Review Article

Bridging the gap between Sustainability and Healthcare: A Bibliometric of Global Research Pattern

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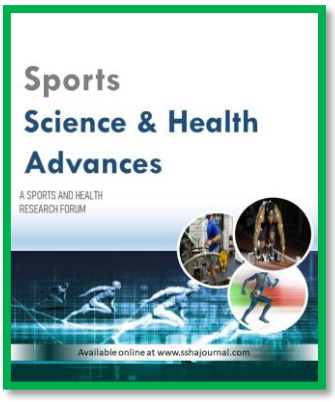

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Abstract

In the era of the 21st century, when the world is grappling with various issues, healthcare and sustainability were found to be the most raised issues in the academic world. The association between these two remains to be thoroughly investigated. In order to investigate the existing literature on the link between these two, a bibliometric analysis was carried out. Subsequently, 501 documents were retrieved from the Scopus database. According to the results, the theme has been widely studied by researchers during the past ten years. Claire A. Harris was found to be the most prolific author. With 15 documents Monash University in Melbourne, Australia was found out to be the leading affiliation. Sustainability in the healthcare industry is becoming increasingly important, as seen by the 19.45 per cent annual increase over the years. Additionally, the results also emphasize that there is a grey area in which researchers may make contributions to advance this field and help identify how sustainability is linked to the healthcare industry.

Keywords: Sustainability, Healthcare, Sustainable Development, SDGs

Introduction

As one of the most pressing challenges of this century, sustainability has been a main keyword in the global research and political agenda for decades. Demands for more attention towards the idea of sustainable development have grown over the past ten years from a variety of stakeholders, including government organizations and end users (Proctor et al., 2015). While the term "sustainability" has been used in many contexts, it was generally agreed upon to mean "meeting the needs of the present generation without compromising the needs of future generations." The concept of sustainability is not new. In 1970, the globe celebrated the first Earth Day, signifying the beginning of sustainability (Tricco et al., 2016). Various literature depicts the emergence of the concept of sustainability according to their own version. According to Lennox et al., (2018), the idea first surfaced in 1970 as a consequence of mounting pressure on large pharmaceutical and petrochemical industries over their detrimental environmental effects. Due to continued backlash, they came up with the idea of

highlighting their positive influence on the environment (Braithwaite et al., 2020). Soon this concept became a hit and it was adopted by other sectors. Since then, this concept has been polished according to the requirements. Later on, “The World Commission on Environment and Development”, led by Gro Harlem Brundtland, issued the seminal "Our Common Future" report in 1987 and established the concept of sustainable development (Maghsoudi et al., 2020). The Sutainability concept is responsible for creation of Corporate Social responsibility in 1990 and Non-financial reporting in 1997. The idea of sustainability was recognised on a global level by the creation of Millennium Development Goals (MDGs) by the United Nations, which were superseded by Sustainable Development Goals in 2015. In SDGs, various bodies participated and agreed on targets to be achieved by 2030.

Organizations no longer view themselves as separate entities since they are part of a larger network, which encourages them to engage with other participants in this intricate network to establish a long-lasting business environment (Faggini et al., 2019; Flynn et al., 2018). Cities have tried to reorganize key infrastructures, such as waste disposal systems, to conform to the rules and principles of the sustainability framework, especially with the advent of the ideas of sustainable development in the healthcare sector (Polese et al., 2018). The long-term viability of healthcare services as they exist now is ultimately linked to the emergence of new issues in society, including local pollution, global warming emissions, and water shortages (Tricco et al., 2013). In this sense, most industrialized nations are now under increasing pressure to adopt new policies and programs in order to lessen the climatic impact of healthcare and achieve climate neutrality. A nation's progress in terms of the welfare and standard of living of its people is determined by the health of its residents (Lennox et al., 2020). As a result, people throughout the world have been requesting more sustainable health care from their governments (Proctor et al., 2015). Since health planners and other stakeholders want to guarantee the long-term effect of their investments, it is necessary to recognize how the sustainability of implemented programs might be impacted in the present environment of increasing demands, shifting priorities, and competition for resources.

