Sustaining Higher Education during a Pandemic a Bibliometric Analysis

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Abstract

Purpose: The purpose is to map the research work stating the readiness or responsiveness of the higher education institutions towards pandemics and identify the patterns of academic research.

Design/Methodology/Approach: Bibliometric analysis is done to map and evaluate the outcomes in the form of the documents published, stating the development of research and understanding the patterns of publication.

Findings: Uncommon examinations are attempted to give a multi-faceted technique required to sustain the crisis and build a robust education system in the long run. Likewise, embraced shared research should be empowered and upheld at various levels.

Practical implications: The brief interferences provided will enable the readers to get quick and valuable insights into the nature and attributes of academic publishing. Thus, benefiting the researchers in developing their future research agenda and come up with some more innovative ideas.

Originality/value: Rare studies using bibliometric analysis are directed to identify the higher education institutions' responses to the pandemic or efforts required for supporting the" New Normal" in post-pandemic, which is a candid and resourceful exercise to contribute to the existing pool of literature.

Key-words: Higher Education, Pandemic, Epidemic, Covid, Corona, Global Crisis.

1. Introduction

The world today is in a crisis, causing a massive disruption unseen in the past several years. The COVID-19 pandemic has pressured society to the region itself within a massive cessation for an elongated duration of time. The entire humanity is possibly on the brink of a transfiguration

depending on how we adapt and live – and the way we produce and distribute the commodities, goods, and services.

Although our emergence from this global calamity will depend largely on how the coronavirus outbreak takes us, humanity by no means should refrain from its ability and power to mold the future through a sustainable transition. While the short-run and long-run impacts of most of the sectors are calculable, it is not easy to deal with the long-lasting repercussions of COVID-19 on teaching and learning activities.

As the spread of COVID-19 continues across the globe, the way to endure to learn in a disruptive environment has become significantly challenging globally to the education community. As mentioned by Audrey Azoulay, the Director-General of the United Nations agency: "We are entering an unfamiliar area and working with nations to discover their tech, less-tech, and no solutions to ensure the progression of learning." Moreover, in the words of Mrs. Stefania Giannini, Assistant Director-General for Education, UNESCO's: "Society is compelled to close not solely to handle the immediate instructional repercussions of this unexampled calamity, but to create an education system having resilience for a long-term."

These days, sustainable advancement is viewed as a fundamental conception and way out for determining an optimistic and roaring future for humanity. For the most part, sustainability is a mix of the three social, monetary, and ecological objectives in which political objectives are included. Feasible improvement is the progression of the nature of all parts of the life of the present age without making negative effects on people's lives in the future. While it might appear to be anything but difficult to make manageability in principle, sustainable improvement faces numerous unanticipated issues and snags that hinder the procedure. One of the foreseen issues is the rise of scourge ailments that negatively affect the economy and aim social issues, the two of which are essential to practical turn of events. Even though this is a brief and transient issue, it can upset the procedure, resulting in long periods of unfavorable impacts. None the less there persist certain expected and unexpected challenges occurring during and post the occurrence of a pandemic or any global crisis for that matter [1].

The past has shown that any calamities, wars, conflicts, famines, pandemics bring significant changes in the establishments with durable impacts on affected societies. The period post-crisis can afford rare circumstances to shift productivity toward an additional fascinating state. We must tend to arrange for changes in public policy and monetary investment instead of anteceding the chance due to an absence of timely action.

The current pandemic, COVID-19, has significantly upset the Higher Education sector, a basic determinant of a nation's financial future. As all the businesses are thinking about vulnerabilities around continuing activities post the lockdown, there is a requirement for taking care of this adjustment capably and most securely.

Hence in our study, we explore and investigate through a bibliometric analysis of the available literature related to the responsiveness or preparedness of the higher education sector for any pandemic or global crisis. The focus of our paper is to study, understand, evaluate and analyze the research outcomes and productivity at different levels viz. individual, institutional, country wise and global level. We will analyze the different attributes, traits, and patterns of research and researchers.

2. Research Methodology

2.1. Methods

A bibliometric analysis gives an insight into the growth of literature and the flow of knowledge in research. While bibliometrics uses both empiric data and quantitative analysis and trails all the formal communications available in the form of published literature, it also helps to understand the patterns of publication within a particular field of academic research. (As cited in Gao et al., 2016, p. 604), Pritchard defines Bibliometric analysis as applying mathematical and statistical methods to articles, documents, books, and other forms of communication.

As an exploration technique, the bibliometric study was utilized by Eales and Cole in 1917, who contemplated the development of logical creation of articles distributed in the field of relative anatomy. This methodology was later named "Bibliometrics" by Allen Richard, a prominent British researcher. Throughout the years, bibliometric reads have been utilized to dissect a point or field rising in the worldwide information scene and assess the advancement of exploration over time [2].

Citation analysis and Content analysis are the two extensively used methods for conducting bibliometric analysis. Citation analysis is a relationship between citing and cited works in a particular research area, enabling one to identify the fundamental literature, journals, countries, etc., while content analysis aims to identify current hotspots based on the frequency of author keywords and other distributions. Primarily bibliometric is a tool, which enables one to navigate from a micro-level (researcher and institute) to a macro level (national and global). Further to study the research trends and popular issues in a particular area of the study. Network analysis done using Vos viewer is used to clarify the relations among the authors across the globe and the different keywords based on the

co-occurrence, using a network of nodes and links through which information or social relationships sail.

2.2. Collection of Data

The purpose of this study is to map the development of research in the domain of higher education in context to the responsiveness of higher education institutions towards sustaining Higher Education in the hours of any worldwide crises or pandemic situations. The study also aims to identify the structures, trends, and patterns of research in this particular field, of the countries working in the said field, network of researchers, year-wise count of publications, its sources affiliating institutions, organizations sponsoring and supporting the research, citation analysis, co-occurrence of keywords.

The main purpose of any literature review is to map and evaluate the plethora of literature to find out the potential research gaps and highlight the array of knowledge. We, therefore, evaluated research studies and articles published up to the year 2020, which focused on the preparedness of the higher education institutes and their pre or post-implementation views, experiences during pandemic situations.

The paper only incorporates the research papers and reviews from journals. The search was limited to the Scopus database, thereby comprising research studies and papers only from peer-reviewed journals indexed in the Scopus database. We have also studied some of the reports available on FICCI, the Government of India, and Maharashtra.

We have used the database from Scopus to compile the literature data set as the data exported from Scopus is more comprehensive and standardized and is extensively used by the academic community. Scopus is the product of Elsevier publishing, which has the largest number of abstracts and citation databases of literature comprising peer-reviewed research in different areas viz. social sciences, arts, and humanities science, technology medicine, agriculture, etc.

The preliminary search results were amplified by meticulously reviewing the articles published up to 2020 for the following keywords. The initial search resulted in 361 documents, which were finally limited to 248 papers after refining the search [3].

The strategy for screening the data based on relevance, using the electronic databases, is mentioned in Table 1.

Table 1 - Electronic Databases

Particulars	Description	No. of documents yield after refining the search
Master keyword	"Higher Education" AND (Pandemic OR epidemic OR Covid OR Corona OR "Global crisis" OR "World Crisis")	361
Primary keywords (AND)	"Students" OR "Teaching" OR "University" OR "Higher Education Institutions" OR "E- Learning"	260
Language	English	248
Document Type	Not limited	
Source Type	Not limited	

3. Results and Discussion

The mapping and evaluation of the outcomes in the form of the documents published, stating the development of research in Higher Education in context to its responsiveness towards any pandemic or crisis of was performed in two steps as mentioned below.

