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Sailing on entrepreneurship academic discourse during COVID-19 crisis by using topic modelling and grounded theory

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Abstract: The study analyses the academic discourse on entrepreneurship in Scopus during COVID-19 crisis to clarify the dominant topics and their evolution over time. Methodologically, the study has two phases: the first was to apply topic modelling by year of publication; the second was to apply grounded theory coding to interpret the topics generated. The results are shown in a research framework with four components: studies trying to better understand COVID-19 crisis impact on business and entrepreneurship; studies showing the entrepreneur's needs to learn how to respond to the pandemic, where characteristics like be innovative, creative, risk taker and proactive are crucial; studies introducing public policies which can help economy's reactivation; and studies focusing on sustainability in the new normal. Finally, the study highlights some interesting avenues for further research where the impact can be more relevant.

Keywords: entrepreneurship; COVID-19; topic modelling; grounded theory; research framework.

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1 Introduction

When our lives are struck with a world health crisis issue, we automatically worry because it is a complex matter to manage. At the end of 2019, a severe acute respiratory problem SARS-CoV-2 was discovered (Zhu et al., 2020), which derived in the COVID-19 pandemic. This health crisis has entailed important changes not only in people but also in organisations, since it has impacted on the patterns of mobility, international trade, consumption and lifestyle (Ratten, 2021). This author points out that the real impact of this crisis is not yet known, but that important political interventions will be required, so it is essential to properly plan public policies with respect to the social changes derived from the COVID-19 pandemic. Liu et al. (2020) emphasise the composition of the word crisis in the Chinese language (危机 wēijī), since it is composed of two words ‘Wei (危 = crisis) and Ji (机 = opportunity)’, which allow us to see it from a positive outlook; they encourage us to perceive it and act differently against it. These authors state that it is necessary to develop individual, as well as organisational responses, altogether with an intense coordination that encompasses both interdisciplinary and multidisciplinary perspectives.

The emergence of a health crisis is not strange, but the measures to control it, such as social distancing (Glass et al., 2006) generate a lot of pressure on the countries’ economies (Kuckertz et al., 2020). The virus continues to spread around the world resulting in a series of fundamental restrictions on people’s lives (Hellewell et al., 2020). With it, strict policies for economic activities arose to contain contagions; however, its impact on the countries is not yet known but it is estimated that the damage will be disastrous, as well as its consequences in the medium and long term (Zhang, 2020). From the point of view of business financing, Brown and Rocha (2020) point out that there are valid theoretical reasons to argue that financing sources decrease substantially in recessive periods, which occurs not only in venture capital, but in different types and forms financing, but it is especially noticeable in the initial rounds of financing because companies are more incipient, so the risks are greater. In addition, direct costs such as medical treatment expenses should also be considered along with indirect costs such as reduced productivity or available workforce due to morbidity (Liu et al., 2020). Thus,

COVID-19 has become an unrivalled challenge, which brought with it social, economic and health problems on a global scale (Gates, 2020).

Innovation enables organisations to be more resilient, as they offer to adapt in advance, quickly and continuously to the various presented events. Previous crisis situations confirm that the way in which an organisation relates to entrepreneurs and small businesses is important for their resilience, since this interaction generates skills that allow them to adapt and be flexible, increasing their ability to face external conflicts (Williams and Vorley, 2014), be more innovative and flexible to sudden events (Cowling et al., 2015). It is important to highlight that, resilient entrepreneurs create changes and opportunities with the resources they had at hand; highlighting that the resources needed to be resilient during the emergency phase are not the same as those needed in the following recovery stages (Martinelli et al., 2018). Countries with a resilient health system (Wyns, 2020) are proving to be better managers of the COVID-19 crisis. Likewise, it is suggested that organisations that had a resilient entrepreneurial ecosystem could resume their activities faster than those that did not (Kuckertz et al., 2020). While startups make better use of their available resources, governments must also provide them with support to ensure their rapid recovery; and these will be successful if they are integrated with attributes of an entrepreneurial ecosystem (Spigel, 2017). Many entrepreneurs and their SMEs were not affected by the crisis, given that they face the pandemic strengthening their performance by using creativity as a characteristic that would guarantee their viability (Williams et al., 2017). Small companies tend to distinguish themselves especially in adaptability (Smallbone et al., 2012); this puts startups in a better position to face the crisis (Linnenluecke, 2017).

Previously, some authors have recognised that novel and instantaneous data sources allow researchers to make important contributions on issues related to entrepreneurship (e.g., Obschonka and Audretsch, 2019; Schwab and Zhang, 2019). In this sense, the use of big datasets allows all stakeholders to better understand the impact that crises, such as COVID-19, have on entrepreneurial activity (Brown and Rocha, 2020). Within this context, we propose to analyse research articles to uncover the underlying themes related with entrepreneurship and COVID-19 as well as to identify some issues that have not captured enough attention in previous research. For this study, we have chosen topic modelling because it is a data-driven technique that does not require human supervision, with a goal of identifying the underlying topics in the analysed documents. For better results interpretation, Baumer et al. (2017) propose that topic modelling can be complemented using grounded theory, which is useful for generating rich and dense descriptions; hence, combining both approaches, it is possible to identify how a social group, in this case researchers, co-construct both reality and its meaning over time.

While most of the research on the impact of COVID-19 has focused on existing businesses, both large and small; startups as well as entrepreneurial activity have received less attention (Kuckertz et al., 2020). In addition, there is a lack of clarity in the topics studied related to entrepreneurship during COVID-19 crisis; hence, this study attempts to answer the following research questions: What are the main themes related to COVID and entrepreneurship by year? What themes have not been sufficiently analysed and can have a greater impact? To answer the proposed research questions, we have structured the paper as follows. First, there is a brief literature review putting readers in context of the impact of COVID-19 in entrepreneurship. Then, the article reports the research methodology, which uses a combination of topic modelling and grounded theory. After that, authors detail the main findings, explaining key issues in the discussion section.

Finally, the study highlights the main conclusions and contributions as well as some challenging paths for further work.

