Investigating the Trends and Future Research of SMEs in the Era of COVID-19: Perceptions from Bibliometric Analysis

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Abstract This paper reviews the impacts of coronavirus disease 2019 (COVID-19) on small and medium-sized enterprises (SMEs) based on a study of the relevant literature, followed by a discussion of the current state of the research and potential future paths. Based on the 519 reviews and articles gathered from the Web of Science (WoS) between 2020 and 2022, a bibliometric analysis of the influential studies of the impacts of COVID-19 on SMEs in terms of various aspects such as research areas, journals, countries or regions, authors, most cited publications, and author keywords were carried out. The findings of the study reported that the major research areas related to the impacts of COVID-19 on SMEs were "Business" (28.32%), "Management" (21.39%), and "Economics" (13.3%). The most productive journal was the *Sustainability*, with a total publication of 41. China, Indonesia, and UK were the top three contributing countries. Furthermore, "COVID-19", "SMEs", "resilience", "sustainability", and "innovation" were the most popular keywords from 2020 until 2022. When combined with the most cited articles in recent years, the topics on challenges and opportunities for SMEs during the crisis by Eggers in 2020 maintained their rank as the dominant articles with the highest number of total citations, 164.

Keywords Bibliometrics Analysis · COVID-19 · Impacts · SMEs · VOSviewer · Web of Science

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1   Introduction

Bibliometric analysis is a well-known method that is being used by researchers to discover and investigate huge amounts of relevant data to determine patterns and trends in publications on a given subject and to discover the precise organisation of a certain field in the literature at the time [1–3]. Indeed, scholars have used the systematic review of bibliometric methodology in a variety of timelines and fields for decades, such as the bibliometric review of key developments in the *European Journal of Marketing* over the past 50 years [4], ten years of social media use in education [5, 6], human resources [7], a 16-year review of the bibliometric analysis methodology [3, 7], economics within 13 years [7], a study on sport for ten years [8, 9], and business sustainability [10].

Since coronavirus disease 2019 (COVID-19) was first reported in Wuhan, China in December 2019, the effects of the enforcement of the movement control order (MCO) by the authorities from all over the world can still be felt two years after the implementation and have had a significant impact on the social and economic lives of the people [11]. Small and medium-sized entrepreneurs (SMEs) are facing economic problems and social and psychological stress. This situation has attracted the researchers to investigate and identify the trends and direction of the impacts of COVID-19 on business, especially among SMEs. These studies could contribute to helping the industries and authorities identify and formulate strategies that could be proposed to ensure that these businesses could either successfully combat the effects of the pandemic or maintain the economic viability of society. Meanwhile, scholars contribute a number of studies on SMEs in the era of the COVID-19 pandemic from various perspectives such as investigating the strategic role of the digital transformation path of SMEs [12], a study on trends of SMEs among women entrepreneurs [13], discovering the current situation of SMEs during the COVID-19 crisis in a developing country [14], and investigating crisis management among SMEs [15].

This paper presents a bibliometric analysis of the impacts of COVID-19 on SMEs in the business and economics sector using the Web of Science Core Collection from 2020 to 2022. The aim of this paper is to investigate the years that correspond to the most papers produced, the most important journals, the most highly referenced publications, the most influential authors, and the most influential nations. Also, keyword co-occurrences are visualised by VOSviewer in this study [8]. This paper is divided into four sections. Section 2 discusses the method of the study, with data collection strategy and analysis approach. Then, Sect. 3 presents the data analysis and results. Finally, Sect. 4 concludes the paper by highlighting the key findings, limitations, and future research directions.

2 Introduction

2.1 Data Collection and Analysis Method

In this study, the analysis of the extracted data was conducted using a bibliometric analysis method, and the results are presented in the following sections. Firstly, the selection of the search query was conducted. At this stage, the articles were taken from the Web of Science database (WoS). This database was selected because of its wide selection of journals with high-impacts publications. The data was extracted from the Web of Science Core Collection on October 14, 2022. Then, the search query was Topic (TS) = 'impacts of COVID-19' in Title, Abstract, Author Keywords, and Keywords Plus with the Year was between 2020 and 2022, as specified by the search parameters. The search resulted in 519 articles. The following string was the target of the search utilised for this study:

(TS = (COVID-19) AND ALL = (small and medium enterprises)) AND (PY = = ("2020" OR "2021" OR "2022" OR "2023") AND LA = = ("ENGLISH")).