1. Bibliometric Analysis

2. Network Analysis

3.1. Bibliometric Analysis

3.1.1. Analysis Based on the Country/Territory

Research happens to be one of the most important tasks undertaken across the globe today. Knowledge, technology, and innovation are the tripod through which human beings can deal with the challenges. However, the emerging trends, which are more in line with the times where sustainability plays a vital role, are triggering the community to undertake more scientific activities with a cross-disciplinary perspective, enabling the participation of knowledge obtained from various areas. Simultaneously, it is also necessitating evaluating this active participation of all fields in knowledge-generating processes. The scientific knowledge generated by the researcher can be quantitatively analyzed and evaluated using bibliometric indicators. Through a simultaneous comparison of different characteristics, the aid of the bibliometric indicator in yielding a holistic view of the scientific activity [4].

The globalization taking place in various segments of the society has phenomenally affected the scientific system; thus, a comparative approach towards the quality of the research activity conducted by a group community or individual from a particular territory with the research of their national and international peers will shed light on certain attributes and traits of the research activity portraying the reality in connecting to the use of information to generate new knowledge and designing of the information centers suitable for meeting their information needs.

Figure 1 is drawn using IMAP builder, which shows the distribution based on geographical regions attentive towards publishing research papers studying the responsiveness of the Higher Education sector towards pandemics or any other world crisis. The concentration of origin depends on the size of the cluster. It is evident from the map that most researchers are from the United States, followed by China and United Kingdom.

Source: Data fetched from http://www.scopus.com (on 2nd August 2020)
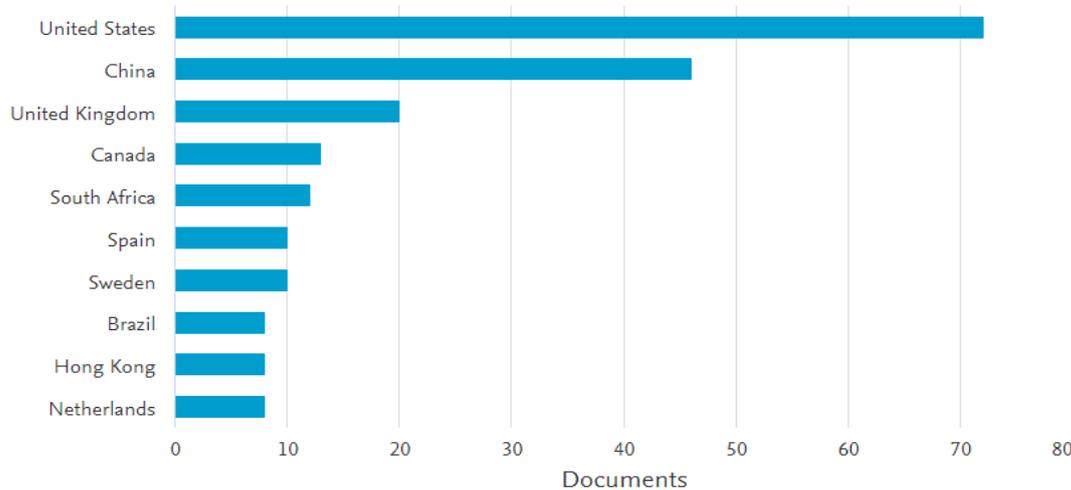
Figure 1- Shows the Countries Involved in the Research Related to Responsiveness of Higher Education towards its Sustainment during Pandemic Situations
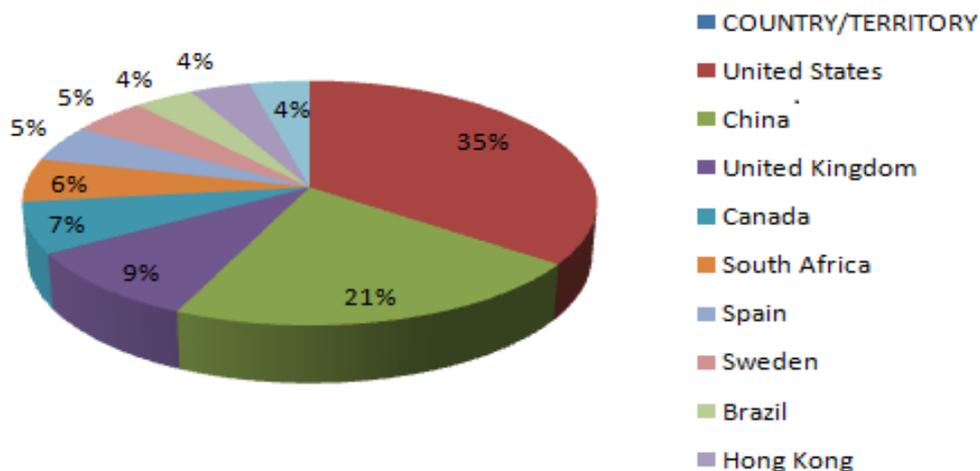
Analysis by Country

Figure 2 - Top 10 Most Productive Countries/Territories who have Published Papers Related to the Responsiveness of the Higher Education Sector towards its Sustainment during any Pandemic Situation

Out of the total 74 countries working in the research area, Figures 2 and Figure 3 show the analysis based on the top 10 most productive countries contributing significantly to the research area. The United States tops the list, followed by China and United Kingdom [5].

Figure 3 - Percentage-wise Contribution of the Top 10 Countries Working in the Research Area Related to Sustaining Higher Education during a Pandemic or Global Crisis

3.1.2. Analysis Based on the Trend of Paper Published Per Year

A gradual increase is observed in the number of documents published in the last ten years addressing the responsiveness of the higher education sector towards the different global crises in translational education. However, a significant rise in the number of papers published is noted in the year 2020. The major reason for the rise is the crisis raised due to the COVID-19 pandemic, which has hardly left any segment unaffected, presented in Table 2.
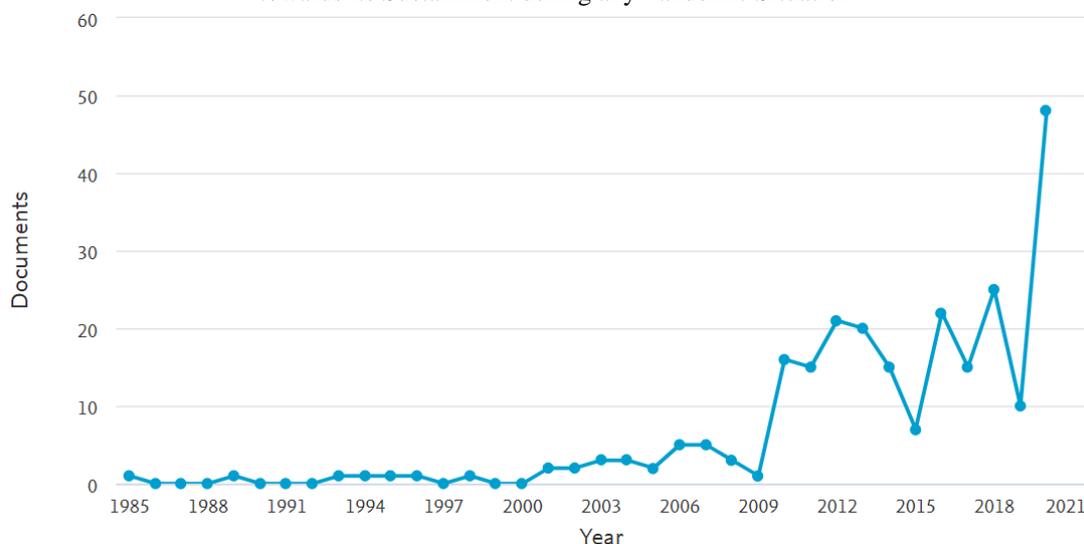
Table 2 - Details of the Documents Related to Studying the Responsiveness of Higher Education towards its Sustainment during any Pandemic Situation or Global Crisis Published Year-wise

