 onward, with a slight increase in 2012 and 2017. The year 2020 is unquestionably the most striking, with 349 articles published on the topic analyzed, as opposed to 21 in 2019.

For the qualitative part of our study, we analyzed which journals had published the best articles cited

together from each journal. This method enables us to develop a ranking of the most productive journals, which included *Journal of Business Venturing Insight*, with 888 citations, and *International Small Business Journal* and *Journal of Entrepreneurship in Emerging Economies*, with 357 and 252, respectively. These journals are located in the first quartile of the Scopus database. The data thus provide us with information about the high quality of the articles analyzed.

Figure 2 presents the ranking of the five most-cited journals.

Another important factor of analysis is author citations, which can be used to measure the influence of a specific study [102]. This method enables rapid identification of the most important contributions in the field, although the measure is biased toward older publications [102, 114].

Table 1 presents the five most influential authors, using the criterion of number of citations and h-index to measure influence.

The data show that the authors with most of the citations are V. Ratten and A. Kuckertz, who far outstrip the other researchers. This difference suggests that the field is highly specialized and has nonuniform distribution of impact.

We also thought it valuable to determine which countries have the highest number of publications in this area, as this figure can indicate the influence of research on the country. Table 2 shows the five countries with

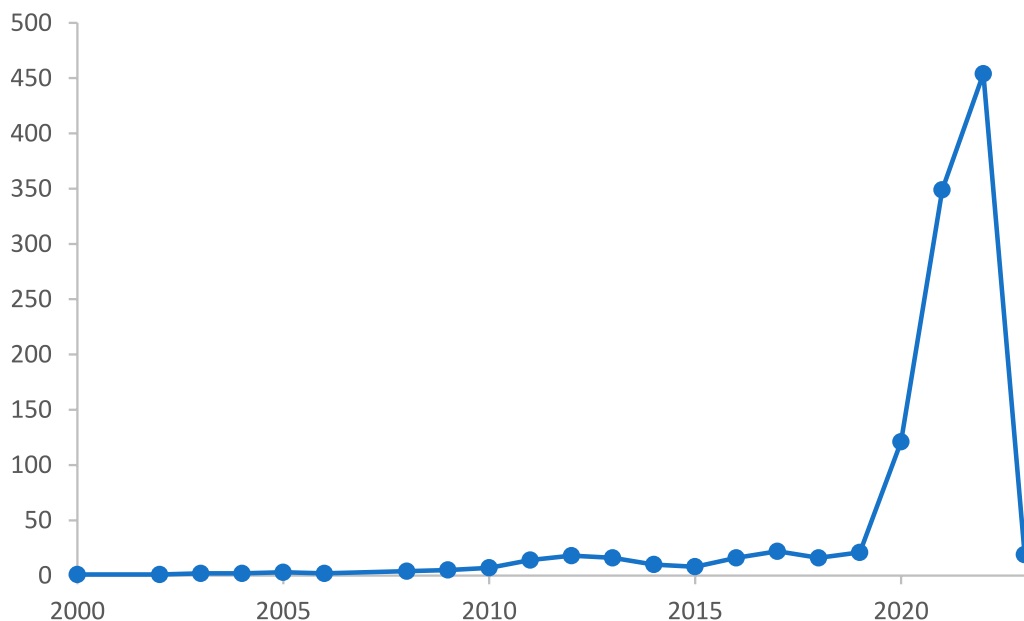


Fig. 1 Number of documents published 2000–2023. Source: The authors, based on Scopus



Fig. 2 Ranking of the most productive journals. *Source:* The authors

Table 1 Ranking of the five most-cited authors

Author	Articles	Citations	h-Index (1)
Ratten V	31	744	41
Kuckertz A	4	446	23
Fairlie R	4	191	86
Apostolopoulos N	5	78	9
Kraus S	4	69	60

(1) h-Index obtained from the Scopus database

Source: The authors

Table 2 Ranking of the five countries with the most publications

Country	Articles	Citations	Link strength
USA	165	2961	161
UK	108	1723	97
Australia	78	1213	111
Italy	66	582	62
India	86	217	61

(1) h-Index obtained from the Scopus database

Source: The authors

the most publications and citations per publication of the total 128 countries.

We observe a current cluster with a great concentration of publications in these five countries. Analyzing the publications' age confirms that the highest volume of cited documents from the first four countries occurred in 2020. This is not the case for India, however, which has more studies cited in 2022. This result suggests that India is a country with a young line of research but great expectations for growth.

Next, Fig. 3 shows the link strength in the ranking of the five countries with the most citations and documents cited.

As the colors assigned show, the five nodes of countries belong to the same cluster. Further, the distance between countries represents the link strength exerted by citations in each country. The closer one country is to another, the greater the strength of the documents cited between them; the farther apart countries are, the weaker the relationship.

To conclude our characterization of the study, we believe it useful to analyze the ranking of the articles by *sponsor*. Figure 4 presents the five institutions with the most articles published in the field and that provide financial support for publication. We confirm that two of the institutions with the most financing for such studies are from China and Canada, and that both are financed with public funds. This information suggests that these countries are committed to and interested in knowing how international crises affect entrepreneurship.

