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Environmental Impact of the Industrial Activity on Air Quality: Global Visualization on Research Progress

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Abstarct

Scientists, politicians, and the general public have all considered environmental issues. Many countries have seen rapid industrialization in recent times, placing intense strain on their natural environments. Literature metrology was employed in this article to demonstrate the cutting-edge scientific inquiry on the topic of the environmental impact of industrial activity on air quality EIIAAQ. City space is the software used to analyze and quantify the scholarly papers in Scopus, the database used as a source of scientific metrics and data. Results reveal that the most influential countries in the field of research were the United States, China, and India. Results revealed also that health issues were at the center of the research. "COVID19" and "particulate matter" were the most recent keywords with the highest burst and are considered hot spots.

Key words: Environmental impact, Industrialization, Air quality, Citespace, hot spots.

INTRODUCTION

We believe that society urgently requires scientific knowledge on the subject of the environmental impact of industrial activity on air quality (EIIAAQ). Consideration has been given to environmental concerns and challenges by scientists, politicians, and the general public. Many nations around the globe have experienced industrialization growth in recent years, putting immense pressure on their respective countries' natural environments. The rise of the Industrial activities brought with it a slew of significant accomplishments that contributed to the high progress of countries' economies and income. The infrastructure plans of industrial facilities and urban areas, on the other hand, had tremendous environmental repercussions on air quality. Recent research shows that industrialization is linked to lower well-being (Downey & Van Willigen, 2005).

The purpose of this paper, which is to our knowledge, the first and only one on the subject, is to conduct a bibliometric analysis of the currently available literature. Citespace(C Chen, 2006) has been selected as the primary tool for analyzing a large number of existing papers on the subject matter to achieve this goal. Bibliometric analysis is used to reveal recent developments in article and publication results, collaborative effort trends, and study components, as well as to examine the essential features of a single topic in the published literature (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021).

The present paper started withseveral metrological aspects related to EIIAAQ topic, and then a network analysis that revealed the keywords burstness to inform the scientific community about the most recent hotspots of the topic.

METHODOLOGY

The database used to extract records related to "the environmental impact of the industrial activity on air quality" Topic, which we will call EIIAAQ, is the Scopus database. Several 600 documents is retrieved from 172 till now and the search keys are as follows: TITLE-ABS-KEY (air AND quality, AND environmental AND impact, AND industrial AND activity). A bibliometric analysis is conducted with CiteSpace tool(Chaomei Chen, 2016)partial tumor resection; nine patients, tumor recurrence; and two patients, persistent hormonal elevation after surgery. The median dose delivered was 50 Gy (45–59.4 Gy, which can be downloaded for free from (http://cluster.cis.drexel.edu/~cchen/citespace/). The clustering technique is used to depict the main focus of the topic. While Burst analysis is the main method used in this article to assess the evolution of the EIIAAQ's topic-related keywords. Readers rely on academic papers' keywords to quickly locate relevant content. LLR, LSI, and MI are the main algorithms used in clustering techniques in Citespace and are detailed in (Chaomei Chen & Song, 2019)empowered by computational and visual analytic approaches, offer

opportunities to improve the timeliness, accessibility, and reproducibility of studies of the literature of a field of research. On the other hand, effectively and adequately identifying the most representative body of scholarly publications as the basis of subsequent analyses remains a common bottleneck in the current practice. What can we do to reduce the risk of missing something potentially significant? How can we compare different search strategies in terms of the relevance and specificity of topical areas covered? In this study, we introduce a flexible and generic methodology based on a significant extension of the general conceptual framework of citation indexing for delineating the literature of a research field. The method, through cascading citation expansion, provides a practical connection between studies of science from local and global perspectives. We demonstrate an application of the methodology to the research of literature-based discovery (LBD.

RESULTS AND DISCUSSIONS

Time Distribution of the Eiiaaq Topic, and Related Sources

The number of papers, as depicted in Figure 1, has fluctuated since 1972, reaching a peak of 77 papers in 2021, with the records for the year 2022 also taken into consideration. It should be noted that a significant increase has been observed since 2003. Before this date, there had not been a significant number of publications on the subject of studies.

