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Exploring the critical success factors (CSFs) for enterprise competitiveness in crises: A bibliometric review

Muntaser Hamdouna[1]

Abstract

This paper examines the evolution of research on critical success factors (CSFs) that enhance competitiveness during enterprise crises. Crises include economic recessions, financial shocks, pandemics and global disruptions. A bibliometric analysis of Scopus-indexed literature from 1998 to 2024 was conducted to address influential authors, key journals, themes and countries. Excel was used to perform statistical analysis, while VOSviewer was used to visualise the authors' keywords in a network. The study focuses on the fields of business, economics and finance, emphasising their critical role in steering turbulent markets. The findings indicate a significant increase in research related to the CSF of enterprise competitiveness during major disruptive events, particularly during economic and financial crises. Countries such as the UK, China, Malaysia and India rank among the top publisher countries. Major themes focus on business resilience, supply chain continuity and organisational agility as core pillars for enterprises to maintain their competitiveness. Although this article relied on the Scopus database, its findings remain valuable, providing a solid foundation for future research. This study serves as a guide for experts, managers and policymakers on evidence-based strategies – such as risk management, dynamic capabilities and leadership agility – that enhance competitiveness in the face of both economic and non-economic crises.

Keywords

- enterprise competitiveness
- critical success factors (CSFs)
- crisis management
- economic disruption
- bibliometric analysis

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[1] Poznan University of Technology, pl. M. Skłodowskiej-Curie 5, 60-965 Poznań, Poland, muntaser.hamdouna@doctorate.put.poznan.pl

Introduction

Crises have become a more common problem for contemporary enterprises, endangering both operational continuity and market positioning, regardless of whether they are caused by supply chain disruptions, natural disasters, global pandemics or financial downturns (Ciekanowski et al., 2024). In addition to stressing strategic planning procedures and increasing uncertainty, these unanticipated events frequently expose enterprises' weaknesses. Consequently, scholars and business professionals worldwide alike underscore the significance of identifying critical success factors (CSFs) that allow enterprises to not only survive but also maintain or improve their capacity to compete in challenging environments (Rockart, 1979; Teece et al., 1997).

From a strategic management perspective, enterprises that can innovate, reconfigure and adapt during times of crisis can achieve superior performance and long-term benefits, according to resource-based theory (Barney, 1991) and dynamic capabilities (Teece et al., 1997). Moreover, these concepts align with current research on enterprise resilience, which emphasises the ability to recover and even thrive in the face of adversity (Lengnick-Hall et al., 2011). Combined, the key functions of elements such as strategic flexibility, risk management and leadership agility are highlighted by these theories. Moreover, different research on the resilience of supply chains and viability during significant disruptions indicates that crises often demand innovative strategies for supply chain structures, as highlighted by (Ivanov & Dolgui, 2021).

However, current publications on critical success factors for the competitiveness of an enterprise in times of crisis are still widely scattered across a variety of academic fields. For example, operations management, business, economics and sociology (Coombs, 2007). For researchers seeking a thorough comprehension of the conception, validation and application of critical success factors (CSFs), the fragmented nature of this literature presents difficulties. Assessing existing research, systematising and mapping, as well as a bibliometric review provide a systematic and quantitative approach to addressing this gap (Aria & Cuccurullo, 2017; Zupic & Čater, 2015). To guide future theoretical development and managerial practice, bibliometric methods, employing techniques such as citation analysis, co-occurrence networks and thematic analysis, help identify intellectual structures and emerging trends.

To address this gap, this paper presents a bibliometric analysis of 1,792 publications indexed by the Scopus database and published between 1998 and 2024. These publications were selected based on filters and keywords that were set to achieve the paper's objective, which is to examine in detail papers with heavily referenced critical success factors for enterprise competitiveness. In addition to the basic concepts of "critical success factors" and "key success factors", additional

criteria were added to focus on different crises using a wide range of terms existing in the field of articles, such as "crisis", "pandemic" and "economic crisis". The search also included the following terms: "businesses", "firms", "organizations", "competitiveness", "competitive advantage" and "business performance". After excluding irrelevant studies and non-English articles, as well as applying other filters to the original dataset of 8,034 documents, a core collection of important research in business, social sciences and economics was retained. This study addresses the following research questions:

- RQ1: What is the distribution of critical success factors (CSFs) for enterprise competitiveness during crises, as reflected in publications from 1998 to 2024?
- RQ2: Which journals and authors have been most influential in publishing research on the critical success factors for enterprise competitiveness during crises, as identified through bibliometric analysis from 1998 to 2024?
- RQ3: Which countries and institutions have contributed the highest number of publications on critical success factors for enterprise competitiveness during crises from 1998 to 2024?
- RQ4: What are the primary research keywords and thematic trends from 1998 to 2024 related to the critical success factors for enterprise competitiveness during crises?

Overall, addressing significant authors, topic clusters and emerging scholarly trends is the main aim of this review article. This will be achieved by answering the four research questions proposed in this introduction. This will provide insights into how enterprises can acquire and maintain a competitive edge during times of change. The following sections present the bibliometric analysis, outline the methodology and discuss the key findings, culminating in conclusions and recommendations for additional research and use.

1. Materials and methods

Bibliometric analysis offers an organised, data-driven approach to charting the evolution of scientific understanding. It reveals trends in research output, collaboration and thematic evolution; it is especially helpful for figuring out how a field has changed over time. In line with this approach, this review paper aims to reveal the profile of the studies conducted on the critical success factors for enterprise competitiveness during crises. In recent years, bibliometric analysis has become extremely popular in business research (Khan et al., 2021). Moreover, bibliometric analysis involves tracking studies on a particular topic and uncovering insights

by examining these studies based on different attributes. Therefore, visualisation and bibliometric methods were used together in the study to achieve the main aim of this paper. Furthermore, VOSviewer version 1.6.20 was used to analyse keywords and identify clusters within the authors' keywords.

