






## Article

# Science Mapping of the Global Knowledge Base on Management, Leadership, and Administration Related to COVID-19 for Promoting the Sustainability of Scientific Research

Turgut Karakose <sup>1</sup>, Ramazan Yirci <sup>2</sup>, Stamatios Papadakis <sup>3,\*</sup>, Tuncay Yavuz Ozdemir <sup>4</sup>, Murat Demirkol <sup>4</sup> and Hakan Polat <sup>4</sup>

<sup>1</sup> Department of Educational Sciences, Faculty of Education, Kutahya Dumlupinar University, Kutahya 43100, Turkey; tkarakose@yahoo.com

<sup>2</sup> Department of Educational Sciences, Faculty of Education, Sutcuimam University, Kahramanmaraş 46050, Turkey; ryirci@gmail.com

<sup>3</sup> Department of Education, University of Crete, 68333 Crete, Greece

<sup>4</sup> Department of Educational Sciences, Faculty of Education, Firat University, Elazığ 23119, Turkey; tyavuz23@gmail.com (T.Y.O.); mdkol@hotmail.com (M.D.); hakanpolat@firat.edu.tr (H.P.)

\* Correspondence: stpapadakis@uoc.gr



**Citation:** Karakose, T.; Yirci, R.; Papadakis, S.; Ozdemir, T.Y.; Demirkol, M.; Polat, H. Science Mapping of the Global Knowledge Base on Management, Leadership, and Administration Related to COVID-19 for Promoting the Sustainability of Scientific Research. *Sustainability* **2021**, *13*, 9631. <https://doi.org/10.3390/su13179631>

Academic Editors: Alfredo Jiménez, Dorra Yahiaoui, Chi Zhang and Cuiling Jiang

Received: 5 August 2021

Accepted: 23 August 2021

Published: 27 August 2021

**Publisher's Note:** MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



**Copyright:** © 2021 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

**Abstract:** The pandemic caused by the COVID-19 virus has resulted in inevitable radical changes across almost all areas of daily life, with the pandemic having revealed perhaps the greatest crisis humanity has faced in modern history. This study aims to provide thematic and methodological recommendations for future sustainable research programs through a bibliometric analysis of publications focused on management, leadership, and administration related to COVID-19. The data for the study were obtained from the Web of Science Core Collection (WoSCC) bibliographic database and then analyzed according to thematic content analysis and bibliometric methodology. The study's units of analysis include countries, journals, keywords, research models, sample/study group, and time to publication. VOSviewer software and visualization maps were used to report the findings obtained from the analyzed data. When the study's results are evaluated regarding the number of related publications and total citations, it can be revealed that Anglo-American-, Chinese-, and European-centered dominance continues in COVID-19-related studies. The vast majority of publications on this subject area are concentrated in the field of health. In addition, the study's findings revealed that the examined articles were generally published in journals considered as prestigious, have high impact factors, are published in the English language, and with articles published in a short time after a much-reduced editorial/review and publishing process. Unlike previous bibliometric reviews, this research comprehensively analyzed the management-, leadership-, and administration-oriented publications related to COVID-19 with a holistic approach, providing essential findings and recommendations for future sustainable thematic research opportunities.

**Keywords:** COVID-19; coronavirus; bibliometric analysis; visualization; management; leadership; administration; sustainability

## 1. Introduction

Throughout human history, various diseases and epidemics such as the Spanish flu, Asian flu, Hong Kong flu, HIV/AIDS, SARS, Ebola, and swine flu have emerged in specific periods, and these epidemics have each profoundly impacted humanity both psychologically and socioeconomically, and especially within the healthcare sector. In today's world, humanity faces a new type of coronavirus (2019-nCoV) infection [1,2]. After its first recorded appearance in Wuhan, China, the COVID-19 virus, which spread rapidly in just a short timeframe, was declared a global pandemic by the World Health Organization on 11 March 2020. The new type of coronavirus (COVID-19) has caused significant

worldwide disruption, especially in healthcare services, the economy, transportation, and education [3–8].

Radical measures were introduced in many countries to help prevent the spread of the COVID-19 virus and protect the public's health from the threat it presents. Forcing individuals to stay at home, travel bans, quarantine, and other restrictions have caused sudden changes to people's daily routines. Social distancing, the wearing of surgical-type facemasks, and certain hygiene practices have been made mandatory by many national and local (e.g., state) governments [9–12]. As a result of these restrictions and quarantine policies, population mobility between countries and even within countries decreased sharply. This general situation affected the daily routine activities of most people and ultimately resulted in economic stagnation on a worldwide scale. Generally speaking, the American economy faced a situation across all states similar to the Great Recession of the 1930s [13]. In the economy and other social areas of life, uncertainty remains about when the recession caused by the COVID-19 pandemic will end. In this context, it has been stated that one of the most significant long-term effects of the pandemic is the uncertainty it has created in society, with no one able to predict how long the effect of the virus will last, nor how significant the effects or consequences of the next stage will be. During this troubled period, people have been forced to live with a hazardous and contagious virus. Furthermore, the global consequences of this virus in terms of human health have not yet been fully predicted. Considering the complex social, economic, political, technical, environmental, and health-related problems that existed globally even before the pandemic, it may be stated that this uncertainty has been increasingly felt across all sectors [14–16].

Severe but varying measures have been taken across many countries at various stages to reduce the uncertainty and risks arising from COVID-19. Although the measures taken within the scope of combating the pandemic were implemented for the health and welfare of the public, the economic policies pursued throughout this period have negatively affected certain already disadvantaged groups [17]. For example, due to COVID-19, face-to-face education was suspended in most countries, and while many tried to solve the problem through distance education, others could not effectively manage the crisis due to a lack of socioeconomic and technological infrastructure. The pandemic's economic adverse effects have been felt in developed and developing countries, leading to increased opportunity inequalities in many areas [18]. In other words, due to the economic, political, and social crisis caused by COVID-19, inequalities between people in different parts of society have increased [16]. Although the social and economic consequences of the pandemic deeply affected all of humanity, its impact on lower-income socioeconomic groups is expected to be more severe [19].

## 2. Literature Review

The related literature has stated that the level of effect of COVID-19 closely correlates with certain variables such as age, gender, ethnicity, socioeconomic status, and education level. In this context, these inequalities can be cited as higher mortality rates due to COVID-19 in more impoverished settlements, children from low-income families being more harmed by school closures, increased workload of women, and occupational groups that are unable to work from or run their business from home [14]. Another negative consequence of the pandemic is that many students have been forced to continue their education online from home following the physical closure of schools and face-to-face lessons [20]. Due to the pandemic, the transition from face-to-face to online education has brought digital inequality to the fore for economically disadvantaged students. From this point of view, the relevant literature has stated that a significant portion of students does not have access to technological tools and that some 40% do not have Internet access. For example, 56 million children in sub-Saharan African countries experience digital inequality, as the mobile networks do not provide adequate service and experience problems every day. Even in many developed countries, it is stated that millions of school-age students live in homes without Internet service [21–26]. In this context, the results of the research

conducted by Jæger and Blaabæk [27] also revealed that COVID-19 has further increased the inequality in learning opportunities and that families with better socioeconomic status are more advantaged than financially more impoverished families during the pandemic.

Another area of inequality brought on by the COVID-19 pandemic has been unequal access to vaccines against the COVID-19 virus. Serious concerns have been raised regarding countries having unequal access to COVID-19 vaccines. The prediction that developed countries will have more vaccines brings the risk that underdeveloped or developing countries may not access vaccines at the same rate [28] to protect their population. From this perspective, it may be said that the importance of management, leadership, and administration concepts has increased even more for some countries and institutions due to the extraordinary circumstances seen during the COVID-19 pandemic. Scientific studies to date have revealed that the scientific community's efforts working on vaccines, new treatments, and effective interventions in the fight against COVID-19 have reached a level of sufficiency and have primarily produced adequate solutions to the problem. In addition, convincing the general public to take necessary precautions in their daily lives and follow scientific recommendations to reduce the spread of the virus has emerged as another facet of the fight against the pandemic. In situations of uncertainty and crisis, it may be said that national leaders and organizational managers who act more responsibly in the fight against COVID-19 have played a critical role in coordinating the problem-solving efforts and in terms of the scientific studies related to the pandemic [29].

The crisis created by COVID-19 has undoubtedly made the tasks faced by national and institutional managers considerably more difficult, in as much as it has complicated the work of almost all employees across all sectors of society. During this challenging period, which has also been expressed as the “new normal,” additional responsibilities have been added to managers' job descriptions, such as remote management, leading new learning methods, and providing remote forms of social interaction [30–32]. The strategies of national and institutional leaders in response to the COVID-19 crisis have undoubtedly significantly impacted the functioning of the economic, social, and healthcare systems of the communities they lead. While some leaders have overcome many difficulties during this challenging period, it is tough to say the same for others. From this perspective, the COVID-19 pandemic has re-emphasized leaders' critical role in reshaping and maintaining organizations during and after the crisis. Leaders' abilities to analyze the threats and opportunities brought about by the crisis environment, such as focusing on results-oriented management skills and developing effective strategies, have undoubtedly increased the competitive advantage of specific countries and institutions during the pandemic [33].

Globally, it may be said that the COVID-19 pandemic is in no way a simple problem but a turbulent and unpredictable time of crisis that has deeply affected almost every country worldwide [34,35]. According to Davis [36], COVID-19 has led to a significantly deep level of crisis that has changed global history. The strategic management approaches adopted by both countries and institutions and the leadership styles that have developed accordingly in each case have ensured that some countries and institutions have remained one step ahead of their competitors or peers [37]. As a result, the importance of management, leadership, and administration concepts have increased even more at the national and institutional level during the pandemic. On the contrary, most academic studies published on COVID-19 during this period have concentrated mainly on health. In this context, the relevant literature was examined in detail to establish if any bibliometric studies have been published that have focused on “management, leadership, and administration” concerning COVID-19; however, none were found that analyzed “management, leadership, and administration” from a holistic perspective to COVID-19. As a result, a need was identified to conduct a comprehensive bibliometric analysis of published scientific studies focused on the management, leadership, and administration issues associated with COVID-19 to identify the evolution of knowledge production in this area.