Figure 2, shows the most related journals from the retrieved documents are: Science Of The Total Environment, Environmental Monitoring And Assessment, Atmospheric Environment, Environmental Science And Pollution Research, International Journal Of Environmental Research And Public Health. Most of the journals are related to health and the environment and the top related journals are Q1 (best quartile). While figure 3 shows the most related areas to the EIIAAQ topic, which are: "Environmental Science, Earth and Planetary Sciences", "Engineering", "Medicine", "Social Sciences", "Agricultural and Biological Sciences", "Energy and Chemistry". While the most influential institutions are: "Chinese Academy of Sciences", "ConsiglioNazionaledelleRicerche", "Universidade de Aveiro", "UniversitateaTehnicaGh". "Asachi din Iasl", "Nanjing University of Information Science & Technology", "UniversitàdegliStudi di Napoli Federico", as demonstrated in Figure 4. Those institutions represent also countries from which they are registered, and Table 1shows clearly that the most influential countries and regions that had the biggest influence on the research in the EIIAAQ field research were:"United States", "China", "India", "Italy" and "Spain".

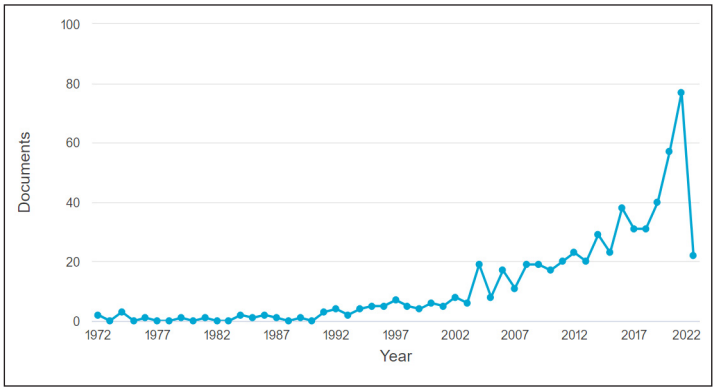


Figure 1. Evolution of the topic from 1972 to the present

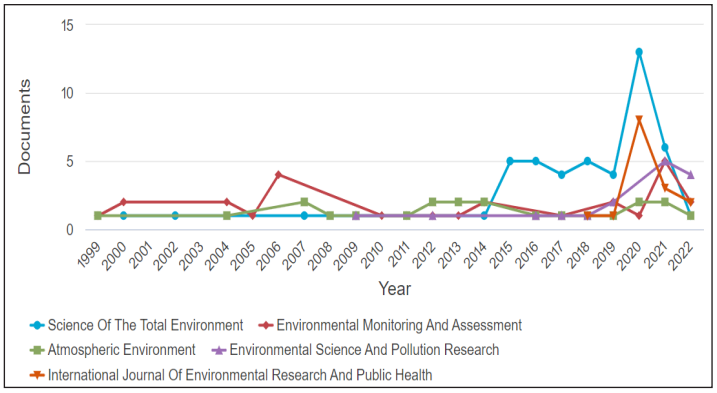


Figure 2. Most Related journals

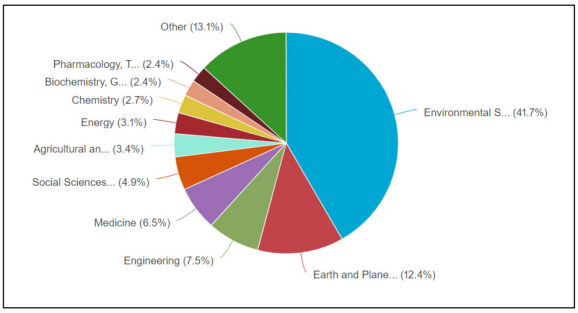


Figure 3. Main subjects

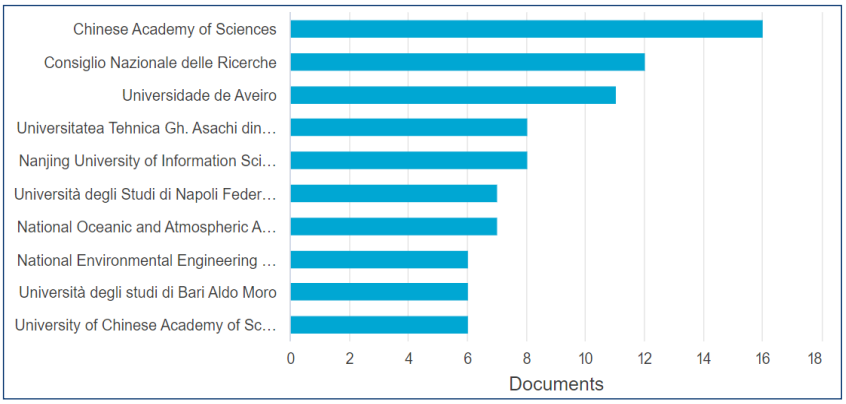


Figure 4. Main influential institutions of the topic

Table 1. Countries with highest contribution in the studied topic

Citation Counts	References	Cluster ID
96	UNITED STATES,	1
53	INDIA,	3
49	CHINA,	0
40	ITALY,	2
25	SPAIN,	6
20	ROMANIA,	0
17	UNITED KINGDOM,	4
16	GERMANY,	8