Year of publication	No. of Documents Published	Year of publication	No. of Documents Published	Year of publication	No. of Documents Published	Year of publication	No. of Documents Published
1985	1	1994	1	2003	3	2012	21
1986	0	1995	1	2004	3	2013	20
1987	0	1996	1	2005	2	2014	15
1988	0	1997	0	2006	5	2015	7
1989	1	1998	0	2007	5	2016	22
1990	0	1999	0	2008	3	2017	15
1991	0	2000	0	2009	1	2018	25
1992	0	2001	2	2010	16	2019	10
1993	1	2002	2	2011	15	2020	49
TOTAL				248			

Source: Data fetched from http://www.scopus.com (on 2nd August 2020)

Analysis of Documents Year Wise

Figure 4 - Year Wise Publishing Trend of the Documents Related to the Responsiveness of Higher Education Sector towards its Sustainment during any Pandemic Situation

Source: Data fetched from http://www.scopus.com (on 2nd August 2020)

Figure 4 illustrates the trend of the documents related to the responsiveness of the Higher Education sector towards its sustainment during any pandemic situation. It is seen that the highest number of documents based on the study was published during the year 2020. A considerable increase is seen in the number of documents published during the past 10 years [6].

3.1.3. Analysis of the Documents per Year by the Source

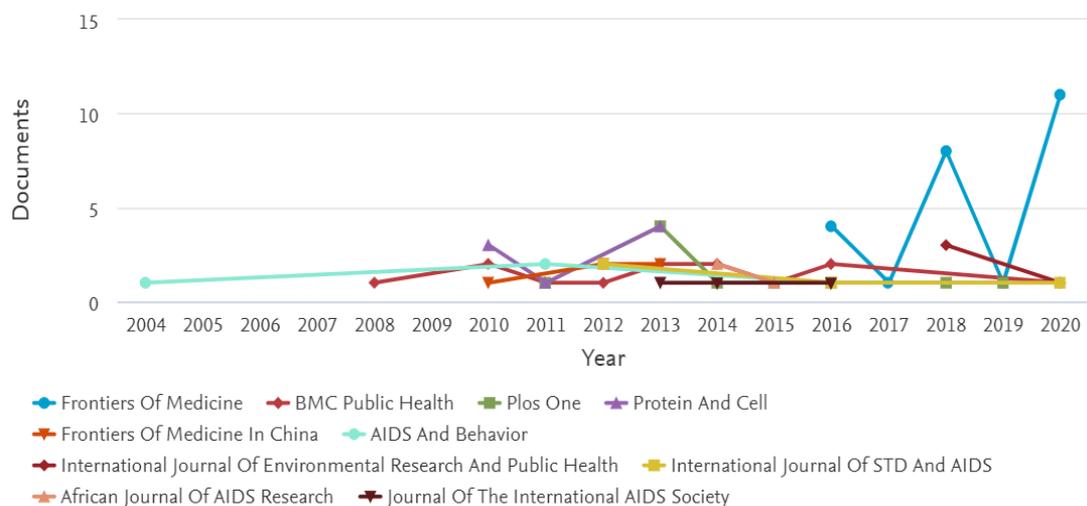Table 3 - No. of Documents Published by the Top 10 Sources Till 2020

Source Title	Total No. of Documents published upto 2020
Frontiers of Medicine	25
BMC Public Health	13
Plos One	10
Protein and Cell	8
Frontiers of Medicine in China	5
AIDS And Behavior	4
International Journal of Environmental Research and Public Health	4
International Journal of STD and AIDS	4
African Journal of AIDS Research	3
Journal of The International AIDS Society	3

Source: Data fetched from http://www.scopus.com (on 2nd August 2020)

Table 3 states the top 10 sources based on the number of documents published over the years. The Journal Frontiers of Medicine, followed by the BMC Public Health and Plos One, has published the maximum documents related to sustaining higher education during global crisis or pandemic, represented in Figure 5.

Source: Data fetched from http://www.scopus.com (on 2nd August 2020).

Figure 5 - Year-wise Contribution of Documents from the Top 10 sources

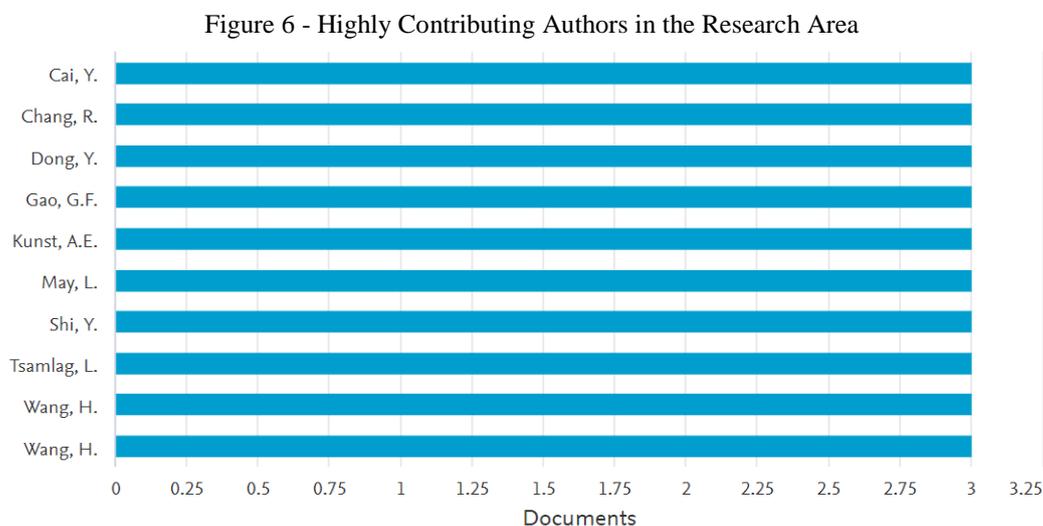### 3.1.4. Analysis Based on the Author of the Documents

We extracted the author's field from the Scopus database, which stated many documents authored or co-authored by them. Table 4 highlights the top ten authors out of the total 160 authors. They contribute significantly to the literature pool related to the sustainment of higher education during pandemic or world crisis. Their outcome in terms of the number of the papers is authored or co-authored by them [7], As outlined in the table, surprisingly, the counts are the same for all these authors. The research area of Highly Contributing Authors is shown in Figure 6.

Source: Data fetched from http://www.scopus.com (on 2nd August 2020)

Table 4: Top ten key authors highly contributing in the research area

Name of the Author	No. of Documents published
Cai, Y.	3
Chang, R.	3
Dong, Y.	3
Gao, G.F.	3
Kunst, A.E.	3
May, L.	3
Shi, Y.	3
Tsamlag, L.	3
Wang, Hui	3
Wang, H.	3

Source: Data fetched from http://www.scopus.com (on 2nd August 2020).

Figure 6 - Highly Contributing Authors in the Research Area

3.1.5. Analysis of the documents based on Citation

(As cited in Estabrooks et al., 2002, p 294), a basic assumption reinforcing the use of the bibliometric analysis method is that research papers represent knowledge produced by scientific research. Also, the Research outcomes are measured by quantifying the number of publications made by the individuals or groups. The frequency or number of times an author is cited is considered to gauge both the research productivity and the quality [8], which means the frequency of a paper is directly proportional to the quality or impact of the paper. Citation represents the author's decision who wishes to convey the relationship between the documents he is writing and the work of another at any given point. The paper, therefore, gives a detailed analysis of all 248 publications based on Citation.