In this context, the current study aims to produce a bibliometric analysis of scientific publications related to COVID-19 that have focused on “management, leadership, and

administration,” and which were published between 1 January 2020 and 30 April 2021 and indexed in the Web of Science (WoS) database. COVID-19 showed the importance of crisis management, leadership during the crisis, and taking administrative precautions. Management, leadership, and administration are three concepts that are closely related to each other. When the COVID-19 literature is examined, there is no comprehensive bibliometric analysis on these concepts in a holistic approach. The current study, therefore, aims to fill the gap identified in the current literature. Therefore, the primary purpose of the current study is to undertake a bibliometric analysis of scientific studies that have been published with a focus on management, leadership, and administration issues related to COVID-19 and present a roadmap to researchers regarding future scientific studies on this subject. Within the framework of this general purpose, the sub-objectives of the current study are as follows:

- To reveal the countries that contributed to the publication of the 246 most-cited articles focused on management, leadership, and/or administration issues related to COVID-19 and the collaboration between them;
- To identify the journals focused on management, leadership, and/or administration related to COVID-19, find in which journals these 246 most-cited articles were published, and analyze their characteristics;
- To reveal the most frequently used keywords in the 246 most-cited articles that focused on COVID-19 concerning management, leadership, and/or administration issues;
- To reveal the research models used in the 246 most-cited articles that focused on management, leadership, and/or administration issues related to COVID-19;
- To examine the sample/working groups of the 246 most-cited articles that focused on management, leadership, and/or administration issues related to COVID-19;
- To explore the period that these 246 most-cited articles focused on management, leadership, and/or administration issues related to COVID-19.

### 3. Materials and Methods

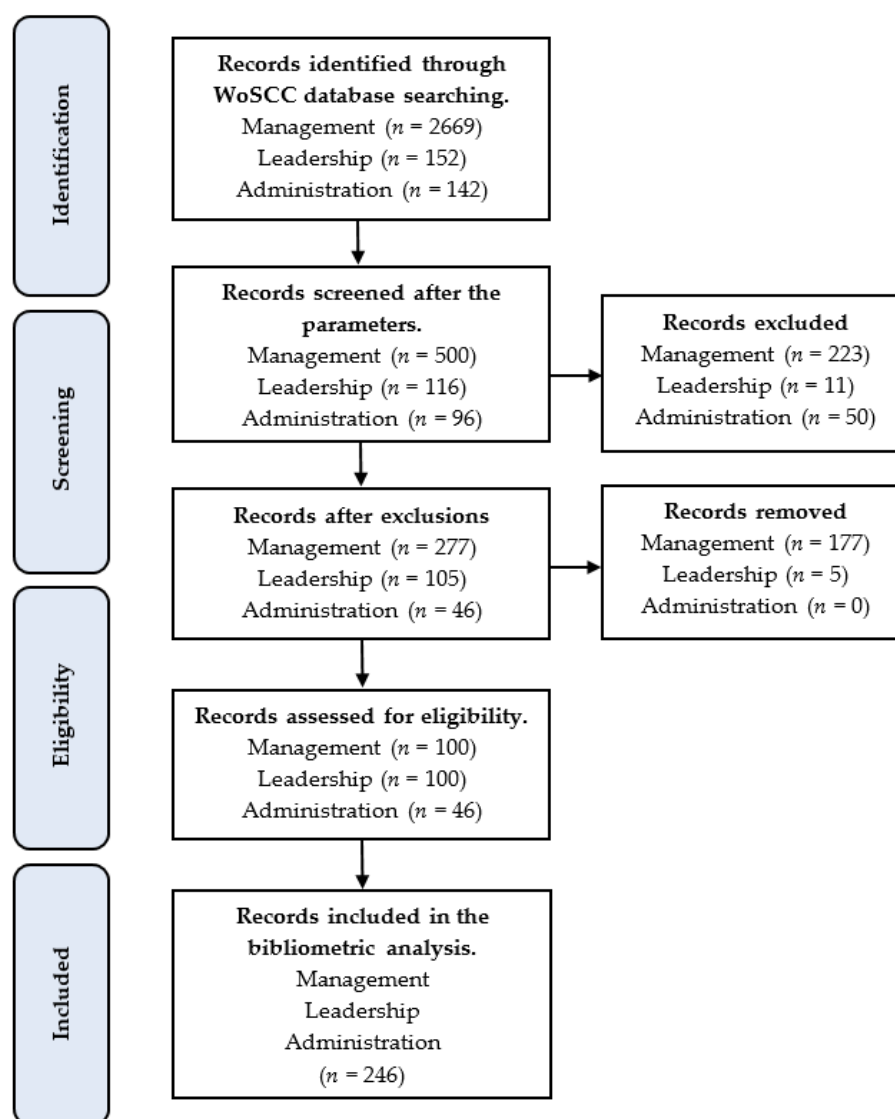
#### 3.1. Study Design

The current study is a bibliometric analysis and mapping exercise [38] that aims to provide an overview of the current knowledge base in the published literature on COVID-19-related management, leadership, and administration issues. Within the scope of the research, and to reveal any connections between identified concepts or publications, a bibliometric analysis [39,40] and content analysis [41,42] were conducted based on units such as country, journal, most frequently used keyword, research model, sample/study group, and time to publication. For the data collection and analysis of the study, a three-stage procedure was followed: (1) searching and identifying data, (2) extracting and cleaning data, and (3) analyzing data [43]. Each procedural stage is explained in detail in the following subsections. Additionally, the study’s review of the 246 most-cited articles within the scope of the research is reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The PRISMA flowchart [44] in Figure 1 presents the search flow applied in identifying and scanning the resources for analysis.

#### 3.2. Data Search and Identification

The study’s researchers used the Web of Science (WoS) database to search for and extract data for the bibliometric analysis. An advanced search of the WoS Core Collection database was conducted to identify publications published between 1 January 2020 and 30 April 2021, focusing on the management, leadership, and/or administration issues associated with COVID-19. The WoS Core Collection covers many high-quality and reputable international scientific journals, each having significant impact factors and providing detailed and reliable information about the published articles. Additionally, the WoS Core Collection is considered the optimum database for conducting bibliometric studies [45,46]. From this perspective, only the journals indexed in this database were

included in the current study, as the WoS is considered one of the most comprehensive databases accepted worldwide.



**Figure 1.** PRISMA search strategy flow detailing identification and screening stages.

The search query applied to the Web of Science (WoS) for management, leadership, and administration was as follows in Box 1:

**Box 1.** Search query string.

TS = ("covid" OR "COVID-19" OR "2019-nCoV" OR "COVID-19 pandemic" OR "SARS-CoV-2" OR "novel coronavirus" OR "SARS-COV") AND TITLE: ("management")  
 TS = ("covid" OR "COVID-19" OR "2019-nCoV" OR "COVID-19 pandemic" OR "SARS-CoV-2" OR "novel coronavirus" OR "SARS-COV") AND TITLE: ("leadership")  
 TS = ("covid" OR "COVID-19" OR "2019-nCoV" OR "COVID-19 pandemic" OR "SARS-CoV-2" OR "novel coronavirus" OR "SARS-COV") AND TITLE: ("administration")

These search criteria, executed following the research purpose in the WoSCC bibliographic database, constitute the current study's limitations. The scope of the study in the WoS database included review articles, primary research articles, letters, editorials, etc. Since the number of articles subject to the research was significantly large, only the 246 articles most-cited following publication were included in the analysis. The researchers



determined these independently to prevent errors in the data being included and reviewed in the study. Subsequently, different lists of determined articles were matched to arrive at the final agreed dataset used in the study's analysis.

### 3.3. Data Extraction and Cleaning

After performing the initial data search and identification stage in the WoS Core Collection database, the researchers exported the obtained data as a Comma-Separated Values (.csv) file. At this stage, for the bibliometric analysis, the researchers only exported the 1000 most-cited articles and ignored all others (i.e., they were not extracted). Afterwards, the data of the most-cited articles were saved in a Microsoft Excel (.xls) file to sort, count, and cleanse the data in terms of its preparation for bibliometric analysis suitability.

### 3.4. Data Analysis

All searches were performed on the WoS Core Collection database on 3 May 2021, and the data required for the bibliometric analysis were obtained and extracted. Within the scope of the research, the 246 most-cited articles that focused on management, leadership, and administration issues related to COVID-19 were examined according to country, journal, most frequently used keyword, research model, sample/study group, and time to publication.

The obtained data were subsequently analyzed according to bibliometric methodology and content analysis. The bibliometric analysis uses bibliometric theory to analyze relevant literature using mathematical and statistical approaches to analyze the research performed in various scientific fields [47]. VOSviewer software and Microsoft Excel were used to visualize and analyze the bibliometric maps and networks in the current study. VOSviewer [48] is a software tool used to visualize publications such as bibliographic matching, co-authoring, and co-citation. In addition, the study's obtained data were analyzed according to content analysis, which is one of the qualitative research methods, as well as categorical analysis and frequency analysis techniques [41,42,49].

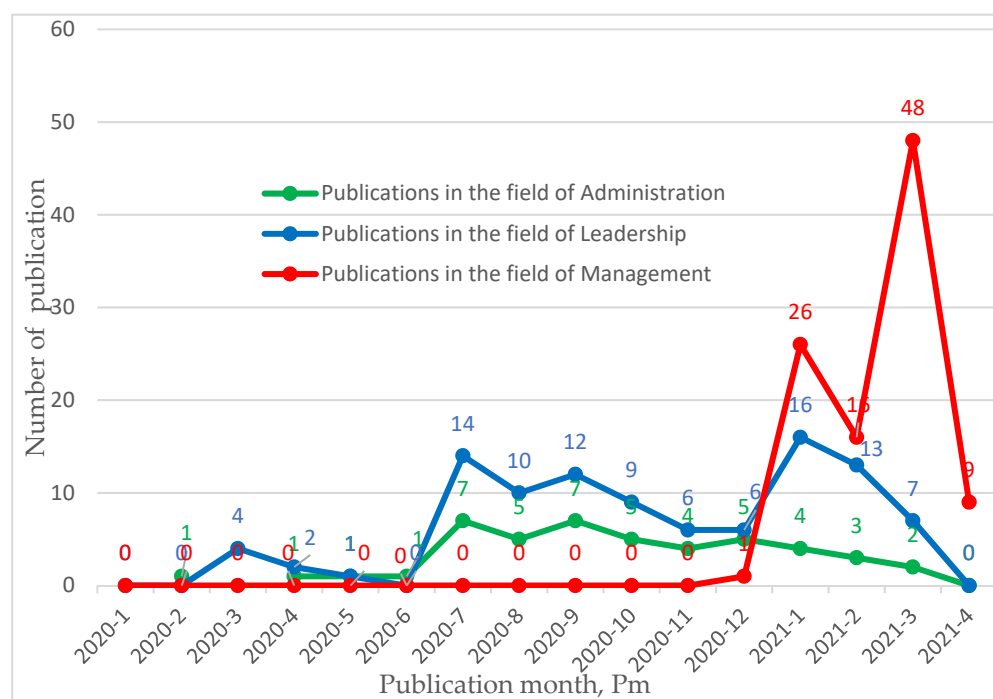
In this context, the 246 most-cited articles were analyzed in detail and subjected to content analysis, with Microsoft Excel used to produce the graphics used to present the findings. Within the scope of the research, the 246 most-cited articles focused on management, leadership, and administration issues related to COVID-19 were analyzed in terms of different variables. Keyword maps, cross-country co-authorship, and bibliometric link networks were used to analyze the obtained data. In addition, to enrich the study's findings, the research model, sample/study group, and time to the publication of the 246 most-cited articles were also included in the bibliometric and content analysis.