The PRISMA framework was applied to structure the article selection process in 2 stages: identification (initial query using broad CSF-related keywords) and eligibility (applying year range, subject area, document type, publication stage and language filters). This process is visualised in Figure 1. Scopus was chosen as the sole data source due to its wide indexing of peer-reviewed journals across the fields

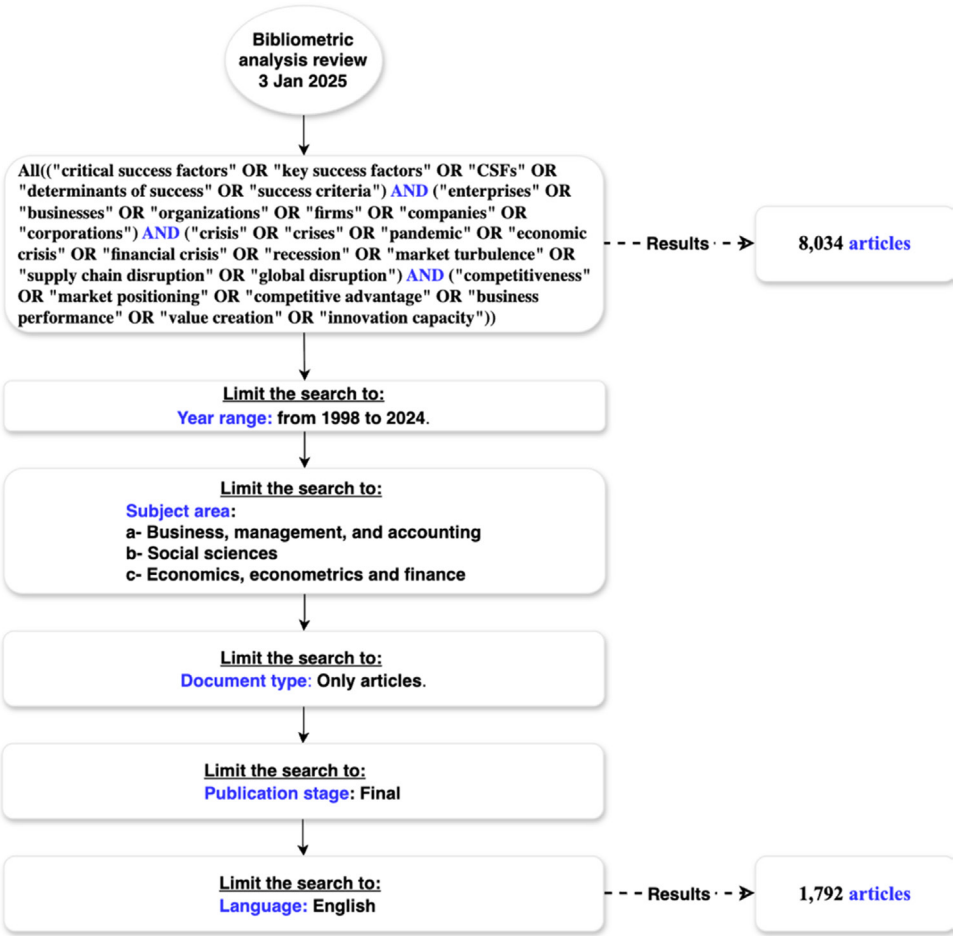

Figure 1. PRISMA flow diagram showing data screening and selection process

Source: author's adaptation based on PRISMA framework and Scopus data.

of business, economics and social sciences. It also offers full export of metadata necessary for keyword co-occurrence analysis and integration with bibliometric software such as VOSviewer. Although this creates some limitation by excluding sources like Web of Science, Scopus provided sufficient depth and breadth for the research scope and objectives.

This research was conducted on 3 January 2025. The Scopus database was used in this research. The initial search was done using the general query, which revealed that there are 8,034 articles in the context of Critical Success Factors (CSFs) for the international competitiveness of enterprises during crises. This does not mean the main focus of the paper; rather, it means any paper that meets the conditions in the query and contains the keywords of the query in any part of it. The "All fields" option was used to search for keywords in all fields during the first scan. The keywords that were used are ("critical success factors" OR "key success factors" OR "CSFs" OR "determinants of success" OR "success criteria") **AND** ("enterprises" OR "businesses" OR "organizations" OR "firms" OR "companies" OR "corporations") **AND** ("crisis" OR "crises" OR "pandemic" OR "economic crisis" OR "financial crisis" OR "recession" OR "market turbulence" OR "supply chain disruption" OR "global disruption") **AND** ("competitiveness" OR "market positioning" OR "competitive advantage" OR "business performance" OR "value creation" OR "innovation capacity"). This research covered the period between 1998 and 2024 articles and included the following subject areas (SUBJAREA, "BUSI") OR (SUBJAREA, "SOCI") OR (SUBJAREA, "ECON").

This research focuses on the already published articles and excludes preprints or drafts. In addition, only English-language journal articles were included in this study; publications in other languages were excluded. Moreover, the final articles used in this review were 1,792 in CSF of international competitiveness of enterprises during crisis. Exclusion and inclusion criteria are presented in Table 1.

In conclusion, this review article utilises bibliometric analysis using VOSviewer version 1.6.20, which is considered as one of the most commonly used software in the area of bibliometric analysis. The main reason for carrying out this research is that the international competitiveness of enterprises has evolved into a compelling research area with growing research numbers. Thus, it is required to investigate the thematic structure of research in this field with a focus on times of crisis. The study relies on tools capable of analysing extensive and documented literature data. This research aims to provide meaningful insights into the key discussions and emerging trends related to the international competitiveness of enterprises in the context of crisis management.

Table 1. Inclusion and exclusion criteria for data screening in review paper

Inclusion criteria	**Searches for all variations of CSFs, ensuring inclusiveness**: "critical success factors" OR "key success factors" OR "CSFs" OR "determinants of success" OR "success criteria"
	Target documents relevant to different types of organisations: "enterprises" OR "businesses" OR "organizations" OR "firms" OR "companies" OR "corporations"
	Captures a wide range of crisis-related scenarios: "crisis" OR "crises" OR "pandemic" OR "economic crisis" OR "financial crisis" OR "recession" OR "market turbulence" OR "supply chain disruption" OR "global disruption"
	Focuses on dimensions of competitiveness: "competitiveness" OR "market positioning" OR "competitive advantage" OR "business performance" OR "value creation" OR "innovation capacity"
Exclusion criteria	**Limit publication years**: PUBYEAR > 1998 AND PUBYEAR < 2025: limits the search to publications from 1998 to 2024, covering recent and relevant decades
	Limit to areas of business, social sciences and economics to ensure contextual relevance: LIMIT-TO (SUBJAREA, "BUSI") OR LIMIT-TO (SUBJAREA, "SOCI") OR LIMIT-TO (SUBJAREA, "ECON")
	Limit document type to journal articles, excluding reviews, conference papers or other formats: LIMIT-TO (DOCTYPE, "ar")
	Limit language to ensure the results are in English for ease of analysis: LIMIT-TO (LANGUAGE, "English")
	Limit publication stage to exclude preprints or drafts, focusing on finalised publications: LIMIT-TO (PUBSTAGE, "final")

Source: author's criteria based on Scopus search parameters and PRISMA guidelines.