Healthcare service sustainability faces several obstacles. The ability to maintain health services at acceptable standards is threatened by a number of factors, including ageing populations and the rise in the prevalence of chronic diseases, the proliferation and high costs of new health technologies, ineffective practices, poor coordination of care, systemic waste, and external economic pressures. Healthcare administration is coming under more scrutiny due to rising expenditures and growing public awareness of health and wellness problems. As a result, healthcare organizations have responded by working to raise the standard of patient safety and care as well as the effectiveness and accessibility of medical services (Largeron et al., 2015; Pinzone et al., 2016). To develop a sustainable healthcare system, the United Nation (UN) initially published MDG (i.e., Millennium Development Goals), which were later superseded by SDG (i.e., Sustainable Development Goals) in 2015 that laid the foundation for Sustainability. Thus, the introduction of SDG provides further momentum for a sustainable healthcare approach where all members agreed on the 2030 agenda. Different SDGs addresses this issue as given below.

Table 1 SDGs and Healthcare

SDG Number	Description
SDG 1	This goal aims to enhance nutrition and food security for people worldwide.
SDG 3	This goal highlights the shared objective of enhancing people's ability to live healthy lives and attain well-being at all ages.
SDG 6	This goal talks about access to clean water and sanitary facilities for all.
SDG 11	This goal aims to maintain the safety, resilience, sustainability, and inclusivity of all.

Each of these SDGs addresses a different component of sustainable health care. Despite being an emerging phrase sustainability in the healthcare sector, it is gaining popularity (Saviano et al., 2018). As discussed earlier, to embrace the sustainable

development goals in the healthcare sector, it is crucial to advocate the adoption of novel and innovative approaches to overseeing the healthcare sector (Faggini et al., 2019). Although "sustainability" is a relatively new concept in healthcare research, it is rapidly becoming a crucial one. The adoption of new and more "sustainable" approaches to managing health care services, organizations, and systems would be crucial for "communities and institutions" to meet the sustainable development objectives. Some believe that by refocusing health care companies on the "triple bottom line" of "social, environmental, and economic", results in emergence of a more sustainable system. Only a small number of bibliometric reviews on pertinent areas of long-term sustainability and health care research have been published till recently. This study aims to map the existing literature on this domain by identifying documents published by year, most relevant authors, affiliations and sources and so on.

Methodology

As previously stated, academic research on business sustainability performance was found using bibliometric analysis. This method is frequently used to find, arrange, and evaluate all published papers in a certain field of study in terms of quality, quantity, productivity, citations, and connections. Block et al., 2020 assert that bibliographic research should concentrate on analyzing the structure of a particular research field and that simply providing reference tables with top research articles that have been examined by a brief discussion, authors' names, or institutions does not satisfy the requirements of bibliographic research. Therefore, this study applied the guidelines set out by Block et al., 2020 to conduct an efficient bibliometric analysis research and examine the development of CSPs.

Table 2 Search String used

Use of search string	(TITLE (sustainability) AND TITLE (healthcare))	501
Access	All Open Access (231) Gold (155) Hybrid Gold (62) Bronze (34) Green (19)	
Year	Included all articles from 1999 to 2024	
Selected Documents		501

Data Retrieval and Analysis Approach

The Scopus index is selected for mapping the existing literature on the adoption of sustainability in the healthcare sector. Punnakitikashem & Hallinger, (2020) found that for domains beyond Physical Science and Medicine, Scopus provides more thorough coverage than the other databases. As a result, the Scopus database is selected for the study. For bibliometric analysis 501 documents were exported from Scopus database for data analysis. The R studio bibliometric package was utilized for the bibliometric analysis in addition to MS Excel and Scopus analytical tools.

Results and Discussion

In this section, the findings of the bibliometric analysis of sustainability in healthcare are presented. The selected sample consists of publications ranging from 1999 to 2024. Following investigation, it was discovered that 1661 authors wrote these 501 papers in the chosen sample, with 13.97% of those publications being single-authored and 20.16% having international co-authorship. The Co-Authors per document was found at 3.91. These 501 documents were published in 348 sources. The document average age of the selected sample was 4.19 years. A total of 21444 documents were referred. Further information is given below in figure 1 respectively.

