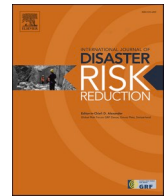


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Entrepreneurial Interventions for crisis management: Lessons from the Covid-19 Pandemic's impact on entrepreneurial ventures

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ABSTRACT

This article investigates both the negative and positive impacts of a crisis on Entrepreneurial Ventures. The behaviour of Entrepreneurial Ventures during the COVID-19 pandemic crisis is studied by undertaking a Systematic Literature Review (SLR) using Bibliometrics of 154 related publications. After analyzing the literature, the behaviour of Entrepreneurial Ventures during the crisis is synthesized and presented as a Phenomenon Structure Diagram, which highlights a combination of Entrepreneurial Actions (EAs) and Entrepreneurial Orientations (EOs), with Entrepreneurial Supports (ESs) employed by them to manage the crisis. This combination of EAs and EOs with ESs is contingent on the surrounding environment, and they aid in minimizing the risk of failure as well as leverage new opportunities. We propose and develop a conceptual model that a combination of EAs and EOs with ESs, referred to as Entrepreneurial Interventions, can better manage a crisis or disaster and improve organizational resilience. This multi-disciplinary study contributes towards theory development that Entrepreneurial Interventions can be made as a crisis and disaster management strategy.

1. Introduction

Managing a crisis or disaster in organizations and businesses is an emerging research area [32,39,40,60,83,98,165,167,199,202]. Crisis management is primarily considered as a response to adversity to bring back the disrupted system into alignment [13,57,85,91,98,145,199,202]. There is an overlap between crisis management and resilience since resilience deals with the ability of an organization to get back to its original state and maintain reliable functioning despite adversity [32,39,40,60,83,98,165,167,199,202]. Recent studies on organizational resilience highlight the following (a) resilience is beyond restoration and includes the development of new capabilities and an expanded ability to keep pace with and create new opportunities [177], (b) resilience is an ability to develop 'proactive' and 'reactive' capabilities [39,47,60] to increase the level of readiness to respond to disruption during the various stages of crisis such as pre-crisis, during-crisis, and post-crisis [91], (c) resilience is founded on four major pillars: preparedness, responsiveness, adaptability and learning [40], (d) resilience consists of two dimensions, namely 'planned' and 'adaptive' resilience [32,167,184], (e) 'absorptive' and 'adaptive' resilience can be considered as two paths for organizational resilience, and (f) dynamic capabilities are known to manage crises, disruptions, and unexpected events, and maximize the organizations' recovery speed, which is known as dynamic resilience [27]. The above studies and findings are significant from the perspective of crisis management and resilience (proactive, adaptive, and dynamic resilience). We propose to additionally contribute to this subject, in this paper. We intend to study the combined influence of negative and positive impacts, namely risk of failure and leveraging opportunities arising from a crisis, and

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how some crisis management strategies can enhance an organization's proactive/adaptive/dynamic resilience.

Several crises and disasters have impacted organizations, such as the global financial crisis, natural disasters such as floods and cyclones, geopolitical threats, and the most recent one due to the COVID-19 pandemic, and scholars have studied ways to manage them [1,14,32,57,71,83,85,91,110,146,167,181,183,199,200]. In this paper, we propose to primarily focus on the COVID-19 pandemic crisis, which started in late 2019, and the consequential lockdowns that resulted in an unforeseen and sudden adverse impact on the global economy [52,66,83,132]. The COVID-19 pandemic can be classified as a crisis and disaster since Faulkner [67] states that disasters are sudden with unpredictable catastrophic changes over which the victims had minimum control. However, the lockdowns that followed were an unexpected problem that originated in planning and management deficiencies of organizations, society, and countries. Since these causes are man-made, they can also be considered as a crisis. Faulkner [67] distinguished between crisis and disaster based on the origin/root cause of the event. In this article, since the focus is on the outcomes/effects of the pandemic and not on its causes, our findings would be equally applicable for both crisis and disaster management. Other authors have also followed such an approach while developing their frameworks for managing crises and disasters [67,91,144].

Considering the existing literature in crisis/disaster management and organizational resilience and viewing crises as having both negative and positive impacts, we propose to study how the COVID-19 pandemic crisis has impacted organizations both negatively (risk of failure) and positively (leveraging opportunities). It would be best to study Entrepreneurial Ventures (EVs) from an opportunity angle since they are known to creatively pursue and realize opportunities [31,56,80,176,199]. At the same juncture, EVs are also known to have a very high failure rate [22,30,45,66,113,178]. Thus, studying EVs' behaviour during a crisis would be appropriate; Annarelli and Nonino (2016) [27] highlighted the need to study SMEs' resilience. The book by Shepherd and Patzelt (2017) [187] also brings out the need to undertake specific studies on EVs related to their failure and resilience. Similarly, Williams et al. (2017) [199] found that entrepreneurial experience will help in influencing resilience. Thus, in this study, we focus on EVs to understand their behaviour during the COVID-19 pandemic crisis. There are different types of EVs, and Morris et al. [133: Table 1, p. [162], identified four broad venture types and among them listed the following as EVs, which include Small business, Small family business, Marginal enterprise, Lifestyle enterprise, High-growth start-up, Tech start-ups, and Innovative start-ups. We add Micro, Small, and Medium Enterprises (MSMEs) and SMEs to this list of EVs since they are similar to Small businesses [52,104,106]. Interestingly, EVs have presented divergent behaviours during crises. These firms have shown high failure rates [22,30,45,66,113,178]. At the same juncture, they are also known to recover from disasters and crises [1,57,67,91] due to their (a) entrepreneurial orientation¹ (EO) [106], (b) ability to take quick entrepreneurial action² (EA) [74,101,106], (c) resilience [127,172] character of being agile [101], flexibility [63, 91,127], pivoting capability [132,179], and (d) resilient business models [57,110,113] to leverage market opportunities [63,172]. Studying the behaviour of EVs during the COVID-19 pandemic would thus help understand both negative and positive impacts encountered by a venture during a crisis. Management scholars could be interested to know if patterns can be identified through research on EVs during the COVID-19 crisis and whether any actionable knowledge for effective governance during crisis [202] can be developed from such patterns. Therefore, in this study, we attempt to understand the behaviour pattern of EVs through a sequencing-based approach, as proposed by Buchanan and Denyer (2013) [206] for crisis management.

The research problem that we aim to address concerns the behaviour of EVs during the COVID-19 pandemic crisis. We investigate the negative and positive impacts of the crisis, to formulate some crisis management strategies. We further briefly investigate if EVs' behaviour could apply to large organizations to enhance their resilience. Systematic Literature Review (SLR) using Bibliometrics is undertaken here, as this is the most appropriate method (see Section-2) to address the above research problem. Several similar studies [27,50,196] have employed SLR using bibliometrics as the research method. The contributions of this multi-disciplinary study are consolidatory in nature with an attempt towards theory development. The first contribution is in understanding EVs' behaviours during the pandemic and presenting a diagrammatic representation through a Phenomenon Structure Diagram (PSD) (see Fig. 6 and Fig. 7(a)). The second contribution is in identifying that EVs employ a combination of Entrepreneurial Actions (EAs) and Entrepreneurial Orientations (EOs) with Entrepreneurial Supports (ESs) to overcome the COVID-19 pandemic crisis. We denote this combination of EAs and EOs with ESs as Entrepreneurial Interventions (Elvs). The third contribution is developing a conceptual model (see Fig. 7) highlighting the applicability of Elvs as a crisis management strategy and the suggestion that this strategy is contingent on the surrounding environment. In addition, this study has tabulated the current status of COVID-19 research for each type of EVs across the various research topics, sectors, and countries of research (see Table C-1, C-2, C-3 in Appendix C). The table highlights the research gaps that academicians can further investigate and convert into research opportunities.

This article is structured as follows: The method used to systematically study the literature is presented. Then, the behaviour of EVs during a crisis is consolidated and presented as a theoretical proposition. Finally, a conceptual model on Entrepreneurial intervention for crisis management is elaborated. The structure of this article is presented in Fig. 1.

2. Research methods and tools used

We have performed an SLR using Bibliometrics of the relevant extant literature. Since the COVID-19 pandemic impacted the whole world, we wanted to study the behaviour of EVs in all possible countries. To do this, we opined that an SLR would be a quick and appropriate research method since an SLR can consolidate literature from different countries. Undertaking SLR is the best approach for

¹ EO refers to strategic posturing through specific activities, practices, and processes, enabling an enterprise to create value by engaging in an entrepreneurial endeavor. EO serve as a firm's driver towards improved performance and success [33]. Further details in section 6.1.2.

² EAs contribute to the restructuring and adaptation of an organization during and after a crisis [106]. Further details of EA are provided in section 6.1.1.

Table 1
Locating the study with inclusion and exclusion criteria.

Inclusion criteria	
Search String	(*COVID* OR Pandemic OR *Corona* OR SARS OR Lockdown) AND (Entrepreneur* OR {SME*} OR {MSME*} OR Start*up* OR Spin*off* OR Silicon Valley * OR High*Tech* OR NTBF* OR Small business* OR Family business* OR Life*style business* OR Marginal* OR unorganized sector*)
Search period	From: not specified (open-ended) To: 18 Oct 2020
Search location	Title, Abstract, Keywords
Type of Document	Article, Conference article, Editorial, Business case studies, book chapters
Database used	Scopus and Web of Science (WoS)
Merging Database	427 (331 documents from Scopus and 96 from WoS) 94 WoS documents were found in the Scopus database also. 331 Scopus +2 from WoS = 333 document
Exclusion criteria	
Duplicates	34 documents: Balance = 299 document
Non-English documents	14 documents: Balance = 285 document Documents in Chinese, Russian, Spanish, German, Portuguese, and Italian were removed
Irrelevant documents	131 documents, after reading their abstract. > These irrelevant topics are molecular biology, microbiology, virus, animal, pharmacology, medicine, drug development, space, astronomy, histotechnology, engineering, material science, movie. > There were documents having different abbreviation for SARS such as Synthetic Aperture Radar Segmentation or South Africa Revenue Systems Balance documents =154

this research since it comprehensively combines information, engendering new ideas/framework/models, and provides new research directions [189] in a transparent and reproducible manner [54]. SLR has been used to study similar subjects in the recent past, such as the dynamic perspective on the resilience of firms [213], and linking resilience and entrepreneurship [214]. As Tranfield et al. [189] proposed, we have employed SLR, and its five stages as listed vertically in Fig. 1. For the fourth stage of ‘analysis and synthesis’, we have used Bibliometrics (‘co-occurrence’ and ‘bibliographic coupling’) to group and form clusters that will enable a systematic understanding of the publications on the subject. Bibliometrics is a popular statistical quantitative research tool to study existing publications and examine the evolution of research domains; it can be used to study the intellectual/conceptual structure of the research topic [43]. Such a combination of SLR and Bibliometrics has been used in recent publications in business and management to study SMEs’ risks [50], study the organization resilience [27], and the impact of COVID-19 in business and management [196].