2. Findings

This bibliometric review article investigates enterprise competitiveness under crisis conditions. The primary aim is to uncover the research landscape surrounding critical success factors (CSFs) that contribute to enterprise readiness and sustained competitiveness during crises. Based on the research questions, the findings of the review are presented below.

RQ1: What is the distribution of critical success factors (CSFs) for enterprises competitiveness during crises, as reflected in publications from 1998 to 2024?

This section addresses the distribution of critical success factors (CSFs) for enterprise competitiveness during crises, in response to Research Question 1 (RQ1). Figure 2 depicts the significantly increasing number of papers in Scopus databases between 2018 and 2024, with 2024 contributing the most with 428 articles, followed by 425 articles in 2023. It is clear that there was little discussion of this sub-

ject prior to 2018, with fewer than 50 articles, but a significant increase occurred between 2020 and 2024, which corresponds to the COVID-19 period.

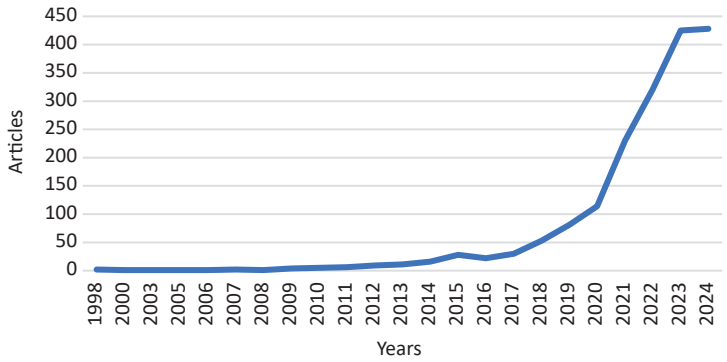

Figure 2. Annual number of publications related to critical success factors (CSFs) for enterprise competitiveness during crises

Source: Scopus, accessed 3 January 2025.

Concurrently, Figure 3, based on the Scopus database, shows the distribution of the retrieved articles by research field from 1998 to 2024. It shows that the fields of business, management, accounting and social sciences dominate, accounting for approximately 46% of the total 1,792 articles. This is followed by environmen-

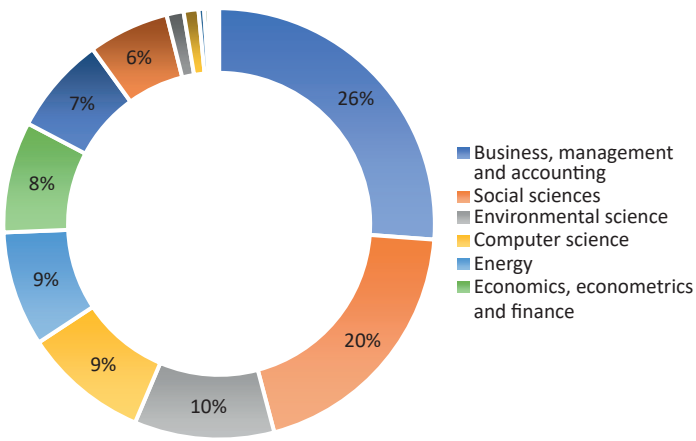

Figure 3. Subject area distribution of selected publications on CSFs and enterprise competitiveness in crisis contexts

Source: Scopus database, accessed 3 January 2025.

tal science (10%), economics, econometrics and finance (8%), decision sciences (7%) and engineering (6%).

RQ2: Which journals and authors have been most influential in publishing research on critical success factors for enterprise competitiveness during crises, as identified through the bibliometric analysis from 1998 to 2024?

Table 2 presents the top ten journals and includes the following data: "Total Publication (TP)", "Total Citation (TC)", "Cite Score of the journal", "The most cited article", "Times cited" and "Publisher of the journal". Sustainability (Switzerland) is the top journal, with 57,100 articles, 413,020 citations and a cite score of 7.2 in 2024. The table below lists the top ten journals.

Table 2. Top 10 journals in the international competitiveness of enterprises during crisis conditions according to the Scopus database

Journal	Number of articles using the query	TP	TC	Cite score	The most cited article	Times cited	Publisher
Sustainability (Switzerland)	319	57,100	413,020	7.2	Recent Advances in the Remediation of Textile-Dye-Containing Wastewater: Prioritizing Human Health and Sustainable Wastewater Treatment	64	Multidisciplinary Digital Publishing Institute (MDPI)
Cogent Business and Management	44	2,043	9,136	4.5	Exploring the evolution of creative accounting and external auditors: Bibliometric analysis	18	Cogent OA
Journal of Open Innovation: Technology, Market, and Complexity	37	883	11,178	12.7	Reducing transport sector CO2 emissions patterns: Environmental technologies and renewable energy	33	Elsevier
Journal of Cleaner Production	28	18,876	375,170	19.9	Navigating the confluence of artificial intelligence and education for sustainable development in the era of industry 4.0: Challenges, opportunities, and ethical dimensions	114	Elsevier

cont. Table 2

Journal	Number of articles using the query	TP	TC	Cite score	The most cited article	Times cited	Publisher
Uncertain Supply Chain Management	27	534	2,984	5.6	Utilizing blockchain technology in enhancing supply chain efficiency and export performance, and its implications on the financial performance of SMEs	36	Growing Science
Business Strategy and the Environment	26	1,215	28,456	23.4	Digitalization transformation and ESG performance: Evidence from China	88	John Wiley & Sons
SAGE Open	24	4,022	13,464	3.3	Modeling the Consumers' Flow Experience in E-commerce: The Integration of ECM and TAM with the Antecedents of Flow Experience	59	SAGE
Technological Forecasting and Social Change	23	2,928	72,165	24.6	Pathways towards carbon neutrality in low carbon cities: The role of green patents, R&D and energy use for carbon emissions	51	Elsevier
Journal of Business Research	17	3,243	76,633	23.6	The authentic virtual influencer: Authenticity manifestations in the metaverse	55	Elsevier
Administrative Sciences	15	896	4,680	5.2	Enhancing the Competitiveness of AI Technology-Based Startups in the Digital Era	13	Multidisciplinary Digital Publishing Institute (MDPI)

Note: TP – total publications, TC – total citations.

Source: Scopus, last updated for 2024 on 5 December 2024.