The visual representation depicted in Figure 1 demonstrates research on the relationship between sustainability and healthcare, as measured by the volume of publications published each year from 1999 to 2024. The figure also depicts the quality of research by depicting the number of citations received on a yearly basis. From analysis, it

was found that only two papers with five citations each were published until 2006; after that, it took an additional six years to achieve double-digit yearly publication. It was interesting to know that 89.24% of publications were published in the last 10 years depicting the growing importance in this domain. Apart from this, an annual growth of 19.45% was recorded showing the growing importance of researchers in this domain.

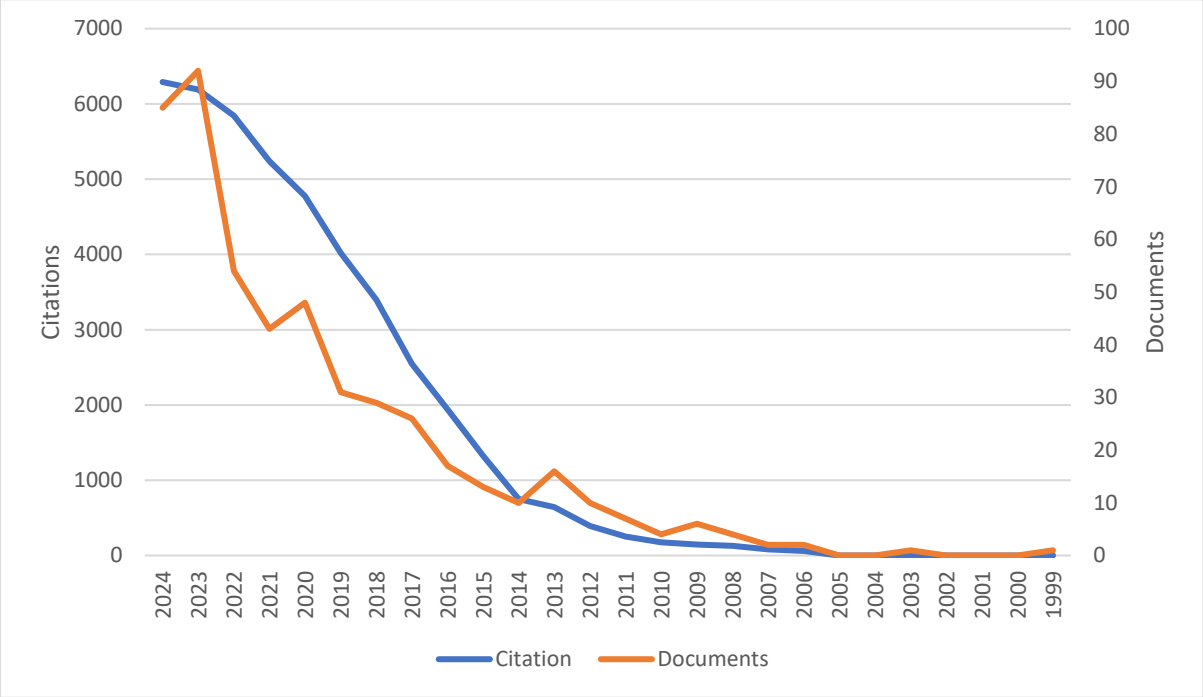