For undertaking Bibliometrics, we used VOSviewer, an open-source software. VOSviewer is compatible with Scopus and Web of Science (WoS) bibliometric databases. Recent publications [35,196] have used VOSviewer for Bibliometrics.

3. Consolidation of publications on pandemics and entrepreneurial ventures

3.1. Locating the study

Scopus and WoS were used for locating literature to build a database of relevant documents on COVID-19 and EVs. Castriotta et al. (2019) [35] have recommended using more than one database to include a greater variety of journals. As we wanted to study the impact of the COVID-19 and the pandemic on EVs, we formulated search strings based on keywords identified in previous SLR/Bibliometrics-based research. For articles related to COVID-19, we referred to Verma and Gustafsson [196], which guided us to use the following keywords, viz., COVID-19, Pandemic, Coronavirus, SARS virus, and Lockdown. Similarly, the articles on EVs [133] and emerging organizations [35] led to the following search string words: Entrepreneurship, Entrepreneur, Start-up, Spin-off, Silicon Valley enterprise/firm, High-Tech firm, New Technology-based firm (NTBF), SME, MSME, Small business, Family business, Lifestyle business, Marginal business, and Unorganized sector. These keywords were reviewed with two experts and finalized after three rounds of iterations for downloading journal citations and reviewing them. Using a combination of search strings (refer to Table 1), the citation details of documents were searched and downloaded from Scopus and WoS. This search process did not specify any start date since we wanted to capture the past research on the pandemic before COVID-19. The end date was the search date (18 Oct 20) of downloading the bibliographic data.

3.2. Study selection and evaluation

The search resulted in a total of 427 documents (331 from Scopus and 96 from WoS). The inclusion criteria used for the identification of appropriate documents are tabulated in Table 1. The databases’ results were superimposed on each other using DOI numbers, and 94 documents from WoS were available in the Scopus database. The two WoS documents not in the Scopus database were added to the latter so that the Scopus database could be used as the master database. Exclusion criteria were applied to this master database containing 333 documents. This resulted in 154 documents, as detailed in Table 1.

These 154 documents were cleaned for uniformity. The correctness of the journal name, author name, and document title was checked and amended. The author keywords were studied and cleaned by performing the following: (a) converting plural to singular, (b) uniformity in hyphenation, (c) various authors have used different keywords to mean a single or similar idea/concept. For example, COVID-19 and Coronavirus convey similar ideas (in the context of this article). Such keywords were identified and replaced with one

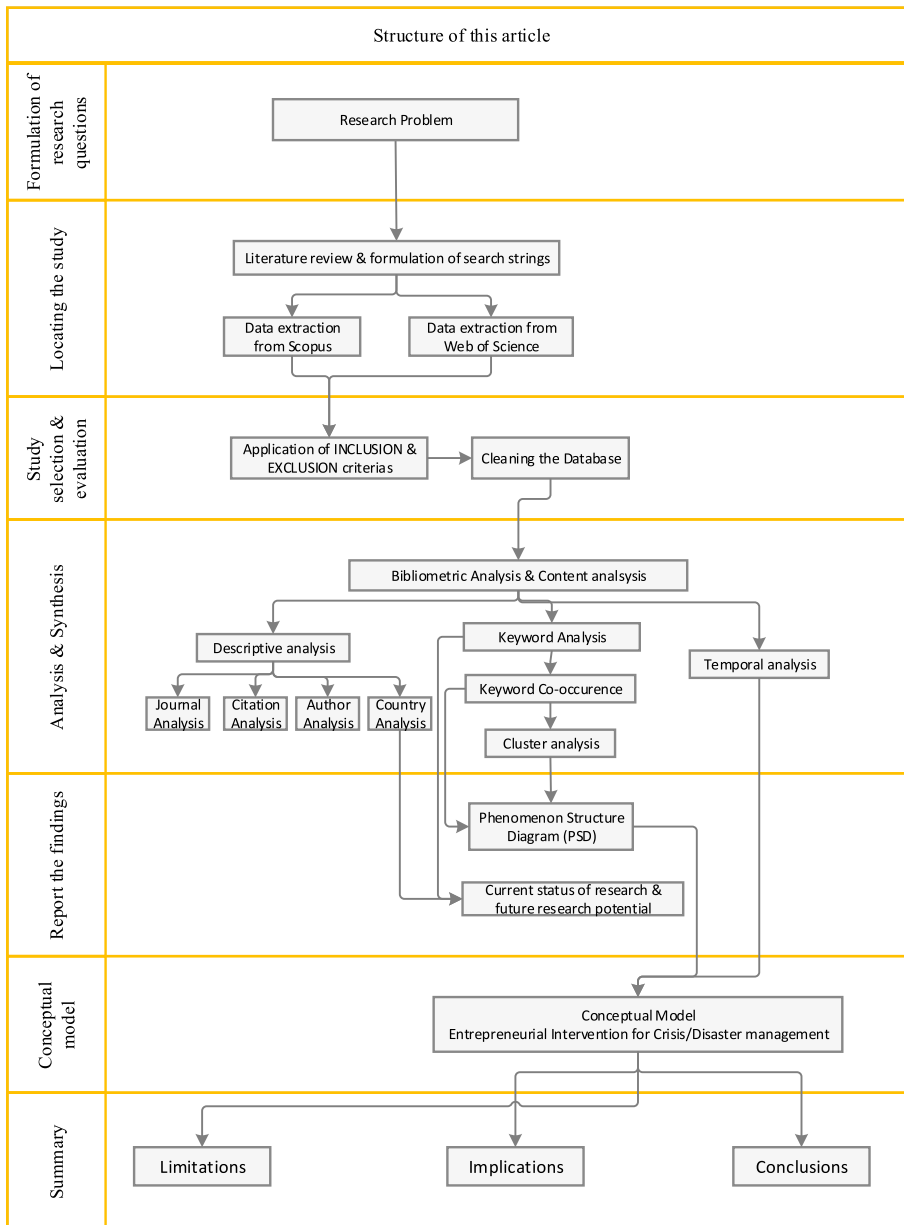


Fig. 1. Structure of the article along with the research method employed.

common keyword, and (d) author keywords were not listed in 14 documents. Index keywords were used as surrogates of authors' keywords for nine, and for the remaining five documents, keywords were assigned from those used in the other 149 documents. The above cleaning of keywords was done by the first author and then rechecked by the second author to improve results' correctness [35].

4. Analysis and synthesis of pandemic literature on entrepreneurial ventures

The shortlisted 154 articles were subjected to three types of analysis and synthesis, which are (1) Descriptive analysis, (2) Keyword, Co-occurrence and Cluster Analysis, and (3) Temporal analysis.

4.1. Descriptive analysis

In the descriptive analysis, the following were analyzed (a) Journal analysis, (b) Citation analysis, (c) Country analysis. The details are placed in Appendix-A.

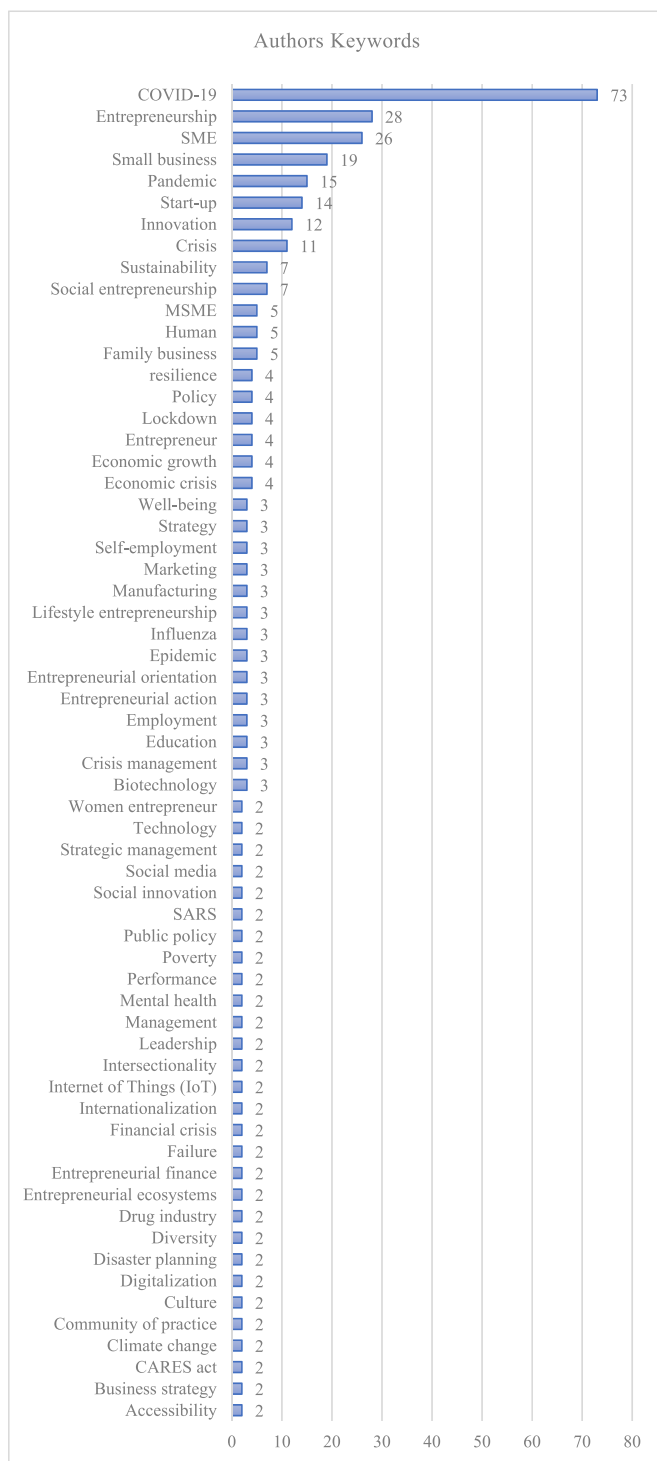


Fig. 2. Author keywords appearing more than once.

4.2. Keyword, Co-occurrence, and Cluster Analysis

4.2.1. Keyword analysis

The database of 154 documents contained 577 different keywords. Their frequency of occurrence was analyzed, and 62 keywords were used in more than two documents. Fig. 2 shows these keywords and their respective frequencies.

start-ups, university spin-offs, and innovative start-ups are grouped as Innovative Start-ups (ISs) [104], we have used Innovative Start-up (ISs) in this article to refer to the above types of Start-ups.