Table 5 gives the yearly citations drawn from the publications in the area of autonomy in higher education, as per the data accessed on Scopus on 29th June 2020, the total citation count for the 248 publications in 2838 to date [9]. Table 6 states the list of the first top 10 papers with maximum citations received to them until data extracted from Scopus.

Table 5 - Year-Wise Analysis of Citations for Publications Related to Sustaining Higher Education during Pandemic or Global Crisis

Year	<2010	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
No. of Citation	314	56	104	140	179	232	271	269	274	340	399	260	2838

Source: Data fetched from http://www.scopus.com (on 2nd August 2020)

Table 6 - A Citation Analysis of Top Ten Publications Addressing the Responsiveness of Higher Education during Any World Crisis or Pandemic

Title of Publication	Year wise citations received by the publication												
	<2010	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
The emergence of pandemic influenza viruses	0	0	8	15	15	8	6	8	5	9	7	4	85
The determinants of 2009 pandemic A/H1N1 influenza vaccination: A systematic review	0	0	0	10	7	12	12	22	3	9	6	3	84
Association of lifetime intellectual enrichment with cognitive decline in the older population	0	0	0	0	0	2	12	16	9	15	20	8	82
Crystal structure	0	5	8	13	16	5	5	5	6	7	9	1	80

of the swine-origin A (H1N1)-2009 influenza A virus hemagglutinin (HA) reveals similar antigenicity to that of the 1918 pandemic virus													
Gender and educational differences in smoking initiation rates in Spain from 1948 to 1992	48	5	3	5	4	3	1	2	2	4	0	2	79
Trends in overweight and misperceived overweight in Spain from 1987 to 2007	0	1	7	8	6	15	11	7	7	9	5	1	77
Insulin resistance and the metabolism of branched-chain amino acids	0	0	0	0	4	11	15	6	9	7	8	8	68
Smoking initiation and cessation by gender and educational level in Catalonia, Spain	37	5	4	6	3	3	5	1	0	3	1	0	68
Diabetes and urbanization in the Omani population: An analysis of national survey data	17	4	6	3	7	9	3	4	5	4	4	1	67
Allergies and diabetes as risk factors for dengue hemorrhagic fever: Results of a case-control study	0	1	3	5	8	8	9	9	5	9	5	2	64

Source: Data fetched from http://www.scopus.com (on 2nd August 2020)

3.1.6. Analysis based on Affiliation

Out of the 160 affiliated organizations contributing in the said field of research, extracted from the Scopus database, an overview of the top ten key affiliated organizations is provided in Table 7. During Pandemic for Sustaining Higher Education Statistics of Contributing towards Affiliation is presented in Figure 7.
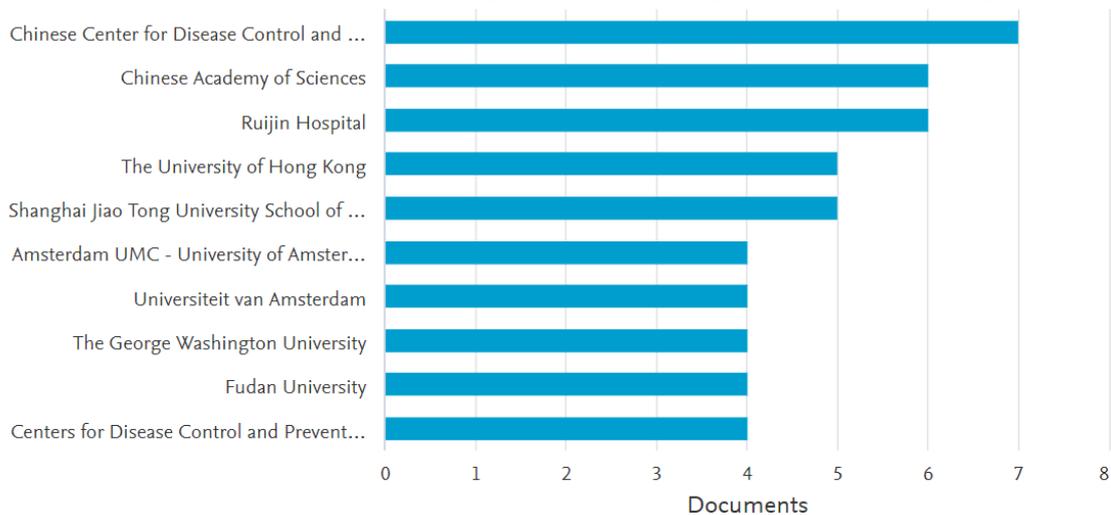
Table 7 - Top Ten Key Affiliating Organizations Contributing Towards Sustaining Higher Education During Pandemic or Another Global Crisis.

Affiliated Organization	No. of Documents published
Chinese Center for Disease Control and Prevention	7
Chinese Academy of Sciences	6
Ruijin Hospital	6
The University of Hong Kong	5
Shanghai Jiao Tong University School of Medicine	5
Amsterdam UMC - University of Amsterdam	4
Universiteit van Amsterdam	4
The George Washington University	4
Fudan University	4
Centers for Disease Control and Prevention	4

Source: Data fetched from http://www.scopus.com (on 2nd August 2020)

Source: Data fetched from http://www.scopus.com (on 2nd August 2020)

Figure 7 - Affiliation Statistics Contributing Towards Sustaining Higher Education during Pandemic
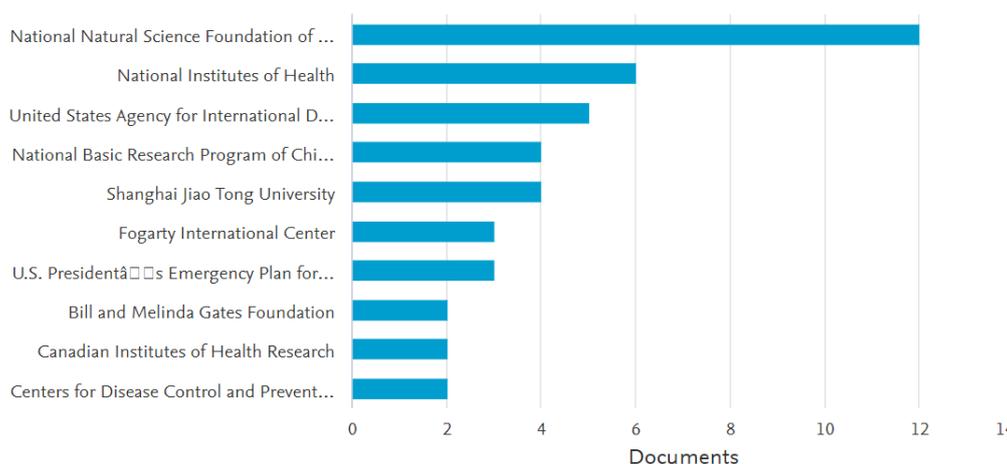

3.1.7. Analyses of the Documents based on Funding Sponsors

The funding sponsors have been playing a crucial role in promoting and releasing research and transfer of technology. In this regard, we have outlined the top ten funding organizations out of the total 64 funding sponsors extracted from the database which is sponsoring the research [10]. National Natural Science Foundation of China tops the list of top 10 funding sponsors, followed by the National Institutes of Health and United States Agency for International Development. Top Ten Funding Sponsors Supporting the Research Related to Sustaining Higher Education during Pandemic, or Global Crisis is shown in Figure 8.