Figure 1 Annual scientific production

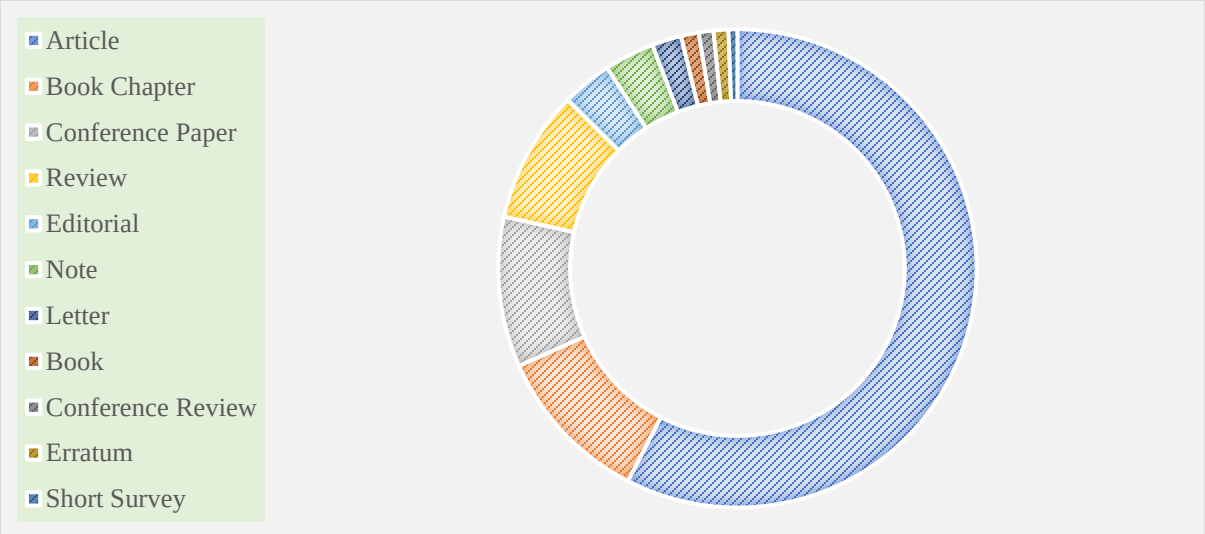

Figure 2 Documents by type

When the sample was categorized according to different document types, it was found that out of these 501 documents, 58% of documents (289 documents) were articles. Articles are mostly peer-reviewed and include a thorough explanation of the study findings. Apart from

this, 54 were book chapters, which are usually written by professionals who concentrate on particular domains from a wider range of topics. Then, 51 were conference papers, unlike article conference papers, aren't peer-reviewed rather they only deliver research presented at the conference. In the same manner, 45 were reviews, commonly these types of papers draw attention to research gaps, trends as well as future prospects and so on.