Evolution of the Topic

As illustrated in Figure 5, the Network is dispersed, which means that the clusters are associated with distinct but related themes. The largest cluster details are illustrated in Table 2. While the main cited works are illustrated in Table 3.

The largest cluster (#0) has 78 members and a silhouette value of 0.971. It is labeled as "particulate matter" by LLR, "covid-19 lockdown" by LSI, and "health risk" by MI. The most relevant citer to the cluster is (Elsaid, Olabi, Sayed, Wilberforce, & Abdelkareem, 2021).It displayed and analyzed the possible impacts of COVID-19 for different economies and offered a unique summary of the impacts of COVID-19 on air, water, wastewater, and waste products, all of which are crucial parts of the ecosystem. While the highest burst belongs to (Sharma et al., 2020). In which, the authors examined the ambient air situation during the lockdown time frame empirically, they used the National Air Quality Index (NAQI) to demonstrate the global patterns of pollution levels before and during the lockdown in India due to the COVID-19 pandemic. The forced restrictions reduced emission levels in cities across the country within days, sparking dialogue about lock-down as an effective option means to manage pollution levels. And they showed that during the lockdown, the quality of air enhances,and pollutant concentrations regulation could indeed improve the quality of the air which proves that momentary origin regulation may recover the atmosphere. The most cited referenced works are, as previously mentioned, illustrated in Table 1. Three of them are published in the last two years and are related to the pandemic, which accentuates the important impact of COVID19 on the scientific production of the topic. But, surprisingly, all of them are centered on health issues, and not specifically on industrial considerations or environmental ones, despite their reliability to those subjects.

Table 2. Summary of the largest cluster

Cluster ID	Size	Silhouette	Label (LSI)	Label (LLR)	Label (MI)	Average Year
0	78	0.971	covid-19 lockdown	particulate matter	health risk	2016

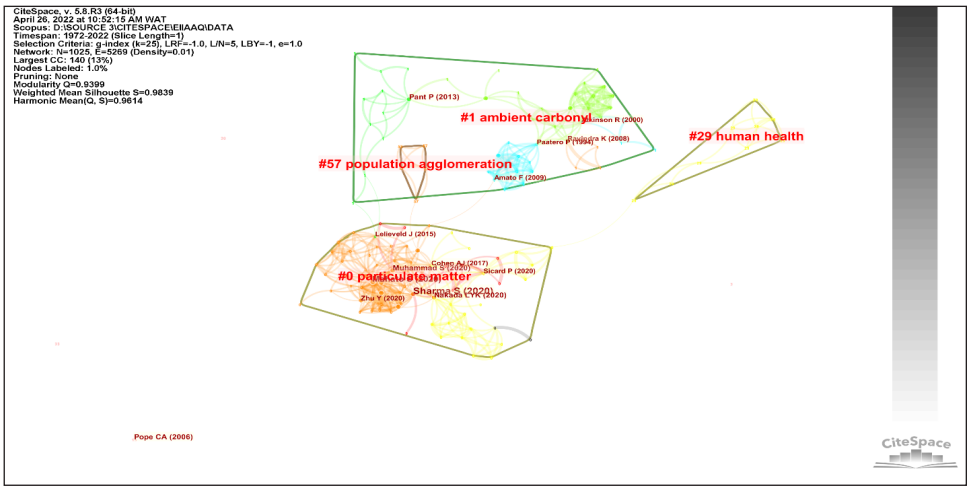


Figure 5. Network map of research on EIIAAQ topic, the colors indicate the evolution by years, red is most recent.