The records of 519 reviews and articles were extracted from WoS into Microsoft Excel to accomplish the data analysis. Microsoft Excel was used to assess the quality of data taken from various aspects. A bar chart was used to display the development trends of research areas, journals, author keywords, and authors more intuitively in the context of COVID-19 research. Cross-relationship tables were used to describe the collective relationships between research areas, countries or regions, and those two types of relationships. Next, the data were visualised in suitable shape for the last step. Tables and charts were used to visually display the results of the final analysis. Therefore, this study did a thorough review of the impacts of COVID-19 research with the goals to identify the most important works, to identify the research topics, and to offer insights into present research interests and potential future directions. To support scholars in understanding the advancement of the impacts of COVID-19 research and future trends, data quantification and graphical display were applied to prepare a clearer picture of the progress of the impacts of COVID-19 research and future trends.

3 Results

3.1 Number of Articles Published

The quantity and pattern of publications are important markers of a discipline's level of progress. As previously stated, as of October 14, 2022, there were 519 research articles and reviews retrieved from the Internet on the impacts of COVID-19 on SMEs from 2020 to 2022. The total number of publications by year was correlated

Table 1 Number of publications related to impacts of COVID-19 on SMEs in 2020–2023

Year	2020	2021	2022	2023
Total Publish	61	230	227	1

with the impacts of COVID-19 on SME trends from 2020 to 2023 (see Table 1). There was an increasing number of articles published from 2020 to 2022 (61 to 227).

3.2 Analysis of Research Areas

The WoS database classified all the information in every article as a research category. The 519 publications on the impacts of COVID-19 on SMEs encompassed 25 WoS research areas since the study fields denoted the application ranges of the subject. Table 2 shows the top ten research areas related to the total number of papers. "Business" (147, 28.32%), "Management" (111, 21.39%), and "Economics" (69, 13.3%) occupied the top three categories concerned with the total paper (TP) and percent of total papers (TPR%) in the field. "Environmental Sciences" accounted for 11.18% of the total papers in the field, followed by "Environmental Studies" with 10.02%. The remaining research areas made up less than 10% of the total.

Table 2 Top 10 WoS research areas

Rank	WoS Categories	TP	TPR%
1	Business	147	28.32
2	Management	111	21.39
3	Economics	69	13.30
4	Environmental Sciences	58	11.18
5	Environmental Studies	52	10.02
6	Green Sustainable Science Technology	48	9.25
7	Business Finance	24	4.62
8	Computer Science Artificial Intelligence	20	3.85
9	Computer Science Information Systems	19	3.66
10	Hospitality Leisure Sport Tourism	17	3.276

Abbreviations: TP, Total papers; TPR%, percent of total papers in the field

3.3 Most Dominant Journals with the Highest Number of Publications

For scholars to obtain information and submit manuscripts, it is important to explain the journal's success in publishing articles in related fields. The top ten journals publishing articles on the impacts of COVID-19 on SMEs were concluded based on the total number of papers and the total citations (see Table 3). In terms of the TP published from 2020 to 2022, the *Sustainability* (41), *Journal of Asian Finance, Economics, and Business* (18), and *Benchmarking: An International Journal* (12) were the top three. As expected, the *Sustainability* ranked at the top of the most referenced journals, along with *International Small Business Journal-Researching Entrepreneurship* (198). The rest of the most referenced journals, on the other hand, differed from the list of the most total papers journal. *International Journal of Information Management* (153), *Journal of Industrial and Business Economics* (114), and *Journal of Business Research* (180). Although *Benchmarking: An International Journal* was listed as one of the top three journals with the greatest number of publications, it was not listed as the most referenced journal.

Table 3 The top 10 WoS journals

Rank	Journal Title	TP	Journal Title	TC
1	*Sustainability*	41	*Sustainability*	198
2	*Journal of Asian Finance Economics and Business*	18	*International Small Business Journal-Researching Entrepreneurship*	198
3	*Benchmarking-An International Journal*	12	*Journal of Business Research*	180
4	*International Small Business Journal-Researching Entrepreneurship*	9	*International Journal of Information Management*	153
5	*Frontiers In Psychology*	9	*Journal of Industrial and Business Economics*	114
6	*Journal of Entrepreneurship in Emerging Economies*	8	*Journal of Asian Finance Economics and Business*	100
7	*Journal of Business Research*	6	*Journal of Entrepreneurship in Emerging Economies*	99
8	*International Journal of Environmental Research and Public Health*	5	*Environmental Hazards-Human and Policy Dimensions*	86
9	*International Journal of Emerging Markets*	5	*Frontiers of Business Research in China*	70
10	*Environment-Behaviour Proceedings Journal*	5	*Research In International Business and Finance*	55