Figure 4 displays the ranking of the most influential authors based on analytics from the Scopus database, using the search query outlined in the methodology section. According to the data, A. F. Kineber holds the top position with ten published articles. He is followed by S. Luthra, A. Lutfi, and J. Antony, each with eight publications. Y. K. Dwivedi, J. A. Garza-Reyes, and A. Gunasekaran follow closely, with seven articles each. Rounding out the top ten are M. Alrawad, A. Kumar and A. E. Oke, each contributing six articles.

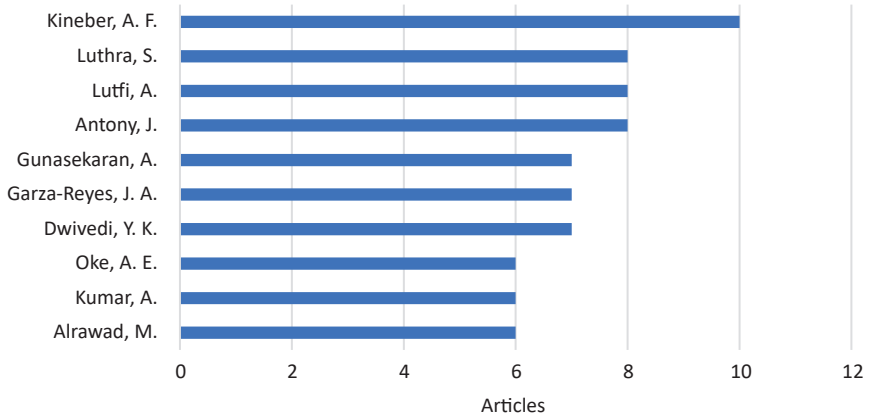

Figure 4. Most prolific authors contributing to research on CSFs and enterprise competitiveness during crises, based on publication count in Scopus (1998–2024)

Source: Scopus, accessed 3 January 2025.

RQ3: Which countries and institutions have been most productive in publishing research on critical success factors for enterprise competitiveness during crises between 1998 and 2024?

Table 3 shows the country and number of published articles based on the Scopus database and the keywords used in the query. According to the final list of articles, the United Kingdom has published the most, with 295 articles, followed by China with 158. This data suggests a significant academic interest in those two countries,

Table 3. Top 10 countries and educational institutions

Country	TP of the country using the final query	Educational institution of the highest cited article in the country
United Kingdom	295	Swansea University
China	158	Soochow University
Malaysia	138	Universiti Malaysia Perlis
India	135	Amity University
Spain	128	University of Alicante
United States	119	California State University
Italy	105	University of Padova
Indonesia	94	Universitas Islam Sultan Agung
Saudi Arabia	91	Mansoura University
South Africa	91	North-West University

Note: TP – total publications.

Source: Scopus database, accessed 3 January 2025.

which might be due to their well-developed research infrastructure and interest in the field of competitiveness of enterprises during a crisis. Malaysia and India follow with 138 and 135 articles, respectively. South Africa and Saudi Arabia have the fewest articles in the top ten (91 articles), but their appearance in the top ten shows emerging research activity and growing interest in this area. Other notable contributors in the top ten include Spain, Italy and the United States.

Figure 5 shows the distribution of affiliations, with the most prominent organisations being the University of Johannesburg, Applied Science Private University, King Faisal University, Al-Balqa Applied University, Silesian University of Technology and Universiti Utara Malaysia. These findings suggest that the critical success factors for enterprise competitiveness during crises align with overarching trends, thereby enriching our understanding of overall enterprise development.

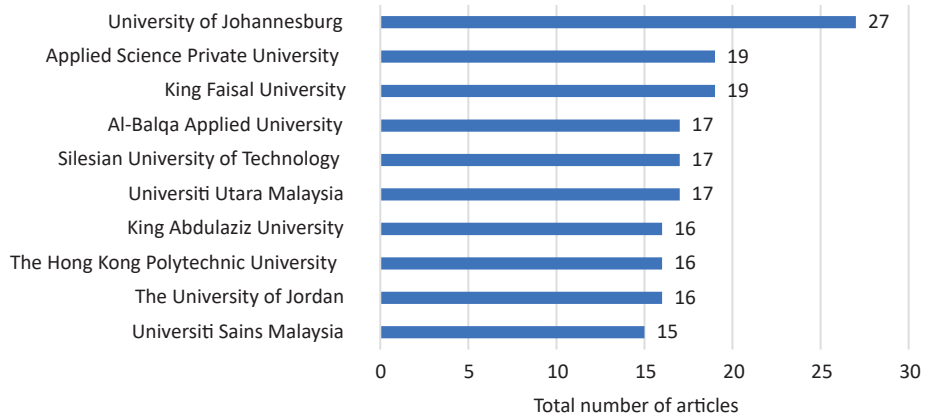

Figure 5. Distribution of publications by institutional affiliation, showing the top contributing organizations in CSF-related research during crisis contexts

Source: Scopus database, accessed 3 January 2025.

RQ4: What are the primary research keywords and thematic trends from 1998 to 2024 related to critical success factors for enterprise competitiveness during crises?

This section examines the keywords most commonly linked to enterprise competitiveness and critical success factors (CSFs) in crisis contexts. Using VOSviewer and based on the co-occurrence analysis of the 1,792 articles extracted from the Scopus database, Table 4 (below) presents the top 20 most frequent keywords, their occurrence counts and total link strengths.

Table 4. Top 20 keywords occurrences in the final dataset (1998–2024)

Rank	Keyword	Occurrences	Total link strength
1	sustainability	251	527
2	COVID-19	143	212
3	innovation	131	215
4	sustainable development	127	267
5	supply chain management	109	225
6	decision making	80	153
7	industry 4.0	66	137
8	SMEs	65	69
9	business	64	148
10	performance	60	52
11	digital transformation	56	122
12	strategic approach	55	158
13	manufacturing	51	133
14	small and medium-sized enterprise	47	150
15	competitiveness	45	77
16	project management	45	65
17	supply chains	44	83
18	critical success factors	42	57
19	stakeholder	39	101
20	artificial intelligence	39	60

Source: author's analysis using VOSviewer (based on Scopus data).

Additionally, Figure 6 presents the distribution of authors' keywords generated using VOSviewer, with a minimum occurrence threshold of 30. This led to five different clusters of keywords, each category reflecting a particular thematic focus within the literature on enterprise competitiveness in times of crisis.