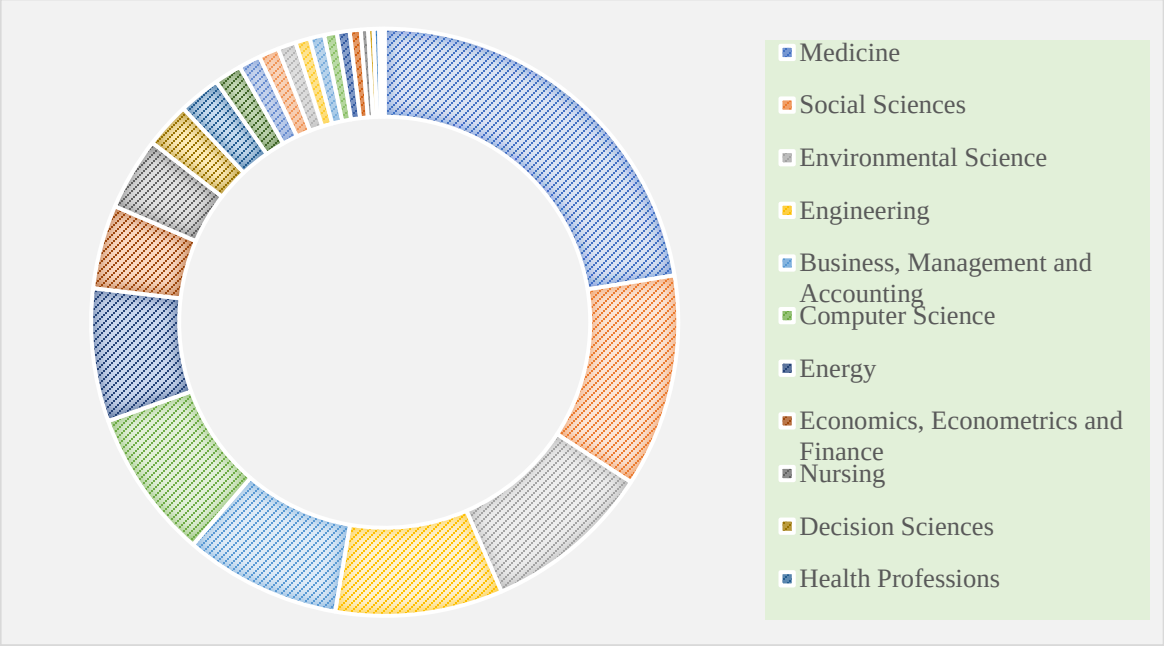

Figure 3 Documents by subject area

Figure 3 explains document categorization on the basis of subject area. Scopus provides the facility to organize documents on the basis of the subject area. Broadly there are 4 subject areas namely Social Science and Humanities, Physical Science, Life Science, and Health Science. These subject areas are further categorized into different subject codes. However, it may be possible that one publication may be included in two or more subject categories. Now talking about the sample, the biggest arc, in Figure 3, holds 22.44% of total publications categorized under the "Medicine" subject category. The second biggest depicted by orange color consists of 11.72% of publications is under the "Social Science" category. In the same way, the third largest is depicted by the grey color in Figure 3 consists of 9.32% of publications under the "Environment Science" subject category.

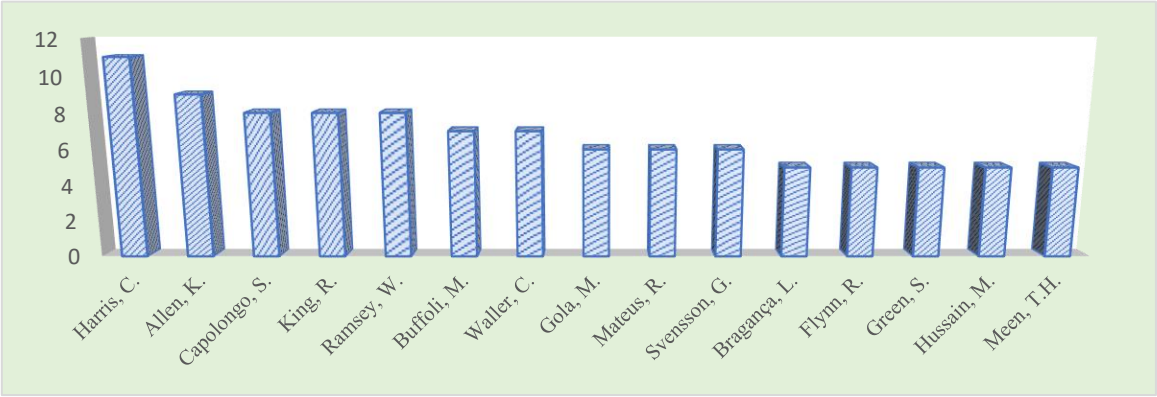

Figure 4 Documents of Prominent authors

Figure 4 explains the top 15 prominent authors according to total publications from the selected sample. Accordingly, top position is occupied by Claire A. Harris from Monash University, Melbourne, Australia with 11 publications. So far, the author has 36 documents on Scopus with a total of 970 citations resulting in an h-index of 18. In the same way, Kelly M. Allen from same Monash University, Melbourne, Australia occupied the second spot with 9 documents from the selected sample. The author has 21 documents with a total of 634 citations resulting in an h-index of 15. The third position is occupied by Stefano Capolongo from Politecnico di Milano, Milan, Italy with 8 documents from the selected sample. The author has 174 documents on Scopus with 3547 citations, resulting in an h-index of 33. Out of the top 15 prominent authors, 6 are from Australia, 3 are from Italy, 2 from Portugal, and 1 from Norway, Ireland, UAE, Taiwan respectively.