From each of these 12 clusters, the keywords and their corresponding articles were identified and studied. The views expressed in each article were understood. To highlight the type of analysis undertaken by us using keyword co-occurrence, we have presented views for some clusters (with the keywords marked in bold):

- (a) Cluster-3: This is the central cluster. There are seven keywords in this cluster. The views of authors connecting these keywords in their article are as follows. Article [142] mention that the “**COVID-19 pandemic can be considered as a life-threatening war ... and ... it is essential to follow the lockdown protocols till the worldwide situation improves**”. Similar views are expressed by Refs. [52,76]. Article [142] also highlight the need to “... **tackle mental burden during the complete lockdown ... and ... there must be some effective strategy to reduce the mental burden**”. Similar views have been indicated by other authors [76,86]. Debata et al. [52], state that the pandemic and the subsequent lockdown has resulted in “**The industrial sectors – manufacturing and start-ups are temporarily closed leading to a significant revenue loss**”. Article [168] state that “**The impact is severe on trade, manufacturing and MSME sectors**”. After reading all the relevant articles, the consolidated, integrated concept that emerges from cluster-3 is expressed in Fig. 5.
- (b) Cluster-5: This cluster has six keywords. The authors’ views related to these keywords are: Zahra [209] highlights that “**When thinking about the global business environment and how it affects international ventures, it is clear that Covid has already brought about major changes that will profoundly impact these businesses for years to come**”. Ratten [152] also states that “**Coronavirus has significantly affected international business particularly in terms of free movement**”. Ratten [156] highlights that the “**(COVID-19) crisis brought about unintended cultural change**”. Ratten [156] elaborates that “**the meaning of entrepreneurship changes over time with the concept broadening to include more lifestyle, cultural and social goals**”. Ratten [156] proposes that “**Social entrepreneurship is needed more in times of a crisis because of the emphasis on societal well-being**” and “**Lifestyle entrepreneurship can mean lifestyle business opportunities are found that can be used to alleviate problems caused by the crisis**”. Similar views on Social, Cultural and Lifestyle entrepreneurship are expressed by Refs. [10,55,154,157,158]. The integrated concept for this cluster is presented in Fig. 5.

<p>Cluster-8: Strategies for performance During an economic crisis, EVs can sustain/improve their performance through appropriate Entrepreneurial Orientation, Business strategies, and strategic management plans.</p>	<p>Cluster-11: Entrepreneurial action Due to COVID-19, the entrepreneurial ecosystem is affected. Entrepreneurial actions are required to overcome this.</p>	<p>Cluster-12: Supportive social media Social media has been used as an effective communication tool during COVID-19 to spread awareness, collect information. Many EVs have effectively used Social media as a part of their new business model.</p>	<p>Cluster-9: Supportive technology The COVID crisis has impacted the educational community of practice. Management strategies are essential to harness Technology to overcome the crisis.</p>
<p>Cluster-7: Strategies for sustenance During the pandemic, sustaining EVs requires planned strategies, strong leadership (who can handle disaster), innovation, and operational efficiency that can be enhanced using digitalization.</p>	<p>Cluster-5: Entrepreneurship COVID-19 impacted Entrepreneurial ventures internationally by bringing cultural and social changes. This crisis has to be managed. Social and lifestyle entrepreneurship can complement community efforts in overcoming this crisis.</p>	<p>Cluster-3: Impact of COVID-19 The viral infection, COVID-19, has caused a Pandemic across the globe. Each country imposed a lockdown to contain the spread of this infection. This lockdown affected the mental health, well-being of people, manufacturing units, and business ventures such as MSMEs.</p>	<p>Cluster-4: Crisis’s impact on self-employed and Women entrepreneurs The crisis caused due to COVID-19 has severely impacted self-employed and women entrepreneurs when viewed through an intersectional lens. The challenges due to their diversity can be minimized by providing support and access to micro credit.</p>
<p>Cluster-6: Strategies against failure Failure of EV can be minimized by enhancing the resilience of entrepreneurs as largely done by small Family businesses. This will also enhance employment opportunities.</p>	<p>Cluster-2: Benefits The outbreak of SARS and the subsequent lockdown have reduced energy consumption and improved the climate. Public policy should ensure this trend continues for sustained economic growth. New Start-ups should also effectively utilize entrepreneurial finance towards this cause, and this approach of sustained growth should be effectively marketed.</p>	<p>Cluster-10: Financial Crisis The Pandemic due to COVID-19 has caused a financial crisis, severely affecting SMEs and other EVs. These EVs are attempting to use digital technology such as the Internet of Things to overcome the various challenge.</p>	<p>Cluster-1: Supportive policies The epidemic due to influenza caused poverty and impacted human lives. The biotechnology and drug industries were not prepared to handle this crisis. In such scenario, small business (such as drug and biotechnology businesses) needs disaster planning mechanism along with governmental financial support policies such as CARES Act, etc.</p>

Fig. 5. Keywords cluster with a brief description of integrated concepts.

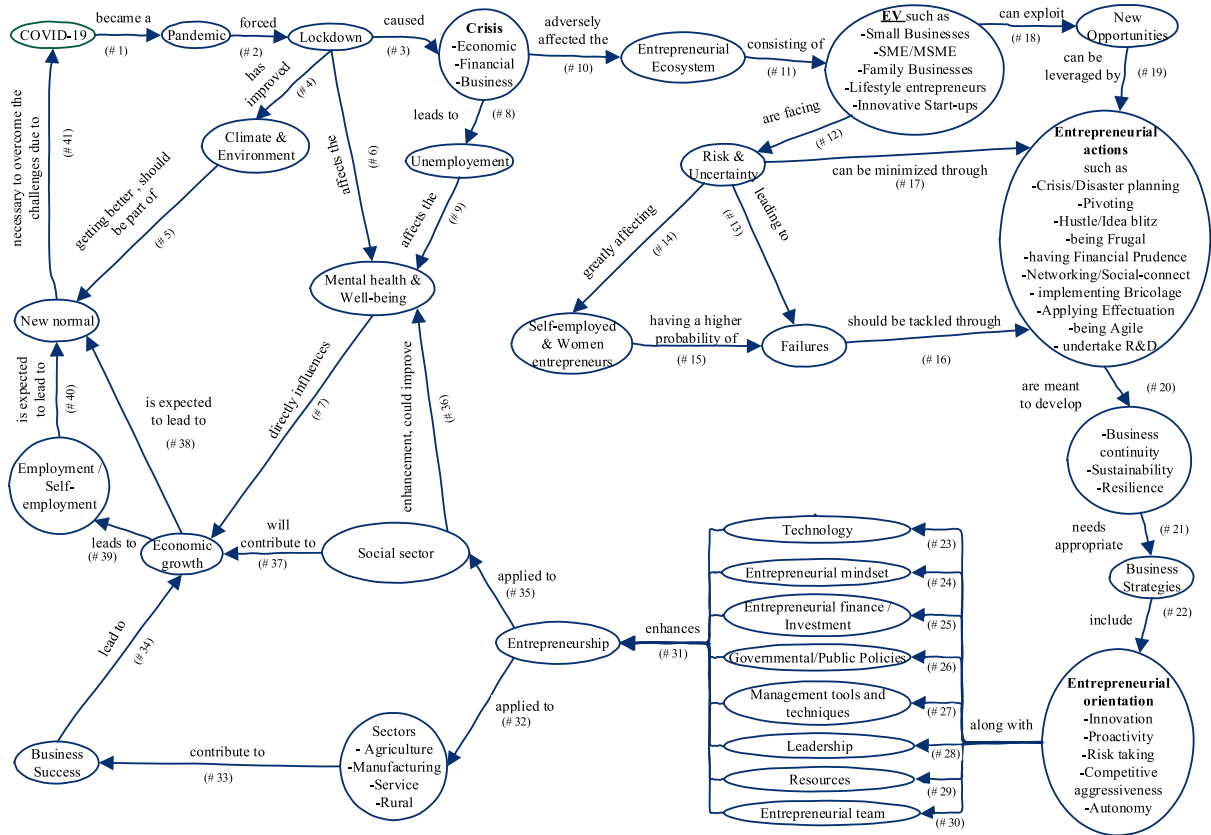


Fig. 6. Phenomenon Structure Diagram (PSD) showing the impact of COVID-19 on Entrepreneurial Ventures (EV).

- (c) Cluster-6: The author(s) views related to the six keywords are: Shepherd [179] states that “In the aftermath of the pandemic (and response), a lot of businesses have failed, but there is little they could have done to avoid this outcome” and “... these victim **entrepreneurs** can eventually drop the label victim and build back a better future for themselves and enhance **resilience** in the process.”. Sawalha [174] states that “**resilience** should further reflect an ability to take advantage of these incidents to become even stronger.” Salvato et al. [172], state that “**family firms**’ superior longevity is their **resilience** to mass emergencies and their ability to transform post-crisis threats into entrepreneurial opportunities”. Similar views on small family business and resilience are expressed by Refs. [51,65,151]. Fossen [69] stated that “**Self-employment** will increase during recessions when unemployment is high ...”. The integrated concept for this cluster is presented in Fig. 5.
- (d) Cluster-10: This cluster highlights that COVID-19 caused a financial crisis, which impacted entrepreneurial ventures such as SMEs. Brown and Rocha [25] illustrate in their article “how chronic uncertainty caused by crisis events affects the availability of entrepreneurial sources of finance for start-ups and SMEs”. To come out of this financial crisis, Roper and Turner [163] highlight that SMEs need to focus on R&D and Innovation “The COVID-19 crisis seems likely to leave many firms financially weaker, with the most significant impacts on the willingness or ability of SMEs to sustain R&D and innovation”. In addition to R&D and Innovation, disruptive technology, such as the Internet of things, is identified by Ref. [5] by stating that “... disruptive computing technologies, data analytics, and the **Internet of Things (IoT)** required to engineer new business models, reduce overheads, enhance competitive advantages, and digitize SMEs’ business operations”. A similar view has been expressed in the article [6]. Refer to Fig. 5 for the integrated concept.
- (e) Cluster-8: The focus of this cluster is on Entrepreneurial Orientation (EO) to improve performance during an economic crisis. Kuckertz et al. [106], state “The COVID-19 pandemic has placed an unprecedented burden ... and ... have caused an economic crisis by bringing a vast amount of economic activity to an abrupt halt” and have identified “seven factors related to adversity and coping strategies”. Article [193] highlights that “Taking into account the environment in which an organization operates, the choice and effective implementation of appropriate strategies should instinctively lead to better performance” and “business performance is a multi-dimensional phenomenon”. Several articles have listed different strategies to overcome the economic crisis caused by the COVID-19 pandemic [2,7,107,112,122,124,190,193]. Cannavale et al. [33], have observed that “In the low-resilient (due to external shocks) sanctioned economy, Iran, EO-performance link is moderated by the level of CEOs’ (leadership) self-transcendence value” and “higher level of CEO self-transcendence leads to stronger impact of EO on performance”. Smith et al. [182], suggest “EO