Abbreviations: TP, Total papers; TC, total citation

3.4   Analysis of Most Dominant Countries or Regions

The results in Table 4 display that China was the most productive country, with the highest number of papers (61), thus showing the most research influence and interest in the impacts of COVID-19 on SMEs. Indonesia supplied the second highest number of papers to the global output (59). The United Kingdom (53), India (48), and USA (41) were ranked as the third, fourth, and fifth most productive countries, respectively. Nearly half of the entire number of papers was made up by the publications of the top five countries (262). The top three productive countries were China, Indonesia, and the United Kingdom. The only country from Oceania included in Table 4 was Australia, which came in eighth place with 21 papers. The top ten regions with the most productive publication were from Asia, America, Europe, and Oceania, with Asia accounting for more than half of them.

Table 4   Most productive countries or regions from 2020 until 2022

Rank	Country	TP by Year				Region
		2020	2021	2022	TP	
1	China	8	22	31	61	Asia
2	Indonesia	4	31	24	59	Asia
3	England	11	19	23	53	Europe
4	India	7	15	26	48	Asia
5	USA	5	21	15	41	America
6	Malaysia	2	14	20	36	Asia
7	Italy	3	11	11	25	Europe
8	Australia	2	6	13	21	Oceania
9	Poland	3	9	8	20	Europe
10	South Korea	2	7	5	14	Asia
11	Czech Republic	1	10	2	13	Europe
12	Canada	1	5	5	11	America
13	Slovakia	2	5	3	10	Europe
14	Vietnam	1	0	9	10	Asia
15	Japan	2	2	4	8	Asia
16	Croatia	1	7	0	8	Europe
17	Sweden	2	2	3	7	Europe
18	Scotland	2	1	3	6	Europe
19	Belgium	1	1	2	4	Europe
20	Denmark	1	2	1	4	Europe

Abbreviation: TP, Total papers

3.5 Most Dominant Authors Who Contributed to the WoS

The top three most dominant authors in the study of the impacts of COVID-19 among SMEs, according to the total number of publications, were Tan KH, Belas J, and Motik D (see Table 5). Tan KH produced the highest number of publications with 156 total papers and influenced the highest values of total citations with h-index (3582, 32), while Belas J was responsible for the second most dominant author with 94 total papers and 1196 total citations. Even though Motik D was the third-ranked total papers of 60, the third-ranked most-referred author was O'Shea M (388).

Table 5 The top 15 most dominant authors

Rank	Author	WoS ID	TP	TC	H-Index	Current affiliation	Country
1	Tan, Kim Hua	FYE-1708-2022	156	3582	32	University of Nottingham	United Kingdom
2	Belas, Jaroslav		90	1196	22	Tomas Bata University Zlin	Czechia
3	Motik, Darko	DJX-6257-2022	60	146	6	University of Zagreb	Croatia
4	Behl, Abhishek	GDR-6711-2022	47	100	6	Management Development Institute (MDI)	India
5	Narmaditya, Bagus Shandy		36	219	9	Universitas Negeri Malang	Indonesia
6	O'Shea, Michelle	DJQ-0610-2022	35	388	11	Western Sydney University	Australia
7	Wibowo, Agus		28	197	9	Universitas Negeri Jakarta	Indonesia
8	Zimon, Grzegorz	GCX-2073-2022	28	106	7	Rzeszow University of Technology	Poland
9	Thanh Tiep Le	GAF-5536-2022	23	143	6	Ho Chi Minh City University	Vietnam
10	Liat, Lim Choon	DDI-1705-2022	17	81	5	Universiti Putra Malaysia	Malaysia

Table 5 (continued)

Rank	Author	WoS ID	TP	TC	H-Index	Current affiliation	Country
11	Ming, Xiao	FOQ-6751-2022	10	30	4	University of Science & Technology Beijing	China
12	Abu Hasan, Norraidah	FXO-8386-2022	7	3	1	Universiti Teknologi MARA	Malaysia
13	Kholaif, Moustafa Mohamed Nazief Haggag Kotb	GBQ-5360-2022	5	8	2	University of Science & Technology Beijing	China
14	Koresis, Alex	CZZ-6106-2022	3	142	2	Curtin University	Australia
15	Huy Khanh Nguyen	DIA-5007-2022	3	17	2	University of Economics and Business	Vietnam

Abbreviations: TP, total papers; TC, total citations.