The following list presents a full analysis regarding these five clusters marked by the VOSviewer:

1. **First cluster (red)**: it includes keywords with high occurrence values: sustainability (251), COVID-19 (143), sustainable development (127), supply chain (127), decision-making (80), business (64), stakeholder (39), strategic approach (55), competitiveness (45) and entrepreneurship (32). The first cluster draws attention to the importance of technical innovation and digital transformation as key drivers of resilience and success in the modern environment.
2. **Second cluster (green)**: this cluster has the following keywords with their occurrence value regardless of their order: Industry 4.0 (66), technology adoption (34), digitization (36) and critical success criteria (42). The second cluster

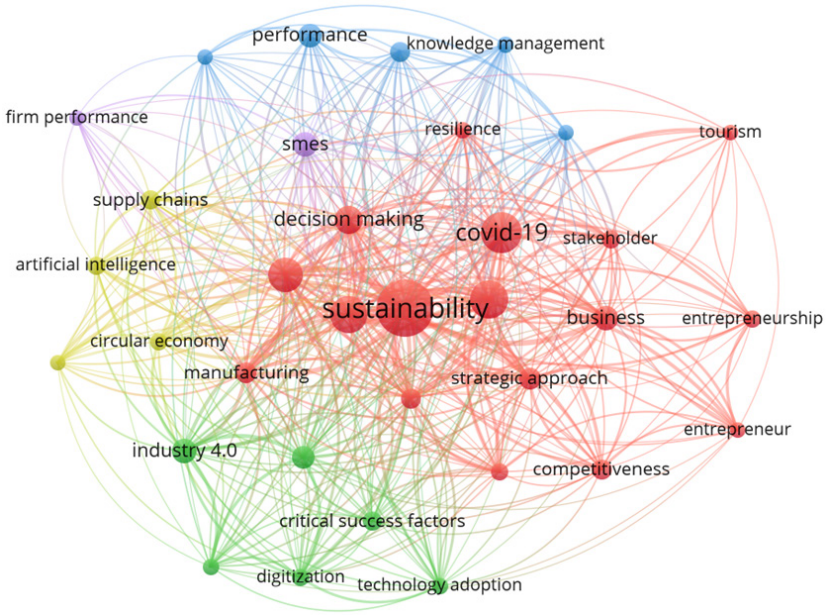

Figure 6. Network visualisation of keyword co-occurrence on critical success factors for enterprise competitiveness in crises

Source: author's analysis using VOSviewer (based on Scopus data).

spotlights the drivers of resilience and success in today's dynamic landscape, such as digital transformation and technical innovation.

3. **Third cluster (blue)**: it covers many keywords such as performance (60), competitive advantage (32), knowledge management (35), performance assessment (30) and project management (45). This cluster concentrates on the importance of studying the strategies that businesses follow to handle crises by means of resilience and performance.
4. **Fourth cluster (purple)**: it covers SMEs (65) and firm performance (32) keywords. It raises awareness of small and medium-sized businesses, and it investigates how they can improve their performance, especially in times of crisis.
5. **Fifth cluster (yellow)**: this cluster focuses on the following keywords along with their occurrence values: circular economy (36), artificial intelligence (39), supply chain (31) and supply chains (44). This cluster focuses on modern technologies – such as artificial intelligence (AI) – that improve competitiveness and resource economy as well as on sustainable production methods.

The five clusters reveal interconnected dimensions of business competitiveness during crises: sustainability and crisis management (red) is enabled by technological capabilities (green), which in turn drives firm performance and resilience

(blue/purple), while being shaped by emerging paradigms like circular economy and AI (yellow). The dense network of interconnections visible in Figure 6 demonstrates how contemporary research on firm competitiveness in challenging contexts requires an interdisciplinary approach, integrating aspects from all five identified clusters.

Moreover, clicking on the "competitiveness" keyword will highlight its links with other important keywords, which are shown clustered around it, as illustrated in Figure 7.

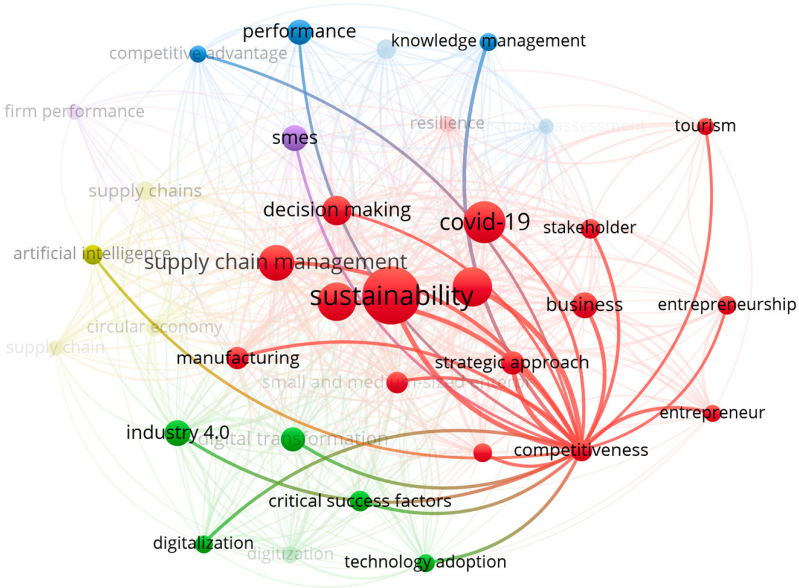

Figure 7. Network visualisation of keyword co-occurrence on critical success factors for enterprise competitiveness in crises (clustered around the competitiveness keyword)

Source: author's analysis using VOSviewer (based on Scopus data).

In Figure 7, the following critical success factors (CSFs) for enterprise competitiveness during crises are highlighted based on VOSviewer analysis, co-occurrence patterns and the prominence of specific terms in the keyword map. Notably, "Sustainability", "Competitiveness" and "COVID-19" frequently appear together, suggesting that long-term sustainability and ethical behaviour are essential for surviving disruptions.

1. **Resilience**: which highlights the importance of organisational adaptability and crisis recovery in gaining a competitive edge. This is reflected from the link between competitiveness, performance and SMEs.