Results

The literature on bibliometric analysis affirms that this method can be used to analyze the knowledge acquired on any research topic to reveal unobservable, objective patterns [46, 61, 62, 80]. Various tools exist for performing such study. Some of those analyzed to determine their operability and applicability were CiteSpace, SALSA, PRISMA, and VOSviewer. After studying the tools cited, we chose VOSviewer for the empirical portion of this study because it is relatively simple to operate and does not require configuration of parameters. In addition to the bibliometric analysis, the software includes analysis of collaborative

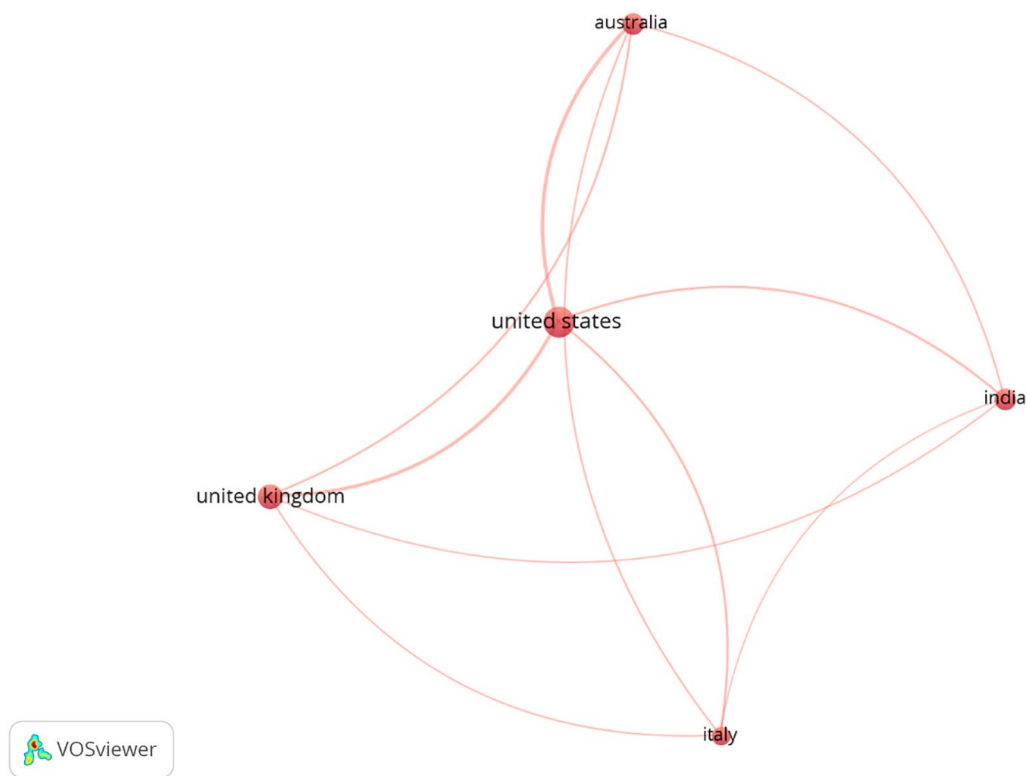


Fig. 3 Ranking of the five countries with the most citations and documents cited. *Source:* The authors

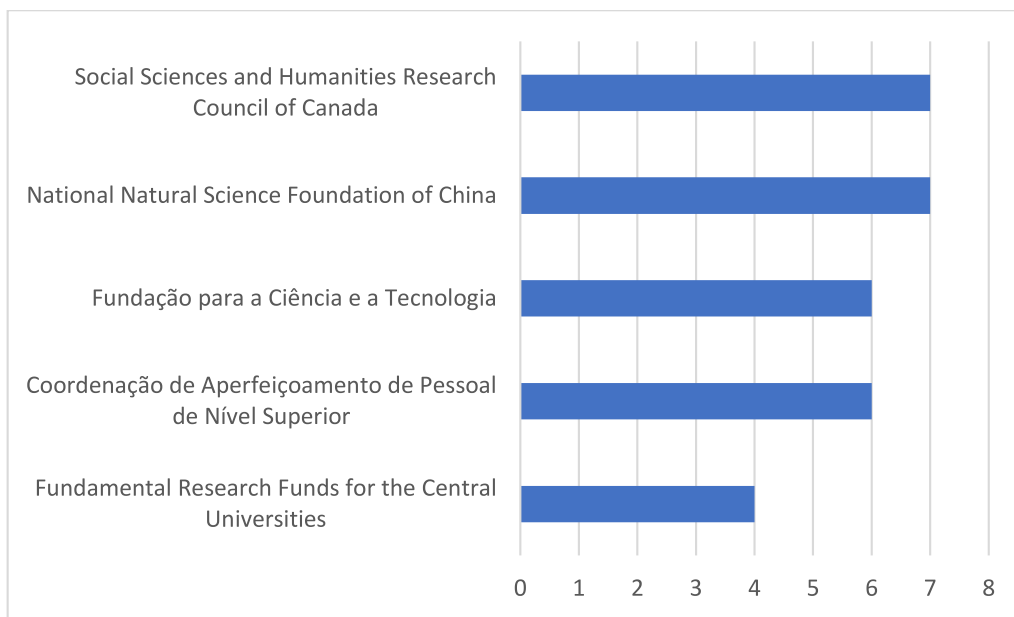


Fig. 4 Ranking of the five financing institutions with the most documents published. *Source:* The authors

networks such as bibliographic coupling, co-citations, and co-occurrence analysis. VOSviewer uses two standardized weightings, number of connections, and total strength to show the networks of visual nodes described above [7]. It can also handle large amounts of data, has tremendous mapping capability, and supports all functions explored in this study [28, 71].

By analyzing the literature collected, we analyzed the field of entrepreneurship in an environment of global crisis by examining the results of the bibliometric tool VOSviewer [100].

Next, we focus on scientific mapping, which examines the relationships between the research components [9, 87].

The techniques used in scientific mapping include citation analysis, co-citation analysis, co-word analysis, and co-authorship analysis. Following Donthu et al. [28], we affirm that it is crucial to present the bibliometric and intellectual structure of the research field when combining analysis with networks [10, 107].