Table 3. Most cited references

Citation Counts	References	Cluster ID
8	(Sharma et al., 2020)	0
6	(Mahato, Pal, & Ghosh, 2020)	0
5	(Keatinge, 1997)	8
5	(Nakada & Urban, 2021)	0
5	(Faulde & Hoffmann, 2001)	8
5	(Laschewski & Jendritzky, 2002)	8
5	(Patz et al., 2001)	8
5	(Pope & Dockery, 2006)	15

Keywords Analysis

The three figures (Figure 6, Figure 7and Figure 8) depict the evolution of the subject through the evolution of keywords associated with it, and the three periods of comparison are as follows: 1972-2002, 2003-2015, and 2016- till the present. By making a simple comparison between them, the three figures demonstrate the evolution of the subject through the evolution of keywords associated with it. During the first period, the majority of the interest was directed toward general keywords; The main keywords with the highest burst and the most time-spanning were: "Environmental engineering", "prevention","water pollution" and "geographic distribution". However, the search for more specific topics begins in the second period, with the following keywords serving as main keywords: 'Eurasia'," United States", "Industrial activity". It is important to mention that some keywords are related, besides geographical aspects, to environmental impacts such as: "environmental assessment", "pollutant gaz". And others more related to technical aspects such as: "Carbon dioxide", "exhaust gas", "ultraviolet radiation".

The most recent period examined, as shown inFigure 8, demonstrates a clear interest in COVID19 among researchers. Although "Analysis", and "COVID19" Are the keywords with the highest amount of burst, "COVID19","SARS COV2", "particular matter 2.5", "communicable disease control", "particulate matter 10" and "lockdown" are the most recent.