3.6   Analysis of Most Cited Articles

Even though several factors affect the citation impacts, analysing a paper's citation frequency also describes its significance in the research area. The most influential article on COVID-19 among SMEs in the business and economics areas by year was *Masters of disasters: Challenges and opportunities for SMEs in times of crisis* with 164 total citations, published by the *Journal of Business Research* in 2020 (see Table 6). The second most cited paper, *The use of digital technologies by small and medium enterprises during COVID-19: Implications for theory and practice* focused on exploring the implementation of digital technologies among SMEs. The study with the title *European SMEs amidst the COVID-19 crisis: assessing impacts and policy responses* that studied the impacts of COVID-19 among Europeans ranked in the third position in total citations (114). According to the study, Elsevier publishers dominated the market relative to other publishers.

Table 6 Most cited articles related to the study on impacts of COVID-19 among SMEs

Rank	Authors	Article Title	Year	Publisher	Publisher	TC
1	Eggers, F	*Masters of disasters? Challenges and opportunities for SMEs in times of crisis*	2020	*Journal of Business Research*	Elsevier Science Inc	164
2	Papadopoulos, T; et al	*The use of digital technologies by small and medium enterprises during COVID-19: Implications for theory and practice*	2020	*International Journal of Information Management*	Elsevier Sci Ltd	153
3	Juergensen, J; et al	*European SMEs amidst the COVID-19 crisis: assessing impact and policy responses*	2020	*Journal of Industrial and Business Economics*	Springer Nature	114
4	Cowling, M; et al	*Did you save some cash for a rainy COVID-19 day? The crisis and SMEs*	2020	*International Small Business Journal-Researching Entrepreneurship*	Sage Publications Ltd	95
5	Lu, Y; et al	*The perceived impact of the Covid-19 epidemic: evidence from a sample of 4807 SMEs in Sichuan Province, China*	2020	*Environmental Hazards-Human and Policy Dimensions*	Taylor & Francis Ltd	86
6	Castro, MP; et al	*Being an entrepreneur post-COVID-19-resilience in times of crisis: a systematic literature review*	2021	*Journal of Entrepreneurship in Emerging Economies*	Emerald Group Publishing Ltd	58
7	Guo, H; et al	*The digitalization and public crisis responses of small and medium enterprises: Implications from a COVID-19 survey*	2020	*Frontiers of Business Research in China*	Springer	54

(continued)

Table 6 (continued)

Rank	Authors	Article Title	Year	Publisher	Publisher	TC
8	Caballero-Morales, SO	*Innovation as recovery strategy for SMEs in emerging economies during the COVID-19 pandemic*	2021	*Research In International Business and Finance*	Elsevier	47
9	Ali, MH; et al	*Supply chain resilience reactive strategies for food SMEs in coping to COVID-19 crisis*	2021	*Trends In Food Science & Technology*	Elsevier Science London	44
10	Gregurec, I; et al	*The Impact of COVID-19 on Sustainable Business Models in SMEs*	2021	*Sustainability*	MDPI	41