## 4. Results and Discussion

The findings obtained within the scope of the research were reported under different themes such as country, journal, the most frequently used keyword, research model, sample/study group, and time to publication. In this context, Figure 2 illustrates the monthly distribution of the 246 most-cited articles on management, leadership, and administration published between 1 January 2020 and 30 April 2021 and focused on COVID-19. Figure 2 also shows the total number of COVID-19-related publications by month and a graphical representation of the average number of citations per article.

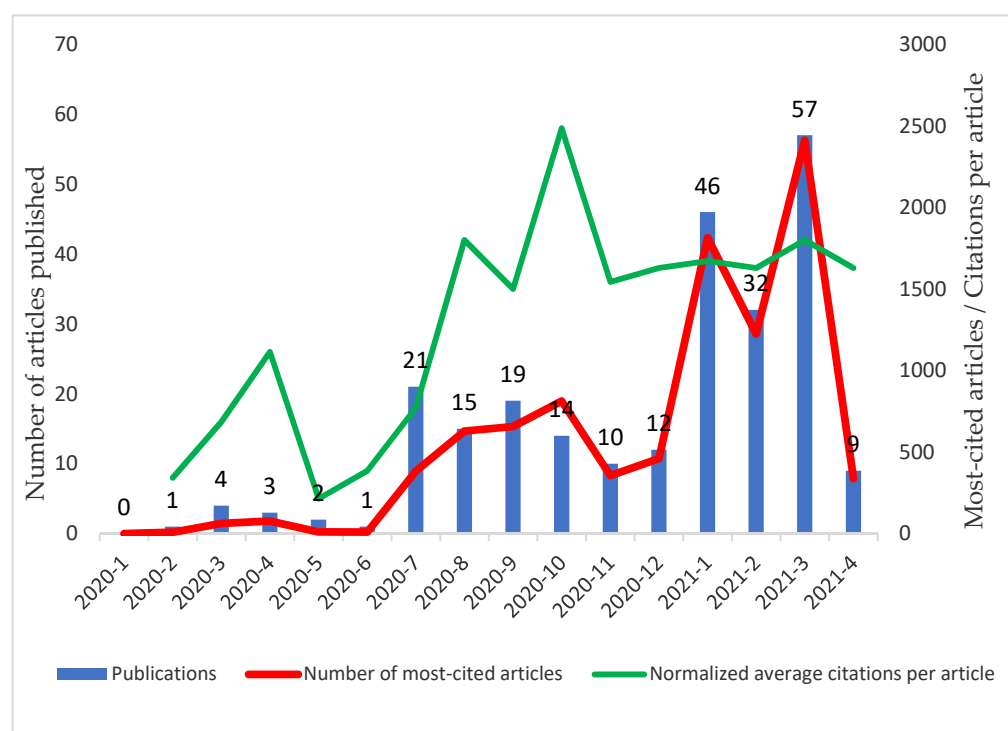
Figure 2 shows the months in which at least one of the 246 most-cited articles were published. Where the monthly publication output is shown, Figure 2 shows a continuous red line which indicates the monthly distribution for articles on "management" that were related to COVID-19, a continuous blue line for articles on "leadership," and a continuous green line for articles on "administration." Based on the presented data, up until the end of 2020, there were no publications cited focused on "management" concerning COVID-19. Almost all articles on this subject were published in 2021. However, while the publication output focused on "leadership and administration" concerning COVID-19 continued with unstable fluctuations over the months, it rose sharply from the middle of

2020 onwards, a trend that indicates a gradually increasing research interest in the subject. In a study conducted by Verma and Gustafsson [50], it was reported that academic interest in “business and management” research focused on COVID-19 had increased. Accordingly, researchers’ exponential increase in the diversity of topics and subtopics addressed during the COVID-19 crisis shows that the virus affected human lifestyles in almost every area. Consequently, studies that examined the impact of COVID-19 in terms of “business and management” were shown to be an upward trend. The same may be said for “leadership and administration” articles related to COVID-19.



**Figure 2.** Publication outputs. Temporal distribution of COVID-19-related most-cited publications.

When Figure 3 is examined, it may be stated that there were only a few publications at the beginning of 2020. The output of publications on this subject increased significantly towards the end of April 2021. In addition, it is seen that the most cited articles were generally those published during 2021. This situation reveals that the published articles later received more citations than those published earlier in the pandemic. The obtained data revealed that as the number of publications focused on management, leadership, and administration related to COVID-19 increased, the number of citations also increased steadily over the months. In other words, as the number of articles increased, both local and global citations also increased in parallel. In this context, considering the articles in the relevant literature and their subsequent citations, it may be said that the interest of researchers in studies that focused on “management, leadership, and administration” related to COVID-19 may continue and that the number of citations for such articles will also increase over time. The number of COVID-19-related studies and the increasing number of citations they subsequently receive are also seen in databases other than the Web of Science. For example, according to the results of a study by Aristovnik et al. [51], a 58.8% increase in COVID-19-related research published between May and June 2020 indicated an exponentially increasing interest in COVID-19-related research. This situation has the effect of constantly increasing the number of citations of such articles following their publication. Table 1 presents the contributions of various countries to the publication of the 246 most-cited articles on management, leadership, and administration related to COVID-19.



**Figure 3.** Number of most-cited publications and citations by month.

Table 1 analyzes the countries that contributed at least 3+ publications in terms of different variables. In this context, it was determined that among the authors of the 246 most-cited studies, the researchers hailed from 34 different countries. The total number of publications is shown as 420 in Table 1 because researchers from more than one country are included as authors in an article. In this context, it was determined that the four countries where researchers contributed the most to the management, leadership, and administration-related publications related to COVID-19 were the United States ( $f = 87$ ), United Kingdom ( $f = 48$ ), China ( $f = 42$ ), and Italy ( $f = 28$ ). In addition, researchers from more than one country participated in some of the studies. The results presented in Table 1 reveal that the United States contributed more than any other country to the most-cited literature on COVID-19-related management, leadership, and administration. Moreover, the first three countries (United States, United Kingdom, and China) contributed to 42.14% of the publications. These results show a clear need for scientific studies focused on management, leadership, and administration related to COVID-19 that present perspectives from countries other than these top three.

In addition, the results show that researchers from the United States cooperate with the highest number of other countries with 40 connections ( $TLS = 40$ ). Considering the strength of their collaboration, China ( $TLS = 37$ ) followed the United States, then France ( $TLS = 26$ ), and then the United Kingdom ( $TLS = 17$ ). Each of these four countries also cooperated mostly with different countries, mainly the United States and China. Furthermore, Italy, Australia, Canada, and Germany were hierarchically ranked reasonably high according to the number of connections, with 16 connections for Italy and 14 for Australia. Likewise, based on the strength of their collaboration, Canada was placed ahead of Germany. These results reveal the importance of international collaboration in preparing management-, leadership-, and administration-oriented publications related to COVID-19. The issue of collaboration between countries in COVID-19-related studies included in the current study's findings was similar to those reported by Wang and Hong [52], in which it was emphasized that the United States was the country most active with the most significant number of cooperative relations with other countries/regions.



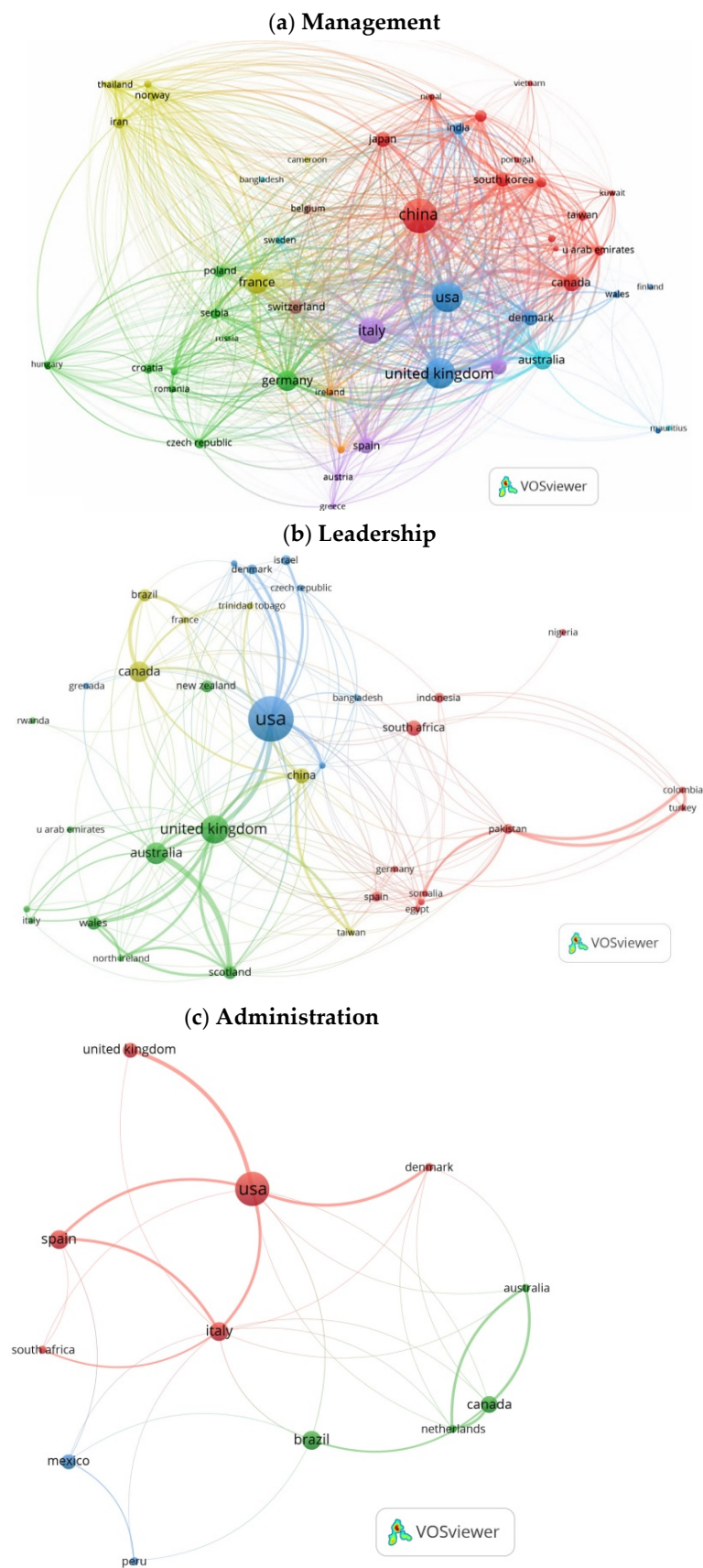
**Table 1.** Countries/regions of origin of most-cited publications.