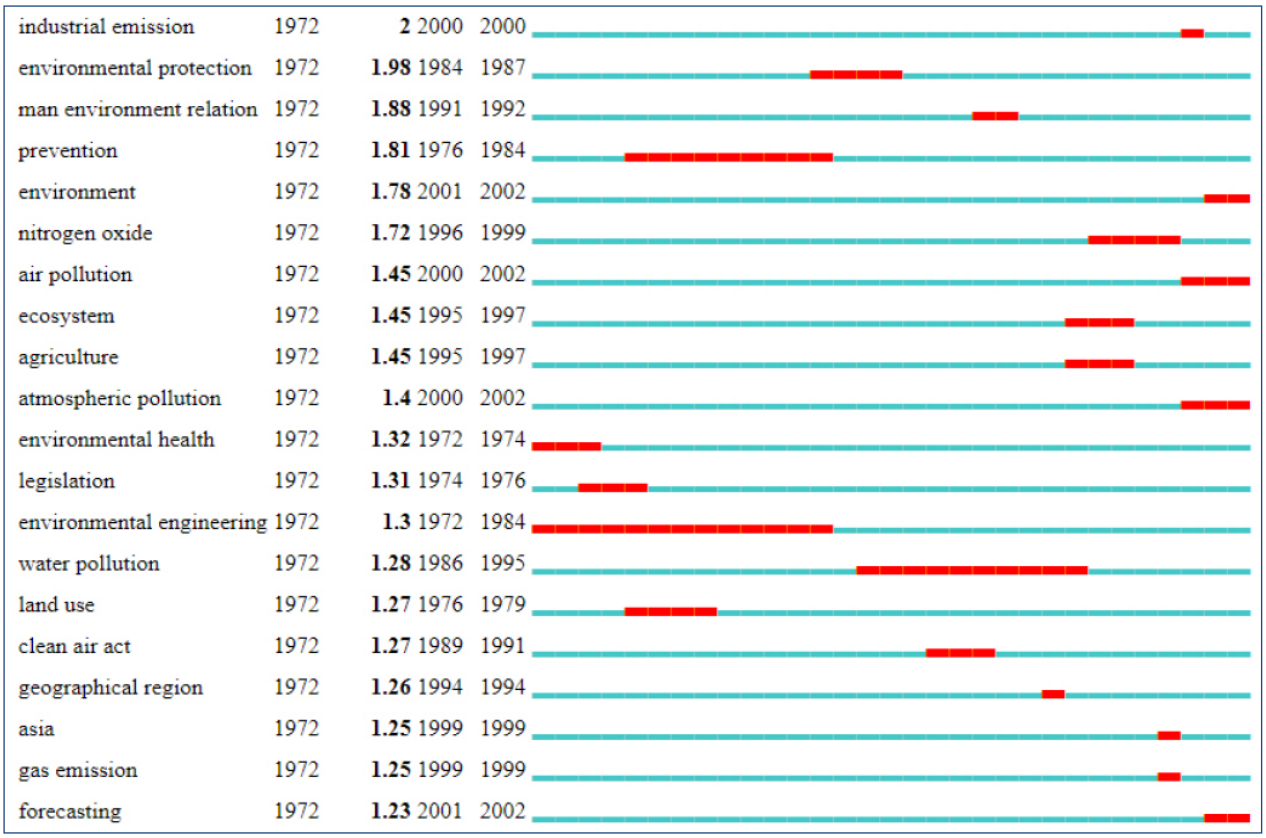


Figure 6. Strongest citation burst of the period 1972-2002

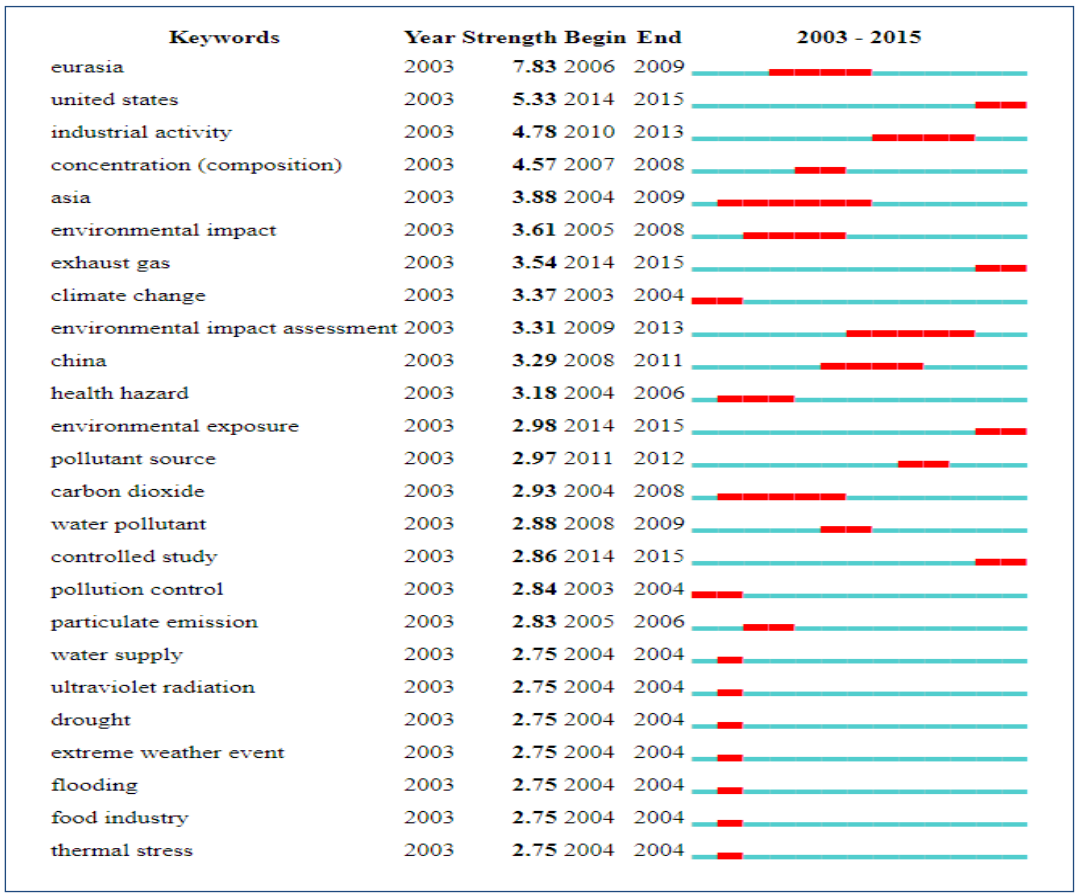
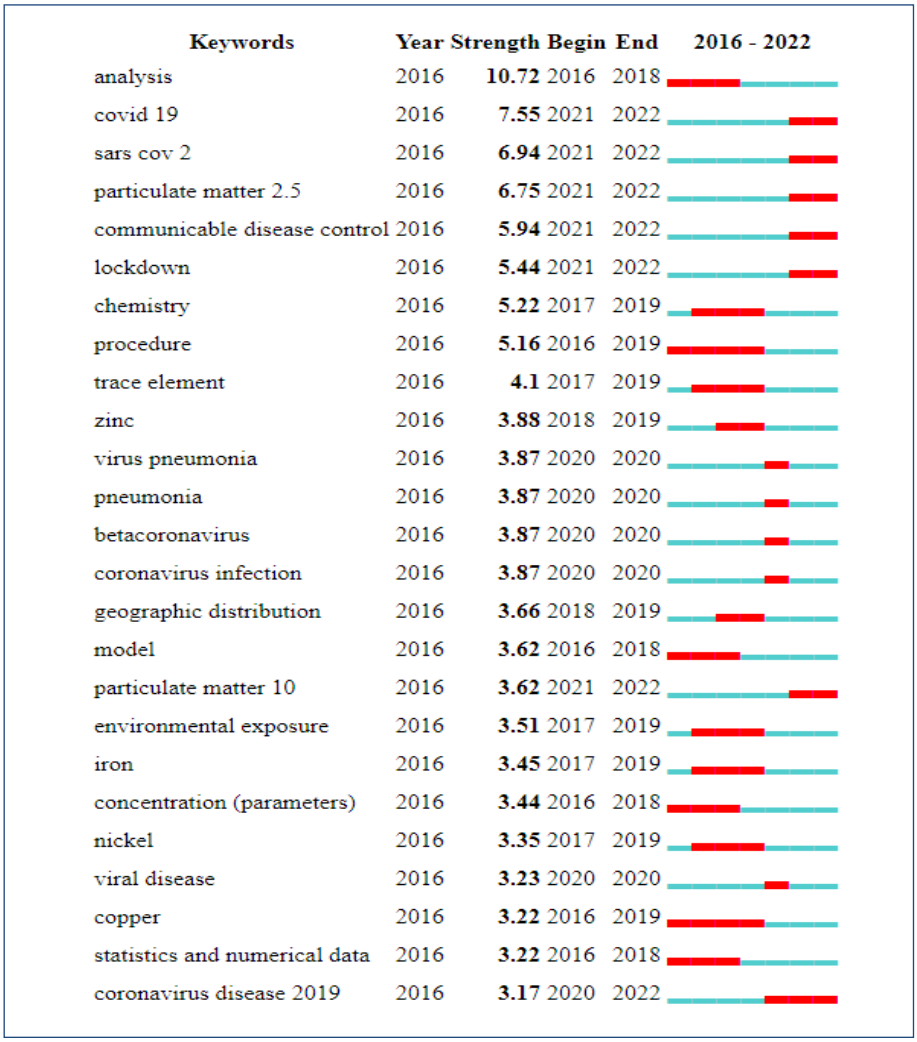