2 Literature review

The pandemic that arose due to COVID-19 has been a totally unforeseen event, which was not considered in the planning of any company, not even in those where several scenarios were planned; the companies that did so included certain risks, considering delays in the development of products or services, in the sales processes, or in the loss of important clients (Giones et al., 2020). However, the effects due to COVID-19 are not the same between small and large companies or between self-employed people and large corporations; since smaller companies are often at a disadvantage when it comes to taking advantage of the opportunities generated by crises (Belitski et al., 2022). These authors highlight that the measures adopted to fight against COVID-19 mostly impacted the service sector, where physical proximity is necessary and where there are many SMEs. Since the pandemic began, some studies have emerged on the impact of COVID-19 in various research fields; specifically in entrepreneurship, we can mention some literature reviews on sports entrepreneurship (Ratten, 2020a), agri-food and entrepreneurship (Apostolopoulos et al., 2021a), women's entrepreneurship and sustainable development (Raman et al., 2022), or empirical results on entrepreneurship during COVID-19 (Kuckertz and Brändle, 2022), providing only a fraction of the big picture. Therefore, the perspective of this article is to analyse the COVID-19's impact on entrepreneurship through the academic discourse to provide a holistic view of this research field.

In this context, all countries have used different strategies that have had a negative impact on many companies; although for some organisations it will be a very complex scenario, for others it will be a source of opportunities, especially for innovative entrepreneurs (Kuckertz et al., 2020). Society must face the uncertainty generated by the crisis; however, the entrepreneurial spirit could provide creative alternatives by making the knowledge of the world's entrepreneur's available, finding opportunities in multiple sectors (Liu et al., 2020). During a highly stressful and uncertain situation such as that generated by COVID-19, where there were many restrictions and physical distancing, the best option to overcome it is through the use of technology (Giones et al., 2020); this coincides with the need of the entrepreneur to combine activities focused on innovation with lucrative activities in order to survive, which is why their behaviour is usually associated with the need to be an agent of change for the context in which they find themselves (Ratten, 2020b). From an organisational point of view, to face the pandemic, many SMEs have had to transform their business model by changing their dynamic capabilities (Priyono et al., 2020), using digital tools and skills as an antidote to COVID-19 (Flammer and Ioannou, 2021), and proposing sustainable business models to reduce costs and increase productivity (Di Vaio et al., 2020). While some SMEs have created or used an ecosystem based on digital platforms for the creation and appropriation of value (Acs et al., 2021), taking advantage of facial recognition, artificial intelligence or robots (Lau, 2020); others, mainly in developing economies, have been difficult to adopt technologies and innovations to optimise their processes (Akpan et al., 2022).

However, not all of people behave in the same way, so in times of crisis it is important to highlight that the entrepreneurial nature, with characteristics such as being risky, innovative and proactive, favours people being able to evolve and adapt (Kuckertz et al., 2020), trying new things, experimenting with new processes to obtain better results in the face of the challenges that arise during the pandemic, which will help them change direction according to the needs and responses of the market (Ratten, 2020b); hence, the COVID-19 health crisis shows different possibilities for entrepreneurs to create disruptive ideas that benefit people and society in general (Liu et al., 2020). In crisis contexts, the concept of resilience takes on special importance for companies to survive (Doern et al., 2019), since we are all struggling against unexpected circumstances, economic impacts and social, for which effective coping strategies, psychological preparation and special support are required (Liu et al., 2020). Resilience allows organisations and employees to respond to adversity or recover more quickly after the problematic situation, developing non-traditional ways of doing business and helping organisations to recover better or faster after crisis (Linnenluecke and McKnight, 2017). The concept of resilience is not only the ability to face a troublesome and disturbing event; but also, the possibility of accessing the resources before the event, using them during and after the crisis (Williams et al., 2017). Therefore, proper crisis management will allow us to strengthen our resilience, which is valuable to continue facing COVID-19 (Kuckertz et al., 2020).

The concept of bricolage applied to entrepreneurship allows creating affordable and value-added products with limited resources (Cai et al., 2019), recombining and reusing available resources in the presence of resource scarcity, even combining existing technologies with locally available resources (Iqbal et al., 2021). Through improvisation and experiential learning, companies with more entrepreneurial bricolage tend to design low-cost, value-added products and services for customers, making it an antecedent of frugal innovation (Cai et al., 2019). Frugality is a timeless concept, which can be powerful in helping entrepreneurs recover from the economic hardships caused by COVID-19 (Giones et al., 2020). Recent research suggests that entrepreneurs with this characteristic adopt resourceful behaviours more frequently (Michaelis et al., 2019). In addition, frugality represents an individual orientation towards self-sufficiency, which aligns well with the concept of initial resources in business projects; therefore, having a frugal disposition can serve to lessen the impact of COVID-19 on SMEs and startups (Giones et al., 2020). Both concepts, as well as the ability to imagine multiple scenarios and pivot according to what happens (Kirtley and O'Mahony, 2023), are essential to get the most out of existing resources. Therefore, those entrepreneurs who do not apply bricolage or frugality may find themselves at a substantial disadvantage when it comes to identifying and taking advantage of new opportunities (Giones et al., 2020).

3 Research methodology

The first decision we must make is to determine the main source of articles to analyse. In this sense, Mongeon and Paul-Hus (2016) compared Web of Science and Scopus, finding that Scopus covers more journals than Web of Science and provides access to more articles with effective search options; therefore, for this research we have chosen the Scopus database. Then, we have extracted abstracts from Scopus database, using a query within article title, abstract and keywords, with the terms 'COVID' and 'ENTREPREN*',

using the asterisk to include all words beginning with that set of characters, obtaining 1827 scientific articles with these keywords from January 2020 to December 2022. Sun and Yin (2017) argued that an article abstract can be used as a proxy to the full document, considering the abstract as a compact article representation, which include most important words related with analysed themes.