| Rank | Country/Region       | Based on the Most-Cited Articles |      |        |     |
|------|----------------------|----------------------------------|------|--------|-----|
|      |                      | TP                               | TC   | CPP    | TLS |
| 1    | United States        | 87                               | 2285 | 26.26  | 40  |
| 2    | United Kingdom       | 48                               | 2094 | 43.63  | 17  |
| 3    | China                | 42                               | 3856 | 91.81  | 37  |
| 4    | Italy                | 28                               | 1878 | 67.07  | 16  |
| 5    | Australia            | 22                               | 1361 | 61.86  | 14  |
| 6    | Canada               | 22                               | 1458 | 66.27  | 13  |
| 7    | France               | 15                               | 657  | 43.80  | 26  |
| 8    | Spain                | 15                               | 283  | 18.87  | 0   |
| 9    | Germany              | 14                               | 616  | 44.00  | 10  |
| 10   | Brazil               | 10                               | 97   | 9.70   | 3   |
| 11   | Denmark              | 10                               | 1045 | 104.50 | 4   |
| 12   | Netherlands          | 9                                | 1157 | 128.56 | 1   |
| 13   | Japan                | 7                                | 710  | 101.43 | 4   |
| 14   | Switzerland          | 7                                | 145  | 20.71  | 4   |
| 15   | Poland               | 6                                | 100  | 16.67  | 1   |
| 16   | South Africa         | 6                                | 21   | 3.50   | 1   |
| 17   | South Korea          | 6                                | 1343 | 223.83 | 5   |
| 18   | Wales                | 6                                | 46   | 7.67   | 0   |
| 19   | Czech Republic       | 5                                | 75   | 15.00  | 5   |
| 20   | Scotland             | 5                                | 19   | 3.80   | 4   |
| 21   | India                | 4                                | 484  | 121.00 | 5   |
| 22   | Iran                 | 4                                | 127  | 31.75  | 0   |
| 23   | Israel               | 4                                | 137  | 34.25  | 6   |
| 24   | New Zealand          | 4                                | 84   | 21.00  | 9   |
| 25   | Pakistan             | 4                                | 95   | 23.75  | 0   |
| 26   | Singapore            | 4                                | 566  | 141.50 | 4   |
| 27   | Taiwan               | 4                                | 276  | 69.00  | 2   |
| 28   | United Arab Emirates | 4                                | 957  | 239.25 | 2   |
| 29   | Croatia              | 3                                | 148  | 49.33  | 6   |
| 30   | Mexico               | 3                                | 0    | 0      | 0   |
| 31   | Norway               | 3                                | 128  | 42.67  | 2   |
| 32   | Saudi Arabia         | 3                                | 1159 | 386.33 | 5   |
| 33   | Serbia               | 3                                | 73   | 24.33  | 6   |
| 34   | Sweden               | 3                                | 69   | 23.00  | 0   |

Notes: TP—Total publication; TC—Total citations; CPP—Citations per publication; TLS—Total link strength; includes countries that contributed to 3+ publications.

Additionally, the United States and China had the most connectivity compared to other countries, with a combined total of 439 collaborative articles. It was also determined that the United States and China played a leading role in COVID-19-related research. In this context, strong co-authorship relations of the two countries and strong co-authorship relations with other countries/regions were determined. Domestic collaboration activities were frequently observed in COVID-19 research among 27 European countries, especially the United Kingdom, Italy, Germany, and France.

The total number of articles published on management, leadership, and administration related to COVID-19 is undoubtedly much higher than the 246 identified in the current study. This also strengthens the potential for more extensive collaboration between countries contributing to publications on this subject. In this context, VOSviewer software was used to create a collaborative network among the contributing countries in the case of the 246 most-cited articles included in the current study. The collaboration network between countries according to the number of publications on management, leadership, and administration related to COVID-19 is presented in Figure 4.



**Figure 4.** Collaboration network among countries/regions based on number of publications in the fields of (a) management, (b) leadership, and (c) administration.

Accordingly, the size of the circles in Figure 4a–c represents the number of collaborative occurrences in the 246 most-cited articles, with larger circles representing larger formations. Additionally, the width of the lines in the figures illustrates the strength of the connection between countries, with wider lines depicting stronger connections, i.e., greater levels of collaboration between countries. In this context, when the countries contributing to the most-cited publications on “management” related to COVID-19 are examined, it may be said that researchers from 54 different countries contributed to these publications. The countries that contributed the most to the publications on this subject were determined as China ( $f = 36$ ), the United Kingdom ( $f = 28$ ), the United States ( $f = 28$ ), Italy ( $f = 22$ ), France ( $f = 14$ ), Germany ( $f = 13$ ), and Australia ( $f = 11$ ). Researchers from more than one country participated in some of these studies. Researchers from China and the United Kingdom worked with researchers from 54 different countries, whereas those from the United States collaborated with 51 countries, Japan with 47 countries, and Denmark with 44 countries.

When the countries contributing to the most-cited publications on “leadership” related to COVID-19 are examined, it may be said that researchers from 38 different countries contributed to these publications. Accordingly, the countries that contributed the most to publications on this subject were the United States ( $f = 43$ ), the United Kingdom ( $f = 17$ ), Australia ( $f = 10$ ), Canada ( $f = 9$ ), China ( $f = 5$ ), and South Africa ( $f = 5$ ). In this context, researchers from the United States worked with researchers from 26 different countries, followed by those from the United Kingdom who worked with 27 countries, while researchers from Australia worked with researchers from 23 other countries. However, researchers in some countries (Costa Rica and Palestine) did not work with researchers from other countries.

When the countries that contributed to the most-cited publications on “administration” related to COVID-19 are examined, it may be said that researchers from 20 different countries contributed to these studies. Accordingly, the top contributors were the United States ( $f = 17$ ), Italy ( $f = 5$ ), Spain ( $f = 5$ ), Canada ( $f = 4$ ), and the United Kingdom ( $f = 3$ ). The fact that Europe became the new epicenter for COVID-19 following China may have been influential in terms of this ranking. For example, Italy was affected more by the outbreak than China [53,54], and, as Ceylan [55] stated, once the European continent became the epicenter of the virus, it was seen that COVID-19 hit the continent harder than it hit China. As of April 15, 2020, the apparent mortality rate of COVID-19 was 4% in China, 13% in Italy, and 11% in Spain. This may have led to an increase in the number of studies on COVID-19 in these countries. Researchers from more than one country contributed to some of these studies. In this context, researchers in Italy contributed to these publications together with researchers from 11 other countries, followed by the United States with researchers from nine countries, Canada with researchers from six countries, and both Mexico and the Netherlands with researchers from five other countries. However, researchers from 20 countries (e.g., China, Ecuador, Ukraine, Jordan, and Poland) did not collaborate with researchers from other countries. Shamsi et al. [56] reported that strengthening international collaboration in scientific studies helps researchers achieve comparative results. According to Zhai et al. [57], various countries worldwide have collaborated extensively in international research studies on coronavirus-related research for almost 20 years. Accordingly, the United States, Germany, the United Kingdom, France, and China have the highest international collaborative partnerships.

Table 2 presents the distribution of the journals in which the 246 most-cited articles were published. Only journals that published at least 2+ articles are included in Table 2, and these journals are hierarchically listed according to the total number of articles published. Accordingly, 32 of the journals published at least two or more of these 246 most-cited articles, focusing on management, leadership, and/or administration related to COVID-19.

**Table 2.** Distribution of journals that published the most-cited articles.

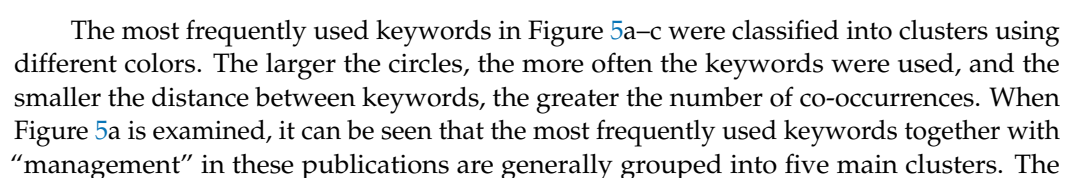
| Rank | Journal Name  | Based on Most-Cited Articles |     |        | Based on All Publications Per Journal |
|------|---|------------------------------|-----|--------|---------------------------------------|
|      |   | TP                           | TC  | CPP    | Journal Impact Factor™ (JIF) *        |
| 1    | International Journal of Environmental Research and Public Health | 7                            | 93  | 13.29  | 3.390                                 |
| 2    | Revista de Administracao Publica                                  | 5                            | 5   | 1.00   | -                                     |
| 3    | International Journal of Public Leadership                        | 5                            | 4   | 0.80   | -                                     |
| 4    | The Lancet Respiratory Medicine                                   | 4                            | 635 | 158.75 | 30.700                                |
| 5    | Journal of Risk and Financial Management                          | 4                            | 147 | 36.75  | -                                     |
| 6    | Science of the Total Environment                                  | 3                            | 88  | 29.33  | 7.963                                 |
| 7    | International Journal of Surgery                                  | 3                            | 87  | 29.00  | 6.071                                 |
| 8    | International Journal of Information Management                   | 3                            | 58  | 19.33  | 14.098                                |
| 9    | The Lancet  | 3                            | 57  | 19.00  | 79.321                                |
| 10   | American Review of Public Administration                          | 3                            | 6   | 2.00   | 3.024                                 |
| 11   | Frontiers in Psychology   | 3                            | 6   | 2.00   | 2.990                                 |
| 12   | Plos One  | 3                            | 2   | 0.67   | 3.240                                 |
| 13   | Canadian Public Administration/Administration Publique du Canada  | 3                            | 0   | 0      | 0.900                                 |
| 14   | American Journal of Roentgenology                                 | 2                            | 385 | 192.50 | 3.959                                 |
| 15   | The Lancet Child & Adolescent Health                              | 2                            | 277 | 138.50 | 11.288                                |
| 16   | Emerging Microbes & Infections                                    | 2                            | 184 | 92.00  | 7.163                                 |
| 17   | Annals of Translational Medicine                                  | 2                            | 151 | 75.50  | 3.932                                 |
| 18   | Cureus  | 2                            | 147 | 73.50  | -                                     |
| 19   | JAMA—Journal of the American Medical Association                  | 2                            | 105 | 52.50  | 56.272                                |
| 20   | Gastroenterology  | 2                            | 69  | 34.50  | 22.682                                |
| 21   | Journal of Business Research                                      | 2                            | 60  | 30.00  | 7.550                                 |
| 22   | Diabetes Care   | 2                            | 50  | 25.00  | 19.112                                |
| 23   | International Journal of Contemporary Hospitality Management      | 2                            | 47  | 23.50  | 6.514                                 |
| 24   | Journal of Medical Virology                                       | 2                            | 29  | 14.50  | 2.327                                 |
| 25   | Human Resource Development International                          | 2                            | 14  | 7.00   | -                                     |
| 26   | BMJ Military Health   | 2                            | 10  | 5.00   | -                                     |
| 27   | SAMJ—South African Medical Journal                                | 2                            | 7   | 3.50   | 1.614                                 |
| 28   | Journal of Asian Finance Economics and Business                   | 2                            | 3   | 1.50   | -                                     |
| 29   | Management and Organization Review                                | 2                            | 3   | 1.50   | 2.373                                 |
| 30   | British Journal of Hospital Medicine                              | 2                            | 2   | 1.00   | 0.825                                 |
| 31   | Journal of Public Health Management and Practice                  | 2                            | 2   | 1.00   | 1.791                                 |
| 32   | Journal of Global Infectious Diseases                             | 2                            | 1   | 0.50   | -                                     |

Notes: TP—total publications; TC—total citations; CPP—citations per publication; includes journals which published 2+ articles; \* 2020 data provided by Clarivate Analytics Journal Citation Reports (JCR).