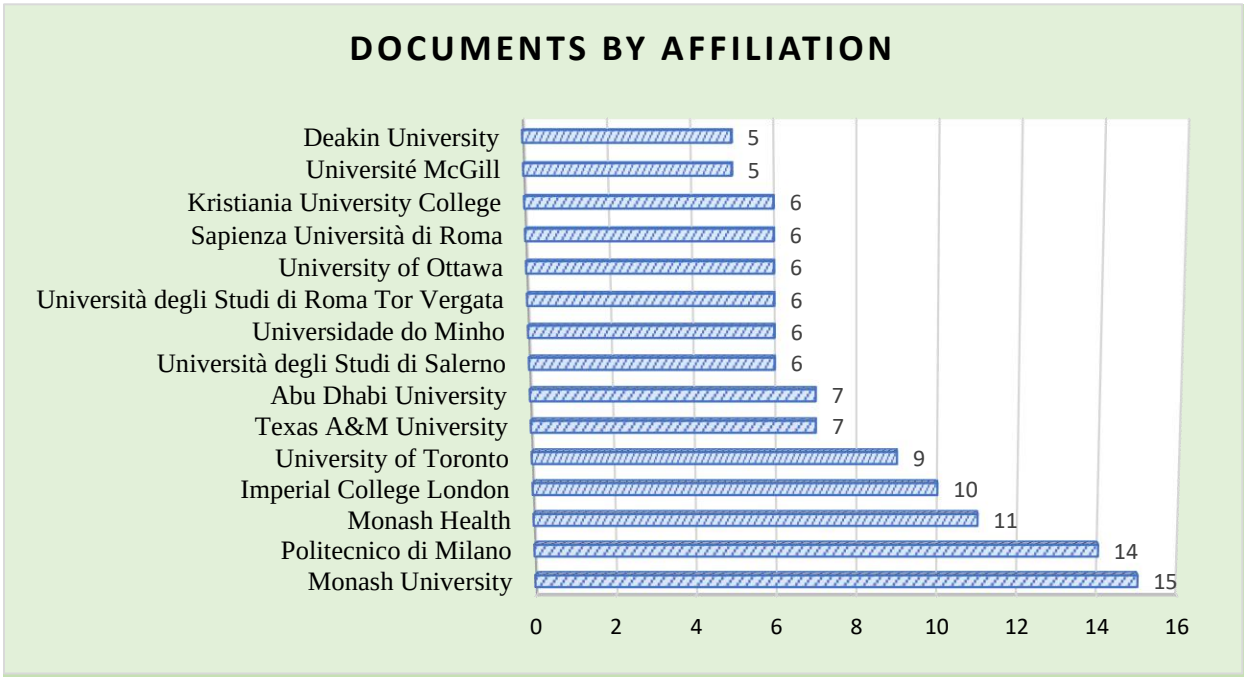

Figure 5 Prominent Affiliations

Figure 5 explains the top 15 prominent affiliations according to the total number of documents produced by them. Accordingly, the top position is occupied by Monash University from Melbourne, Australia with 15 documents. The university has produced 1,97,605 documents from the contribution of 31,298 authors. The Majority of these documents i.e. 73,817 (37.36%) were under the Medicine category. The second position is occupied by Politecnico di Milano university from Italy with 14 documents. the university has 95,712 documents which were produced by 17,652 authors. In the same way the third rank is occupied by Monash Health from Australia with 11 documents. the university has 18,988 documents which are contributed by 1,637 authors. From top 15 affiliations, 4 are from Italy, 3 are from Australia and Canada, and 1 is from the UK, USA, UAE, Portugal, and Norway respectively.

Figure 6 explains the top 10 prominent sources according to the number of publications in the selected sample. The position is occupied by the Sustainability (Switzerland) journal with 42 documents. The journal has a cite score of 6.8 (2023). The journal has Scopus coverage since 2009. So far it has produced 86,405 documents on Scopus. The second spot it occupied by BMC Health Science Research journal with 22 documents. the journal has a cite score of 4.4 (2023). The journal has Scopus coverage since 2001 and its journal has produced 14,788 documents on Scopus. In the same way, the third rank has been occupied by the International Journal of Environmental Research

and Public Health with 8 documents. The journal has a cite score of 7.3 (2023) and Scopus coverage since 2004. So far, it has produced 63,283 documents on Scopus.