Figure 7. Strongest citation burst of the period 2003-2015



Keywords	Year	Strength	Begin	End	2016 - 2022
analysis	2016	**10.72**	2016	2018	
covid 19	2016	**7.55**	2021	2022	
sars cov 2	2016	**6.94**	2021	2022	
particulate matter 2.5	2016	**6.75**	2021	2022	
communicable disease control	2016	**5.94**	2021	2022	
lockdown	2016	**5.44**	2021	2022	
chemistry	2016	**5.22**	2017	2019	
procedure	2016	**5.16**	2016	2019	
trace element	2016	**4.1**	2017	2019	
zinc	2016	**3.88**	2018	2019	
virus pneumonia	2016	**3.87**	2020	2020	
pneumonia	2016	**3.87**	2020	2020	
betacoronavirus	2016	**3.87**	2020	2020	
coronavirus infection	2016	**3.87**	2020	2020	
geographic distribution	2016	**3.66**	2018	2019	
model	2016	**3.62**	2016	2018	
particulate matter 10	2016	**3.62**	2021	2022	
environmental exposure	2016	**3.51**	2017	2019	
iron	2016	**3.45**	2017	2019	
concentration (parameters)	2016	**3.44**	2016	2018	
nickel	2016	**3.35**	2017	2019	
viral disease	2016	**3.23**	2020	2020	
copper	2016	**3.22**	2016	2019	
statistics and numerical data	2016	**3.22**	2016	2018	
coronavirus disease 2019	2016	**3.17**	2020	2022	

Figure 8. Strongest citation burst of the period 2016-2022

CONCLUSION

This article makes use of literature surveying to illustrate the cutting-edge of scientific investigation on the subject of industrial activity's environmental impact on air quality EIIAAQ. Citespace is the software that is used to assess and accurately measure academic papers contained in Scopus, the database that serves as a storage system for science-based data and information. The findings indicate that the United States, China, and India were the most impactful countries during the field research. Additionally, the results indicated that "COVID19" and "Specific matter" were the most latest keywords with the largest burst and are thus assumed hot spots.