#	Link words	References	Statements from Literature
1	COVID-19 became a Pandemic	[45, 51, 52]	"The world is witnessing dramatic changes brought about by COVID-19 and its aftermath, ... We argue that the pandemic and its social and economic reverberations are triggering particularly salient challenges for ... business organization in any world economy" [51]
2	Pandemic forced Lockdown	[52, 142, 188]	"The fallout from the pandemic and the various government responses to it (lockdowns, social distancing guidelines, etc.) will affect SMEs" [188]
3	Lockdown caused Crisis	[23, 25, 26, 37, 106, 111]	"the unprecedented lockdown of large parts of society arising from the COVID-19 crisis marks the current situation out as an acute crisis" [106]
4	Lockdown has improved Climate and environment	[52, 164]	"Despite the economic slowdown, the lockdown has become a boon for the environment to revive due to less pollution" [52]
5	Climate and environment getting better, should be part of 'New normal.'	[136, 164]	"The post-COVID-19 era also presents equal opportunities to address climate change and to advance green innovation..." [164]
6	Lockdown affects the mental health and well-being	[42, 52, 142, 207]	"...tackle mental burden during the complete lockdown ... and... there must be effective strategy to reduce the mental burden" [142]
7	Mental health and well-being directly influence economic growth	[86, 142]	"The idea that economic and social factors are related to the health and ... provides a starting point for an economy that is more focused on human well-being" [86]
8	Crisis leads to Unemployment	[64, 69, 205]	"...the sudden onset of the crisis with its sharp increase in unemployment" [69]
9	Unemployment affects the mental health and well-being	[69, 86]	"Great Recession (crisis) is almost entirely explained by the higher unemployment rate during this period..." [69].
10	Crisis adversely affected the entrepreneurial ecosystem	[20, 152, 179]	"Covid-19 as a 'common' crisis ... for the ecosystem actors" [20]
11	Entrepreneurial ecosystem consisting of Entrepreneurial Ventures	[46, 66, 106, 133, 151, 156]	"While the discipline of entrepreneurship has focused on a wide range of enterprise contexts ... we propose a typology of entrepreneurial ventures that distinguishes four kinds of early stage ventures: survival, lifestyle, managed growth, and aggressive growth". [133]
12	Entrepreneurial Ventures are facing Risk and Uncertainty	[25, 37, 45, 106]	"SMEs are most at risk if the lockdown extends for a protracted period of time" [45]
13	Risk and Uncertainty leading to failure	[7, 45, 58, 77]	"a large enough share of the business population at risk of failure then this would represent a systemic risk to the stability of the economy." [45]
14	Risk and Uncertainty greatly affecting self-employed and women entrepreneurs	[17, 49, 77, 114, 126]	"Notable risk factors for self-employed people include whether their work is part-time or full-time, whether they are self-employed or if they run a business with employees.... Any combination of these...indicates that a business ... has... risk during a crisis" [126] "...an intersectional analysis of the differential effects of race, class and gender for self-employed people. It is evident that the presence of risk factors is greater among women in general" [126]
15	Self-employed and women entrepreneurs have a higher probability of failure	[17, 77, 114, 126]	"At times of crisis, the risk of business failures increases, and thus, individuals (Self-employed) are pulled out of entrepreneurship." [114] "The reasons behind women entrepreneurs' struggle with securing financing are multifaceted... For example, some claim that women are risk averse and fear failure" [77]
16	Failures should be tackled through Entrepreneurial actions	[101, 179, 188]	"...to coordinate across entrepreneurship... in order to better understand organizational success and failure and to better guide managers, especially in times of dire trouble" [101]
17	Risk and Uncertainty can be minimized through Entrepreneurial actions	[5, 68, 182, 188]	"When such uncertainty abounds, policy-makers need to consider whether it is better to support SMEs by means of various programs or, alternatively, to stimulate the economy" [188]
18	EVs can exploit new opportunities	[12, 79, 96, 106, 124, 131, 132, 136, 139, 172, 185, 195]	"Many entrepreneurs ... attempt to spur change and create opportunities...and ... crises can nurture the development of new opportunities, innovation, and alternative products/services" [106]
19	New opportunities can be leveraged by entrepreneurial actions	Bricolage [16, 101, 106, 190] Business model pivot, [122, 132, 156] Emotional capital [172] Disaster planning management [174]	"Many entrepreneurs adopt the bricoleur role as they attempt to spur change and create opportunities with the resources available" [106] "...realised the opportunity presented by the pandemic, and pivoted their business model..." [122] "During disaster events, family ownership resources ... provide the firm with the social and emotional capital needed to address the hardship" [172] "In the context of disaster management, entrepreneurship is characterized and defined by behaviours, primarily proactivity in identifying and exploiting opportunity..." [172] "we offer research-based evidence and associated insights focused on three perspectives (i.e., business planning, frugality, and emotional support) regarding entrepreneurial action under an exogenous shock". [74]

Fig. 7. Phenomenon Structure Diagram (PSD) references to the link between the structural entities showing the impact of COVID-19 on Entrepreneurial Ventures (EV).

		Frugal, [74, 129] Disruption [164] Agility [101, 112] Hustle [68] R&D [163]	<i>"Innovation HUB ... will facilitate...recovery post-COVID-19 era, which will facilitate resource utilization, help recovery of businesses, and accelerate technology disruption"</i> [164] <i>"Resilience, strategic agility, and entrepreneurship will continue to play a key role in capturing value from these opportunities while overcoming the crisis."</i> [112] <i>"...permission to hustle is an important sense-breaking device that ignites and sustains entrepreneurial action"</i> [68] <i>"Firms that continued to invest in R&D and innovation ... were able to sustain competitiveness"</i> [163]
20	Entrepreneurial actions are meant to develop Resilience, Business continuity, Sustainability	[55, 68, 87, 106, 112, 156, 163, 164, 172, 175]	<i>"Firms ... enhancing their organisational resilience, were able to sustain competitiveness"</i> [163] <i>"...competitive, sustainable, and innovative actions ... are necessary for modern day organizations, especially in times of crisis"</i> [68]
21	Resilience, Business continuity, Sustainability needs appropriate Business strategies	[101, 105, 150, 164, 193]	<i>"Business strategy is the key to improve ... antecedent's entrepreneurial orientation and market orientation. Business strategies to drive the value of dynamic innovation and marketing capabilities."</i> [105]
22	Business strategies include Entrepreneurial orientation (EO)	[33, 101, 105, 182]	<i>"...defined EO as the strategy process of entrepreneurship at firm level..."</i> [33]
23	Entrepreneurial orientation along with Technology/Digitalization/IoT	[5, 6, 159, 185, 212]	<i>"the current COVID-19 pandemic offers an opportunity for a resurgence of a new generation of entrepreneurs to lead the next industrial revolution and invent new ways of doing business by utilizing cutting-edge technology."</i> [6]
24	Entrepreneurial orientation and Entrepreneurial mind-set	[65, 68, 108, 124]	<i>"Entrepreneurs who have an entrepreneurial mindset will recognize opportunities that might arise or be around their organizations."</i> [108]
25	Entrepreneurial orientation along with Entrepreneurial finance/investment	[25, 26, 132, 195]	<i>"It appears that seed finance is the main type of entrepreneurial finance most acutely affected by the crisis, which typically goes to the most nascent entrepreneurial start-ups facing the greatest obstacles obtaining finance."</i> [26]
26	Entrepreneurial orientation along with Government/Public policies	[37, 38, 45, 52, 64, 106, 112, 198]	<i>"Coproduction between government actors and citizens are needed. Effective crisis management is depending just as much on the citizens behavior and voluntary cooperation based on trust in government as on government capacity".</i> [38]
27	Entrepreneurial orientation along with Management tools and techniques	[6, 46, 101, 174]	<i>"...require specialized tools and techniques, such as visual analytics to process and transform into usable information for decision-making"</i> [6]
28	Entrepreneurial orientation along with leadership	[36, 51, 108, 148, 175]	<i>"innovation could emerge through an entrepreneurial mindset, culture, leadership, and through creativity."</i> [108]
29	Entrepreneurial orientation along with Resources	[16, 20, 28, 106, 111, 163, 190]	<i>"...policymakers need to adjust their support system towards enabling resource-constrained SMEs to deal with the aftermath of negative shocks in their business environment."</i> [190]
30	Entrepreneurial orientation along with the Entrepreneurial team	[68, 175, 188]	<i>"Entrepreneurs should seek to empower their teams to approach challenges..."</i> [68]
31	EO along with either (a) Technology, (b) Entrepreneurial mindset, (c) Entrepreneurial finance/investment, (d) Governments/Public policies, (e) Management tools and techniques, (f) Leadership, (g) Resources, (h) Entrepreneurial team enhances Entrepreneurship	[6, 12, 26, 33, 38, 68, 74, 101, 106, 108, 179, 190]	<i>"...defined EO as the strategy process of entrepreneurship at firm level, including "methods, practices, and decision making styles managers employ to act entrepreneurially."</i> [33] <i>"new generation of entrepreneurs to lead the next industrial revolution and invent new ways of doing business by utilizing cutting-edge technology."</i> [6] <i>"Entrepreneurs who have an entrepreneurial mindset will recognize opportunities"</i> [108] <i>"policy measures should not only provide first aid to startups..., but also involve long-term measures embedded in and supported by the wider entrepreneurial ecosystem to ensure rapid recovery and growth."</i> [106]
32	Entrepreneurship applied to sectors (Agriculture, Manufacturing, Services, Rural)	[20, 52, 90, 116, 133, 161, 164, 168, 182, 210]	<i>"...conceptualizations of entrepreneurship that emphasize ventures created for the purpose of shifting resources from areas of lower to areas of higher productivity and yield...and ...those involved in discovery, evaluation and exploitation of opportunities to create future goods and services"</i> [133]
33	Sectors (Agriculture, Manufacturing, Services, Rural) contribute to Business success	[6, 55, 106, 140, 150, 168]	<i>"The success of the model was context specific to a homogenous production environment, and stable economic conditions."</i> [55]
34	Business success is very likely to lead to Economic growth	[81, 106, 111, 149, 150, 163, 168, 210]	<i>"Business success can be seen from success in competition, increasing company assets, and success in developing new products and in the financial aspects of sales growth and increased profitability."</i> [150]
35	Entrepreneurship applied to social sector	[12, 55, 78, 154, 156, 158, 166]	<i>"...the heart of social entrepreneurship is a need to act as a collective to solve social problems."</i> [156]

Fig. 7. (continued).