2. **Technology adoption**: this critical key factor is reflected in keywords such as industry 4.0, AI and technology adoption. This factor emphasises the importance of using current technologies to retain efficiency, innovation and adaptability during crises.
3. **Digital transformation**: based on the keyword "digitalization" which emphasises technology and process optimisation as a critical success factor (CSF) to sustain innovation and entrepreneurial capacity for adaptation, particularly in times of crisis, this could be another important component.
4. **Stakeholder**: another critical success factor identified through the keyword "stakeholder". It emphasises how important it is for all stakeholders to have solid relationships and use information effectively.
5. **Knowledge management**: it could be another key factor that underscores the need for strong and effective use of information, which is required for well-coordinated, competent decision-making in the face of ambiguity.
6. **Entrepreneurial and strategic approach**: the emphasis on phrases such as entrepreneurship, decision-making and strategic approach conveys a clear message – to successfully go through unpredictable and tough situations, leaders must take the initiative, have an opportunity-seeking mindset and have adaptable strategies.

Figure 8. summarises the important key factors identified through keywords centred on the term "competitiveness".

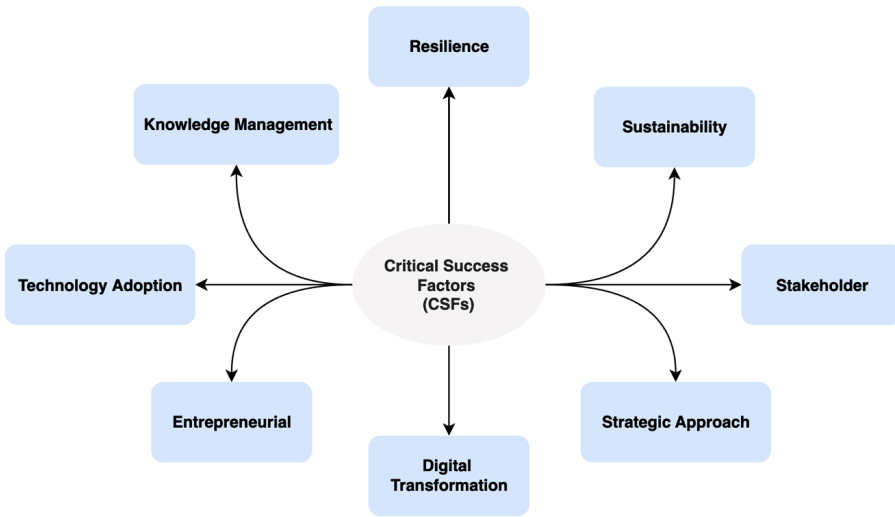

Figure 8. Critical success factors (CSFs) based on terms clustered around "competitiveness"

Source: author's analysis using VOSviewer.

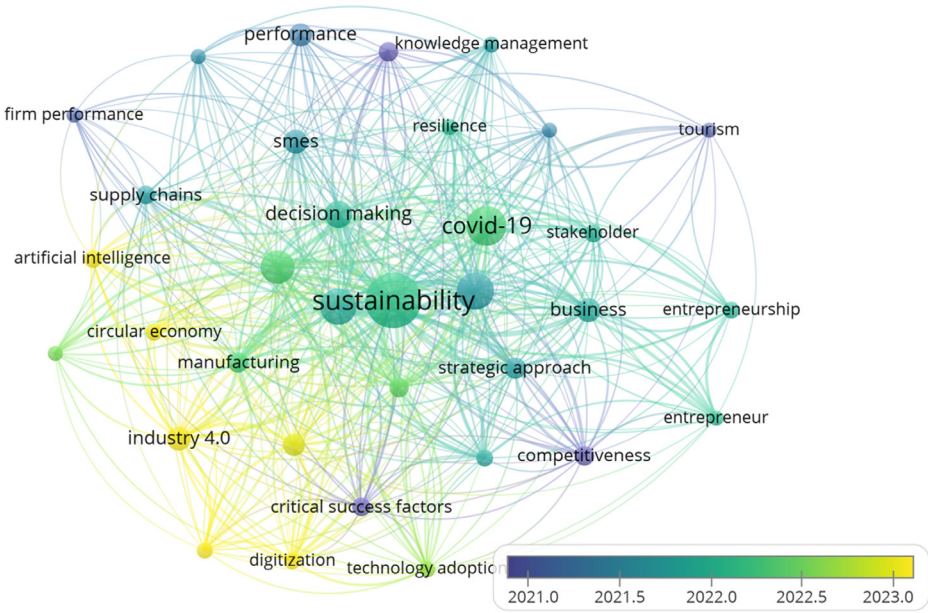

Figure 9. Overlay visualisation of past, current and future research trends on critical success factors for enterprise competitiveness in crises

Source: author's analysis using VOSviewer (based on Scopus data).

Furthermore, Figure 9 displays another output from VOSviewer after uploading all the articles collected from the Scopus database using the defined query. This visualisation illustrates evolving research trends related to critical success factors for enterprise competitiveness during crises. The network of keywords brings to the fore different key topics such as sustainability, decision-making, supply chains and resilience. Moreover, it presents the interconnections among different keywords. The gradient of colour in the map of keywords represents the timeline from 2021 (blue) to 2023 (yellow), indicating the shift in focus areas over time. Darker colours represent earlier studies, pointing out topics like knowledge management and firm performance. In contrast, lighter colours signify more recent research, demonstrating how it increasingly explores themes like artificial intelligence, Industry 4.0, digitization and the circular economy. Hence, there is increased attention on technology-driven and sustainable approaches to enterprise resilience and competitiveness. The visualisation shows that both sustainability and COVID-19 were major factors in how businesses adapted their strategies during turbulent times.

3. Discussion

An in-depth exploration of the critical success factors (CSFs) that influence enterprise competitiveness during crises was the main topic for this bibliometric review. The main findings were structured around four key research questions. Each question was written precisely to offer a unique insight into the evolution, impact and future directions of research in this field. Addressing these four questions systematically does not only offer a broad perspective on the current state of research but also identifies important theme clusters and developing patterns that influence an enterprise's resilience in a rapidly changing environment.

3.1. Evolution and distribution of CSFs in crisis conditions (RQ1)

Scholars' interest in CSFs in crisis conditions for enterprises is growing sharply. This is evident from the increase in the number of publications between 2018 and 2024. This reflects increasing scholarly attention in understanding and developing key strategies that enterprises can use to maintain competitiveness during times of crisis. Also, it's clear from the Scoups data that the number of publications increased dramatically after 2020, which is caused by the global economic disruptions caused by the COVID-19 pandemic, as supported by different sources (Burcă et al., 2024; Javed et al., 2024; Maden et al., 2024; Orjuela et al., 2023). This period during the pandemic emphasised the need for resilient business strategies. Prior to 2018, there was less research on this, which raises the question of whether the 2008 financial crisis simply did not spark the same level of academic interest that the pandemic did.