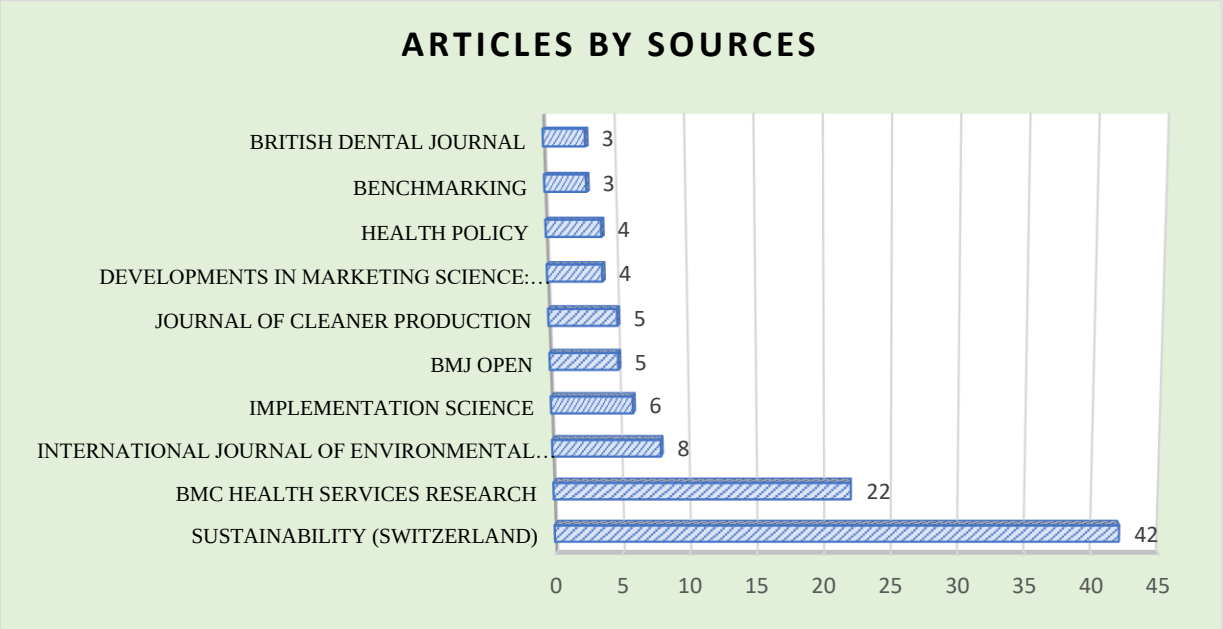

Figure 6 Prominent Sources

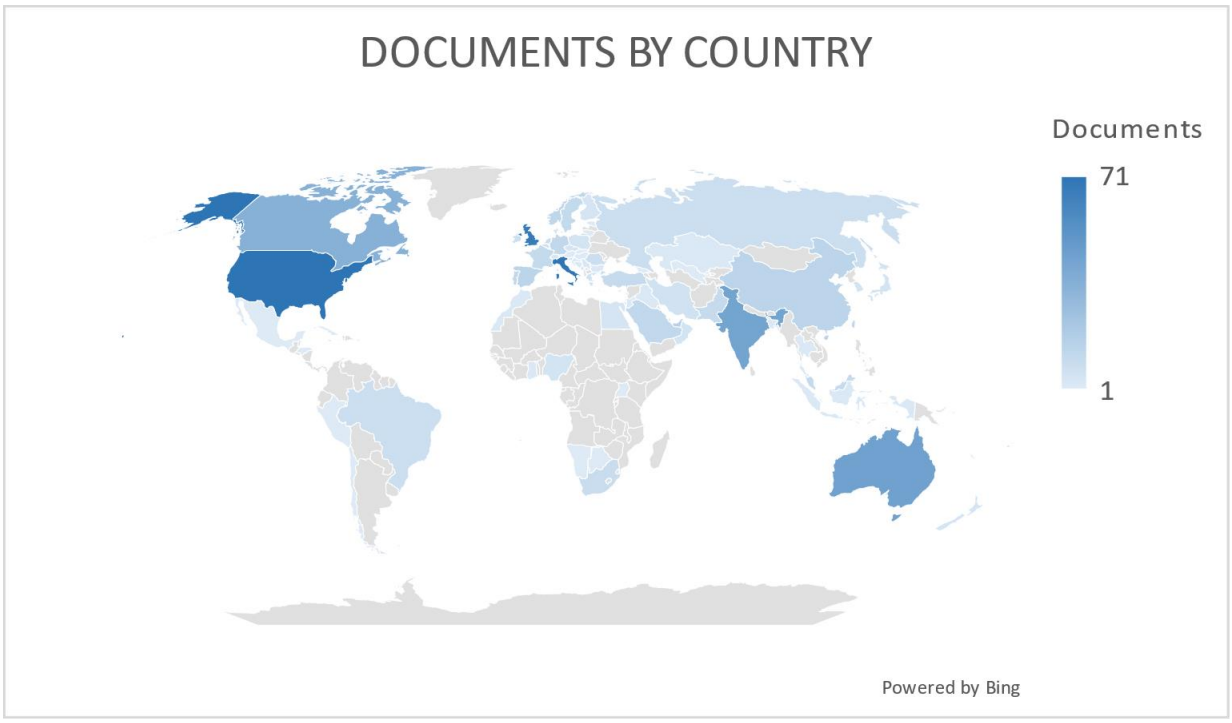

Figure 7 Document distribution according to region

Figure 7 explains the most prominent countries according to the number of publications in the selected sample. Top position is occupied by the United States of America with 71 documents. out of published documents 57 are published in journals, 7 in conference

proceedings, and 7 in book and book series. The second spot is occupied by Italy with 70 documents. From these 54 documents are published in journals, 13 are in book and book series, and 3 documents are on conference proceedings. The third position is occupied by the United Kingdom with 67 documents. out of these 54 are published in journals, 10 in book and book series, 2 in conference proceedings, and 1 in trade journal. Out of the top 10 prominent countries, 8 are developed nations and 2 are developing nations namely India and China with 43 and 14 publications each.

Table 3 Most Globally cited documents

S. No.	Paper	DOI	Total Citations	TC per Year	Normalized TC
1	Pinzone et al., 2016	10.1016/j.jclepro.2016.02.031	276	30.67	7.59
2	Proctor et al., 2015	10.1186/s13012-015-0274-5	247	24.7	5.59
3	Lennox et al., 2018	10.1186/s13012-017-0707-4	232	33.14	7.88
4	Sherman et al., 2020	10.1016/j.resconrec.2020.104882	169	33.8	10.72
5	Nethravathy et al., 2019	10.1111/1541-4337.12500	159	26.5	7.96
6	Thiel et al., 2017	10.1016/j.jcrs.2017.08.017	156	19.5	6.69
7	Hussain et al., 2018	10.1016/j.jclepro.2018.08.157	141	20.14	4.79
8	Fleiszer et al., 2015	10.1111/jan.12633	104	10.4	2.36
9	Tricco et al., 2016	10.1186/s13012-016-0421-7	101	11.22	2.78
10	Doyle et al., 2013	10.1186/1748-5908-8-127	93	7.75	5.95

Table 3 explains the most 10 globally cited documents. Pinzone et al., (2016) has occupied the first spot in terms of citations received globally. This article has received 276 citations across 9-year span. The total number of citations per year was found to be 30.67. Proctor et al., (2015) has occupied the second spot with a total of 247 citations across 