While the aforementioned results clarify the state of knowledge and progress in the area ofthe EIIAAQ topic, there are still some constraints. For software development, and to enhance the integrity of the literature, data gathering and computation are limited to a single directory; multiple databases cannot be assessed concurrently. There are some drawbacks, but the summary of the field can be further managed to improve.

BIBLIOGRAPHY

1. Chen, C. (2006). CiteSpace II: Detecting and visualizing emerging trends and transient patterns in scientific literature. *Wiley Online Library*, *57*(3), 359–377. https://doi.org/10.1002/asi.20317

2. Chen, Chaomei. (2016). CiteSpace : a practical guide for mapping scientific literature. In *Novinka*. Retrieved from http://www.dobraca.com/wp-content/uploads/2019/03/CiteSpacePracticalGuide-Nova-Sample1-50pp.pdf%0Ahttp://cluster.cis.drexel.edu/~cchen/citespace/books/

3. Chen, Chaomei, & Song, M. (2019). Visualizing a field of research: A methodology of systematic scientometric

reviews. *PLoS ONE*, *14*(10). https://doi.org/10.1371/journal.pone.0223994

4. Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, *133*(March), 285–296. https://doi.org/10.1016/j.jbusres.2021.04.070
5. Downey, L., & Van Willigen, M. (2005). Environmental stressors: The mental health impacts of living near industrial activity. *Journal of Health and Social Behavior*, *46*(3), 289–305. https://doi.org/10.1177/002214650504600306
6. Elsaid, K., Olabi, V., Sayed, E. T., Wilberforce, T., & Abdelkareem, M. A. (2021). Effects of COVID-19 on the environment: An overview on air, water, wastewater, and solid waste. *Journal of Environmental Management*, *292*(November 2020), 112694. https://doi.org/10.1016/j.jenvman.2021.112694
7. Faulde, M., & Hoffmann, G. (2001). Vorkommen und Verhütung vektorassoziierter Erkrankungen des Menschen in Deutschland unter Berücksichtigung zoonotischer Aspekte. *Bundesgesundheitsblatt - Gesundheitsforschung - Gesundheitsschutz*, *44*(2), 116–136. https://doi.org/10.1007/s001030050422
8. Keatinge, W. R. (1997). Cold exposure and winter mortality from ischaemic heart disease, cerebrovascular disease, respiratory disease, and all causes in warm and cold regions of Europe. *Lancet*, *349*(9062), 1341–1346. https://doi.org/10.1016/S0140-6736(96)12338-2
9. Laschewski, G., & Jendritzky, G. (2002). Effects of the thermal environment on human health: An investigation of 30 years of daily mortality data from SW Germany. *Climate Research*, *21*(1), 91–103. https://doi.org/10.3354/cr021091
10. Mahato, S., Pal, S., & Ghosh, K. G. (2020). Effect of lockdown amid COVID-19 pandemic on air quality of the megacity Delhi, India. *Science of the Total Environment*, *730*, 139086. https://doi.org/10.1016/j.scitotenv.2020.139086
11. Nakada, L. Y. K., & Urban, R. C. (2021). COVID-19 pandemic: environmental and social factors influencing the spread of SARS-CoV-2 in São Paulo, Brazil. *Environmental Science and Pollution Research*, *28*(30), 40322–40328. https://doi.org/10.1007/s11356-020-10930-w
12. Patz, J. A., McGeehin, M. A., Bernard, S. M., Ebi, K. L., Epstein, P. R., Grambsch, A., … Trtanj, J. (2001). The potential health impacts of climate variability and change for the United States: Executive summary of the report of the health sector of the U.S. National Assessment. *Journal of Environmental Health*, *64*(2), 20–28. https://doi.org/10.2307/3454357
13. Pope, C. A., & Dockery, D. W. (2006). Health effects of fine particulate air pollution: Lines that connect. *Journal of the Air and Waste Management Association*, *56*(6), 709–742. https://doi.org/10.1080/10473289.2006.10464485
14. Sharma, S., Zhang, M., Anshika, Gao, J., Zhang, H., & Kota, S. H. (2020). Effect of restricted emissions during COVID-19 on air quality in India. *Science of the Total Environment*, *728*, 138878. https://doi.org/10.1016/j.scitotenv.2020.138878

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