Based on the results shown in Table 2, a significant majority of the 246 most-cited articles were published in medical journals. Accordingly, the journals in which the most articles were published were *International Journal of Environmental Research and Public Health* ( $f = 7$ ), *Revista de Administracao Publica* ( $f = 5$ ), *International Journal of Public Leadership* ( $f = 5$ ), *The Lancet Respiratory Medicine* ( $f = 4$ ), and the *Journal of Risk and Financial Management* ( $f = 4$ ). These results reveal that the most-cited articles on management, leadership, and administration related to COVID-19 are distributed between journals from numerous fields of study. However, when Table 2 is examined, it can be said that the journals in which the most-cited articles on management, leadership, and administration related to COVID-19 are published are mostly prestigious journals with a high impact factor that publish in the English language. In a research study by Yu et al. [58], it was reported that the most-cited journal in COVID-19 research was *The Lancet* with 2485 citations and a Journal Impact Factor of 59.102, and the language of the publication was English. In parallel with the current study's findings, it may be stated that the majority of journals with a high impact factor value in which COVID-19 research is published are in the English language [59–61].

A detailed review was conducted to explore critical concepts researched in the most-cited articles on COVID-19-related management, leadership, and administration. In this context, the most frequently used keywords and related concepts in the most-cited articles on “management” related to COVID-19 are shown in Figure 5a.







most frequently highlighted keywords in each of these clusters are listed as “coronavirus” ( $f = 15$ ), “pneumonia” ( $f = 12$ ), “sars” ( $f = 11$ ), “transmission” ( $f = 8$ ), and “pandemic” ( $f = 7$ ). Furthermore, in the articles, it was determined that the keywords of “China,” “diagnosis,” and “risk” were used six times, whereas “impact,” “influenza,” “pandemics,” and “Wuhan” were used five times, and both “chloroquine” and “end-expiratory pressure” were used four times. When Figure 5a is examined, a close relationship can be seen to exist between the keywords in the five main clusters, as all five clusters are located close to each other in the visualization network. In addition, in articles dealing with the relationship between COVID-19 management, it can be seen that medical terms such as “pneumonia,” “sars,” “transmission,” “pandemic,” and “diagnosis” were the most frequently used keywords. This shows that the term “management” is used more in the medical fight against COVID-19. Many countries and organizations, including Turkey and the United States, have prepared various guides on managing the COVID-19 pandemic. The term “management” appears to be frequently used in the guidelines on the clinical management of the COVID-19 outbreak prepared by many countries and institutions such as the World Health Organization [62], the American National Institutes of Health [63], and the Ministry of Health of the Republic of Turkey [64]. This situation draws attention to the importance of crisis management in response to the COVID-19 pandemic.

The co-occurrence network related to the keywords and concepts in the most-cited articles on “leadership” related to COVID-19 was created by bibliometric matching analysis, the results of which were produced using VOSviewer software as presented in Figure 4b. The most frequently used keywords and “leadership” in the most-cited publications were categorized into four clusters. Accordingly, the most frequently emphasized keywords in each of these clusters were “coronavirus” ( $f = 7$ ), “pandemic” ( $f = 7$ ), “crisis” ( $f = 6$ ), and “performance” ( $f = 5$ ). In addition, it was determined that the keywords of “communication,” “crisis management,” “governance,” “policy,” “public health,” and “trust” were used together with the term “leadership” four times in the 246 most-cited articles. Rasul [65] stated that the management of crises such as those created by COVID-19 requires a holistic approach and coordinated action in decision making. Local and national governments, which make quick decisions based on scientific data and research and share them transparently with society, have demonstrated strong leadership in pandemic management. For example, the strong political leadership, open communication with the public, and evidence-based precautionary decisions made by the Head of State of a country in the continent of Oceania during the COVID-19 crisis were highly appreciated. However, other leaders have moved in the opposite direction, with populist leaders in some countries having downplayed the pandemic, rejected scientific public health advice (including the wearing of facemasks and social distancing), promoted unproven treatments, and criticized the approach and decisions of the World Health Organization [66]. In addition, although there has been news (in both print and visual media) that female leaders have managed the COVID-19 crisis better than male leaders and communicated better about pandemic policies, no scientific evidence has been found in the relevant literature to support the popular claims that female leaders have been more effective in managing the COVID-19 crisis [67]. Within the scope of the current study, it was determined that articles on management and leadership related to COVID-19 used keywords and topics that had a general focus on issues such as public administration, crisis-fighting policies, effectiveness, and performance.

The most frequently used keywords and related concepts in the most-cited articles on “administration” related to COVID-19 are presented in Figure 5c. As can be seen, the most frequently used keywords together with “administration” in the 246 most-cited publications were categorized in three main clusters. The most frequently highlighted keywords in each of these clusters were “coronavirus” ( $f = 8$ ), “leadership” ( $f = 4$ ), and “management” ( $f = 4$ ). In addition, the keywords of “crisis,” “education,” “efficacy,” “governance,” “pandemic,” “performance,” “public management,” “quarantine,” and

“student” were each used twice, together with the term “administration” in the 246 most-cited articles.

The obtained data showed that the COVID-19 outbreak especially highlighted the concepts of “administration, leadership, management, crisis, education, and efficacy.” Acuto [68] stated that crises such as COVID-19 had helped us learn essential lessons in global and urban governance. In this context, it is indisputable that effective crisis management helps reduce the potential risks for society and reduce both the financial and social impact [69]. However, how many countries managed the COVID-19 crisis also caused some level of controversy [70]. As a result, the pandemic has proven the importance of effective crisis management and citizens’ compliance with the implementation of decisions made by local and national governments.

The research model used in the 246 most-cited articles on management, leadership, and administration related to COVID-19 was also examined, and the findings are presented in Table 3.

**Table 3.** Number of most-cited publications and citations by research model.

| Research Model         | Number of Publications | Number of Citations | Citations Per Publication |
|------------------------|------------------------|---------------------|---------------------------|
| Theoretical *          | 139                    | 5393                | 38.80                     |
| Empirical qualitative  | 74                     | 2575                | 34.80                     |
| Empirical quantitative | 31                     | 1223                | 39.45                     |
| Mixed-method           | 2                      | 63                  | 31.50                     |

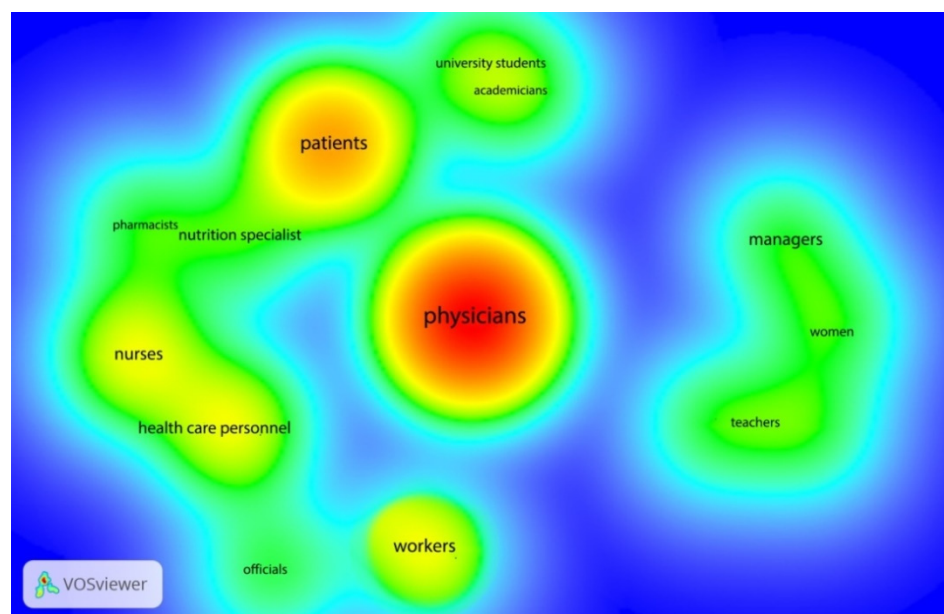
\* Includes literature reviews, systematic reviews, and meta-analyses.

When Table 3 is examined, theoretical studies ( $f = 139$ ) were the research model most used by the authors of the 246 most-cited articles on management, leadership, and administration related to COVID-19. Following theoretical studies, the most preferred research models in the 246 most-cited articles were “empirical qualitative studies” ( $f = 74$ ), “empirical quantitative studies” ( $f = 31$ ), and “mixed-method studies” ( $f = 2$ ). While approximately 30% of the articles reviewed within the scope of the current study were conducted as empirical qualitative studies, a significantly high 56.5% of all 246 most-cited articles were theoretical studies. In a study conducted by Piccarozzi et al. [71], theoretical articles on COVID-19 totaled 45%, while 55% were empirical qualitative studies. Additionally, Fidahic et al. [72] stated that researchers showed increased interest in publishing articles on the COVID-19 outbreak compared to previous coronavirus outbreaks (i.e., SARS-CoV and MERS-CoV). However, most of these publications were editorial, compilations, or studies that expressed an opinion. Raynaud et al. [73] revealed that the majority of COVID-19 publications since the beginning of the pandemic consisted of publications that contained no original data and that 4190 (56.1%) of the 10,516 articles examined were based on theoretical studies consisting of editorial, commentary, or expert opinions that presented no scientific data-based analysis. When evaluated in general, it is possible to say that qualitative research methods were preferred in studies examining the effects of COVID-19 [74–80].

A detailed analysis was performed to determine the sample/working groups of the 246 most-cited research articles on management, leadership, and administration related to COVID-19, and the findings are illustrated as shown in Figure 6.