Table 1 Number of articles by year and journal/book/conference (2020–2022)

<i>Journals, book series and conference proceedings</i>	2020	2021	2022	Total
Sustainability (Switzerland)	7	38	48	93
Frontiers in Psychology	-	10	37	47
Lecture Notes in Networks and Systems	-	9	25	34
Emerald Emerging Markets Case Studies	5	7	14	26
Proceedings of the European Conference on Innovation and Entrepreneurship, ECIE	4	8	8	20
Journal of Entrepreneurship in Emerging Economies	3	9	4	16
Journal of Business Venturing Insights	6	7	2	15
Springer Proceedings in Business and Economics	-	2	13	15
Small Business Economics	-	1	13	14
ASEE Annual Conference and Exposition, Conference Proceedings	-	10	3	13
E3S Web of Conferences	1	10	2	13
Handbook of Research on Strategies and Interventions to Mitigate COVID-19 Impact on SMEs	-	12	-	12
International Journal of Environmental Research and Public Health	2	5	5	12
International Studies in Entrepreneurship	-	-	12	12
ACM International Conference Proceeding Series	2	5	4	11
Contributions to Management Science	-	3	8	11
Journal of the International Council for Small Business	1	4	6	11
Proceedings of the International Conference on Industrial Engineering and Operations Management	3	8	-	11
International Journal of Entrepreneurship and Innovation	-	2	8	10
International Small Business Journal: Researching Entrepreneurship	7	1	2	10
Procedia Computer Science	-	7	3	10
Total	41	158	217	416

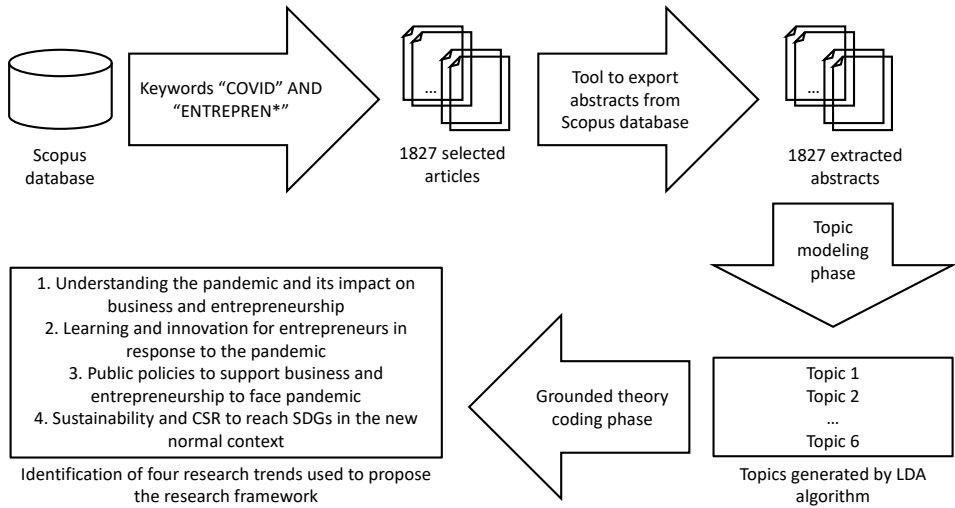
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Table 1 shows journals, book series and conference proceedings with 10 or more articles in the analysed period, whereas all other sources with nine or less articles were excluded by space reasons. All abstracts were extracted from Scopus using its own export tool, generating a BibTex file, which were later loaded into the R software to apply topic modelling to answer the proposed research questions. Topic modelling is a dimensionalisation and category surfacing method borrowed from computer science, which can be used to analyse a set of text documents to uncover the latent topics that

compose them based on statistical associations (Hannigan et al., 2019); hence, it is suitable for this study because that is more transparent, replicable, and with less ambiguity than manual or taxonomy-based categorisations (Walker et al., 2019); in addition, it has been applied in several research fields such as social media (Bohorquez-Lopez, 2022), management (Aranda et al., 2021), marketing (Mustak et al., 2021), among others. We have applied Latent Dirichlet Allocation (LDA), a text mining technique, because it is the simplest and the most frequent topic modelling technique (Silva et al., 2021). LDA is used to statistically model the process of document generation by assuming that topics are potential variables that are not visibly exposed in textual data (Kang et al., 2019), and considering that the most frequent words within a topic will represent the topic (Asmussen and Møller, 2019).

With this abstract dataset, two phases were followed (Jiang et al., 2021), the first was to apply topic modelling (Schmiedel et al., 2019) by year of publication, where all the abstracts corresponding to the same year were grouped to find the most used words in each period of time; the second was to apply grounded theory coding (Wiesche et al., 2017) to interpret the topics generated by the previous phase, aggregating topics into higher-order concepts and providing a better understanding of the academic discourse about COVID-19 and entrepreneurship. Figure 1 shows in detail the research methodology used and its results.

Figure 1 Research methodology and results of each phase



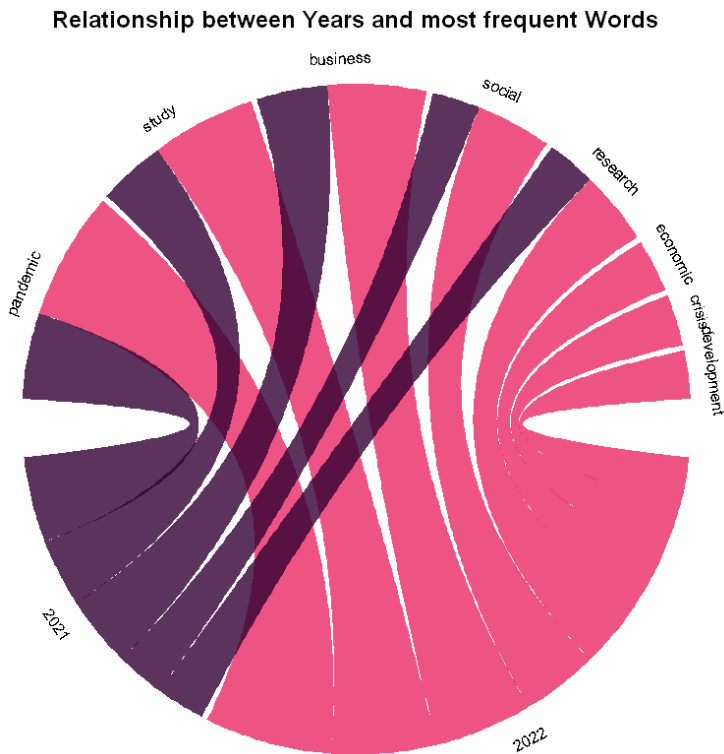
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4 Findings

Before applying topic modelling, some words that did not contribute to the classification were eliminated, such as 'COVID', '19', '2020', '2021', '2022', etc. as well as other words related to journal publishers; then, it is convenient to identify the most important

words in the abstracts, based on their frequency by year, as can be seen in the chord diagram in Figure 2. For a better visualisation, a chord diagram is unreadable if it includes all the words; hence, Figure 2 only includes those words that were repeated 500 or more times. Thus, we have applied the LDA algorithm to the abstracts considered for each case.