The distribution of disciplines also yields significant analytical findings: business, management and social sciences predominate, accounting for almost half of all publications, while fields like environmental science and decision sciences add much. This distribution points to an interdisciplinary methodology where competitiveness is not just an economic issue but also a strategic and environmental one in times of crisis. Innovation in enterprise sustainability is supported by the presence of engineering research (6%) that suggests the impact of technical improvements in crisis resilience.

3.2. Influential journals, authors and thought leadership (RQ2)

This question aims to identify the most influential publications and writers in the field of CSFs for competitiveness during crisis, as well as to reveal the schol-

arly networks that propel knowledge development. The top publication outlet with the greatest citation impact was Sustainability (Switzerland). The strategic role that enterprises play in attaining sustainable development is examined in the paper "Strategic transition to sustainability: A cybernetic model" by Štrukelj et al. (2023). Since sustainability frequently involves long-term viability and resilience, the fact that Sustainability publishes such research indicates its involvement in examining the fundamental significance of sustainability in organisational strategy, which is essential when enterprises manage crises. This implies that the idea of sustainability is essential to how enterprises handle crises. Furthermore, journals such as the Journal of Cleaner Production as well as Business Strategy and the Environment emphasise the connection between competitive advantage and environmental responsibility, especially during difficult times.

A focused group of academics are driving the discussion on enterprise competitiveness in crisis situations, as evidenced by a review of important authors. The discussion has benefited greatly from the contributions of A. F. Kineber, S. Luthra and A. Lutfi, who represent a variety of viewpoints on digital transformation, company resilience and strategic decision-making. Although there are still differences in geographical representation, the participation of authors from many countries further suggests a global academic effort to address these issues.

3.3. Geographic and institutional research productivity (RQ3)

The United Kingdom leads in the number of publications on this topic. Based on the geographic distribution of research output, it is followed by China, Malaysia and India. This acts as an indication that corporate competitiveness and crisis management are central to a strong academic infrastructure in these regions. The dominance of Asian and European nations is in line with their vigorous industrial sustainability and economic resilience initiatives.

Moreover, Saudi Arabia and South Africa rank among the top ten contributors. Even though these countries are producing comparatively less research, there is still an increased interest in this field, which may reflect more general economic measures aimed at improving corporate sustainability in the face of global upheavals and financial volatility. Leading universities such as Swansea University, Soochow University and Universiti Malaysia Perlis have also made substantial contributions to knowledge advancement by serving as regional centres for industrial research focused on crises.

3.4. Thematic trends and critical success factors (RQ4)

Using VOSviewer, a keyword analysis reveals important themes in corporate competitiveness in times of crisis. The prevailing themes of sustainability, innovation, supply chain management and digital transformation demonstrate the tactical methods used by businesses to weather disasters. The five thematic clusters – knowledge management, stakeholder engagement, resilience, sustainability and technology adoption – showcase interrelated aspects of corporate success in challenging times.

1. **Sustainability and crisis management**: the popularity of terms like "sustainable development", with 127 occurrences, "COVID-19", with 143 occurrences and "sustainability", with 251 occurrences, indicates that long-term ethical and environmental measures are essential for crisis resilience. Businesses that apply sustainability concepts typically exhibit increased stakeholder trust and flexibility. Numerous articles specifically address how sustainability and enterprise performance are related (Burcă et al., 2024; Matinaro et al., 2019; Setyaningrum & Muafi, 2023), how important sustainable development is in a changing business environment (Burcă et al., 2024), and how supply chain management may incorporate sustainability (Javed et al., 2024; Khan et al., 2023).
2. **Technology adoption and digital transformation**: the use of keywords such as "digitization", with 36 occurrences, "artificial intelligence", with 39 occurrences, and "Industry 4.0", with 66 occurrences, paints a picture of how important cutting-edge technologies are to preserving competitiveness. Moreover, the importance of adopting digital technologies and undergoing digital transformation is a common theme (Calderon-Monge & Ribeiro-Soriano, 2024; Souza et al., 2024; Troise et al., 2022). Businesses that use automation, blockchain and artificial intelligence seem better able to handle operational difficulties and supply chain interruptions (Ayan et al., 2022; Javed et al., 2024; Vongurai, 2024). Moreover, in the post-COVID-19 age, implementing digital technologies is also associated with improving the performance of socially conscious activities (Asokan et al., 2022).
3. **Performance management and resilience**: the correlation between "competitiveness", "decision-making" and "knowledge management" draws attention to the operational and strategic facets of business survival (Mahdi & Nassar, 2021; Martinez et al., 2023; Troise et al., 2022). To lessen the effects of a crisis, resilient businesses place a high value on flexibility (Troise et al., 2022), real-time data analytics and well-informed decision-making (Nisar et al., 2023).
4. **Stakeholder engagement and strategic approaches**: the emphasis on "stakeholder", "entrepreneurship" and "strategic approach" implies that companies that prosper in times of crisis prioritise proactive market strategies (Florek-Paszkowska et al., 2021), leadership agility and cooperative networks

(Philsoophian et al., 2021). Additionally, it emphasises how important leadership choices are to an enterprise's ability to survive a crisis (Chudziński et al., 2022).

5. **Circular economy and sustainability-driven innovation**: businesses are depending more and more on resource efficiency and closed-loop systems to maintain long-term competitiveness (Kiefer et al., 2024), as seen by the rise of the terms "circular economy" and "supply chain" as major themes. Numerous sources emphasise how unsustainable the linear economy is and how improving resource utilisation requires a shift to a circular economy (Kannan et al., 2024; Kiefer et al., 2024).

A change in research focus is also revealed by the keyword co-occurrence timeline. While knowledge management and business performance were the focus of earlier studies (before 2020), more recent studies (2021–2024) have shifted their focus to artificial intelligence, Industry 4.0 and digital resilience. According to this trend, enterprises are not shifting from reactive crisis management to technology-driven, proactive approaches for sustained competitiveness.

3.5. Emerging directions and gaps

1. **Integration of digital and sustainable strategies**: enterprises' approach to crisis responses is changing to balance social, environmental and economic imperatives. This is indicated by the continuous emphasis on digital technologies (digital transformation, digitization) in conjunction with environmental aspects (sustainability, circular economy).
2. **SMEs and crisis adaptation**: although this group of keywords appears frequently, further research may be necessary to fully examine the unique difficulties and creative coping strategies faced by SMEs.
3. **Long-term competitiveness**: Although competitiveness ranks 19th in the list of keywords according to VOSviewer, there is still an opportunity to investigate how these top keywords come together to provide a comprehensive strategy framework that can guarantee both survival and long-term growth after the crisis.