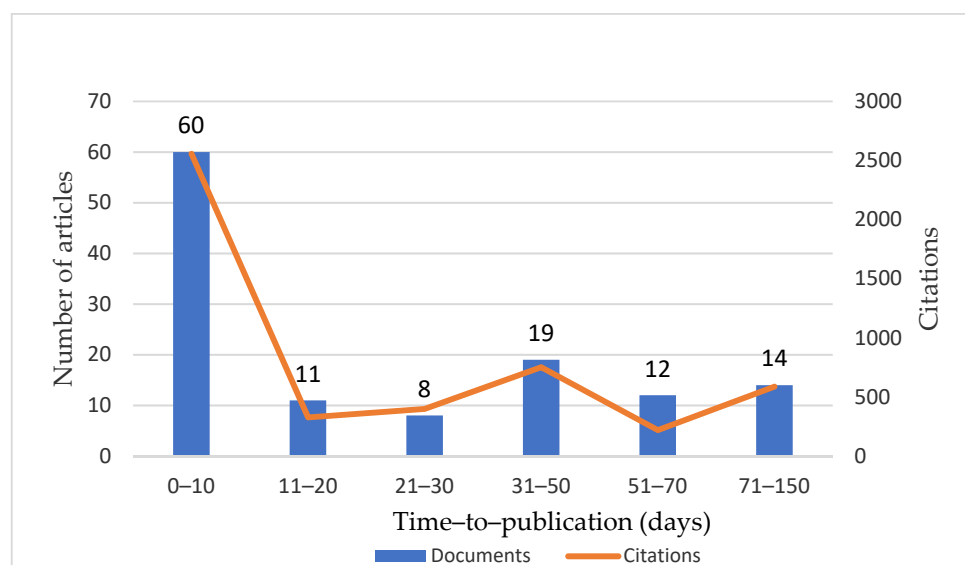
When Figure 6 is examined, in the sample/study groups of the 246 most-cited articles, “doctors” ( $f = 41$ ) took part the most, followed by “patients” ( $f = 13$ ), “nurses” ( $f = 5$ ), “health personnel” ( $f = 4$ ), “workers” ( $f = 3$ ), “nutritionists” ( $f = 3$ ), “bureaucratic managers” ( $f = 3$ ), “civil servants” ( $f = 2$ ), “citizens” ( $f = 2$ ), “teachers” ( $f = 2$ ), and “administrators” ( $f = 2$ ). The current research results show that the sample/study groups in the 246 most-cited articles consisted mostly of healthcare professionals and patients, with doctors included the most in the sample/study groups. With the emergence of the COVID-19 virus, doctors and healthcare workers who battled the pandemic were subject to unprecedented personal health risks working on the frontline. In this context, the early COVID-19 medical literature

mainly focused on the clinical features and diagnosis of the disease, with many articles published in a short timeframe that focused on the epidemiological features, clinical features, and diagnosis COVID-19 in patients [81]. In addition, the number of articles that focused on the psychological issues experienced by doctors and healthcare professionals in their fight against COVID-19 was seen to increase significantly [82,83]. These findings show that occupational groups other than healthcare workers were generally neglected in studies that focused on management, leadership, and administration related to COVID-19. In the 246 articles examined, the number in which teachers and students were sampled was limited.



**Figure 6.** Density visualization map of sample/study group in most-cited publications.

Lastly, the published time of the 246 most-cited articles on management, leadership, and administration related to COVID-19 in journals was examined. At this stage, the period between submitting an article to a publisher/journal and the actual publication date was determined. The articles' publication time is presented in Figure 7.



**Figure 7.** Distribution of time to publication (days) in most-cited publications.

Of the 246 most-cited articles examined within the scope of the current research, information about the editorial review and publication period was found to be available for only 124 articles, meaning that information on the submission and acceptance dates of 122 of the reviewed articles was not accessible data. It was also determined that 60 of the 124 articles with available data were published in 0–10 days. Nineteen articles were published in 11–30 days, and 45 articles were published in a timeframe of more than 30 days. One important issue discussed in the COVID-19 literature has been the rapid editorial review and publication timeline from candidate articles' initial submittal to journals through to their actual publication. When the relevant literature is examined, it can be seen that, especially in the early period of the pandemic, COVID-19 research was being published in a short time. In this context, Gale [84] claimed that the COVID-19 outbreak offered authors and journals the opportunity to publish their studies far quicker than would normally be expected, with some journals significantly lowering their article acceptance criteria. Palayew et al. [85] reported that the acceptance period for articles on COVID-19 was notably reduced to just six days, resulting in the rapid publication of a large number of studies. Although the nature of the emergency brought about by the pandemic warranted some speeding up of the research review and publication process, specific strict measures should still be adhered to to ensure the integrity of the reporting of scientific evidence. As such, articles containing information that has not been appropriately verified or examined in detail may adversely affect public health policy decisions should they be taken even in part based upon unverified evidence [86]. During this process, publishing articles at an extraordinary speed also triggered discussions regarding these articles' quality. It was further stated that journal editors were under evident pressure to publish research about COVID-19 as quickly as possible. This pressure experienced by journal editors caused significant workload increases for the expert referees in the field, and this resulted in articles going through the referee process without due care for the quality and accuracy of the presented studies. The methodological and reporting quality of hastily published articles on COVID-19 appears to be significantly lower than articles published within what may be considered a "normal timeline" for other topics or areas of study (i.e., not related to COVID-19) [87,88]. Few of the COVID-19 articles published during this process were found to meet the high scientific standards that might typically be expected [73]. As a result, the pandemic has caused a paradigm shift in the quality of certain publications in academia [89]. Recognizing the need for immediate information deliverance on COVID-19, some reputable journals quickly published numerous case reports through an accelerated review process to make them freely available on time. At the same time, these articles may also be said to have been hastily published just to make the data available to a broader audience [90]. The average time to publish the 124 articles examined within the scope of the current research was determined as being 23 days.

## 5. Conclusions

This study presents bibliometric research that analyzed the 246 most-cited articles on management, leadership, and administration related to COVID-19 in the Web of Science Core Collection database. In determining the thematic structure of the articles examined within the scope of the study, the current trends identified from the reviewed articles offer a guide for future research on similar topics. It is assumed that the current research results will encourage researchers to research less studied topics in current literature.

When the current study results are evaluated regarding the number of related publications and total citations, the Anglo-American-, Chinese-, and European-centered dominance continues in the management, leadership, and administration-oriented publications related to COVID-19. A similar finding was obtained in a study conducted by Hallinger [91]. Accordingly, although there has been a significant increase in the number of articles on "educational leadership and management" originating from Asia, Africa, and Latin America in recent years, the level of publications of American–European origin is still considerably higher. However, while the results of a study by Gümüş et al. [92] revealed that

Anglo-American-European-centered dominance continued in studies that focused on “Educational Leadership and management,” it was emphasized that the past two decades had seen significant efforts to contribute to knowledge production in the field of educational leadership and management (EDLM) outside of Western countries.

Gale [84] and Stoye [93] reported that the number of publications related to COVID-19 increased very rapidly. The COVID-19 outbreak, which was declared a global emergency early on by the World Health Organization, attracted researchers’ great deal of attention. In particular, China published many articles in prestigious international journals in a concise space of time. In this context, a significant portion of the research articles on COVID-19 published in international journals was authored by researchers in China [94]. The United States and the United Kingdom were the two countries with the highest number of researchers, following China [95]. Notably, the outbreak’s initial appearance in China enabled researchers in China to conduct numerous scientific studies and research regarding the COVID-19 virus.

Within the scope of the current study, management- and leadership-oriented studies related to COVID-19 were generally found to have focused on issues such as “pandemic, crisis management, performance, public management, effectiveness, education, and students.” In addition, publication trends in administration-oriented articles related to COVID-19 mainly focused on “pneumonia, sars, transmission, diagnosis, risk, impact, influenza, and pandemics.” The samples in the examined studies, mainly composed of health workers, doctors, and patients, show that the number of studies on this subject based on other occupational groups has been significantly lower. For this reason, researching management, leadership, and administration related to COVID-19 with different professional groups will undoubtedly enrich this scientific field.

Another of the results obtained within the scope of the current research was that the published articles were mainly “theoretical” articles based on literature reviews. In this context, while research using datasets was mainly conducted with “qualitative methods,” the number of studies conducted with a “mixed-methods” design was found to be limited. From this perspective, choosing a mixed-methods design in future research focused on management, leadership, and administration related to COVID-19 may help provide more analytically richer results. Finally, the current study results revealed that articles focused on COVID-19 were subject to an exceptionally rapid editorial review before publication. In this context, it may be said that the editors of international journals have a clear responsibility to pass COVID-19-focused articles through a healthy referee process to protect the publication standards of their journals and to uphold the ethics of the scientific study.

**Author Contributions:** Conceptualization, T.K., R.Y. and T.Y.O.; methodology, T.K., S.P. and R.Y.; formal analysis, T.K., M.D., T.Y.O. and H.P.; data curation, T.K., M.D., H.P. and T.Y.O.; writing—original draft preparation, T.K., S.P. and R.Y.; writing, T.K., M.D. and R.Y.; review and editing, T.K., S.P. and R.Y.; supervision, T.K. and S.P.; All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Data used were publicly available; no identifying information was collected or included. All the data used in this research was accessed through Web of Science Core Collection (WoSCC) bibliographic database.

**Conflicts of Interest:** The authors declare no conflict of interest.

**Ethics Statement:** Ethical approval and consent to participate were not required because the study was designed as a bibliographic analysis of already published manuscripts.