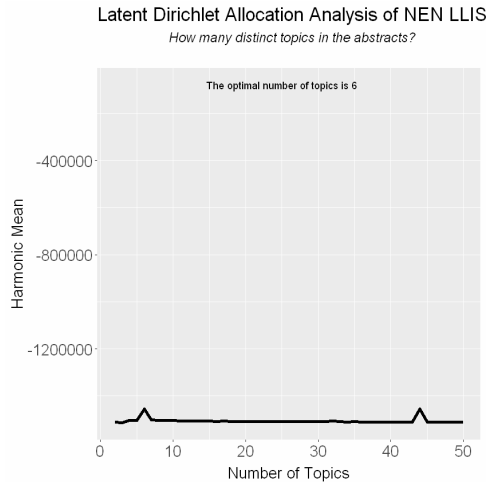
Figure 2 Most important words by year (see online version for colours)



Source: Author

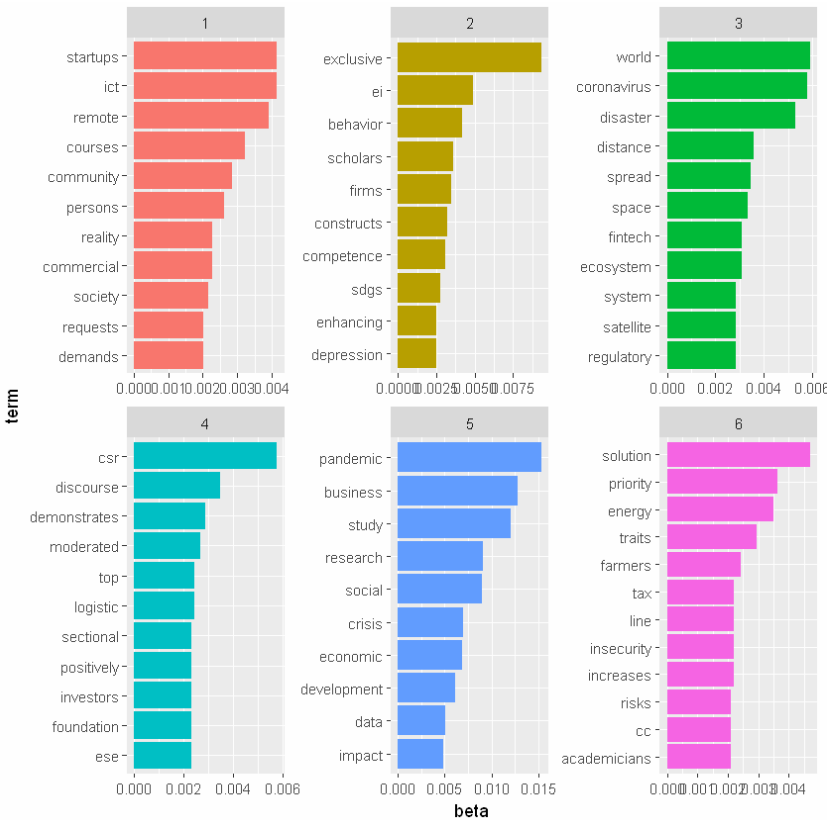
Topic modelling is part of unsupervised learning techniques, so its objective is to identify hidden or underlying structures in the analysed data. In this sense, the LDA algorithm analyses the data to identify the combination of words that form each topic; in this way, we can determine the probability that each document is associated with a topic, based on the words it contains. Similarly, to determine the optimal number of groups in clustering algorithms, it is critical to determine the optimal number of topics in the LDA (Blei, 2012), since if it is too large, the computational complexity increases and the interpretation of the results become unclear (Kang et al., 2019). Therefore, in this study we have run a simulation applying topic modelling with different number of topics from 2 to 50 to find the best solution. In Figure 3, we can see that the function is maximised when the number of topics is equal to 6, which would be the optimal value to use.

Figure 3 Optimal number of topics



Source: Author

Figure 4 Most important words by topic based on years (see online version for colours)