Figure 8 - Top Ten Funding Sponsors Supporting the Research Related to Sustaining Higher Education during Pandemic or Global Crisis

3.1.8. Analysis of Documents based on the Subject Area

Some research areas within conventional disciplines or faculty like Social Sciences, Accounting, and Finance, Management, Arts, Engineering, Medical, Agriculture are relatively more established than other areas and have distinct themes and research agendas. Also, a coherent body of previous literature is created in these established areas for the researcher to build on new literature, methodologies further adding incrementally to the established pool of knowledge [11]. While there will be some emergent subject areas like Tourism, Hospitality, Technology, etc., where the story is otherwise, the more established disciplines and sub-disciplines, the higher the output will be compared to the newly emerging and developing areas.

We, therefore, examine the output of the publication trends based on the subject area in Table 8, illustrating the details of the top 10 subject areas publishing maximum documents in the said area of our study.

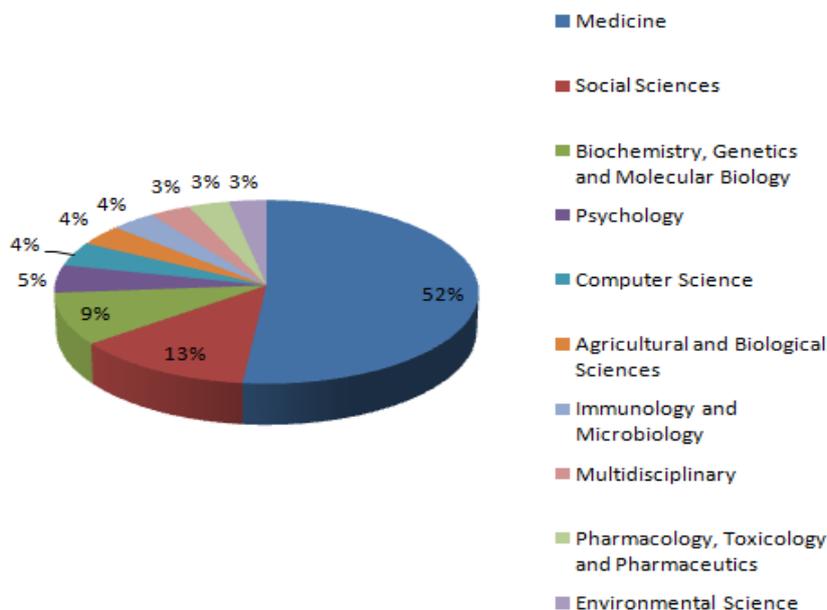Table 8 - Distributions of Documents Published by Top 10 Subject Areas

Subject Areas	Documents
Medicine	169
Social Sciences	42
Biochemistry, Genetics and Molecular Biology	30
Psychology	16
Computer Science	14
Agricultural and Biological Sciences	12
Immunology and Microbiology	12
Multidisciplinary	11
Pharmacology, Toxicology and Pharmaceutics	11
Environmental Science	10

Source: Data fetched from http://www.scopus.com (on 2nd August 2020).

As seen in Table 8 and Figure 9, the faculty of Medicine has the maximum contribution in higher education (52%). Followed by social sciences (13%) and other paramedical fields (9%) of the disciplines having the literature pool related to the said research area [12].
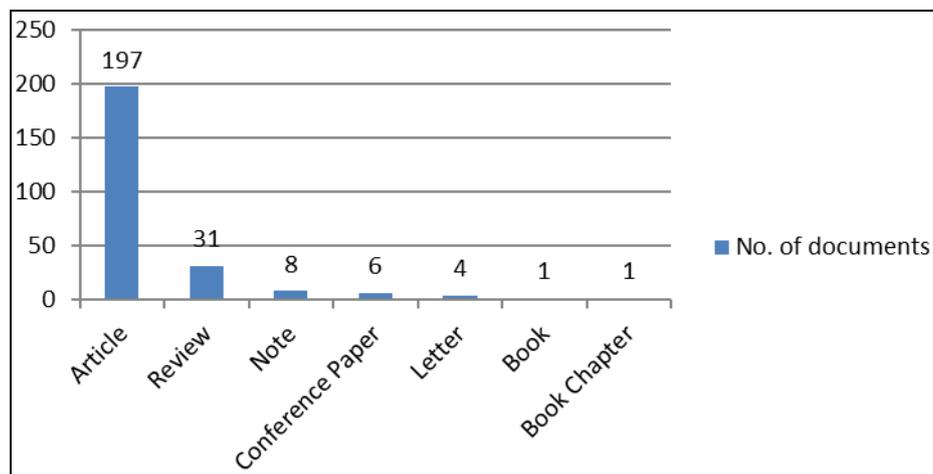
Source: Data fetched from http://www.scopus.com (on 2nd August 2020)

Figure 9 - Subject Area Wise Distribution of the Extracted Literature Related to Sustaining Higher Education During Pandemic

3.1.10. Analysis based on the Types of Documents

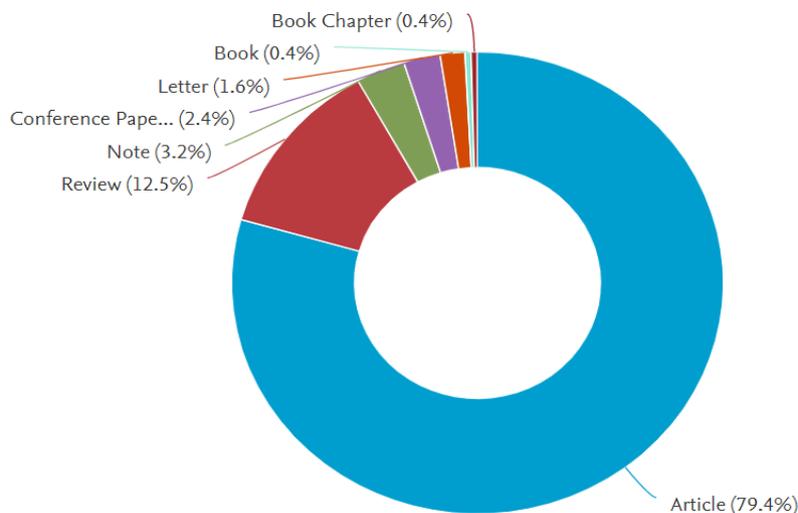Source: Data fetched from http://www.scopus.com (on 2nd August 2020)

Figure 10 - Analysis Based on the Types of Documents- Maximum Number of Articles Are Published Related to the Research on Sustaining Higher Education During Pandemic or Global Crisis

Analysis of various types of documents addressing the studies relate to higher education and its sustainment during the pandemic or crisis reflects that there are more Articles been published related to the research on sustaining Higher Education during a pandemic or global crisis, as compared to other types of research documents. From Figure 10, we can understand that the Maximum Number of Articles has Been Published Related to the Research on Sustaining Higher Education during Pandemic or Global Crisis, which is being analyzed based on the type of documents [13]. From Figure 11, we see that Analysis based on the Types of Documents Publishing Data Related to the sustaining Higher Education during Pandemic or Global Crisis.

Source: Data fetched from http://www.scopus.com (on 2nd August 2020).

Figure 11 - Analysis Based on the Types of Documents Publishing Data Related to the sustaining Higher Education During Pandemic or Global Crisis

4. Network Analysis

In this paper, we have used VOSviewer, an analytical tool primarily intended for analyzing bibliometric networks. The network considering the co-occurrence link between the author keywords and co-authorship linked based on the country was constructed using the bibliographic database files obtained from Scopus [14].