## References

1. Padhan, R.; Prabheesh, K.P. The economics of COVID-19 pandemic: A survey. *Econ. Anal. Policy* **2021**, *70*, 220–237. [\[CrossRef\]](#) [\[PubMed\]](#)
2. Siche, R. What is the impact of COVID-19 disease on agriculture? *Sci. Agropecu.* **2020**, *11*, 3–6. [\[CrossRef\]](#)
3. Dash, D.P.; Sethi, N.; Dash, A.K. Infectious disease, human capital, and the BRICS economy in the time of COVID-19. *MethodsX* **2021**, *8*, 101202. [\[CrossRef\]](#) [\[PubMed\]](#)
4. Davico, C.; Ghiggia, A.; Marcotulli, D.; Ricci, F.; Amianto, F.; Vitiello, B. Psychological impact of the COVID-19 pandemic on adults and their children in Italy. *Front. Psychiatry* **2021**, *12*, 239. [\[CrossRef\]](#)
5. Joffe, A.R. COVID-19: Rethinking the lockdown groupthink. *Front. Public Health* **2021**, *9*, 625778. [\[CrossRef\]](#)
6. Karakose, T.; Yirci, R.; Basyigit, H.; Kucukcakil, A. Investigation of associations between the effects of COVID-19 fear on school administrators and nutrition and problematic eating behaviors. *Prog. Nutr.* **2021**, *23*, 2021187. [\[CrossRef\]](#)
7. Pfefferbaum, B.; North, C.S. Mental Health and the Covid-19 Pandemic. *N. Eng. J. Med.* **2020**, *383*, 510–512. [\[CrossRef\]](#)
8. Soga, M.; Evans, M.J.; Tsuchiya, K.; Fukano, Y. A room with a green view: The importance of nearby nature for mental health during the COVID-19 pandemic. *Ecol. Appl.* **2021**, *31*, e2248. [\[CrossRef\]](#)
9. Flanagan, E.W.; Beyl, R.A.; Fearnbach, S.N.; Altazan, A.D.; Martin, C.K.; Redman, L.M. The impact of COVID-19 stay-at-home orders on health behaviors in adults. *Obesity* **2021**, *29*, 438–445. [\[CrossRef\]](#)
10. Lewnard, J.A.; Lo, N.C. Scientific and ethical basis for social-distancing interventions against COVID-19. *Lancet Infect. Dis.* **2020**, *20*, 631–633. [\[CrossRef\]](#)
11. Tee, M.L.; Tee, C.A.; Anlacan, J.P.; Aligam, K.K.; Reyes, P.W.; Kuruchittham, V.; Ho, R.C. Psychological impact of COVID-19 pandemic in the Philippines. *J. Affect. Disord.* **2020**, *277*, 379–391. [\[CrossRef\]](#)
12. Unal, M.; Irez, T. Covid-19 Disease, Self-Isolation and Physical Inactivity. *Int. J. Sports Med.* **2021**, *7*, 184. [\[CrossRef\]](#)
13. Shen, H.; Fu, M.; Pan, H.; Yu, Z.; Chen, Y. The impact of the COVID-19 pandemic on firm performance. *Emerg. Mark. Financ. Tr.* **2020**, *56*, 2213–2230. [\[CrossRef\]](#)
14. Blundell, R.; Costa Dias, M.; Joyce, R.; Xu, X. COVID-19 and Inequalities. *Fisc. Stud.* **2020**, *41*, 291–319. [\[CrossRef\]](#)
15. Jung, J.; Horta, H.; Postiglione, G.A. Living in uncertainty: The COVID-19 pandemic and higher education in Hong Kong. *Stud. High. Educ.* **2021**, *46*, 107–120. [\[CrossRef\]](#)
16. Kim, H.-S. Beyond Doubt and Uncertainty: Religious Education for a Post-COVID-19 World. *Relig. Educ.* **2021**, *116*, 41–52. [\[CrossRef\]](#)
17. Patel, J.A.; Nielsen, F.B.H.; Badiani, A.A.; Assi, S.; Unadkat, V.A.; Patel, B.; Ravindrane, R.; Wardle, H. Poverty, inequality and COVID-19: The forgotten vulnerable. *Public Health* **2020**, *183*, 110–111. [\[CrossRef\]](#)
18. Tasci, G. The impact of COVID-19 on Higher Education: Rethinking internationalization behind the iceberg: COVID-19 and Higher Education. *Int. J. Curric. Instr.* **2021**, *13*, 522–536.
19. Burström, B.; Tao, W. Social determinants of health and inequalities in COVID-19. *Eur. J. Public Health* **2020**, *30*, 617–618. [\[CrossRef\]](#)
20. Mochida, S.; Sanada, M.; Shao, Q.; Lee, J.; Takaoka, J.; Ando, S.; Sakakihara, Y. Factors modifying children's stress during the COVID-19 pandemic in Japan. *Eur. Early Child. Educ. Res. J.* **2021**, *29*, 51–65. [\[CrossRef\]](#)
21. Karakose, T. The perceptions of primary school teachers on principal cultural leadership behaviors. *Educ. Sci. Theory Pract.* **2008**, *8*, 569–579.
22. Karakose, T. The impact of the COVID-19 epidemic on higher education: Opportunities and implications for policy and practice. *Ed. Process Int. J.* **2021**, *10*, 7–12. [\[CrossRef\]](#)
23. Karakose, T.; Kocabas, I. An investigation of ethical culture in educational organizations. *Afr. J. Bus. Manag.* **2009**, *3*, 504–510. [\[CrossRef\]](#)
24. Karakose, T.; Yirci, R.; Kocabas, I. A qualitative study of the novice principals' problems in the school management process and solutions. *Pak. J. Stat.* **2014**, *30*, 1365–1378.
25. Press, V.G.; Huisingh-Scheetz, M.; Arora, V.M. Inequities in Technology Contribute to Disparities in COVID-19 Vaccine Distribution. *JAMA Health Forum* **2021**, *2*, e210264. [\[CrossRef\]](#)
26. Walters, A. Inequities in access to education: Lessons from the COVID-19 pandemic. *Brown Univ. Child Adol. Behav. Let.* **2020**, *36*, 8. [\[CrossRef\]](#)
27. Jæger, M.M.; Blaabæk, E.H. Inequality in learning opportunities during Covid-19: Evidence from library takeout. *Res. Soc. Strat. Mobil.* **2020**, *68*, 100524. [\[CrossRef\]](#)
28. Burgess, R.A.; Osborne, R.H.; Yongabi, K.A.; Greenhalgh, T.; Gurdasani, D.; Kang, G.; Falade, A.G.; Odone, A.; Busse, R.; Martin-Moreno, J.M.; et al. The COVID-19 vaccines rush: Participatory community engagement matters more than ever. *Lancet* **2021**, *397*, 8–10. [\[CrossRef\]](#)
29. Antonakis, J. Leadership to defeat COVID-19. *Group Proces. Intergr. Relat.* **2021**, *24*, 210–215. [\[CrossRef\]](#)
30. Karakose, T. Emergency remote teaching due to COVID-19 pandemic and potential risks for socioeconomically disadvantaged students in higher education. *Ed. Process Int. J.* **2021**, *10*, 53–61.
31. Karakose, T.; Yirci, R.; Papadakis, S. Exploring the Interrelationship between COVID-19 Phobia, Work–Family Conflict, Family–Work Conflict, and Life Satisfaction among School Administrators for Advancing Sustainable Management. *Sustainability* **2021**, *13*, 8654. [\[CrossRef\]](#)

32. Kirchner, K.; Ipsen, C.; Hansen, J.P. COVID-19 leadership challenges in knowledge work. *Knowl. Manag. Res. Pract.* **2021**. [CrossRef]
33. Dirani, K.M.; Abadi, M.; Alizadeh, A.; Barhate, B.; Garza, R.C.; Gunasekara, N.; Ibrahim, G.; Majzun, Z. Leadership competencies and the essential role of human resource development in times of crisis: A response to Covid-19 pandemic. *Hum. Resour. Dev. Int.* **2020**, *23*, 380–394. [CrossRef]
34. Ansell, C.; Sørensen, E.; Torfing, J. The COVID-19 pandemic as a game changer for public administration and leadership? The need for robust governance responses to turbulent problems. *Public Manag. Rev.* **2020**, *23*, 949–960. [CrossRef]
35. Karakose, T. Global Education in the shadow of the novel coronavirus: Reflections on the impact of COVID-19 outbreak on education systems. *Ed. Process Int. J.* **2020**, *9*, 201–204. [CrossRef]
36. Davis, W. *The Unravelling of America*; Rolling Stone: New York, NY, USA, 2020; Available online: <https://www.rollingstone.com/politics/political-commentary/covid-19-end-of-american-era-wade-davis-1038206/> (accessed on 17 May 2021).
37. O'Flynn, J. Confronting the big challenges of our time: Making a difference during and after COVID-19. *Public Manag. Rev.* **2020**, *23*, 961–980. [CrossRef]
38. Morris, S.A.; Van der Veer Martens, B. Mapping research specialties. *Annu. Rev. Inform. Sci. Tech.* **2008**, *42*, 213–295. [CrossRef]
39. Cobo, M.J.; Chiclana, F.; Collop, A.; De Ona, J.; Herrera-Viedma, E. A Bibliometric Analysis of the Intelligent Transportation Systems Research Based on Science Mapping. *IEEE Trans. Intel. Trans. Syst.* **2014**, *15*, 901–908. [CrossRef]
40. Van Eck, N.J.; Waltman, L. Visualizing bibliometric networks. In *Measuring Scholarly Impact: Methods and Practice*; Ding, Y., Rousseau, R., Wolfram, D., Eds.; Springer: Berlin/Heidelberg, Germany, 2014; pp. 285–320.
41. Corbin, J.M.; Strauss, A. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*, 3rd ed.; Sage: New York, NY, USA, 2008.
42. Köhler, T.; Stemmler, M. Normative versus impulsive frequency analysis in personality research -their use discussed in a reanalysis of data on situation-bound anxiety. *Eur. J. Pers.* **1997**, *11*, 69–79. [CrossRef]
43. Hallinger, P.; Kulophas, D. The evolving knowledge base on leadership and teacher professional learning: A bibliometric analysis of the literature, 1960–2018. *Prof. Dev. Educ.* **2019**, *46*, 521–540. [CrossRef]
44. Moher, D.; Liberati, A.; Tetzlaff, J.; Altman, D.G. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *Ann. Inter. Med.* **2009**, *151*, 264–269. [CrossRef]
45. Aggarwal, A.; Lewison, G.; Idir, S.; Peters, M.; Aldigee, C.; Boerckel, W.; Boyle, P.; Trimble, E.L.; Roe, P.; Sethi, T.; et al. The state of lung cancer research: A global analysis. *J. Thorac. Oncol.* **2016**, *11*, 1040–1050. [CrossRef]
46. Zhai, X.; Cui, J.; Shao, J.; Wang, Q.; Chen, X.; Wei, X.; Zhou, X.; Chen, Z.; Bai, Y.; Li, M. Global research trends in spinal ultrasound: A systematic bibliometric analysis. *BMJ Open* **2017**, *7*, e015317. [CrossRef] [PubMed]
47. Zou, X.; Yue, W.L.; Vu, H.L. Visualization and analysis of mapping knowledge domain of road safety studies. *Accid. Anal. Prev.* **2018**, *118*, 131–145. [CrossRef] [PubMed]
48. Van Eck, N.J.; Waltman, L. Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics* **2010**, *84*, 523–538. [CrossRef]
49. Tavascil, E.; Aslan, A.E. *Content Analysis and Application Examples for Verbal, Written and Other Materials*; Epsilon: Erving, TX, USA, 2001.
50. Verma, S.; Gustafsson, A. Investigating the emerging COVID-19 research trends in the field of business and management: A bibliometric analysis approach. *J. Bus. Res.* **2020**, *118*, 253–261. [CrossRef] [PubMed]
51. Aristovnik, A.; Ravšelj, D.; Umek, L. A bibliometric analysis of COVID-19 across science and social science research landscape. *Sustainability* **2020**, *12*, 9132. [CrossRef]
52. Wang, J.; Hong, N. The COVID-19 research landscape: Measuring topics and collaborations using scientific literature. *Medicine* **2020**, *99*, e22849. [CrossRef]
53. Boccia, S.; Ricciardi, W.; Ioannidis, J.P. What other countries can learn from Italy during the COVID-19 pandemic. *JAMA Int. Med.* **2020**, *180*, 927–928. [CrossRef] [PubMed]
54. Remuzzi, A.; Remuzzi, G. COVID-19 and Italy: What next? *Lancet* **2020**, *395*, 1225–1228. [CrossRef]
55. Ceylan, Z. Estimation of COVID-19 prevalence in Italy, Spain, and France. *Sci. Total Environ.* **2020**, *729*, 138817. [CrossRef]
56. Shamsi, A.; Mansourzadeh, M.J.; Ghazbani, A.; Khalagi, K.; Fahimfar, N.; Ostovar, A. Contribution of Iran in COVID-19 studies: A bibliometrics analysis. *J. Diabetes Metab. Disord.* **2020**, *19*, 1845–1854. [CrossRef]
57. Zhai, F.; Zhai, Y.; Cong, C.; Song, T.; Xiang, R.; Feng, T.; Liang, Z.; Zeng, Y.; Yang, J.; Yang, J.; et al. Research progress of coronavirus based on bibliometric analysis. *Int. J. Environ. Res. Public Health* **2020**, *17*, 3766. [CrossRef]
58. Yu, Y.; Li, Y.; Zhang, Z.; Gu, Z.; Zhong, H.; Zha, Q.; Lang, Y.; Zhu, C.; Chen, E. A bibliometric analysis using VOSviewer of publications on COVID-19. *Ann. Transl. Med.* **2020**, *8*, 816. [CrossRef]
59. Gul, S.; Ur Rehman, S.; Ashiq, M.; Khattak, A. Mapping the Scientific Literature on COVID-19 and Mental Health. *Psychiatr. Danub.* **2020**, *32*, 463–471. [CrossRef]
60. Nasab, F.R.; Rahim, F. Bibliometric analysis of global scientific research on SARSCoV-2 (COVID-19). *MedRxiv* **2020**. [CrossRef]
61. Teixeira da Silva, J.A.; Tsigaris, P.; Erfanmanesh, M. Publishing volumes in major databases related to Covid-19. *Scientometrics* **2021**, *126*, 831–842. [CrossRef]
62. World Health Organization. COVID-19 Clinical Management: Living Guidance. Available online: <https://www.who.int/publications/i/item/WHO-2019-nCoV-clinical-2021-1> (accessed on 23 April 2021).