36	Social sector enhancement could improve mental health and well-being	[16, 86, 156]	"...social factors are related to the health and satisfaction ... that is more focused on human well-being." [86]
37	Social sector will contribute to economic growth	[78, 86, 154]	"...social factors ... provides a starting point for an economy" [86]
38	Economic growth is expected to lead to New normal	[10, 51, 108, 136, 179, 212]	"The Ecocentric Business Continuity Planning model will help the MSMEs to adopt the new-normal business strategies" [136]
39	Economic growth leads to Employment/ Self-employment	[86, 210]	"...the intention to start a business, and also enhance the well-being and mental health of these young people to be able to self-employ.[86]
40	Employment/ Self-employment is expected to lead to 'New Normal'	[28, 136, 154, 195]	"In the new normal, healthcare, sanitisation and hygiene will have a priority focus ... and the need for micro-self-employment is the need of the hour" [195]
41	New Normal' necessary to overcome the challenges due to COVID-19	[6, 136, 154, 179]	"This 'new normal' calls for a change in business strategies, operations, and business conduct." [6] "...entrepreneurship research assumes that entrepreneurs are a main force of disruption. In the current case, it is a virus (COVID-19) that caused the disruption. The disruption will dissipate, and there will be a new normal" [179]

Fig. 7. (continued).

may be viewed as the *entrepreneurial strategy-making processes*" and similar views are expressed by Refs. [33,105]. Refer to Fig. 5 for the integrated concept.

- (f) Cluster-7: The focus of this cluster is on strategies for sustenance. Smith et al. [182], state that "*the organisational ability to be entrepreneurially orientated, grow, adapt and be a responsible and sustainable business is affected by factors ... that include ...*" and they also state that Entrepreneurial Orientation "*EO may be viewed as the entrepreneurial strategy-making processes that key decision-makers use to enact their firm's organisational purpose, sustain its vision and create competitive advantage*". Ketchen and Craighead [101] highlight the need to "*build knowledge about how to coordinate across entrepreneurship, supply chain management, and strategic management in order to better understand organizational success and failure and to better guide managers, especially in times of dire trouble*". Similar views are expressed by Ref. [115]. Sawalha [174] states that "*A number of contemporary disaster management studies started stressing the value of leadership and emphasize the need for leaders who possess innovative insight and entrepreneurial skills needed to mitigate disasters*". Zahra [209] states that "*The changes prompted by Covid are likely to fuel innovation worldwide as a means of finding solutions to the problems entrepreneurs encounter. Digital technology is likely to expedite this trend*" and "*digital technology has offered innovative solutions*". Soto-Acosta [185] states that "*companies can apply digital technologies to accelerate business processes, eliminate inefficiencies, and/or reduce costs or even to sell more*". Refer to Fig. 5 for the integrated concept.
- (g) Cluster-11: The focus of this cluster is the Entrepreneurial ecosystem and Entrepreneurial action. Ratten [152] states that "*the pandemic has impacted various entities of the (entrepreneurial) ecosystem ...*". Kuckertz et al. [106], highlight that "*some businesspeople in the entrepreneurial ecosystem already perceive entrepreneurial opportunity in a positive sense, that is, they see an opportunity to address current issues by employing entrepreneurial measures*". Giones et al. [74], state that "*Entrepreneurial action must be situated in the entrepreneurs' assessment of the opportunities and environment where they operate*" and they "... offer research-based evidence and associated insights focused on three perspectives (i.e., business planning, frugality, and emotional support) regarding entrepreneurial action under an exogenous shock". Similar views are expressed by Shepherd [179], who states that "*victims (affected entrepreneurs) of adversity engage in entrepreneurial actions that help themselves*". Fisher et al. [68] also states that "*Entrepreneurial action must be situated in the entrepreneurs' assessment of the opportunities and environment where they operate*". Viewing it from a country perspective, Kuckertz et al. [106], state that "*countries that have established resilient entrepreneurial ecosystems will be able to resume their pre-crisis level of activity more quickly than those that have not*". Refer to Fig. 5 for the integrated concept.
- (h) Cluster-9: The integrated concept from this cluster is, supporting technologies and management skills help in overcoming the crisis. Ratten [155] states that "*Covid-19 (coronavirus) has significantly affected education communities particularly in terms of the massive shift towards online learning. This has meant a quick transformation of the curriculum and learning styles to a digital platform*". Adoption of technology is essential during a crisis, as highlighted by Akpan et al. [6], "*The strategies to survive the 'new normal' imposed by COVID-19 and fierce global competition includes a successful adoption of advanced technologies*". Management skills are also essential for survival amidst the crisis, as highlighted by Akpan et al. [5], "... *decision-analytic framework for innovative marketing, management, and financial planning ... are required ... to avoid small business failure*". Refer to Fig. 5 for the integrated concept.
- (i) Cluster-12: The importance of social media, information and communication technology (ICT) for business communities during the COVID crisis is highlighted in this cluster. Saleh [171] states that "*ICTs and social media help these businesses to increase their overall performance and spread the business in different markets*".

The condensed integrated concepts for all the 12 clusters are presented in Fig. 5. This has evolved after analyzing and synthesizing multiple authors' views. These integrated concepts developed using bibliometrics form the backbone towards understanding the

behaviour of Entrepreneurial ventures during a crisis. This is used in developing the PSD in the subsequent section.

4.3. Temporal analysis

Temporal analysis is performed to understand the evolution of a subject over a period of time [35]. Temporal analysis of the 154 documents reveals that 21 documents have been published before the onset of COVID-19. The details of the Temporal analysis are placed in Appendix-B. Interestingly, even before the advent of COVID-19, researchers have published articles highlighting the possible effect that pandemics could have on small businesses. The pre-COVID-19 era publications indicate (a) A pandemic can cause the failure of entrepreneurial ventures [93,118,197], (b) Entrepreneurship has been identified as one strategy to reduce the unemployment crisis [120], (c) Entrepreneurship and social entrepreneurship have been identified as a saviour of lives while investigating the Ebola pandemic crisis-ridden communities [119], and (d) Both entrepreneurship and social entrepreneurship talk about proactivity, innovation, risk management, seeking and recognizing opportunities [119].

5. Impact of the pandemic on entrepreneurial ventures: reporting the findings

The outcomes of the literature analysis are reported in the subsequent two sub-sections.

5.1. Research status and gaps in the literature related to COVID-19 and entrepreneurial ventures (EVs)

The current status of research for each type of EVs is consolidated using Bibliometrics and represented in Appendix-C. The non-availability of research articles indicates a gap, and 295 gaps are identified. These gaps need further investigation [138] to establish research opportunities.

5.2. Diagrammatic representation of COVID-19's impact on EVs

The integrated concepts, elaborated in Fig. 5, are used in understanding the behavioural pattern of EVs during the impact of the COVID-19 pandemic. This understanding has been translated into a Phenomenon Structure Diagram (PSD) presented in Fig. 6. This PSD provides a comprehensive graphical representation of the current status of research on the COVID-19 pandemic and its impact on EVs. It reveals the phenomenon's conceptual structure in terms of the relationships among the entities related to the pandemic. The PSD has been developed after reviewing all the SLR articles and integrating the various concepts/ideas presented in them. The key-words used in the co-occurrence map (Fig. 4) have been used as the conceptual entities in the PSD. Each entity is represented within a circle in Fig. 6. The link between these entities is parsimoniously indicated by short statements adjacent to the arrow connecting them. Fig. 6 should be read from one entity to its neighbouring entity, in the direction of the arrow along with the link word(s) marked adjacent to the arrow connecting the two entities. For example, in the top left corner, there are two entities, 'COVID-19' and 'Pandemic'; this should be read as 'COVID-19 became a pandemic'. The literary references corresponding to each link are marked as # with a number. This #number is linked with corresponding references in Fig. 7(a). For example, the #1 below the arrow refers to select important references, which are [45,51,52]. Relevant statements from these reference(s) are listed in the last column in Fig. 7(a). Such a PSD representation is a first attempt to portray the COVID-19 phenomenon and its impact on EVs graphically and presents the story sequentially as abstracted from the 154 articles in the database.

This PSD highlights the influences of the COVID-19 pandemic on EVs, based on various researchers' findings and views on this subject. The comprehensive understanding from this PSD presented in simple sentences is:

"COVID-19 became a pandemic. The pandemic forced national lockdowns that affect the human populations' mental health and well-being. The lockdown also reduced environmental pollution and helped to improve the climate. It also resulted in a crisis (Economic, Financial, and Business) affecting the entrepreneurial ecosystem, encompassing EVs that faced risk and uncertainty that could lead to their failure. The self-employed and women entrepreneurs were subjected to higher risks and uncertainty, leading to a higher probability of failure. In the same situation, some EVs attempted to capitalize on the new opportunities created by COVID-19. EVs that are likely to fail, and those which are seeing opportunities in this crisis, can employ appropriate entrepreneurial actions (EA), such as crisis/disaster planning, business model pivoting, Hustle/Idea blitz, being frugal, having financial prudence, networking, and social connecting, bricolage, effectuation, being agile, and undertaking R&D. Entrepreneurial actions (EA) are required to develop business continuity, sustainability, and resilience. Business strategies at the firm-level are known as entrepreneurial orientation (EO), whose components are Innovativeness, Proactiveness, Risk-taking, Competitive aggressiveness, and Autonomy. The EO supported with (a) Technology, (b) Digitalization/IoT, (c) Entrepreneurial mindset, (d) Finance and Investment, (e) Government policies, (f) Management tools, (g) Leadership, (h) Resources, and (i) Entrepreneurial team, will enhance entrepreneurship. Entrepreneurship, when practiced in various sectors such as agriculture, manufacturing, and services in urban/rural areas, could lead to business success contributing to economic growth. In the social sector, entrepreneurship could improve the well-being of people, further accelerating the national economy. A spur in economic growth will increase employment/self-employment opportunities and lead to a new normal that will help transcend the challenges posed by the COVID-19 pandemic."

The PSD presented in Fig. 6 is entirely supported by published literature on COVID-19, which is tabulated in Fig. 7(a).