As illustrated in the user manual of VOSviewer, the size of the label of an item (any object of interest) is determined by its weight. The weight of an item is directly proportional to the size of the label, indicating the strength of the relatedness. The thickness of the lines used to display the links suggests strengthening linkages between two items.

4.1. Analysis of Distribution and Co-Occurrence of Key Words

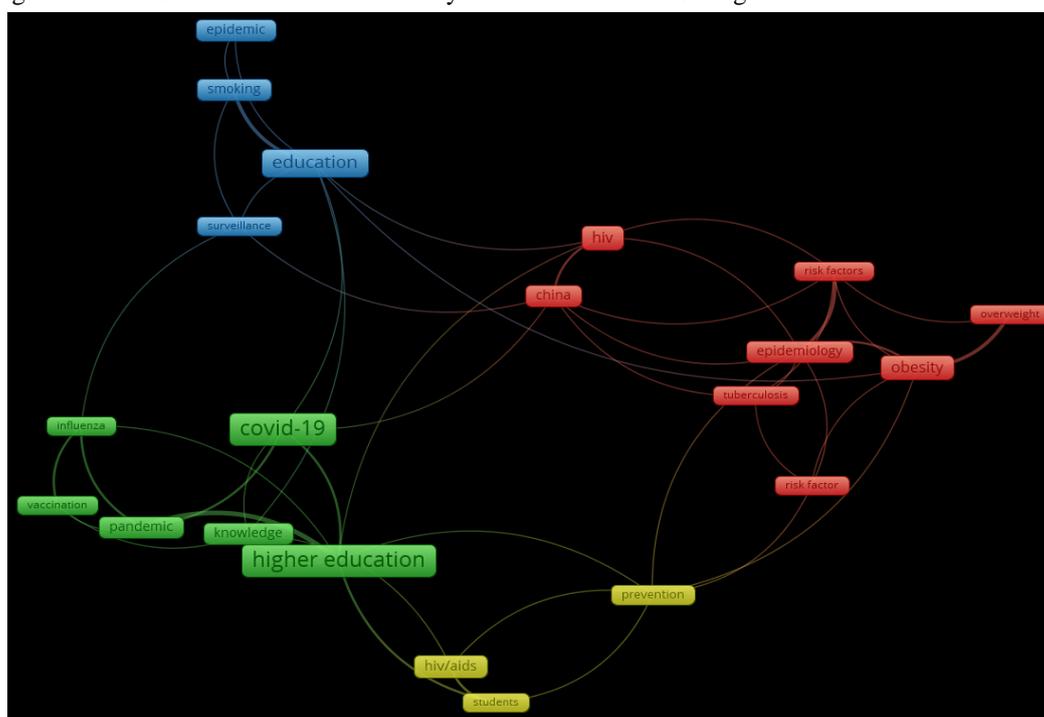Keywords distributed across the article title, abstract, author keywords, methods are considered.

The title of an article always contains the gist of the entire paper. It is vital in helping the readers to search for the data they are seeking. Abstract gives a summary of the research paper with an in-depth analysis of a specified subject. It is often referred to by the readers to ascertain the purpose of the paper quickly [15].

Both titles of the Article and analysis of the abstract analysis are useful and effective for word statistical analysis, which can be used to identify the focus and emphasis on a particular subject specified by authors and make the inferences of the scientific literature.

Author keywords are the words, which are used to unfold the internal structure of the author's objective or reasoning for undertaking the study. The analysis of Author keywords provides the idea of research trends and patterns concerned by the researchers [16].

While building the co-occurrence network for keywords, we have limited the number of keywords to 4 to calculate and analyze the total strength of co-occurrence links with other keywords that will be calculated. Figures 12 and Figure 13 give the keywords having greatest links amongst each other.

Figure 12 - Co-Occurrence Network of Keywords Based on the Strength of the Links Between Them

4.2. Analysis of Co- Authorship

Engagements of authors from separate disciplines/ territories and venturing beyond the boundaries of familiar disciplines for collaborative research certainly aids in knowledge creation reflecting the realities of an increasingly complex world. Also, great effort is being made worldwide to develop and attitude an approach for multidisciplinary research. Although there are benefits of a supportive, collaborative partnership, some elements are related to risks and discomfort experienced due to lack of tangible support, transparency, policies, etc. Since attentiveness towards the process is crucial for all researchers engaged in any collaborative partnership [17].

In this paper, we have analyzed the co-authorship based on two units of analysis, namely Author and Country, to draw interferences. Despite keeping a minimal threshold of three documents and two citations per author, out of the 1129 authors, only 22 authors showed inter-linkages concerning the documents published.

While a threshold of a minimum of three documents and two citations respectively for each of the counties was the limit to find out the connection amongst these countries, it was found that 26 out of the 80 contributing countries met the threshold set by us and seen evidence that the United States, China, United Kingdom are some of the prominent countries contributing to the research and have strong linkages with other countries.

Figures 14 and Figure 15 demonstrate the details of the authors and the countries having strong linkages amongst each other concerning co-authorship, respectively, while Figure 16 illustrates the countries having a strong connection amongst themselves concerning the documents published over the years.

Figure 13 - Closer the Color of the Point is Yellow; the More is the Relatedness of the Keywords and its Co-Occurrence
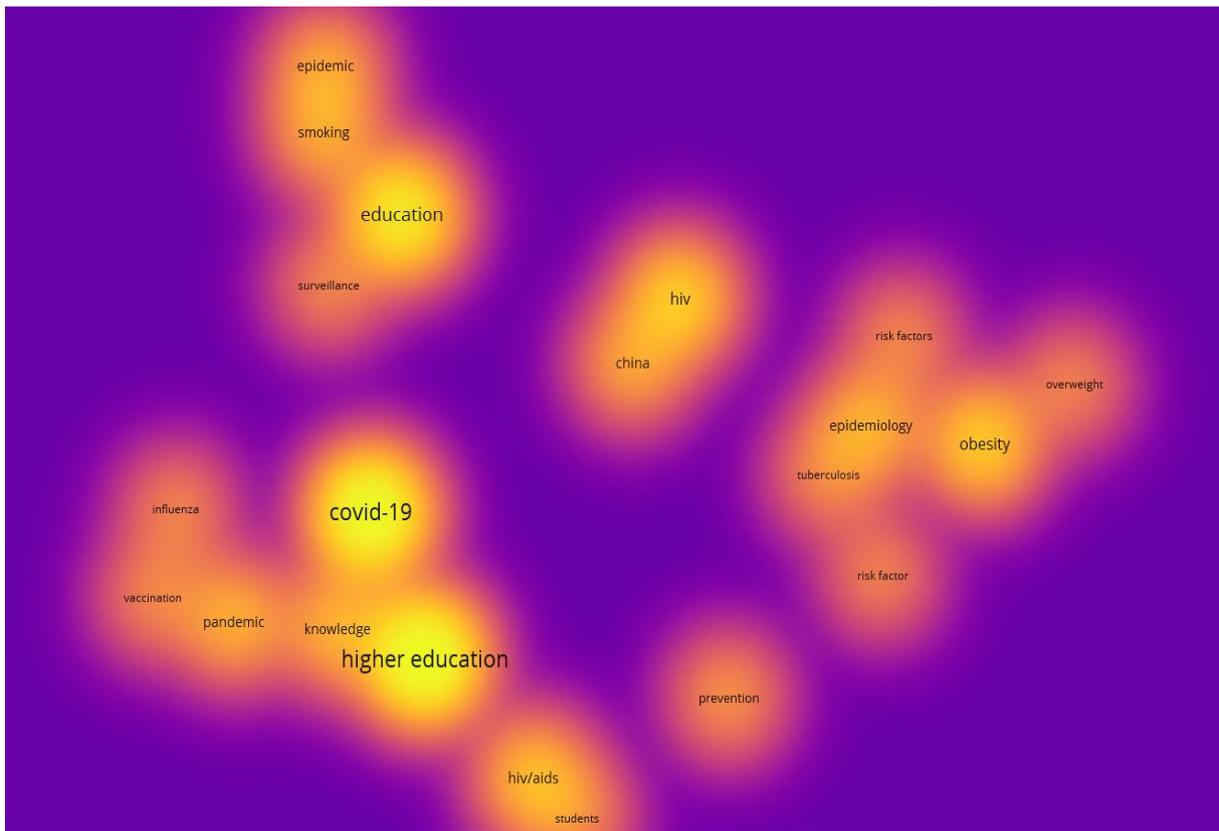