Citation analysis

Studies like that performed by Appio et al. [6] define citation analysis as a basic technique for scientific mapping that assumes that the citations reflect intellectual links among publications. Such analysis determines the impact of a publication by the number of citations that receive this information, enabling us to determine the most influential publications in a specific research field. Although other methods exist for determining the importance of publications in a research field, citation analysis is one of the most direct and objective ways of determining a study's impact [82, 101].

Table 3 presents a ranking of the most-cited articles. In fact, Xu et al. (2020) state that the popularity and recognition of a document can be shown by the number of times it is cited.

Co-citation analysis

Bibliometric studies use co-citation analysis extensively [2]. This analysis is useful both for determining an article's intellectual affiliations and for providing an intellectual map of a specific field of study [16]. As two independent articles can be considered as belonging to the same research field if they are frequently cited together [22], co-citation analysis can be used to identify the main currents in a specific field [90], as well as its underlying topics [68].

Figure 5 presents our co-citation analysis, taking author as the unit of analysis. The colors show seven clearly defined clusters, composed of 24–124 authors each. Our analysis included a total of 522 authors with at least 20 co-citations each.

Co-word analysis

Co-word analysis is a technique that examines the publication's real content [29]. It analyzes words derived from the "author's keywords" and, in the absence of keywords, significant words in "article titles," "abstracts," and "full texts" [10, 15, 28, 35, 67].

Co-word analysis assumes that words that appear together are often thematically related. Following Donthu et al. [29], our study uses co-word analysis to clarify future research in the field, including words in the field obtained from the implications of the publications analyzed and future lines of research.

After co-word analysis, we proceeded to co-occurrence analysis, using VOSviewer. We extracted a total of 2779 keywords from authors, applying a minimum threshold of five co-occurring words. We then divided these words into 11 clusters based on the relationships between the words. The three keywords with strongest links were Covid-19 (605), entrepreneurship (457), and crisis (169), as we expected due to the search performed. It is striking to note, however, that the words with the next strongest link strength were innovation, pandemic, and resilience. Figure 6 presents the map of keyword co-occurrence.

Table 3 Ranking of the five most-cited articles

Article title	Author	Year	Number of citations
International migration, remittances, and household investment: Evidence from Philippine migrants' exchange rate shocks	Yang D	2008	523
Startups in times of crisis: A rapid response to the Covid-19 pandemic	Kuckterz A	2020	415
From offline to online: Challenges and opportunities for entrepreneurship education following the Covid-19 pandemic	Liguori E	2020	200
Universities and enterprise education: Responding to the challenges of the new era	Rae D	2010	169
Fintech and regtech: Impact on regulators and banks	Anagnostopoulos I	2018	152