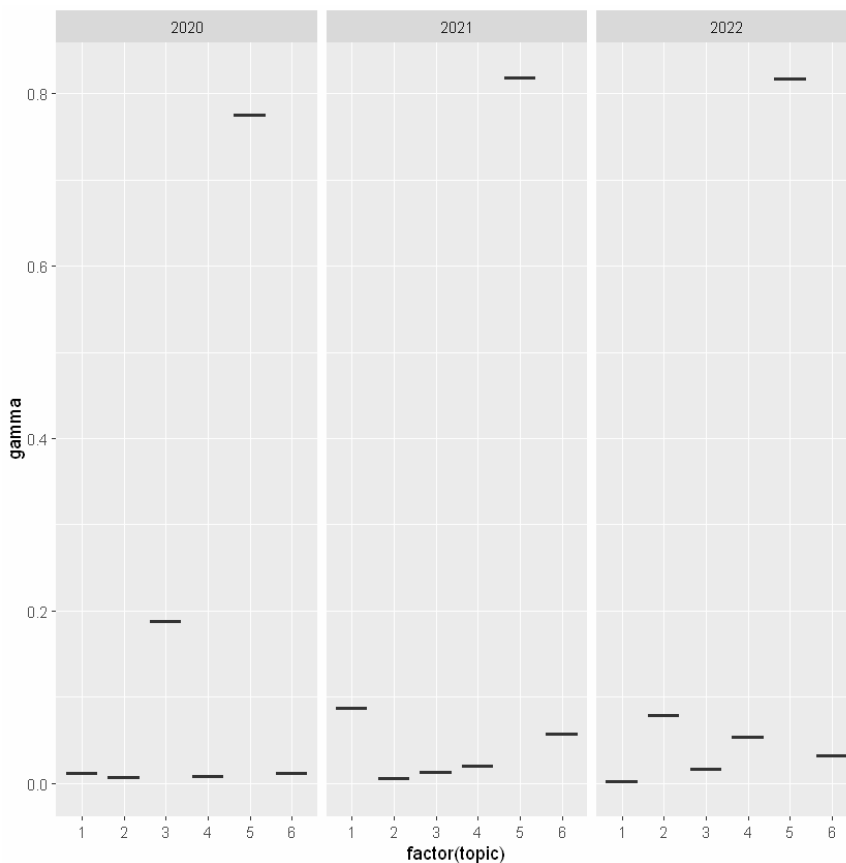


Source: Author

After running the LDA algorithm with six topics, the main words that form each topic are shown by year (Figure 4), with their respective contributions (beta) of each word to that topic, which will be used to apply the grounded theory coding in the next phase. Taking the third topic in Figure 4 as an example, the main words that represent this cluster are ‘world, coronavirus, and disaster’; while for the fourth topic they are ‘csr, discourse, and demonstrates’. It should be noted that there are some similarities between the words shown among topics; however the topics differ in terms of the contribution of each of the words (beta). Because the analysed corpus corresponds to articles related to ‘COVID’ and ‘ENTREPREN*’, it is usual that some significant words can be shared between topics.

Next, to analyse how much each year is associated with each topic, we are going to use the ‘gamma’ metric, which can be understood as the probability per year per topic. For example, topic 5 is the most important for all analysed years having a proportion close to 80%; other topics are more relevant for different years, for year 2020 topic 3 is more important, while for year 2021 are topics 1 and 6, and for year 2022 are topics 2 and 4 (see Figure 5).

Figure 5 Association between topics and years



Source: Author

In terms of the most frequent themes over years, we can combine Figures 4 and 5 to obtain that, in year 2020, authors are talking about topics 3 and 5, which contain, among others, the words: pandemic, business, study, research, world, coronavirus, disaster, distance, etc. In year 2021, authors are talking about topics 1, 5 and 6, which contain, among others, the words: startups, ict, remote, courses, solution, priority, energy, traits, etc. In year 2022, authors are talking about topics 2, 4 and 5, which contain, among others, the words: exclusive, ei, behaviour, scholars, csr, discourse, demonstrates, moderated, etc. As we can see, there is an evolution of the studied themes over years, shifting their importance based on the preponderant context when the articles were written; however, the topic 5 is relevant for all the years.

Following Jiang et al. (2021), for each topic shown in Figure 4, we ordered their most important words based on their beta's values; then, we analysed relevant abstracts with the words identified for each topic, considering their publication year, proposing an appropriate label in the open coding step. In the axial coding step, we grouped similar labels summarising them in a higher abstraction level concept (see Table 2). Finally, we structured these concepts in a research framework, which represents the most salient themes covered by research articles in Scopus related with COVID-19 and entrepreneurship.

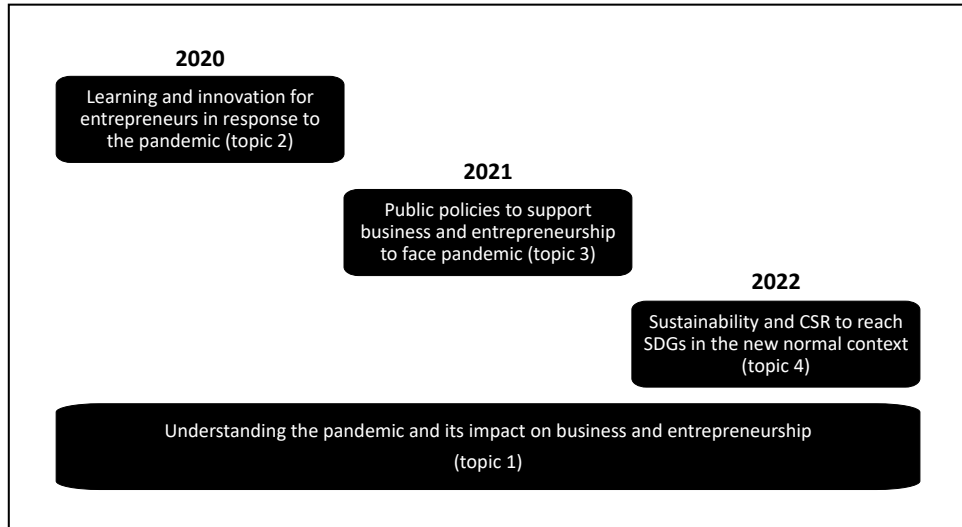
Table 2 Data structure of the coding process

<i>Topics</i>	<i>Main words</i>	<i>Open coding</i>	<i>Axial coding</i>	<i>Years</i>
5	pandemic, business, study, research, social, economic, development, data, impact	Pandemic, business impact, and economic development	Understanding the pandemic and its impact on business and entrepreneurship	All
3	world, coronavirus, disaster, distance, spread, space, fintech, ecosystem, system, satellite, regulatory	World during coronavirus and innovations to overcome this situation	Learning and innovation for entrepreneurs in response to the pandemic	2020
1	startups, ict, remote, courses, community, persons, reality, commercial, society, requests, demands	Startups and ict to support society requests during pandemic	Public policies to support business and entrepreneurship to face pandemic	2021
6	solution, priority, energy, traits, farmers, tax, line, insecurity, increases, risks, cc, academicians	Public solutions in different sectors		
2	exclusive, ei, behaviour, scholars, firms, constructs, competence, sdgs, enhancing, depression	Entrepreneurial intention for sustainable development goals (SDGs)	Sustainability and CSR to reach SDGs in the new normal context	2022
4	csr, discourse, demonstrates, moderated, top, logistic, sectional, positively, investors, foundation, ese	Corporate social responsibility (CSR) for sustainability		

Source: Author

Figure 6 shows the research framework, where we can highlight four components: the first one covers the whole analysed period, where most studies tried to better understand the impact of COVID-19 crisis on business and entrepreneurship issues; the second one, in 2020, most studies argue the need among entrepreneurs to learn how to respond to the pandemic, specially using innovation; the third one, in 2021, most studies attempt to propose public policies that can help in the economy's reactivation; and the fourth one, in 2022, most studies proposed that, in the new normal, a path towards sustainability is needed, taking into account CSR and SDGs.