6. Discussion: entrepreneurial intervention (EIV) for crisis management

From this PSD, the entrepreneurial behaviour of EVs during the COVID-19 pandemic can be understood. Entrepreneurial behaviour refers to the behaviour set during the entrepreneurial process. It generally denotes a series of acts with which entrepreneurial firms

develop resources creatively to pursue opportunities and realize opportunity value [31,80,176]. Looking at how EVs are managing the crisis caused by the COVID-19 pandemic and the lockdown, we observe that EVs employ some strategies to manage the crisis, minimize the risk of failure as well as attempt to leverage new opportunities created by the crisis. A critical analysis of the PSD reveals that a combination of Entrepreneurial Actions (EAs), Entrepreneurial Orientations (EOs), with assistance from various support-systems could probably be the reasons for the EVs to manage the crisis better. A further study on EA, EO, and Support-Systems is essential for formulating a proposition.

6.1. Evidence from literature on entrepreneurial actions, orientations, and support-systems

We investigate the contribution of EAs, EOs, and support-systems towards crisis management of EVs based on COVID-19 literature.

6.1.1. Entrepreneurial actions (EAs)

EAs can contribute to the restructuring and adaptation of an organization during and after a crisis [106]. Research-based evidence is available that EAs can be used to overcome the exogenous shock caused by COVID-19 [74]. These EAs are (1) crisis and disaster planning [74], (2) pivoting [122], (3) Hustle/Idea blitz [12,68], (4) frugality [74], (5) including financial prudence [74], (6) emotional support (through networking and lobbying initiatives [74]. Other possible EAs that can be taken during the crisis are (7) bricolage [74,101,106], (8) effectuation [74,106], (9) agility [101], and (10) R&D [163], which are justified below. Since resources are limited during a crisis/disaster, applying bricolage [74,101,106] helps in optimum resource utilization. Similarly, applying the principle of effectuation [74,106] also helps to use the available resources to find a solution. Agility and quick decision-making are vital during a crisis/disaster [101]. Studies have also established that R&D is essential to quickly move out from a crisis into the post-crisis stage; in fact, R&D will lead to better survival chances, growth, and profitability [163]. In summary, the above-mentioned ten EAs, as identified from our SLR database, have been observed to manage a crisis/disaster better. The list of EAs can be further enhanced based on future publications.

6.1.2. Entrepreneurial orientations (EOs)

EOs serve as a firm's driver towards improved performance and success [33], which is essential to overcome the current and post-COVID crisis [209]. As per the multi-dimensional concept, the five components³ of EO can co-exist or vary independently, and all of them need not co-exist in a firm [33,182]. Researches [101] on entrepreneurship, supply chain management, and strategic management have highlighted the importance and role of EOs during the COVID-19 crisis and indicated the applicability of these five components: (1) the propensity to experiment through innovation, (2) being proactive in anticipating and acting on future opportunities and making strategic moves, (3) the ability to take calculated risks which shows the inclination to take bold actions, (4) possessing competitive aggressiveness, where a firm directly engages its competition, and (5) having autonomy, where the organization members have the freedom to develop an idea towards its completion. These five components of EOs are essential for managing a crisis/disaster.

6.1.3. Support systems

EVs need supports from multiple sources. During the COVID-19, the following components were used as supports to manage the crisis: (1) Technology in the form of Digitalization, IoT, etc. [185,212], (2) Entrepreneurial mindset/thinking [11,74], (3) Finance/investment [25,45], (4) Supportive Government/Public policies [25,90], (5) Management tools and techniques [84,88], (6) Leadership [33], (7) Resources [46,74,111], and (8) Entrepreneurial team [188]. These supportive components are not exhaustive. Some more can be added; we have listed the above based on the information available in our SLR database. We call all these components together as Entrepreneurial Support (ES) and highlight that these ESs are essential to overcome the crisis.

6.2. Proposition development

From the study of the above literature, we observe that EVs combine entrepreneurial actions (EAs) and entrepreneurial orientations (EOs) with entrepreneurial supports (ESs) to overcome the crisis. We, therefore, propose to call the combination of EAs and EOs with ESs as Entrepreneurial Interventions (EIvs) and underscore that EIvs can be used to manage a crisis and disaster and improve organizational resilience. The above proposition will be strengthened and validated based on evidence from eleven case studies.

7. Case study review of the applicability of EIv for crisis management

The proposition that Entrepreneurial Interventions (EIvs) can be used to manage a crisis has been developed based on the study of EVs, which experienced the crisis due to COVID-19. We first attempt to validate this proposition by checking its applicability for general management in large organizations, which experienced the COVID-19 pandemic. Then, we shall validate in the context of general management in large organizations, which experienced a crisis other than that caused by COVID-19.

7.1. Evidence from organizations that experienced the COVID-19 pandemic crisis

Four articles containing case studies from quality journals (only A*, A, and B of ABDC ranking) were selected, in which organizations encountered crises due to the COVID-19 pandemic. These four articles cover large organizations [16,34] and general management [42,209]. They were analyzed to identify the components of EAs and EOs, with ESs employed to either minimize the risk of

³ The five components of EO are (1) Innovation, (2) Proactiveness, (3) Risk-taking (4) Competitive aggressiveness, and (5) Autonomy.

Table-2

Evidence of Entrepreneurial Interventions made during COVID-19 by large organizations as a crisis management strategy.

Reference	Crisis/disaster details	EA taken	EO used	ES availed
How Michelin-starred chefs are being transformed into social bricoleurs? An online qualitative study of luxury foodservice during the pandemic crisis [16]	The luxury foodservice sector is facing a severe crisis due to lockdown, and the business was forced to close.	Social bricolage , since the chefs used the available resources and prepared food for health workers. These chefs used the available ingredients to innovatively devise recipes and thereby applied effectuation . These elite chefs used their social status, reputation, and lobbying/networking power to influence and formulate government policies supporting the food industry during the pandemic.	These chefs relearned creative and innovative ways to cook, pack and deliver luxury meals.	These chefs adopted Entrepreneurial thinking to develop a multilevel response strategy to tackle social issues. These elite chefs had a legitimate status to act as influential leaders, influence public opinion, and formulate government policies in favour of hotel/restaurant business.
Employee Adjustment and Well-Being in the Era of COVID-19: Implications for Human Resource Management [34]	Employees were struggling with the new working environment. The Human Resource (HR) professionals were attempting to help them.	To ensure a smooth transition into the new working style, the HR professionals are undertaking multiple approaches such as 'work-from-home, online recruitment, virtual training, etc. By using the available resources/techniques and not much worried about the long-term outcomes of these actions, the HR professionals are applying the principle of effectuation . Conduct online training/ social events to help the employees to socially connect and network with other employees.	The proactive orientation of HR professionals for ensuring the relevance of person-environment fit (P-E fit) for their employees. Providing autonomy to employees during the work-from-home scenario so that the work-life balance is not affected.	The HR professionals are shifting the recruitment, selection, and training to virtual mode, using technology (Digitalization) . The HR professionals are applying entrepreneurial mindset/thinking for the benefit of employees.
Reflections on threat and uncertainty for the future of elite women's football in England [42]	The elite women's football team in England is facing a threat and uncertainty during the COVID-19 due to economic repercussions, and the need for maintaining players' well-being, and related contractual issues.	Due to the reduced financial inflow from corporate companies, crisis planning is undertaken to avoid football clubs' closing. During the financial crisis, the football clubs are reducing their costs by applying all possible financial prudence . Also, they are applying bricolage in using scarce financial resources. The football associations are attempting to pivot their business model by conducting matches near tourist sites.	The Women's clubs attempted to explore an innovative source of revenue through crowdfunding. The women's football team plans to proactively integrate with the professional men's club (as men's clubs are better funded). Secondly, such integration can enhance the competitive aggressiveness of football clubs among other sports.	Women's clubs are encouraged to embrace an entrepreneurial mindset to explore revenue generation and improve their wellbeing. To increase the financial inflow and retain the league's integrity, regular crisis management reviews are undertaken by the higher level of leadership , and suitable supportive policies are being formulated. To ensure the well-being of the players, additional resources (infrastructure) are employed. Only a team of relevant stakeholders (governing bodies of football clubs, players associations, football associations, etc.) with coordinated action will help the football clubs to overcome the crisis.
International entrepreneurship in the post-Covid world [209]	Travel restrictions on Global and International businesses (IBs), caused due to lockdown.	To overcome the inability to travel IBs have shifted focus on local development of R&D , as they believe this will give them a unique competitive advantage. These firms may collaborate with local ventures to engage in frugal innovations so that	IBs attempt to use universities' discoveries, aiming to convert these innovative ideas/prototypes into products and goods. The IBs are taking a calculated risk , as their challenges to handle	Digital technology helps IBs to connect with firms across the globe.

(continued on next page)

Table-2 (continued)

Reference	Crisis/disaster details	EA taken	EO used	ES availed
		local resources are best used by way of <i>bricolage</i> . Due to digital communication technologies, IBs have achieved greater responsiveness and <i>agility</i> in handling IBs.	stakeholders across the globe have increased.	

failure or leverage the opportunity created by the crisis. The outcome of this study is presented in Table 2. We observed some components of EA, EO, with ES employed to overcome the COVID-19 crisis for each case. The EAs'/EOs'/ESs' components have been highlighted in bold and italics in Table 2. All the components indicated for EAs, EOs, with ESs in sub-section 6.1 are cumulatively present across all four cases.

7.2. Evidence from organizations during crises (non-COVID-19)

To further validate that EIvs can be used to manage crises in general, we examine the application of this proposition in large organizations and general management by taking case studies unrelated to COVID-19. We explore these case studies to review if various components of EIvs have been employed. Seven case studies, two from an organizational [13,89] and five from a general management perspective [73, 144 (3 separate cases), 100], were analyzed. After a complete analysis and synthesis of these cases, the outcome is summarized in Table 3. For each case, the explicit crisis management approach adopted, as indicated by the respective author(s), is mentioned. The EA and EO, with ES components employed to overcome the crisis, are indicated (in bold and italics) separately. The above table considers cases from various sectors and contexts such as manufacturing, reconstruction projects, natural calamities such as earthquake, fire, tsunami, civil calamity, different types of businesses such as SMEs, large organizations, and corporates.

While developing Tables 2 and 3, we observed that some components of EAs, EOs, and ESs were explicitly or inherently used to manage the crisis. In a few instances, we performed thematic coding [170] to identify the use of EAs/EOs/ESs. The first and second authors did coding separately to confirm the correct interpretation. These case studies reinforce the observation that all the components of EAs/EOs/ESs need not be applied concurrently. To manage crisis/disaster better, a suitable combination of EAs/EOs/ESs needs to be employed, and it is contingent on the environmental condition.