Source: The authors

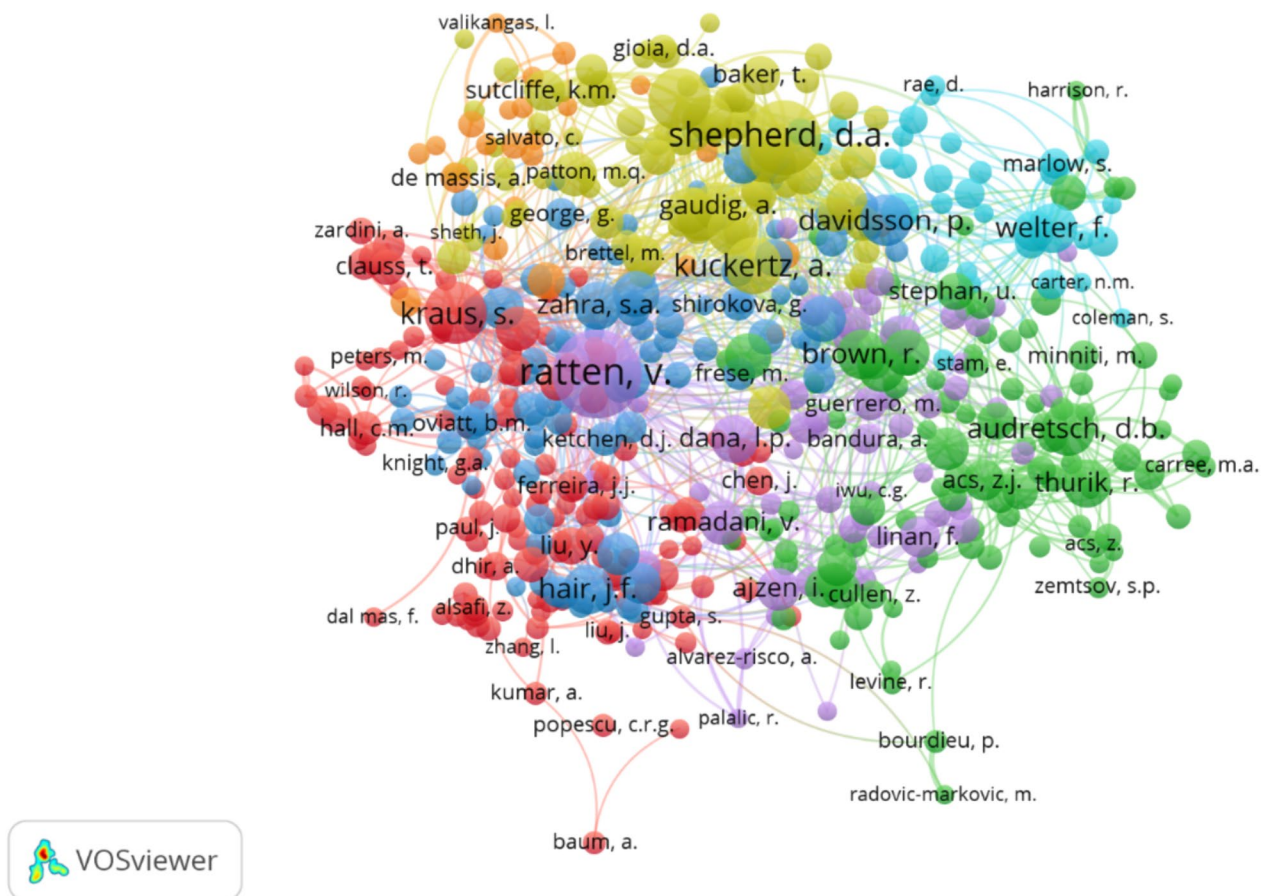


Fig. 5 Co-citation analysis, taking authorship as the unit of analysis. *Source:* The authors

To deepen this analysis, following Killinski (2023), we extracted the keywords from the authors (2779), applying a minimum threshold of ten co-occurring words. In this case, the information was divided into six clusters. Figure 7 presents the resulting map of keyword occurrence. The description of each cluster can give us information about strength of connection and frequency.

The first cluster contains the largest number of terms (13 items), among which the following can be distinguished (colored red): “digital entrepreneurship,” “innovation,” “performance,” “resilience,” “sustainability,” and “women’s entrepreneurship.” This cluster connects crisis with innovation and resilience. The frequency of these words in the sample studied is 54 and 34, and the strength of connection 95 and 77, respectively.

The second cluster (7 items) combines terms such as “Covid-19 pandemic,” “entrepreneurs,” “technology,” “tourism,” and “women’s entrepreneurship.” In this cluster, the keyword “Covid-19 pandemic” has the highest frequency of co-occurrence (18), while the strength of association is 50.

The third cluster (6 items) includes terms such as “e-commerce,” “entrepreneurial skills,” “leadership,” and “strategy.” In this cluster, the keyword “strategy” has the highest frequency of co-occurrence (17), while the strength of association is 29 (after the word entrepreneurship).

The fourth cluster (6 items) connects keywords like “coronavirus,” “crisis management,” “education,” and “uncertainty.” In this cluster, the keywords “coronavirus” and “crisis management” have the highest frequency of co-occurrence, 18 each, while the strength of association is 68 and 75, respectively.

The fifth cluster (4 items) includes keywords such as “self-employment,” “social entrepreneurship,” and “small business.” In this case, the keyword with the highest frequency is “social entrepreneurship,” and the strength of association is 46.

The sixth cluster (3 items) connects keywords like “crisis,” “public policy,” and “venture capital.” In this cluster, the most frequent word is “crisis,” and the strength of association is 128.