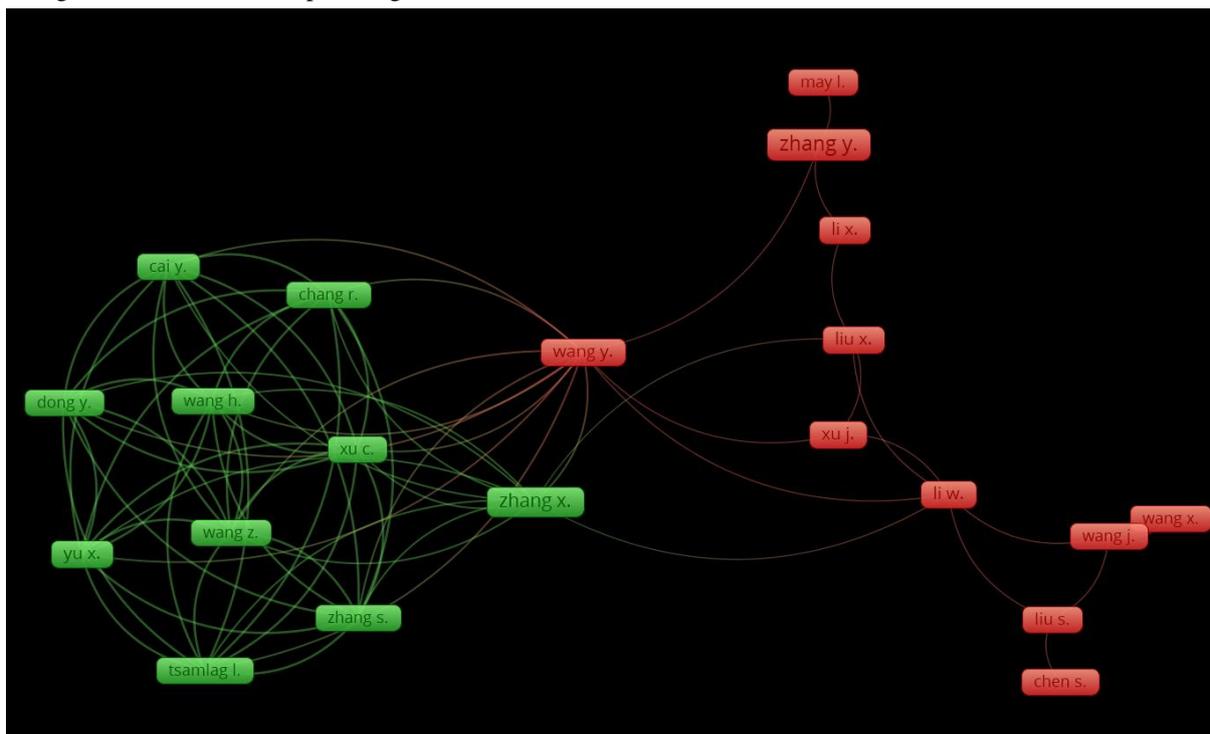Figure 14 - Co-Authorship Linkages with Authors Across the Countries based on the Documents Published

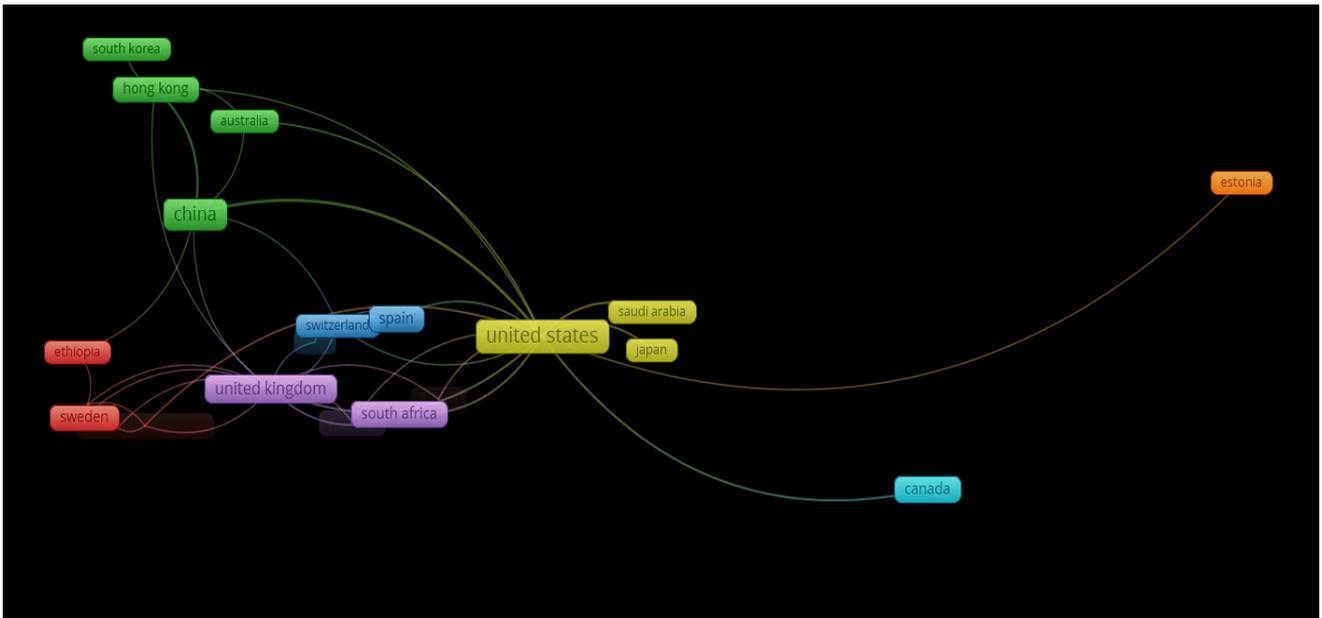Figure 15 - Relationship amongst the Country Based on the Co-Authorship Linkages