8. Conceptual model on crisis management using entrepreneurial intervention

After studying the behaviour of EVs during the crisis caused by the COVID-19 pandemic, a phenomenon structure diagram (PSD) has been developed (Fig. 6 Fig. 7(a)). From this PSD, it is observed that EVs have used entrepreneurial actions (EAs) and entrepreneurial orientation (EOs), with entrepreneurial supports (ESs) to minimize the risk of failure as well as leverage the opportunities created during the crisis. Based on this, a proposition has been developed which states that Entrepreneurial Interventions (EIvs), which are a combination of EAs and EOs, with ESs, can be made to manage a crisis better by handling the negative and positive impacts of a crisis/disaster. The correctness of this proposition has been checked with eleven case studies on crises that affected large organizations and general management. In all these cases, it is observed that appropriate combinations of components of EAs and EOs, with ESs, were employed to minimize the negative effects of the respective crises and leverage the opportunities. The Temporal analysis (Section 4.3) of the pre-COVID-19 era shows that the failure rates of EVs were high during the earlier pandemics. Also, during those pandemics, entrepreneurship and social entrepreneurship helped to reduce unemployment and saved certain communities. A conceptual model has been developed based on these studies (PSD, Temporal analysis, and case studies analysis). The conceptual model shows that EIvs, which are a combination of EAs and EOs, with ESs, can be made to manage the negative and positive impacts of a crisis. The negative impacts of a crisis could lead to the failure of enterprises, whereas the positive impacts of a crisis could facilitate these enterprises to leverage the crisis-given new opportunities. This conceptual model is presented in Fig. 8.

In the above figure, we can observe that when an enterprise is impacted by a crisis or disaster (shown in the left corner), it can employ Entrepreneurial Interventions (EIvs). The components of EAs and EOs, with ESs, are listed in the center of the model. These components have been identified from the literature on EVs. The EIvs during a crisis/disaster will either (a) minimize the risk of failure of enterprises, or (b) help its management to recover faster, or (c) help enterprises to leverage the opportunities generated. Thus, Entrepreneurial Interventions can be used as a crisis management strategy and to improve organizational resilience.

To the best of our knowledge, this is the first time such a model has been developed for crisis/disaster management based on the behaviour observed in EVs during a crisis. This conceptual model is a unique outcome of the above multi-disciplinary study. It presents a pragmatic approach [3] by way of being a ready reckoner in managers' hands to manage an organizational crisis. It also appears that some of the above-identified components of EAs, EOs, and ESs can be applied during three different broad stages of a crisis, namely pre-crisis, during-crisis, and post-crisis stages; this would need further investigation. The strategy to resolve a crisis must be decided based on the environmental conditions. A single solution may not fit all conditions [84]. Crisis management needs custom-made strategies [84,146]. This is in line with the view that crises do not follow a clear pattern, and every crisis could be unique and needs to be studied for its context and industry sector [84,85]. Thus, a contingent approach towards crisis management [84] would be appropriate, and our proposed EIvs model would support such an approach.

Table 3

Evidence of Entrepreneurial Interventions made as a crisis management strategy by any business/organization and in general management.

Reference	Details of Crisis/ Disaster	Details of Crisis/Disaster management as per Author(s)	EAs taken	EOs used	ESs availed
Crisis management for SMEs: insights from a multiple-case study [89]	Firm C is a US automobile stamping firm, a supplier to three leading automobile manufacturers in Detroit. The technology used by Firm C got obsolete, and therefore, their major customers' de-sourced them, leading them into a crisis.	<p><u>Immediate actions by Firm-C:</u></p> <ol style="list-style-type: none"> 1. Reducing its operational costs by laying-off employees and reducing working time. 2. Switching away from the current target market to an alternate market. <p><u>Long-term Actions:</u></p> <ol style="list-style-type: none"> 1. Adopted a set of activities such as expanding its business, diversifying its customers, and renewing its technological infrastructure. 	<p>Crisis plan: The firm established a crisis management plan and a systematic recovery plan through insurance.</p> <p>Business model Pivot: The firm changed its target market.</p> <p>Financial Prudence: Reduced the operational costs by laying off employees and reducing working time.</p> <p>Networking: The top management was proactively communicating with their suppliers and customers to rebuild their relationships.</p>	<p>Proactiveness: Observed their competitors undertake technological innovation and foresaw the crisis.</p> <p>Innovativeness: Undertook technological innovation, as they realized only this could help them sustain in the market.</p> <p>Competitive Aggressiveness: They increased their competitive aggressiveness by investing in technology.</p>	<p>Technology: Updated their technological infrastructure.</p> <p>Investment: Made a significant investment in technology.</p>
Towards the agility of collaborative workflows through an event driven approach – Application to crisis management [13]	This article discusses a software/platform which supports decision-making during crises. The platform's use is illustrated in the context of the Fukushima nuclear disaster. .	<ol style="list-style-type: none"> 1. Crisis responses are generally delayed due to a lack of situational awareness. This article proposes using a software/platform (known as Agility service) that gathers data and uses an agile, collaborative workflow to support decision-makers. 2. Decision-makers can choose an appropriate 'adaptation tool' to perform/execute the selected crisis management strategy. 	<p>Crisis/disaster management plan: Use of adaptative strategy.</p> <p>Agility: The platform (Agility service) works on the principle that agility is essential during collaboration.</p> <p>Pivot: Used adaptative and pivoting strategies during crises.</p> <p>Networking: This platform facilitated collaboration (through networking) between heterogeneous organizations that are connected with each other.</p>	<p>Proactiveness: The proposed platform proactively orchestrates and drives collaborative situations.</p> <p>Risk-taking: The platform helps the decision-maker to select a crisis management solution with risk as one of the variables.</p>	<p>Technology: Information systems architecture for the development of the platform.</p> <p>Management tools: The 'Agility service' platform helps the decision-makers' use of appropriate tools for crisis response.</p> <p>Resources: The available resources are used as a meta-type variable.</p> <p>Team: The proposed platform helps organizations to collaborate as a team to face crises.</p>
Notre-Dame Is Burning: Learning from the Crisis of a Superstar Religious Monument [73]	The fire accident took place at Notre-Dame in April 2019. The Notre-Dame fire accident was considered a Processual crisis.	<p><u>Immediate response:</u></p> <ol style="list-style-type: none"> 1. Firefighting: 500 firefighters fought the fire till it was completely doused. The firefighters were able to save the cathedral structure and many treasures. 2. Communication: The French President informed the public that the historic monument will be rebuilt. This provided a sense of relief to the people. 3. Plan for restoration/reconstruction: A bill on the restoration of Notre-Dame was immediately drafted and adopted by the National Assembly. <p><u>Long-term action:</u></p> <ol style="list-style-type: none"> 1. Restore/rebuild: Plan to rebuild the cathedral in 	<p>Disaster Recovery Plan: A restoration bill was drafted immediately and adopted by the National Assembly.</p> <p>Idea Blitz: Tourists can experience an online digital show during the restoration work so that they are not disappointed.</p> <p>Financial prudence: While seeking funds for restoration, donations were exempted from tax.</p>	<p>Aggressiveness: The national leadership demonstrated aggressiveness to address the crisis. The French President addressed the public from the burning cathedral.</p> <p>Innovativeness: The reconstruction work was planned by calling for an 'international architectural competition'. The restoration team adopted innovative ways to reconstruct without damaging the existing structure.</p>	<p>Digital technology: During restoration work, the tourists were shown digital movies about the monument.</p> <p>Supportive Government policies: The Government issued supportive policies to overcome the crisis.</p> <p>Leadership: Role played by the Government in taking the views of relevant stakeholders such as Heritage experts, Architects, religious and political views before finalizing the restoration plan.</p>

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Table 3 (continued)

Reference	Details of Crisis/ Disaster	Details of Crisis/Disaster management as per Author(s)	EAs taken	EOs used	ESs availed
Intentionally building relationships between participatory online groups and formal organizations for effective emergency response [144]	This paper has presented four case studies Case-1: Violence in Kenya post-election-2007-08, that claimed the lives of around 1500 people.	an innovative way with the use of modern technologies. 1. To control the crisis, the media under-reported the severity of political instability. 2. The Minister for Internal security ordered for suspension of the live broadcast of violence. 3. A Kenyan lawyer asked bloggers to develop a software platform to help affected people. 4. Bloggers developed an internet-based platform using Google maps called 'Ushahidi', to report the incidents of violence, destruction and provided geo-location where help and relief material was required. 5. The local NGOs ratified the correctness of information provided in 'Ushahidi' and provided help and support to affected people.	Being Frugal: A dozen software developers and bloggers designed and build 'Ushahidi'. This simple and cost-effective solution (Frugal) ensured sharing of information leading towards providing help to affected victims. Agility: Quickly processing/categorizing information in 'Ushahidi'. This was happening in near real-time by the volunteers. Networking: The Ushahidi volunteers actively build partnerships with Kenyan NGOs and with the local contacts at the site of incidence to provide support.	Innovativeness: Bloggers developing Ushahidi using Google maps. Proactiveness: A Kenyan lawyer calling out bloggers to develop a platform to help violence victims.	Technology: Information Communication Technology (ICT) enabled bloggers to develop Ushahidi. Team: Formation of teams by individuals (Bloggers, NGOs, Social workers, etc.) to develop a system to coordinate peacebuilding efforts in Kenya.
-do-	Case-2: An earthquake of 7.0 magnitude struck Haiti on 12 January 2010, leaving several people homeless without basic amenities.	1. More than 200 Tufts University students, guided by a Ph.D. student, set up the 'Ushahidi-Haiti' platform after enabling open-sourcing, and facilitating interactive mapping among multiple users. These volunteers collected, prioritized, and mapped critical information on disaster conditions from e-mail, social media, and web sources. 2. Several Haitian NGOs and telecommunications companies, and formal organizations worldwide worked together to launch a free SMS reporting system called 'Mission-4636'. 3. As these SMSs reported incidence in the Haitian Creole language, which was not understood by NGOs (English/French-speaking people), a computational linguist from Stanford University	Frugal: OSM volunteers using donated satellite imagery to develop a digital map. Idea Blitz: (a) The idea of deploying 'Ushahidi' in Haiti as 'Ushahidi-Haiti' platform; (b) Subsequently, the 'Ushahidi-Haiti' platform being modified with an open chatroom, where volunteers could translate messages; (c) Integration of 'Mission-4636' and the Ushahidi-Haiti platform. Bricolage: (a) Diverse resources were brought together by Haitian telecommunication companies, local radio stations, NGOs, and several global organizations to develop and launch 'Mission-4636'; (b) Translation of SMSs by translators (available resources) staying in 49 countries. Agility: The average processing speed of response for each SMS after its receipt was less than 10 min.	Proactiveness: (a) In less than 2 h after the earthquake struck Haiti, the Ushahidi-Haiti platform was set-up; (b) a computational linguist calling for volunteers to translate SMS messages. Innovativeness: (a) Updating 'Ushahidi-Haiti' platform with chat room for translators, and then integrating it with Mission 4636; (b) Taking the support of translators from 49 counties to translate SMSs, using Facebook.	Technology: Use of the Ushahidi-Haiti platform, Mission-4636, SMS translation, OSM Maps to acquire, process, and share data/information. Funding: Donations obtained from the world bank and imagery companies. Assumed leadership role: (a) A Ph.D. student set up the Ushahidi-Haiti platform and organized more than 200 volunteers to process data. (b) A computational linguist was organizing more than 1000 volunteers to translate SMS messages. Team: Self-formed teams (200 'Ushahidi-Haiti' volunteers, 1000 translators, 600 OSM volunteers) working towards earthquake relief.