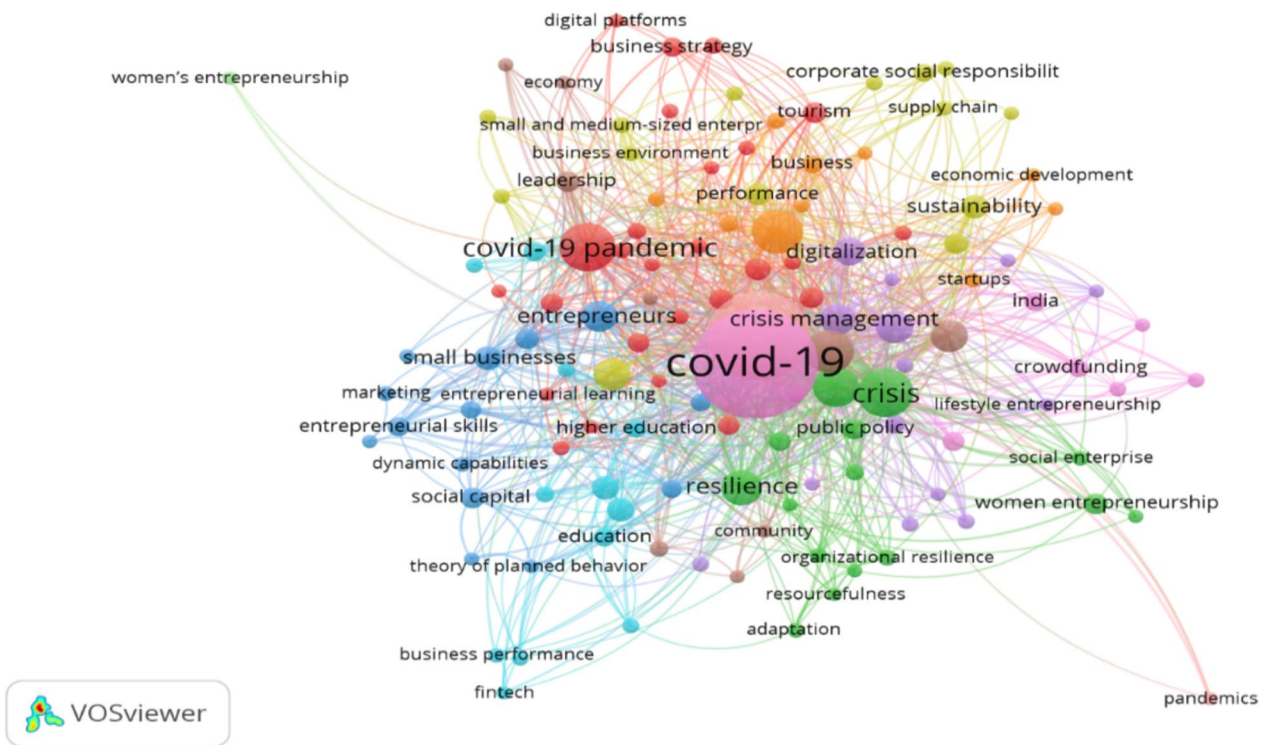


Fig. 6 Co-occurrence analysis. Source: The authors

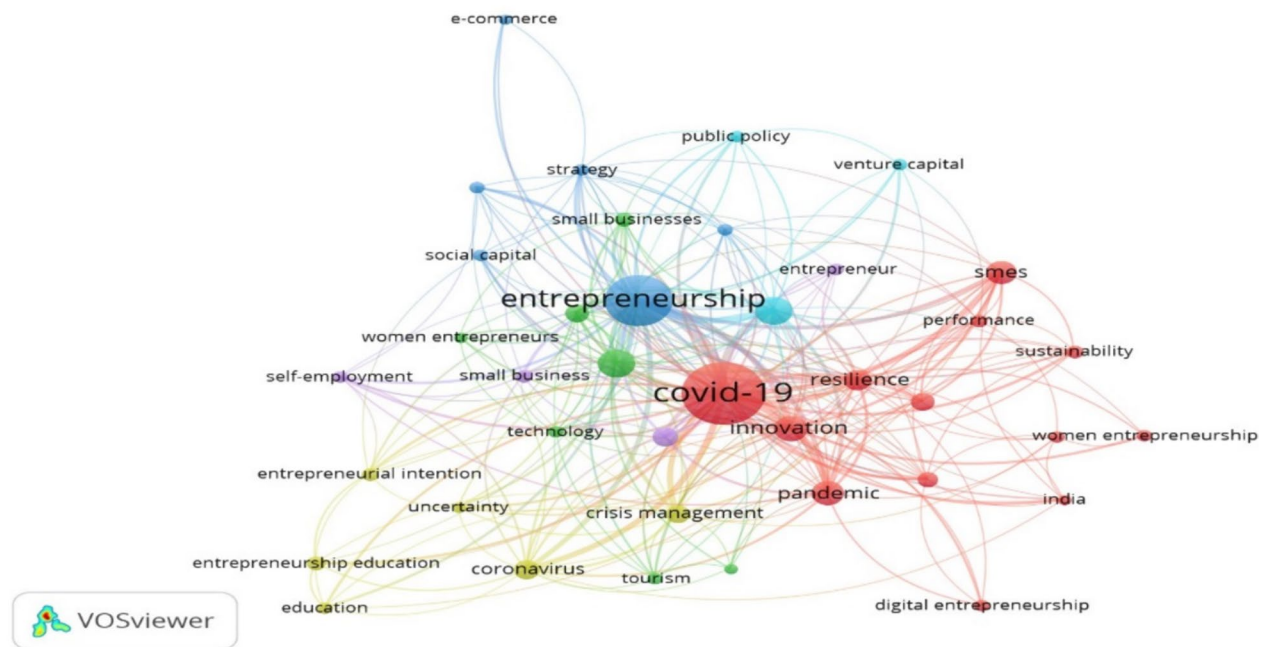


Fig. 7 Co-occurrence analysis (6 clusters)

As noted above, the most-mentioned word in the analysis was “Covid-19,” which encompasses the challenges facing entrepreneurs [34], analysis of specific sectors most affected by the crisis, specific questions related to financing of entrepreneurs, and the opportunity the Covid-19 crisis generated for innovation to contain the organizational problems [45].

The second-most-frequent word was “entrepreneurship,” which focuses on the challenges that different types of entrepreneurs faced during the pandemic and their capability to exploit opportunities in the new normal. This keyword has also been used to express businesspeople’s efforts to achieve sustainability for their businesses in uncertain times [86]. Further, the publications analyzed stress the emergence and implementation of various plans providing public financial support for survival and support of entrepreneurs [105].

Finally, the word “crisis,” which appeared 169 times, includes the topic of the Covid-19 pandemic’s repercussions for firms.

Figure 8 presents a superimposed network of keyword co-occurrence to show the temporal distribution of keywords in different groups. Variation in darkness of color is based on the keyword’s average year of publication. The darker the color, the longer ago the article was published; the lighter the color, the more recent it is. Although this

analysis spanned the years 2000–2023, the data show the greatest co-occurrence of keywords in recent years, with 2020 as the most productive year in this field.

We confirm that the word Covid-19 is linked to diverging studies, such as women’s entrepreneurship, digital marketing, and social entrepreneurship, among others.

In numerous articles, the concept of “women’s entrepreneurship” demonstrates women’s capability to survive the crisis [48, 70]. Other publications that focus on this important topic explore women’s capability to create opportunities in specific countries in Latin America or links to the public or private sector [92].

The research line on “digital marketing” is associated with the challenges entrepreneurs had to overcome during the Covid-19 crisis, strategies, and possible barriers to be surmounted [20, 97].

Finally, “social entrepreneurship” in environments of crisis is associated with topics such as digitalization and resilience [94], entrepreneurial skills [47], and the effects of the pandemic on social entrepreneurs [42].

In the evolutionary and temporal dimension, in contrast, we identify the three most significant stages in the development of scientific research.