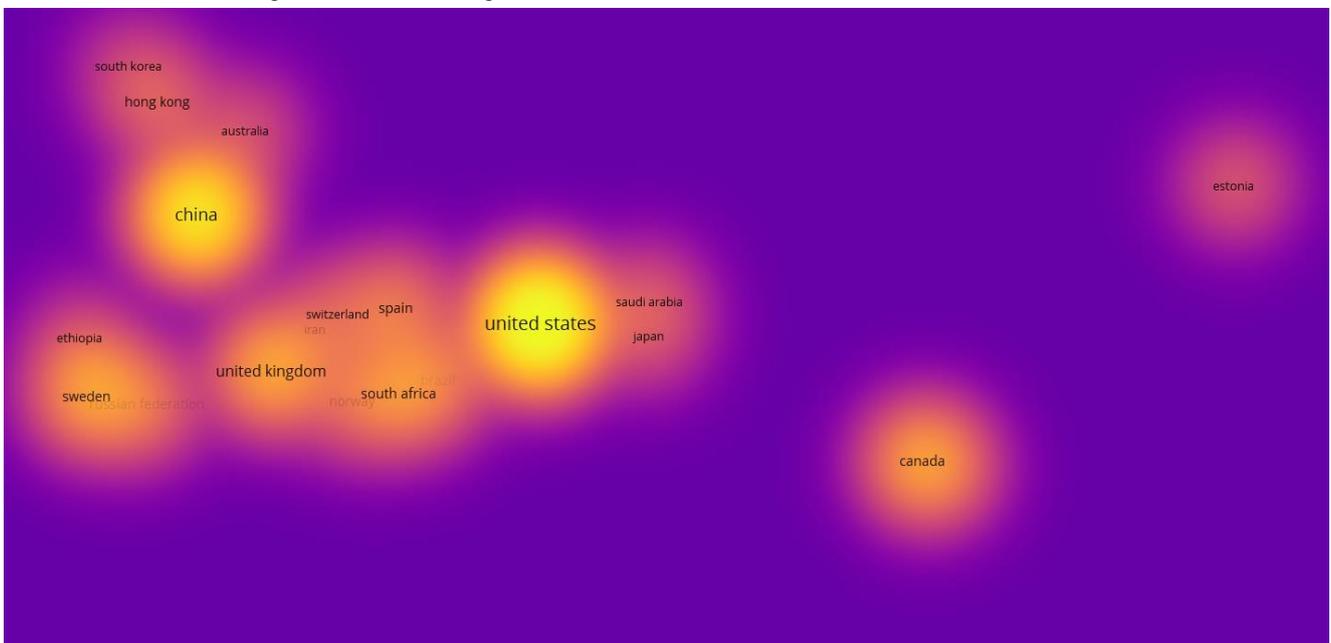Figure 16 - The Linkages of the Countries Based on the Documents Published

5. Results and Discussions

5.1. Interferences

The pattern of research publications, observed through analysis based on various attributes, is summarized as follows:

Attributes for analysis	Interference drawn	Supporting Table or Figure
Contributing Countries	The United States tops the list of significant contributors in the said research area, followed by China and the United Kingdom.	Figure-1, 2, 3
Paper published per year.	A considerable increase is seen in the number of documents published during the past 10 years. A significant rise in the number of papers published is noted in the year 2020; the major reason for the rise is the crisis raised due to the COVID-19 pandemic, which has hardly left any segment unaffected.	Table-2 and Figure-4
Documents per year by the source	The Journal Frontiers of Medicine, followed by the BMC Public Health and Plos One, has published the maximum documents related to sustaining higher education during any situation of global crisis or pandemic.	Table-3 and Figure-5
Author of the documents	All the authors listed in the list of top ten contributors have published an equal number of research articles.	Table-4 and Figure-6
Citation Analysis	The total citation count for the 248 publications in 2838 to date.	Table-5 and 6
Affiliation	The top 2 affiliated organizations include the Chinese Center for Disease Control and Prevention and the Chinese Academy of Sciences.	Table-7 and Figure-7
Funding sponsors	National Natural Science Foundation of China tops the list of top 10 funding sponsors, followed by the National Institutes of Health and United States Agency for International Development.	Figure-8
Subject area	The faculty of Medicine has the maximum contribution in the field of higher education (52%). Followed by social Sciences (13%) and other paramedical fields (9%) of the disciplines having the literature pool related to the said research area.	Table-8 and Figure-9
Types of documents	More peer-reviewed Articles have been published related to the research on sustaining. Higher Education during a pandemic or global crisis, as compared to other types of research documents.	Figure-10, 11
co- occurrence of Key words	"Higher Education", Pandemic, epidemic, Covid, Corona, "Global crisis," "World Crisis," Students, universities, education, epidemiology, surveillance, risk, China, HIV, influenza, knowledge, vaccination.	Table-1 and Figure-12, 13
co-authorship amongst the authors	Out of the 1129 authors, only 22 authors showed inter-linkages concerning the documents published	Figure-14
Co-authorship based on countries	United States, China, United Kingdom are some of the prominent countries contributing to the research and have strong linkages with other countries.	Figure-15,16

5.2. Contribution of the Study

On reviewing the different sets of research documents obtained after trying different combinations of the keywords, it is observed and realized that rare studies using bibliometric analysis are directed to identify the responses of the higher education institutions to the pandemic or efforts required for supporting the "New Normal" in post-pandemic, which is a candid and resourceful exercise to contribute to the existing pool of literature.

Therefore, we believe that our study will be a good resource and encouragement for emerging researchers to investigate the said research area further. With a view of contributing to the existing pool of literature on Autonomy in Higher Education, our study moves beyond just being a systematic literature review of the said research area. It has proposed and applied bibliometric and network analysis techniques to derive and compare the researchers' most influential and significant works (based on the contributing counties, number of documents publications, citations, authors, funding agencies, subject areas, etc.) The brief interferences provided in the concluding section of the paper will enable the readers to get quick and valuable insights into the nature and attributes of academic publishing related to "Autonomy in Higher Education." Thus, benefiting the researchers in developing their future research agenda and come up with some more innovative ideas [18].

5.3. Limitations of the Study and Recommendations for Further Research

Few limitations of the study areas mentioned below:

We have narrowed down our search by using only the Scopus database for exploring the documents. Also, the language was limited to English, representing only a part of the literature published in the said research area. The possibility that some important publications and articles not available in the Scopus database while analyzing the data may not have been incorporated in this study is therefore not ruled out.

The review does not include any data, findings from any social media sources or websites of the government agencies, etc., in the literature. Thus, some useful insights, observations, and discussions, especially from the government agencies, may have been excluded from the study.

Reviewing the literature and analysis of the documents based on various attributes was done using bibliometrics and network analysis.

The study can be extended further and broaden using other databases like Web of Science, PubMed. Referring to social media sources may also give some useful insights. Also, other tools and

techniques can be used for conducting the analytical study of the literature. The outcomes of such extended study could contribute to some supportive interventions, which will exalt the scientific results and promote extensive research in this particular research area.

6. Conclusion

The outburst of COVID-19 has massively impacted all economies globally; the education sector is no exception to its impact. The extensive spread of this pandemic, alongside its high pace of infectivity, has impelled a worldwide interest for important exploration and conduct observational studies related to COVID-19 that will not only help to describe the amount of work done but also find out the unidentified areas of research about the preparedness and responsiveness of higher education institutes towards COVID-19.

Thus, our study presents a substantial systematic literature review using the bibliometric and network analysis to map and evaluate the significant attributes of the research publications on sustaining Higher Education during and after any pandemic or global crisis. The results of the bibliometric analysis investigation uncover that although broad work is continuous around the world in the field of Higher Education, uncommon examinations are attempted in context to the higher education to give a multi-faceted technique, which is required to sustain the crisis and build a robust education system in the long run. Likewise, embraced shared research should be empowered and upheld at various levels. The inferences demonstrated in the paper will certainly provide some useful insights related to the said area of research and influence the attitude of the researcher towards it. Also, the quantitative analysis done on various parameters and trends of the publication, highlighting a niche created by the highly contributing countries, funding agencies, authors, etc., will certainly help the researchers to figure out how to drive engagements and collaborations at a scale, invading the niche created by the prominent contributing countries.

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