Figure 6 Research framework based on topic covered by research articles in Scopus



Source: Author

5 Discussion

5.1 *Understanding the pandemic and its impact on business and entrepreneurship (topic 1)*

COVID-19 crisis can encourage entrepreneurs, managers, scholars, and professionals to jointly reflect on how to take advantage of their experience to propose community responses to the great number of social challenges we face today (George et al., 2016). These efforts could achieve important social benefits that can be obtained quickly and lead to high-impact results (Bacq et al., 2020). This means that in some situations there will be social pressure on entrepreneurs to take specific actions, while in other situations they must identify new opportunities and generate new ideas based on social and environmental factors, using creativity, which is especially useful to face the COVID-19 crisis, since competitive advantages can be obtained in the global market (Ratten, 2020b). Entrepreneurs build their identity based on cultural conditions, in terms of how innovative activity is perceived in society, since culture influences the behaviour of individuals, determines how they act collectively, as well as how they develop their

businesses, which means that culture can be understood in the way that entrepreneurs perceive their role in society (Ratten, 2020b). Therefore, entrepreneurs face a crucial dilemma, which does not have to do with making a rapid change in their business model, but in understanding the impact that this change would have on their organisation and their environment (Giones et al., 2020). For example, some authors argued:

“In particular, we are interested in a deeper understanding of the societal impact the Corona-Crisis will have on social relations in Germany through the eyes of a key-demographic: entrepreneurs.” (Weinhardt and Bartosch, 2020)

“The COVID-19 pandemic has had an uncertain impact on the global economy, especially for entrepreneurs and small and medium-sized enterprises that have suffered significant consequences.” (Portuguez Castro and Gómez Zermeño, 2020)

In this new context, practically all industries have been affected, during the pandemic many of the traditional business models have stopped working, which brought with it surprise and concern about what to do (Kraus et al., 2020). Some industries have a greater impact than others do due to isolation and logistics disruption. Sectors such as travel, entertainment, and restaurants, which depended on a physical space, were some of those that suffered the greatest losses (Zhang, 2020). The full impact on the global economy cannot yet be determined, but there are sectors where its consequences are worst. Liu et al. (2020) mention some of them in their research; as is that of the electronics value chain, since many intermediate products are produced in China and are integrated into the global technology supply, forcing to rethink their model. The automotive industry is also mentioned, as suppliers have had to stop production, which led to the closure of one of the largest manufacturers in Korea. The food industry is obliged to guarantee that the lines remain active and without interruptions, for which the countries have had to keep their connections active and reduce rates. Clarkson et al. (2022) mention that the sports business will not only face effects in the short term, but also in the long term. It is critical to evaluate sports entrepreneurship, questioning current knowledge to understand the transformative potential of this type of entrepreneurship in times of crisis, as well as highlighting how sports entities respond to these situations, applying creative strategies to adapt, achieving the emergence of new ways of thinking and acting (Ratten, 2020a). In this sense, some authors stated:

“The aim of this research was to explore the implementation of strategic management approaches in Greek tourism and hospitality businesses during economic crises, in order to further expand our current knowledge of operating in a turbulent environment and embracing novel aspects by linking economic crises with the current literature on the COVID-19 pandemic.” (Varelas and Apostolopoulos, 2020)

“This article is the first to explicitly state the need for sport businesses to harness the entrepreneurial potential of the COVID-19 crisis thereby contributing to new practices that will help the sport sector survive this uncertain time period and flourish in the future.” (Ratten, 2020a)

5.2 *Learning and innovation for entrepreneurs in response to the pandemic (topic 2)*

Aligned with our literature review, Ratten (2020b) highlights that the main elements of entrepreneurship necessary to handle crisis situations are innovation, risk taking and practice in the market. However, during crisis events, levels of uncertainty increase at such a speed that all actors in the entrepreneurial ecosystem rapidly weaken (Packard et al., 2017). Therefore, minimising uncertainty is essential to determine how entrepreneurship is affected by a crisis such as the COVID-19 pandemic (Brown and Rocha, 2020). Another critical characteristic in entrepreneurs is that they are able to learn how to take advantage of their social interactions, according to their culture and lifestyle, recognising opportunities based on their social ties, obtaining access to a wide range of resources for entrepreneurial purposes (Ratten, 2020b), which characterises the lifestyle entrepreneur, who has dual motivations for leisure and work (Sun and Xu, 2017); associating the desire to start a business with certain values that define their lifestyle, giving it greater importance to social objectives than to economic benefits, placing special emphasis on improving their quality of life, which makes them seem like social entrepreneurs (Fadda, 2020). The changes that have arisen due to the COVID-19 crisis have generated different ways of thinking and seeing the world, this challenge demands generate innovative responses, aimed at mitigating the impact and rapidly alleviating suffering (Bacq et al., 2020). Consequently, some authors highlighted:

“The purpose of this article is to understand how COVID-19 has resulted in increased levels of social value co-creation aimed at producing innovative benefits to society.” (Ratten, 2022)

“The event was organized and executed in less than a week and ultimately involved 200 individuals, including entrepreneurs, coders, medical doctors, venture capitalists, industry professionals, students, and professors from around the world. By the end of the weekend, 21 ideas with corresponding pitches were developed in five thematic areas: health needs, education, small businesses, community, and purchasing.” (Bacq et al., 2020)

There is a lack of research studies on crisis management and entrepreneurship; and the few that exist have basically focused on how to mitigate its negative consequences (Doern et al., 2019); however, proper crisis management will reduce its impact and allow exploring new opportunities (Brünjes and Revilla-Diez, 2013), such as generating ideas for new products and services (Brem et al., 2020). More research is needed on how to use entrepreneurship as a coping strategy in times of crisis, considering the characteristics of the new normal, such as social distancing and working from home, since although some previous research has studied financial crises and environmental, the COVID-19 crisis is different because it has no start or end date (Ratten, 2020b). This author mentions that it is necessary to learn how people, consumers and companies are responding to COVID-19, as well as what type of products and services have been successfully launched on the market and what characteristics of entrepreneurs have been valued the most. Thorgren and Williams (2020) suggest that entrepreneurs and SMEs should postpone investments, reduce costs and expenses, negotiate contracts with more flexible terms; in this way, organisations can quickly recover from the effects by which they have been affected or weakened (Williams et al., 2017). However, as our literature review indicates, the best way to fight a crisis is through innovation (Fisher et al., 2020), which can be crucial to develop innovative initiatives or reduce its impact, as has been done in

several sectors, such as education, telecommunications, logistics, remote support, etc. (Liu et al., 2020). The following examples show some authors' arguments:

"This paper aims to identify if and how interorganizational learning (IOL) may assist entrepreneurial ventures adapt, survive and grow in a crisis." (Haneberg, 2021)

"Existing entrepreneurship and innovation practices are therefore undergoing transformation to adapt production systems to the post-COVID-19 reality of increased risks of calamities within a context of shrinking resources." (Habiyaemye, 2021)

5.3 Public policies to support business and entrepreneurship to face pandemic (topic 3)

The current crisis presents a dilemma for public policy makers, as they seek to promote entrepreneurship in such a way that people, companies and public institutions can face the COVID-19 crisis, but at the same time trying to preserve existing investments (Ratten, 2020b). There is evidence that, although the pandemic has affected all types of organisations, public support programs have prioritised established organisations, reducing the risk of bankruptcies and layoffs, but forgetting to promote innovation or entrepreneurial activity (Giones et al., 2020). These authors emphasise that entrepreneurs, with the intention of launching their first product/service or growing after attracting their first clients, are not receiving the support they need; despite previous studies indicate that it is possible to face crises adequately, when the country has a high level of entrepreneurship (e.g., Bishop, 2019). Around the world, governments have taken different paths in relation to supporting companies during the COVID-19 crisis, although most of these initiatives aim to protect economies, industries, and established corporations so that economic activity does not stall and jobs are not lost (Kuckertz et al., 2020); however, there are not many policies for SMEs, which have struggled to meet the requirements requested by the government to have the possibility of reopening their businesses (Zhang, 2020). Nonetheless, some authors identified that entrepreneurs hope that public policies will help them overcome the pandemic:

"The Greek rural areas' healthcare enterprises suffer the consequences of the public policies on COVID-19 as their activities have been affected, their turnover has decreased, and liquidity problems have arisen. Entrepreneurs believe that the announced state and European support will help them overcome the implications." (Apostolopoulos et al., 2021b)

"By utilizing collective efforts and drawing on powerful politicians' mobilization, SLPE (street-level policy entrepreneurship) during crisis shares similarities with, yet differs from, SLPE during ordinary times, while further closing the interstices between local, professional, and political perspectives in the formulation of policy decisions." (Gofen et al., 2021)

Governments have taken different actions to control the spread of COVID-19, opting for community quarantines, stay-at-home orders, social distancing, tracking travellers, etc. however, they also channelled their efforts towards the economy, supporting factories and entrepreneurs (Zhang, 2020). So far, preventive actions taken by governments to fight against COVID-19 pandemic have had a large and important impact on the world's economies (Maliszewska et al., 2020). The closure of borders blocked the transit of people as well as goods, which has resulted in a global recession (Giles et al., 2020). To

activate the economy, aid packages and financial stimuli of all kinds have been offered, supporting the industries most affected, as well as workers (Liu et al., 2020). The most publicised action carried out by the different countries of the world has been the reduction of interest rates and the optimisation of the availability of loans to improve the financial capital of companies (Kuckertz et al., 2020). According to these authors, only 26.83% of the countries included support for startups within their policies, offering specific programs such as growth loans or conversion schemes; while 63.41% of the countries included measures that consider the needs of SMEs; since they do not have access to many of the financial mechanisms offered because they simply do not meet the usual requirements to obtain loans. It should be noted that startups, although they are called to reactivate the economy in the future, are the most sensitive and vulnerable organisations in different countries (Walsh and Cunningham, 2016). Therefore, some studies are proposing different initiatives to improve policies to cope COVID-19:

“This study also aims to provide policy recommendations to the stakeholders by reviewing the situation of small and medium scale enterprises (SMEs) after the COVID-19 sudden surge.” (Aftab et al., 2021)

“We find that both generalized social and political trust are associated with a greater willingness to support a COVID-related tax and that generalized social trust, in particular, attenuates the negative effect of an experimentally manipulated, specified level of tax burden on policy support.” (Lachapelle et al., 2021)

5.4 Sustainability and CSR to reach SDGs in the new normal context (topic 4)

COVID-19 brought to the table the importance of sustainability in business models to overcome this crisis, which is reflected in the interaction between the concepts of sustainability, CSR, and SDGs; which can contribute to improving the performance of organisations by strengthening their competitiveness (Le and Ikram, 2022). However, for organisations to get the most out of CSR initiatives, they must consider their employees, promoting work engagement, quality of work-life, and internal organisational dynamics, with the common objective of achieving sustainability and economic growth (Bu et al., 2022). In this sense, it is important to promote a balance between economic, environmental, and social aspects to reach a better financial performance (Le, 2023). In the new normal, it is essential to deepen the relationship between CSR commitment and ethical values in customer civic behaviour (Abdelmoety et al., 2022), which will affect not only internally, employee commitment, but also externally, environmental management, rural development, small business growth, etc. (Huang et al., 2022). We extract some quotations to reinforce author’s argument:

“In the context of COVID-19 emergency, [...], the value of cohesion between entities in society towards sustainable values for stakeholders becomes more important than ever.” (Le and Ikram, 2022)

“CSR is seen as one of the primary responsibilities of enterprises towards stakeholders, customers included, so businesses should, therefore, consider CSR as a long-term strategy and incorporate into the core business strategy in a voluntary manner towards sustainability on the basis of balancing the economic, social and environmental benefits.” (Le, 2023)

The SDGs are changing the debate on CSR, becoming the roadmap towards a more sustainable future; hence, CSR becomes the first step towards that goal (Lecka et al.,

2022). In this sense, companies must review their approach to social responsibility, realising that a simple mistake or irresponsible action would have a major impact around the world (Fallah Shayan et al., 2022). Previous studies show that there is no consensus on what CSR is and how it is related to sustainable development and business sustainability (Lecka et al., 2022). Therefore, there are contradictory visions, where some authors argue that there is an increasing importance of the SDGs for the environment after COVID-19, while others suggest that COVID-19 may hinder the implementation of the SDGs (Nair et al., 2021). In this context, it is critical to understand the environmental and social impacts of CSR activities in sustainable development and circular economy, as well as the way in which CSR can generate sustainable benefits not only for companies but above all for society (ElAlfy et al., 2020). The following authors are aligned with this argument:

“The SDGs are much broader and more forward-looking than individual corporations, making the economy more social and sustainable” (Fallah Shayan et al., 2022)

“While adjusting their business models in a pandemic, entrepreneurs began to pay more attention to issues related to SDGs and circular economy” (Klein and Szychalska-Wojtkiewicz, 2022)

5.5 Topics that need further studies

When reviewing the proposed model, we focus where we can generate the greatest impact on the entrepreneurial community, since public money is scarce, and we must try to make the best use of it. Therefore, the next step is to identify topics that have not been sufficiently explored, proposing further research lines that covers these topics to help interested researchers to better position their contributions as well as highlighting the practical side of them benefiting society. In term of the analysed articles, on one hand, we have found some individual or multiple case studies about different experiences facing COVID-19 around the world, but with limitations in terms of the generalisability of the results. On the other hand, we have found little evidence about how to choose the best option in terms of financial stimuli. Below, you can find some discourse showed as examples for each research line:

“Entrepreneurs, in an effort to avoid bankruptcy, have been restarting gyms and fitness clubs by creatively taking advantage of existing regulations” (Piotrowski and Piotrowska, 2021)

“The analysis infers that SMEs in Pakistan have encountered unfavorable implications of COVID-19 in the form of shortage of goods, blockage in transportation, decrease in demand of products and services, decline in profits and sales, limited operations, lockdown and employee’s layoff” (Aftab et al., 2021)

“The objective of this study is to investigate the effectiveness of economic stimulus packages of COVID-19 for small-medium enterprises (SMEs) in Malaysia, specifically on the young entrepreneurs’ age 40 and below to offer some views on financial measures that should be prioritised and strengthened to lessen the burden of those young entrepreneurs who are severely affected during the pandemic” (Lim et al., 2021)

“Financing schemes, youth entrepreneurship loans, retention of skilled staff and proactive planning for adverse future are few recommended measures for revival of the SMEs sector” (Aftab et al., 2021)

After a detailed analysis of the articles used in this study, we are proposing two promising research lines as an initial research agenda. The first one, analysing experiences to identify best practices, but doing more quantitative studies, in such a way that the results are generalisable and best practices can be defined enabling their replication and adaptation to other contexts. The second one, analysing different financial stimuli for the recovery of SMEs, but doing experiments to understand what stimuli works better and in which circumstances, because changing one variable or another can obtain a different result. It is important to quantify the results because is the only way to make the most of available resources.

6 Conclusions and further research

The initial forecasts about the consequences of COVID-19 indicated that it would be a much deeper economic crisis than the recent financial crisis of 2008, since its effects on entrepreneurship would be much more severe (Liñán and Jaen, 2022). However, the global impact of the COVID-19 health crisis cannot yet be determined exactly, since it has been affecting countries in different ways, and its effects on nations will have distinct results depending on the stage in which they are within the pandemic, the actions that governments have been taking, as well as their economic structure (Liu et al., 2020). Although it is currently difficult to predict its future consequences, analysed publications show that uncertainty and failure are circumstances that are naturally experienced by entrepreneurs (Mandl et al., 2016). Due to this situation, they may be more prepared for a crisis, which allows them to adapt better and show flexibility in unexpected circumstances (Kuckertz et al., 2020). COVID-19 has also highlighted the importance of decoupling supply chains and relocating manufacturing operations. In the future, collaboration between governments and industries will be necessary to guarantee the flow of the global supply chain as well as the inclusion of predictive models that consider elements of risk that allow different scenarios to be proposed, which would allow governments and organisations to become more efficient in decision-making (Liu et al., 2020).

Answering the first research question, the application of topic modelling allows us to discover nine underlying topics in the analysed abstracts of the articles published in Scopus. The output of the first step serves as input to the second one, where grounded theory coding allows us to propose a research framework highlighting the four salient themes related with COVID-19 and entrepreneurship: understanding the pandemic and its impact on business and entrepreneurship, where studies underscore the need to know more about the pandemic consequences, (e.g., Weinhardt and Bartosch, 2020); learning and innovation for entrepreneurs in response to the pandemic, where studies show that certain characteristics such as the entrepreneurial spirit, innovation, recognition of opportunities, resilience, among others, can help reduce problems during crisis situations, (e.g., Maritz et al., 2020); public policies to support business and entrepreneurship to face pandemic, where studies describe public policy initiatives across the world for coping COVID-19, (e.g., Aftab et al., 2021) and sustainability and CSR to reach SDGs in the

new normal context, where studies highlight that as a pandemic consequence entrepreneurs and organisations shift towards sustainable values through CSR and focusing on SDGs. These themes show the evolution of research publications on this topic in Scopus. To answer the second question, we have highlighted the need to do more quantitative studies to gain generalisation of best practices, and the use of experiments to validate the behaviour of different incentives when using different control variables, which will help governments to better use public funds.

The theoretical contribution is twofold: the proposed research framework, which allows to know the most published themes related with COVID-19 and entrepreneurship; and the combination of topic modelling and grounded theory as a promising research methodology to analyse not only published articles, but also the large amounts of data generated in social media, forums, etc. In terms of practical contribution, governments have oriented their public policies to protect the present; however, very little attention is being paid to the future. Although governments may benefit the population in the short term, the proposed aid is not enough to strengthen economic and social resilience (Liu et al., 2020). In this sense, the proposed research lines are interesting avenues for further research, enabling governments to make the best use of their available resources, and that new public policies will be designed allowing startups and SMEs to alleviate the pressure generated by restricted cash flow due to health restrictions (Kuckertz et al., 2020), with the aim that the blockades imposed by the government were gradually and safely ended (Liu et al., 2020).

We must recognise some limitations. First, this research only considers articles in Scopus; hence, for future research we propose to include articles in other databases (e.g., Web of Science). Second, our initial research agenda only includes two promissory research themes because they seem to generate the greatest impact on the entrepreneurial community; therefore, we propose the identification of other themes that have been under-analysed as a fruitful future work. Third, it must be understood that COVID-19 as a research topic is something new, so the results reveal what is known currently, but it must be followed closely because it is a field in constant evolution. Finally, as future work, it is important to complement this study identifying the topics most used not only by year, but also by journal, in such a way that it will be possible to know which journals have preference to publish which topics; hence, this information will be very valuable for researchers seeking to publish articles to choose the right journal for a specific article.

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