The first stage ended in 2020, when the publications analyzed cover topics such as “economic growth,” “competitiveness,” “business environment,” “entrepreneurial

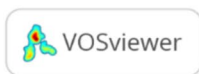
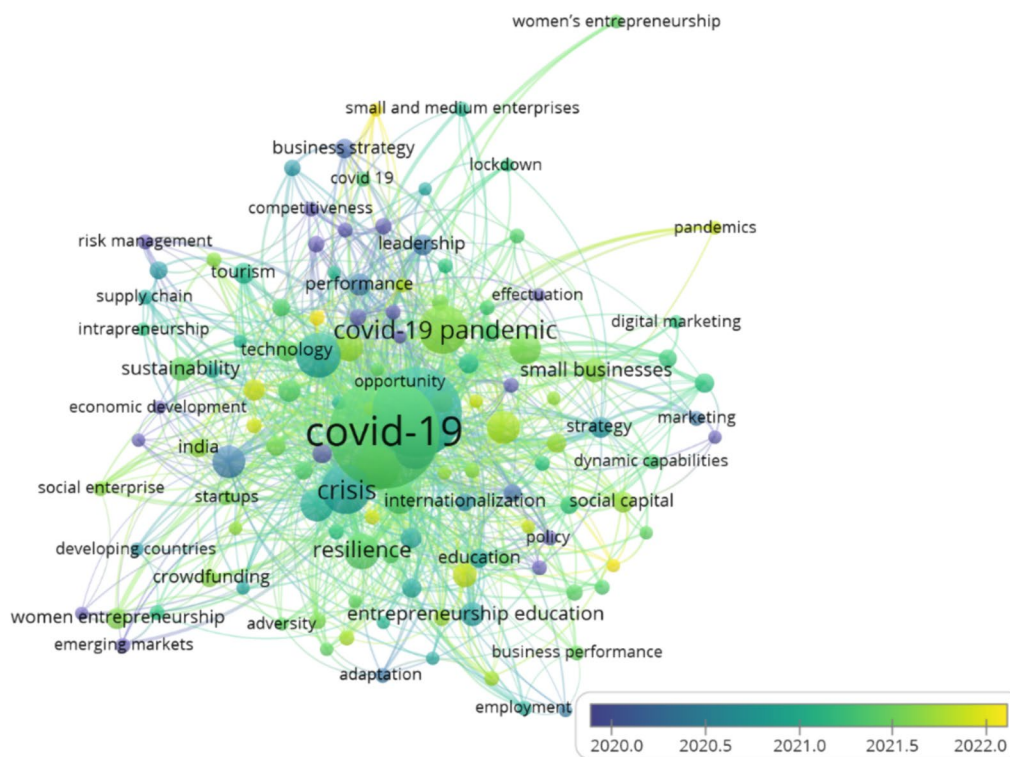


Fig. 8 Superimposed network of keyword co-occurrence. Source: The authors

clusters composed of 1–7 authors each. Of these, 89 were composed of 1–2 authors, suggesting that many researchers performed their analyses independently, with little or no cooperation with other academics.

Co-author analysis provides information on how research is clustered among different academics in a specific region or country. Our analysis thus helps to determine the character of these collaborations, evolution of their trajectory, and most-cited authors.

For our purposes, it is very valuable to determine co-authorship relationships, taking country or region in which the article was published as the unit of analysis. These data can provide information about possible underrepresented regions. We confirmed that the USA and the UK had the highest number of publications, 4047 and 3508 citations, respectively.

Figure 10 presents the co-author relationships between countries or regions.

The network ties in red, for example, represent the Spanish cluster composed almost entirely of Spanish-speaking countries. We find 10 clusters, with a size of 2–12 items each. The largest clusters of countries are those represented by red and green lines.

Figure 11 shows the relationships between co-authorship by country and age of network in years. We observe that networks with more recent publications belong to countries such as Nigeria, Iran, and the Philippines, which have less graphic representation.

Discussion

This study deepens analysis of the advance in research on international crises, as well as different trends in this research field. Innovation, social entrepreneurship, and gender differences may be new lines of research that help those who develop policies and programs to support entrepreneurship. These keywords may indicate that future lines of study should focus more on innovative aspects of firms by analyzing what business area is least affected by the crisis.

On the other hand, the analysis enabled us to determine new opportunities to evaluate the successes or failures of efforts to improve political systems and public support implemented in environments of crisis. More specifically, our review suggests initiatives for policy intervention to stabilize economic crisis, such as providing financial assistance to recover from the crisis.