These findings suggest that the academic community is responding not only to empirical disruptions, such as COVID-19, but also to deeper concerns about organisational adaptability, environmental fragility and global interconnectivity. The consistent emphasis on digital transformation, sustainability and stakeholder engagement indicates a shift in how competitiveness is being reconceptualised – not merely as efficiency or profitability, but as long-term viability in complex, uncertain environments. This change reflects both real-world business needs and a broader evolution in scholarly thinking.

Although this review provides a thorough mapping of authors, journals and keywords, its main goal is to explain the evolution of enterprise competitiveness research during crises and its future directions. The bibliometric approach is used to show how disparate discussions in domains such as business, economics, sustainability and crisis management are starting to come together around common issues, in addition to counting publications and visualising keywords. These consist of adaptability to change, resilience and long-term value generation. By classifying and analysing these patterns, the study hopes to inform future research and practice, assisting academics, decision-makers and business executives in developing strategies that are not only reactive but also flexible and proactive.

Conclusions

Examining the critical success factors (CSFs) that enhance enterprise competitiveness during crises was the main goal of this bibliometric review. In addressing four primary research questions, several important findings emerged. First (RQ1), a descriptive analysis of publication trends from 1998 to 2024 confirmed a steady rise in scholarly attention to crisis-related competitiveness topics, with a marked surge following global disruptions, such as the COVID-19 pandemic. Analysis revealed a distinct shift in publication trends. Before 2018, the scholarly output on this topic was limited. However, a significant surge in research occurred after 2020, suggesting a heightened sense of urgency and scholarly focus driven by the crises precipitated by the COVID-19 pandemic.

Regarding the second research question (RQ2), the analysis shows Sustainability (Switzerland) as the most active journal, with numerous publications focused on enterprise resilience and sustainable initiatives. Furthermore, A. F. Kineber and S. Luthra were among the most prolific contributors to this field. These influences impact current discussions about how businesses may stay ahead of the competition in dynamic market conditions. This is through improved supply chain management, digital transformation or strategic innovation.

Third (RQ3), the geographic distribution of research output indicates that the UK was the most productive nation in crisis-focused competitiveness research, followed by China, Malaysia and India. Strong citation impacts were shown by prestigious universities, such as Swansea University and Soochow University, indicating thriving networks of academic engagement and collaboration in these areas. The inclusion of South Africa and Saudi Arabia in the top ten list presents an increase in the interest of the topic among emerging economies and the expanding

geographical diversity in crisis management research, suggesting its increasing recognition across different economic contexts.

Additionally, regarding (RQ4), a keyword co-occurrence analysis highlighted supply chain management, innovation and sustainability as key themes. While digital transformation and technology adoption highlight the role of advanced technologies in strengthening enterprise resilience, references to COVID-19 draw attention to the recent surge in pandemic-related studies. The frequent reference to SMEs, stakeholders and the circular economy highlights the raising awareness of the value of sustainability principles and a variety of organisational structures for crisis preparedness and long-term competitive advantage.

In summary, this bibliometric review identified several key themes central to enhancing enterprise competitiveness during crisis conditions. Based on keyword co-occurrence patterns and thematic clustering across 1,792 articles, the following five critical success factors (CSFs) consistently emerged as the most influential:

1. Sustainability – integrating long-term environmental and social objectives into business strategy to enhance resilience and stakeholder trust.
2. Digital transformation – adopting advanced technologies to drive innovation, operational agility and adaptability in uncertain environments.
3. Organisational resilience – the capacity to absorb shocks, recover from disruptions and maintain continuity in performance.
4. Stakeholder engagement – fostering strong relationships with internal and external stakeholders to support coordinated crisis response.
5. Knowledge management – leveraging institutional learning, data analytics and information flow to support timely and informed decision-making.

These five CSFs form the conceptual foundation for enterprise crisis preparedness and long-term competitiveness. They offer a strategic framework for both academic inquiry and managerial practice in increasingly volatile environments.

Implications for practice: The results of this study offer practical guidance for enterprise leaders and policy decision-makers navigating crisis situations. Rather than relying on academic literature, the following actionable priorities can be integrated directly into planning and operations:

1. Embed sustainability in core strategies: focus on long-term value by incorporating environmental and social considerations into key business decisions. This approach enhances stability and reputation during times of disruption.
2. Advance digital readiness: strengthen technological infrastructure by adopting tools like artificial intelligence and data platforms, enabling real-time decision-making and operational flexibility in unpredictable conditions.

3. Enhance supply network robustness: mitigate risk by broadening supplier bases, utilising digital monitoring tools and reinforcing localised or diversified sourcing strategies.
4. Foster inclusive communication with stakeholders: maintain clear, consistent dialogue with employees, partners and public institutions to improve coordination and trust throughout periods of uncertainty.
5. Develop organisational learning systems: capture and systematise crisis experiences to inform future decisions. Encouraging reflective practices and internal training will support ongoing adaptation.

Governments can facilitate these actions by offering financial and infrastructure support, promoting sustainability-focused incentives and encouraging collaboration between sectors. By doing so, enterprises can become more adaptable, future-focused and better equipped to maintain competitiveness in volatile environments.

Limitations: Even though this bibliometric review paper is based on a solid scientific approach, it has certain limitations. Firstly, relying on the Scopus database may lead to missing some publications in other databases, such as Web of Science or Google Scholar. Secondly, depending on English-language articles may result in missing important research published in other languages. Thirdly, the bibliometrics' quantitative emphasis is unable to adequately capture contextual specificities or qualitative subtleties, such as regional business practices or industry quirks, that may have an impact on how enterprises deal with crises.

Future research directions: Extending data sources to encompass various bibliographic databases – such as Web of Science, and others – in future studies will enhance the breadth and depth of coverage. Additionally, to verify whether the main factors for the success of an enterprise are consistent across contexts or dependent on specific situations, comparing various crises, such as financial downturns, natural disasters and health emergencies, is critical. Furthermore, detailed case studies of successful enterprises or national economies could clarify how theoretical factors translate into actionable plans in the real world. Additionally, it may be necessary to further examine the distinct challenges and innovative responses encountered by Small and Medium-sized Enterprises (SMEs). Lastly, researchers could explore longitudinal or network-based approaches to understand how cooperative relationships among universities, industries and governments influence ongoing innovations in crisis preparedness and competitiveness.

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