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Table 3 (continued)

Reference	Details of Crisis/ Disaster	Details of Crisis/Disaster management as per Author(s)	EAs taken	EOs used	ESs availed
		<p>called for volunteers to translate these SMSs.</p> <ol style="list-style-type: none"> More than 1000 volunteers from the Haitian Diaspora in 49 countries translated SMSs through Facebook. These volunteers also categorized and geo-tagged these messages. To process disaster-related information more effectively, the 'Mission-4636' reporting system and the Ushahidi-Haiti platform were integrated a week after the earthquake. The Open Street Map (OSM) volunteers used donated satellite imagery to create an accurate map of the country. 	<p>Networking: Multiple organizations (Haiti's telecommunication companies, local radio stations, and NGOs) and volunteers worked together.</p>		
-do-	<p>Case-4: An earthquake of 9.0 magnitude struck Japan on 11 March 2011, followed by Tsunamis causing damage to the Fukushima Daiichi Nuclear Power Plant, resulting in enormous amounts of radiation leaking into the environment.</p>	<ol style="list-style-type: none"> Japanese Open Street Map (OSM) community created 'Sinsai.info' to develop a crisis mapping project to share information towards supporting disaster management. A participatory online group called Safecast developed a new, low-cost radiation monitoring device called 'bGeigie Nano' and then deployed 800 devices to monitor radiation levels at various locations. 	<p>Frugal: low-cost development of radiation monitoring device- 'bGeigie Nano'.</p> <p>Blitz: Idea to develop a radiation monitoring system, as the government-provided data was felt incomplete and inadequate.</p> <p>Bricolage: Resources across the globe join hands to work together ((a) 200 volunteers participated in this crisis mapping project, (b) 500 OSM volunteers created digital maps, (c) designers, engineers, computer programmers, and scientists developed radiation monitoring device)</p> <p>Networking: Volunteers among OSM and Safecast working together for disaster management.</p>	<p>Innovativeness: An innovative low-cost radiation monitoring device was designed, prototyped, and developed by 'Safecast'. This was deployed, and approximately 18 million radiation data points were collected.</p>	<p>Technology: Digital technology was used for (a) developing digital maps, (b) generating radiation data.</p> <p>Funding: A crowdfunding platform was used to collect funds for developing the radiation monitoring device.</p> <p>Entrepreneurial team: (a) A team of three key founding members, along with designers, engineers, computer programmers, and scientists, developed a radiation monitoring device. (b) The Japanese OSM community (200 volunteers) jointly created a digital crisis map.</p>
Balancing and stabilizing South Asia: challenges and opportunities for sustainable peace and stability [100]	<p>The constant conflict between India and Pakistan, due to terrorism and the Kashmir issue. This has become one of the major issues between these two countries, fearing escalation to military/nuclear confrontation.</p>	<p>To focus on crisis management rather than conflict resolution. This can be done through</p> <ol style="list-style-type: none"> Having a sustained approach towards confidence-building measures, Institutionalize crisis management mechanisms, Providing an opportunity for a third-party role, Having a concrete mechanism for conflict 	<p>Crisis plan: Both countries attempt to divide the bigger issues into smaller issues for working out a solution.</p> <p>Financial prudence: Both countries want to avoid the cost of war.</p> <p>Networking: Role of third-party countries in preventing major military escalations. This networked relationship with other countries helps in preventing crisis escalation.</p>	<p>Innovativeness: A regular confidence-building measure being formulated and adopted from both sides.</p> <p>Proactiveness: Both countries are evaluating the situation and taking corrective actions constantly and, quickly. .</p> <p>Autonomy: Freedom given to the team which undertakes</p>	<p>Technology: Remote possibility of the accidental use of nuclear weapons during peacetime is pre-empted by technological advancement..</p> <p>Leadership: The national/political leaders' conscious effort to show self-restraint and the "wait and see" approach signals the seriousness</p>

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Table 3 (continued)

Reference	Details of Crisis/ Disaster	Details of Crisis/Disaster management as per Author(s)	EAs taken	EOs used	ESs availed
		resolution of long-standing issues.	<p>Effectuation: Both India and Pakistan, focusing only on their immediate goals rather than their ultimate goal (conflict resolution). Handling the immediate goal is under the control of the local military power. This is preventing crisis escalation.</p> <p>R&D: The Think-tanks from both countries are advising their respective Governments on long-term strategies.</p>	confidence-building measures, especially for building backchannel confidence-building measures.	of ending the crisis mutually.

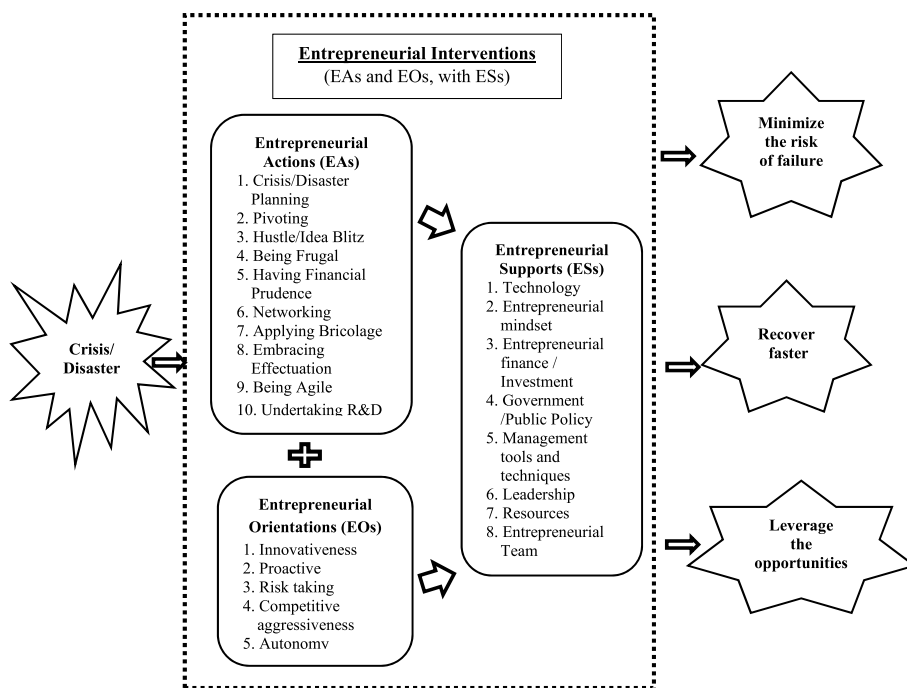


Fig. 8. Conceptual model for Crisis/Disaster Management using Entrepreneurial Interventions.

9. Limitations, implications, and conclusions

9.1. Limitations

The SLR on COVID-19, Pandemic, and EVs has been undertaken based on the published works available in the Scopus and WoS databases till mid-Oct 2020 only. Research works beyond this time, and other databases have not been considered in this article. These published articles capture the initial period of the COVID-19 crisis, and thus they may not capture the complete behaviour. However, a quick review of subsequent publications reveals no major conceptual changes in the articles published subsequently. Therefore, our findings based on this SLR published works could be largely relevant. Secondly, the 295 research gaps identified through this SLR would need further investigations [138] to see if there are any research opportunities corresponding to each gap. Thirdly, the above research has been undertaken mainly based on published literature and case studies. Therefore, this would need further empirical validation. The existing component list of EAs, and ESs, has been developed based on the 154 published articles; this list can be further enhanced.

9.2. Implications

9.2.1. Theoretical contributions

The behaviour of EVs during the COVID-19 pandemic has been captured using a PSD. To the best of our knowledge, such development of PSD has been undertaken for the first time. Future researchers can develop similar PSDs to study (a) the impacts of crises on other types of organizations, and (b) the impacts of other types of crises, such as natural disasters, on different types of organizations. Secondly, from the behaviour of the EVs, a conceptual model is developed for EIVs, which are combinations of EAs and EOs with ESs for crisis/disaster management. Researchers can extend this study by empirically validating the EIVs model for (a) different stages of the crisis, namely pre-, during- and post-crisis stages, (b) linking the EIVs model with 'proactive' and 'reactive' resilience/capacity, and (c) studying resilience as a dynamic attribute. Thirdly, this paper points out and justifies the applicability of contingency theory as a crisis management strategy. Future researchers can use this paper to extend the existing knowledge on either 'contingency theory' or 'crisis management strategy'. In addition, this paper has identified 295 gaps in existing literature related to the COVID-19 pandemic and EVs. Future researchers can study these gaps for research potential [138] and undertake research.

9.2.2. Managerial implications

This article has generated a pragmatic set of ten components of EAs, five components of EOs, and eight components of ESs to overcome crises/disasters as presented in Fig. 8. Owners and/or managers can use this list to formulate crisis management strategies. In addition, our paper suggests owners and/or managers that crisis management strategies need to be formulated depending on the environmental condition and surrounding situation. The approach of 'one-size, fits for all' does not work.

9.3. Conclusions

In this article, based on a Structured Literature Review (SLR) using Bibliometrics of 154 publications, an understanding of Entrepreneurial Ventures' behaviours during the crisis caused by the pandemics is presented. An abstraction of the entrepreneurial behaviours during the COVID-19 crisis is diagrammatically represented in the form of a PSD, which shows that COVID-19, depending upon the context, causes either slowdowns or growth of EVs. This PSD also highlights the various combinations of Entrepreneurial Actions (EAs) and Entrepreneurial Orientations (EOs), with Entrepreneurial Supports (ESs) that can be employed on a contingency basis, depending upon the situation in the surrounding environment, to deal with the negative or positive impacts caused by a crisis. From the behaviours of EVs, a conceptual model of crisis management employing Entrepreneurial Interventions (EIVs) has been developed. EIVs, which are a combination of EAs and EOs with ESs, can be made to manage a crisis better by handling the negative and positive impacts of a crisis/disaster. The EIVs model highlights the applicability of contingency theory and provides a pragmatic solution for formulating a crisis management strategy and improving the dynamic resilience of an organization. This article has laid a theoretical foundation for crisis management and resilience based on evidence from entrepreneurship and has thus attempted to integrate different fields.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijdr.2022.102830>.

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