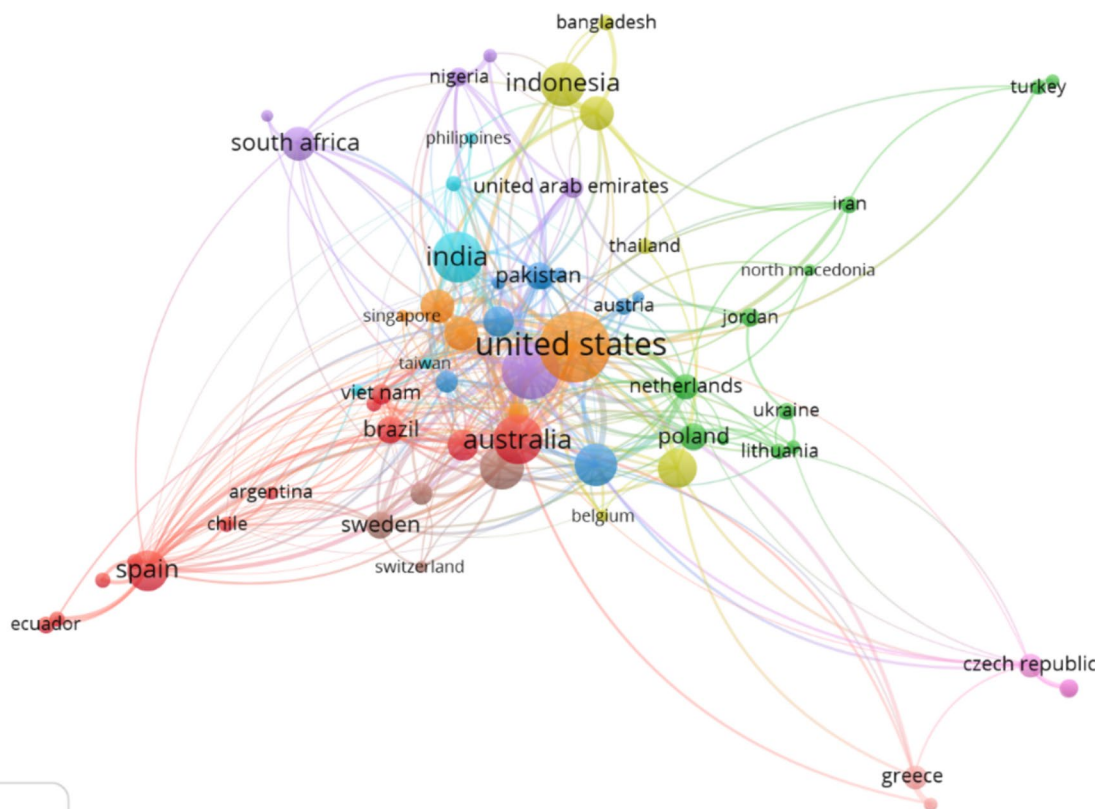


Fig. 10 Co-authorship relationships between countries and regions. *Source:* The authors

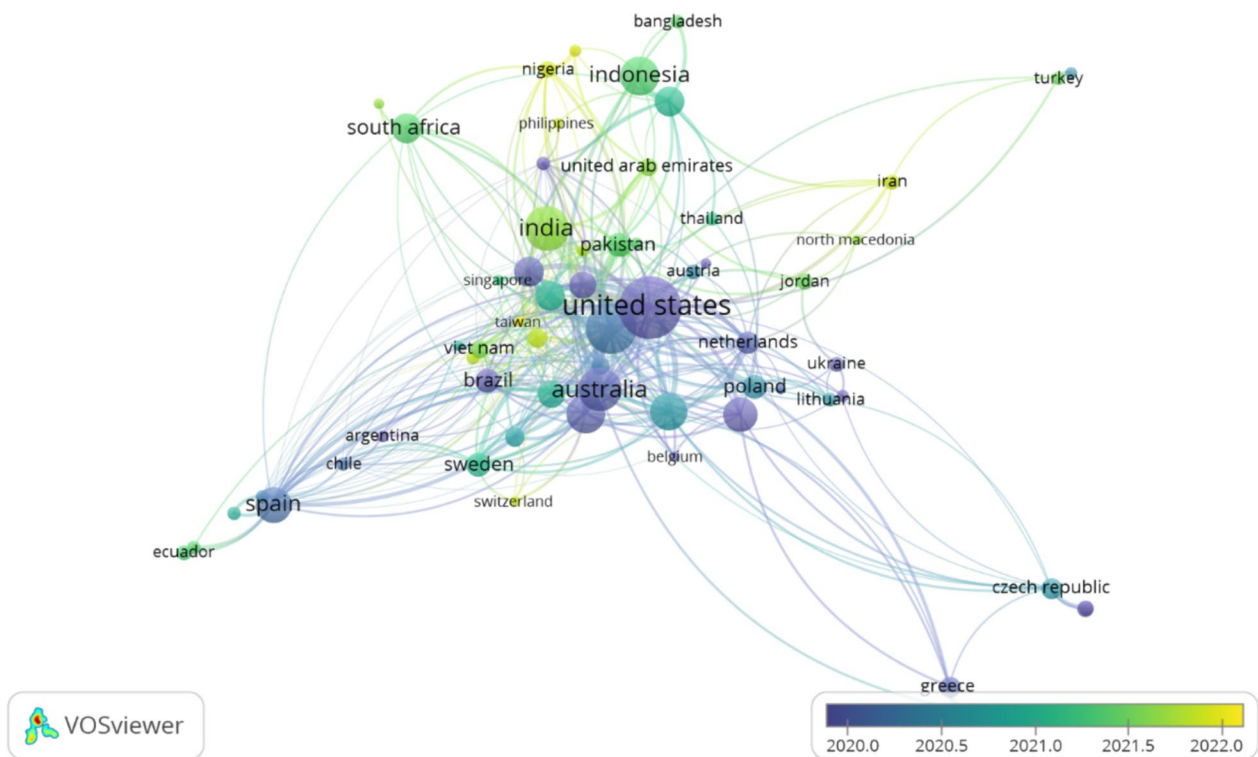


Fig. 11 Co-authorship relationships between countries and age of network in years. Source: The authors

These initiatives can stimulate knowledge exchange to determine impacts, which can then be used to palliate the crisis. Knowledge exchange can also promote open innovation and digitalization to generate new products and develop an ecosystem that can generate synergies among entrepreneurs.

Some interventions can be applied generically to all economies, while others must be adopted contextually.

Situations of international crisis generate great uncertainty, which can lead to new lines of research based on new challenges. Among these, we find new products and processes that give new initiatives flexibility to adapt to new situations. As many existing studies are based on situations of uncertainty in the environment, some research proposals should focus on decision-making in uncertain situations. Other limitation of this study is that only articles in English have been considered; future research could include book chapters or contributions to conferences in other languages, which would enrich the research. In addition, the search topics can be considered generic so new research could include other more specific topics related to the research area.

Finally, a new line could focus on new ways to respond to the evolution of the crisis to minimize its impact.

Conclusions

This study has performed different types of analysis. The first classified the existing literature on entrepreneurship and international crises into five different conceptual frameworks that help us to understand the structure of existing research on the topic.