63. National Institutes of Health. Therapeutic Management of Adults with COVID-19. Available online: <https://www.covid19treatmentguidelines.nih.gov/therapeutic-management/> (accessed on 22 April 2021).
64. Ministry of Health of the Republic of Turkey. COVID-19 Pandemic Management and Working Guide. 2020. Available online: <https://covid19.saglik.gov.tr/Eklenti/40340/0/covid-19salginyonetimivecalismarehberipdf.pdf> (accessed on 11 May 2021).
65. Rasul, G. A framework for improving policy priorities in managing COVID-19 challenges in developing countries. *Front. Public Health* **2020**, *8*, 89681. [CrossRef]
66. Baum, F.; Freeman, T.; Musolino, C.; Abramovitz, M.; De Ceukelaire, W.; Flavel, J.; Friel, S.; Giugliani, C.; Howden-Chapman, P.; Huong, N.T.; et al. Explaining covid-19 performance: What factors might predict national responses? *BMJ* **2021**, *372*, 91. [CrossRef]
67. Aldrich, A.S.; Lotito, N.J. Pandemic performance: Women leaders in the Covid-19 crisis. *Polit. Gen.* **2020**, *16*, 960–967. [CrossRef]
68. Acuto, M. COVID-19: Lessons for an Urban(izing) world. *One Earth* **2020**, *2*, 317–319. [CrossRef]
69. Mizrahi, S.; Vigoda-Gadot, E.; Cohen, N. How Well Do They Manage a Crisis? The Government's Effectiveness during the Covid-19 Pandemic. *Public Adm. Rev.* **2021**. [CrossRef]
70. Hegele, Y.; Schnabel, J. Federalism and the management of the COVID-19 crisis: Centralisation, decentralisation and (non-) coordination. *West Eur. Polit.* **2021**, *44*, 1052–1076. [CrossRef]
71. Piccarozzi, M.; Silvestri, C.; Morganti, P. COVID-19 in Management Studies: A Systematic Literature Review. *Sustainability* **2021**, *13*, 3791. [CrossRef]
72. Fidahic, M.; Nujic, D.; Runjic, R.; Civljak, M.; Markotic, F.; Makaric, Z.L.; Puljak, L. Research methodology and characteristics of journal articles with original data, preprint articles and registered clinical trial protocols about COVID-19. *BMC Med. Res. Methodol.* **2020**, *20*, 161. [CrossRef]
73. Raynaud, M.; Zhang, H.; Louis, K.; Goutaudier, V.; Wang, J.; Dubourg, Q.; Wei, Y.; Demir, Z.; Debiais, C.; Aubert, O.; et al. COVID-19-related medical research: A meta-research and critical appraisal. *BMC Med. Res. Methodol.* **2021**, *21*, 1. [CrossRef]
74. Baltacı, A. The Qualitative Research Process: How to Perform a Qualitative Research? *Ahi Evran Univ. Inst. Soc. Sci. J.* **2019**, *5*, 368–388. [CrossRef]
75. Cao, J.; Wei, J.; Zhu, H.; Duan, Y.; Geng, W.; Hong, X.; Jiang, J.; Zhao, X.; Zhu, B. A study of basic needs and psychological wellbeing of medical workers in the fever clinic of a tertiary general hospital in Beijing during the COVID-19 outbreak. *Psychother. Psychosom.* **2020**, *89*, 252–254. [CrossRef]
76. Karakose, T.; Malkoc, N. Behavioral and interpersonal effects of the COVID-19 epidemic on frontline physicians working in Emergency Departments (EDs) and Intensive Care Units (ICUs). *Acta Med. Mediterr.* **2021**, *37*, 437–444. [CrossRef]
77. Liu, Q.; Luo, D.; Haase, J.E.; Guo, Q.; Wang, X.Q.; Liu, S.; Xia, L.; Yang, B.X. The experiences of healthcare providers during the COVID-19 crisis in China: A qualitative study. *Lancet Glob. Health* **2020**, *8*, 790–798. [CrossRef]
78. Merriam, S.B.; Grenier, R.S. *Qualitative Research in Practice: Examples for Discussion and Analysis*; Jossey-Bass: San Francisco, CA, USA, 2019.
79. Ozturk, M.; Gok, S.G. Investigation of research trends in the management literature with the bibliometric analysis method in the COVID-19 period. *Kapadokya Akad. Bak.* **2020**, *4*, 73–89. Available online: <https://dergipark.org.tr/en/pub/car/issue/58937/832792> (accessed on 5 May 2021).
80. Turan, S. Technological leadership of school principal during the COVID-19 period. *Milli Egitim Dergisi* **2020**, *49*, 175–199. [CrossRef]
81. Liu, N.; Chee, M.L.; Niu, C.; Pek, P.P.; Siddiqui, F.J.; Ansah, J.P.; Matchar, D.B.; Lam, S.S.W.; Abdullah, H.R.; Chan, A.; et al. Coronavirus disease 2019 (COVID-19): An evidence map of medical literature. *BMC Med. Res. Methodol.* **2020**, *20*, 177. [CrossRef] [PubMed]
82. Karakose, T.; Malkoc, N. Psychological impact of the COVID-19 pandemic on medical doctors in Turkey. *Soc. Behav. Pers.* **2021**, *49*, 9890. [CrossRef]
83. Lai, J.; Ma, S.; Wang, Y.; Cai, Z.; Hu, J.; Wei, N.; Wu, J.; Du, H.; Chen, T.; Li, R.; et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Netw. Open* **2020**, *3*, e203976. [CrossRef]
84. Gale, R.P. Conquest of COVID-19. Publish it to death? *Br. J. Haematol.* **2020**, *190*, 358–360. [CrossRef] [PubMed]
85. Palayew, A.; Norgaard, O.; Safreed-Harmon, K.; Andersen, T.H.; Rasmussen, L.N.; Lazarus, J.V. Pandemic publishing poses a new COVID-19 challenge. *Nat. Hum. Behav.* **2020**, *4*, 666–669. [CrossRef] [PubMed]
86. Bagdasarian, N.; Cross, G.B.; Fisher, D. Rapid publications risk the integrity of science in the era of COVID-19. *BMC Med.* **2020**, *18*, 192. [CrossRef]
87. Karakose, T.; Demirkol, M. Exploring the emerging COVID-19 research trends and current status in the field of education: A bibliometric analysis and knowledge mapping. *Ed. Process Int. J.* **2021**, *10*, 7–27.
88. Wolkewitz, M.; Puljak, L. Methodological challenges of analysing COVID-19 data during the pandemic. *BMC Med. Res. Methodol.* **2020**, *20*, 81. [CrossRef]
89. Mubarak, M. COVID-19 and Biomedical Publishing: Challenges and Prospects (editorial). *J. Coll. Physic. Surg. Pak.* **2020**, *30*, 92–93. [CrossRef]
90. Rubin, E.J.; Baden, L.R.; Morrissey, S.; Champion, E.W. Medical journals and the 2019-nCoV outbreak. *N. Eng. J. Med.* **2020**, *382*, 866. [CrossRef] [PubMed]

- 
91. Hallinger, P. Science mapping the knowledge base on educational leadership and management from the emerging regions of Asia, Africa and Latin America, 1965–2018. *Educ. Manag. Admin. Lead.* **2020**, *48*, 209–230. [[CrossRef](#)]
  92. Gümüş, S.; Bellibaş, M.Ş.; Gümüş, E.; Hallinger, P. Science mapping research on educational leadership and management in Turkey: A bibliometric review of international publications. *Sch. Leadersh. Manag.* **2020**, *40*, 23–44. [[CrossRef](#)]
  93. Stoye, E. China coronavirus: How many papers have been published? *Nature* **2020**. [[CrossRef](#)] [[PubMed](#)]
  94. Xiang, Y.-T.; Li, W.; Zhang, Q.; Jin, Y.; Rao, W.-W.; Zeng, L.-N.; Lok, G.K.I.; Chow, I.H.I.; Cheung, T.; Hall, B.J. Timely research papers about COVID-19 in China. *Lancet* **2020**, *395*, 684–685. [[CrossRef](#)]
  95. Zhang, L.; Li, B.; Jia, P.; Pu, J.; Bai, B.; Li, Y.; Zhu, P.; Li, L.; Zeng, G.; Zhao, X.; et al. An analysis of global research on SARS-CoV-2. *J. Biomed. Eng.* **2020**, *37*, 236–245. [[CrossRef](#)]