Abbreviations: TC, total citations.
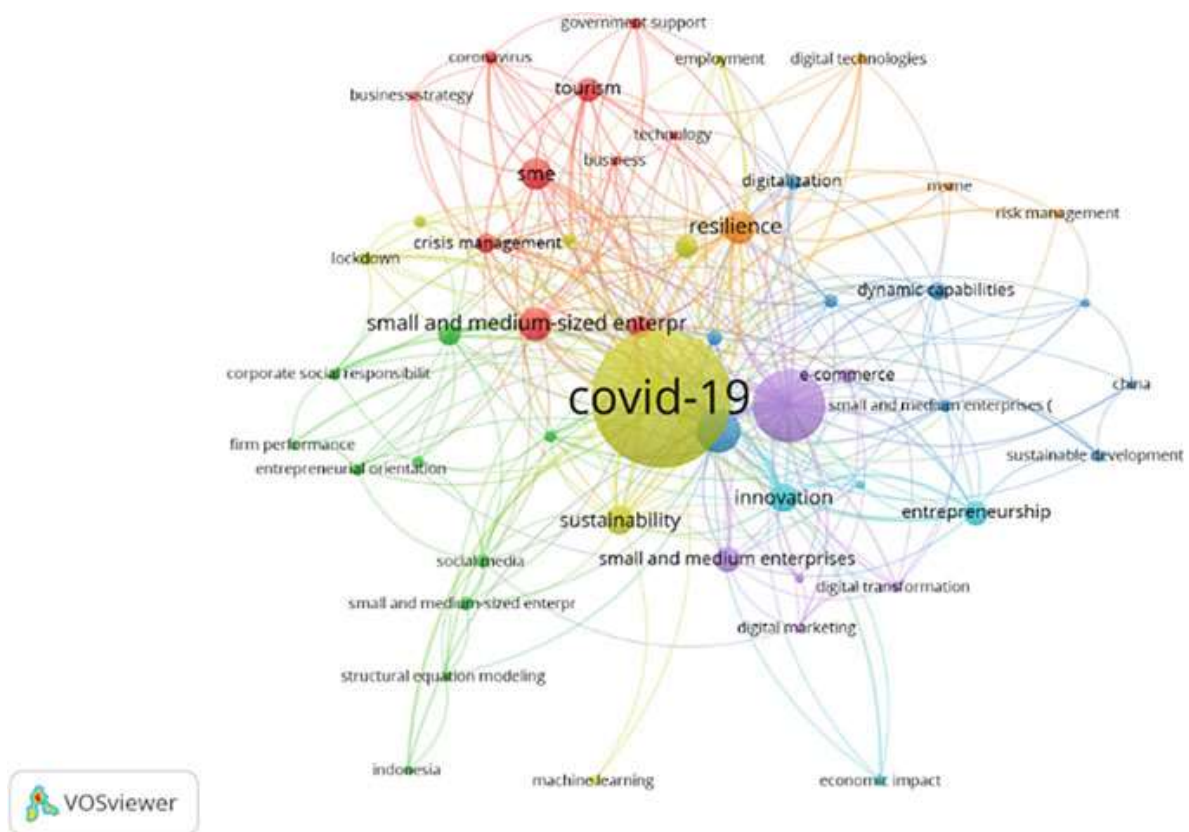
Fig. 1 Co-occurrence of authors' keywords

3.7 Analysis of Author Keywords

The network analysis of the keyword co-occurrence was conducted to investigate which keywords were frequently applied in the various articles. The analysis delivered information on methods, topics, and themes that were mostly focused on by the researchers. There were a total of 1,557 keywords in the data set, and 51 keywords were selected, which appeared more than five times in the data set and were used to create a co-occurrence (author keywords) network map (see Fig. 1). Table 7 highlights the 15 keywords with the most link strength among author keywords. The five most important keywords, according to the analysis, were "COVID-19," "SMEs," "resilience," "sustainability," and "innovation." The authors also significantly focused on the keywords such as "COVID-19 pandemic" and "crisis" in their articles.

Table 7 Co-occurrence of authors' keywords

No	Keyword	Total link strength	Occurrences
1	COVID-19	274	209
2	SMEs	134	83
3	Resilience	65	27
4	Sustainability	47	23
5	Innovation	45	22
6	COVID-19 pandemic	40	41
7	Crisis	39	16
8	SME	39	26
9	Entrepreneurship	37	18
10	Small and medium-sized enterprises	37	27
11	Tourism	32	18
12	Crisis management	31	13
13	Pandemic	31	16
14	MSMES	24	17
15	Small and medium enterprises	24	19

4   Conclusion

In this study, the impacts of COVID-19 among SMEs in the business and economics research areas were analysed using a bibliometrics method. Utilising the WoS database, 591 publications were examined, and Microsoft Excel was employed to present the data. There are several restrictions on this study that might be expanded in subsequent research. Only articles published between 2020 and 2022 were included in this analysis by using the WoS database. It is suggested for future research to prolong the length of the year in which the articles are published to cover more interesting themes. Additionally, a variety of databases including Scopus might be used.

From 2020 to 2022, there were generally more studies on COVID-19's impacts on SMEs in the fields of business and economics. According to the analysis, *Sustainability* (41), *Journal of Asian Finance, Economics and Business* (18), and *Benchmarking: An International Journal* (12) were the top journals with the highest number of publications. The most often cited article on COVID-19's impacts on SMEs was *Masters of disasters? Challenges and opportunities for SMEs in times of crisis*. It was discovered that the top three countries with the highest number of publications were China, Indonesia, and the United Kingdom, while Asia was the most productive region in the total number of publications. From the author keywords, it was found that most research topics such as "COVID-19" and "SMEs" were mentioned. Future research could also investigate the environmental impacts of COVID-19.

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