This initial study was complemented by descriptive and bibliometric analysis of publications over the past 22 years on entrepreneurship in environments of international crisis. VOSviewer software enabled us to analyze the evolution of these years visually from different perspectives. These results led to the following conclusions:

Based on the annual indicators obtained, there is a growing trend in both number of documents and number of citations. Given the difficulty of publishing articles in the area analyzed, however, the data show a moderate quality by source analyzed.

The keywords analysis of years of publication shows us that the most-cited publications correspond to very recent years, such as 2020. Analyzing this information with the number of articles published per year indicates that the publication trend has increased more due to the Covid-19 pandemic than to the financial crisis.

Moreover, distribution of the research by country shows a clearly established cluster of five countries that concentrate a significant volume of publication with

relatively high link strength. This result suggests these countries' marked influence on the research field. The countries with the greatest influence are the US and the UK.

Finally, as to authorship in the research field, five researchers lead the co-citation ranking. A single author (Vanessa Ratten) stands out, with 31 documents published in the research field and a total of 744 citations. This finding indicates that only a few researchers are experts in the field. Further, analysis of the collaboration network among authors shows that approximately 78% of the authors analyzed developed their studies independently, or with little or no cooperation with other academics.

Even though the most prominent words focus entirely on the research topic, analyzing the co-citations in article keywords shows a growing trend to link the words to innovation, new types of entrepreneurs (e.g., social and women entrepreneurs), and key issues for the organization, such as digitalization and dynamic capabilities. More specifically, we found recent points approaching words such as digital platforms and sustainability.

Lastly, we confirm that Spain ranks ninth in the article production of 128 countries and that the field has a significant cluster of Spanish-speaking countries. The results also show relationships between English-speaking countries, such as Australia and Sweden. These relationships indicate strong potential for growth in the research field.

Further, countries such as Iran, Nigeria, and Taiwan emerge as having excellent opportunities to situate themselves in positions of importance, given their publications in more recent years. The field would also benefit greatly from more detailed study of how to facilitate international collaboration and its impact in order to exploit and improve network creation.

The bibliographic analysis performed in this study provides a more complete image of the relationship between entrepreneurship and environments of global crisis. Knowledge of the evolution of these initiatives, evolution of the topic, and clusters by country offers a broader perspective of the research performed. The evolution of the field studied indicates that there are two lines of research related to crisis environments: One research trend, which analyzes digitalization and digital platforms as well as their relationship with business strategy and leadership. And, a second research trend, which focuses on entrepreneurial behavior, education, and decision-making.

These are two very important fields of study in crisis situations, since the literature proposes social and technological entrepreneurship for the development of new initiatives, requiring innovations and offering opportunities to identify new business models that allow them to

survive the crisis. On the other hand, the research gap on entrepreneurial behavior and decision-making is important to know how they react to crisis situations as well as the strategies that allow them to survive.

The content analysis, in turn, has enabled us to determine different areas associated with this line of research. Firstly, we obtain conclusions about how the institutional context should consider entrepreneurial intentions and perceptions depending on the stage of entrepreneurship. This information can help to create more specific lines of aid and subsidies for each type of company.

Secondly, the content analysis enables us to delve deeper into the literature on the strategies that these firms developed to survive and prosper in the crisis situation. This analysis is the key to economic and social development in unstable environments.

Another point analyzed is social entrepreneurship as a subdiscipline of entrepreneurship. That social entrepreneurs are crucial in crisis environments reinforces the need to provide and design effective programs to foster entrepreneurial motivation to develop social entrepreneurship actions. Moreover, some implications could focus on implementation of educational actions to promote educational institutions as spaces in which future entrepreneurs can absorb knowledge to develop their social skills.

Thirdly, entrepreneurship financing has been analyzed as a key factor in crisis situations. The literature review concludes that the main factor driving business creation is having the necessary financing and public aid to encourage entrepreneurship, followed by appropriate training and adequate social recognition.

Various publications have analyzed the theoretical framework associated with public aid in an international crisis scenario. The literature review performed is interesting because it demonstrates the effect of support policies on the creation of companies through comparison between the companies that managed to survive the crisis and those that did not. Future lines of study could thus focus on this issue and analyze the measures applied by different governments at international level and the results obtained.

The social implications of this study can help reduce the social vulnerability created in crisis situations such as that experienced during the Covid-19 pandemic. By studying the literature developed in various countries analyzed, governments can design supportive public policies to promote and develop greater confidence in entrepreneurs in such situations and thus the ability to survive the crisis.

The content and bibliometric analyses performed would further support policy makers in combatting unstable circumstances or pandemics predicted. Future

lines of study could focus on bibliometric research on the topics: “entrepreneurial women,” “gender gap,” and “global crisis” situations. Studies such as Bartik et al. [11] state that the main victims of the pandemic are small businesses owned by women because they lack access to sufficient resources, particularly administrative and financial. At global level, it is worth highlighting, for example, the promotion of the 2030 Agenda and its Sustainable Development Goals, in which gender equality is one of the main axes of intervention and a driving force for the economic and social transformation essential to achieving a peaceful, prosperous, and sustainable world.

Abbreviations

SMEs	Small- and medium-sized enterprises
US	United States
WoS	Web of Science
EU	European Union

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Author contributions

Our study makes two main contributions. First, it provides better understanding about the evolution of studies performed during periods of global crisis and the intensity of this research field. Second, this study offers us the direction in which the literature on entrepreneurship and environments of crisis should evolve in order to improve future policy and strategic decisions.

Availability of data and materials

This is available on request.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

The authors hereby give their consent for the publication of this article.

Competing interests

The authors declare no competing interests.

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