10 years, resulting in a total number of citations per year at 24.7. In the same way Lennox et al., (2018) has occupied the third spot with a total of 232 citations across 7 years, resulting in the total number of citations per year at 33.14. The oldest document among the top 10 globally cited documents was Doyle et al., (2013) and the most recent document was Sherman et al.,(2020).

Conclusion

Although there are several disagreements in the existing literature over the definitions as well as the potential influence of sustainability on healthcare. Still in order to create a sustainable healthcare system and accomplish ambitious targets like those outlined by the UN in form of SDGs and the Intergovernmental Panel on Climate Change a revolutionary vision is needed. The increasing significance of this topic is demonstrated by the 19.45% yearly growth in publications and the 89.24% of papers produced in the previous ten years. It was found that 289 of the 501 papers, or 58% of the total, were articles. The vast majority (22.44%) of all publications fall within the topic area of "Medicine." With 11 articles,

Claire A. Harris of Monash University in Melbourne, Australia, was the most prolific author, followed by Stefano Capolongo and Kelly M. Allen, who each had 9 and 8 publications respectively. The most notable association, according to 15 records, was Monash University in Melbourne, Australia. Sustainability (Switzerland) journal with 42 documents was found to be the most prominent source. The USA tops the region with 71 publications in this domain. This study makes a contribution in highlighting many dimensions of the research efforts made on the synthesis of sustainability and the healthcare industry. The growth rate of publications on these aspects depicts the scope of carrying out more research in the more diversified spectrum. There can be extensions of this bibliometric analysis by using other tools while covering other databases.

Conflict of Interest: No conflict of interest declared among authors

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