A Bibliometric Analysis of Sustainable Shipping in Web of Science Database in 2020 and 2021

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Abstract

The word sustainable became more and more important in maritime affairs especially in shipping. It has strong impact on environmental, social and economic sector. Throughout the years the number of researches on sustainable shipping has increased and became often represented in scientific articles. Through the authors' science mapping, it could be noticed that many papers on this topic were elaborated on and were given the systematic literature review for the period of ten years, precisely 2009-2019. In this paper, authors try to research how many articles with the term sustainable shipping had been published in the last two years. The term sustainable shipping was searched in keywords, publication titles and abstracts. The research resulted in 35 selected papers. The obtained scientific papers are categorized according to the following: Web of science Categories, Web of Science Index, Paper Document, Open Access, Research Area and Countries.
The paper will try to give future research directions how to easily categorize hot research topics in the domain of the word sustainable or any other, which is of author's interests.

1 INTRODUCTION

Sustainable shipping is recognized as one of the biggest challenges of our century. Although relatively safe and clean, it quite affects the environment. However, it is becoming more and more recognizable in theory as well as in practice. It also has great impact on the development of socio-economic systems since it has to be cost-effective and capable to adapt to all environmental changes. Furthermore, the aim is to reduce fossil fuels and the use of CO emissions associated with freight handling and their negative effects on the environment and the health of coastal population [5]. The IMO MEPC is using legislative instruments, codes and guidance to achieve more sustainable shipping with many different stakeholders involved in the process. Shipping companies spend money and effort to improve their efficiency and to become more sustainable. The value of sustainability in general is hidden behind long-term performance improvements. The whole shipping

system must engage with academic institutions, research entities in order to accept new technologies that would lead towards achieving economic, social and environmental advances [44, 45].
Reviewing the scientific literature on sustainable shipping it is possible to notice that many researchers often use this term and try to make qualitative and/or quantitative analysis which application will be key driver of the sustainability.

2 METHODOLOGY

Bearing in mind the importance of sustainable shipping, the authors tried to research how often mentioned term is represented in scientific papers. They were interested in papers published in the last two years (2020 and 2021) in the Web of Science (WOS) Core Collection database.

The method used is known as science mapping method i.e. a systematic review of literature. The approach is recognized as generic process of domain analysis and visualization of specific issues [4]. It focuses on the specific unit or field of research by using sources of scientific literature including Scopus, Web of Science, PubMed, Google Scholar etc. The use of a science mapping rather than a textual visualising of items in a citation index or certain keywords efficiently presents a user' broader overview of the content and facilitates the immediate recognition of interesting features and topics in the searched domain [15, 36]. With the help of this method, authors create criteria for deciding which topic is included or excluded before starting the systematic analysis in order to make findings more reliable [7].

The paper gives bibliometric analysis of the relevant literature in the domain of sustainable shipping in the Web of Science Core Collection database. Many papers on similar topic were published, but the most comprehensive one was given in the systematic literature review for the period of ten years, precisely 2009 – 2019. This paper covered the *sustainable transport* topic, and a total of 882 bibliometric records of articles were searched from the Web of Science Core Collection database [38].

A search on the Web of Science Core Collection database [43], topic sustainable shipping, is composed of 35 scientific papers published in the last two years, 2020 and 2021 [1, 2, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 37, 39, 40, 41, 42]. Topic search used for this purpose was *"sustainable shipping"* or *sustainable shipping**. Our review summarised only scientific papers with this topic search and with precisely given combination of words. The other scientific papers that had one of these topic words (sustainable or shipping) were not taken into consideration.

Topics were searched in Keywords, Publication Titles and Abstracts. There were 14 scientific papers found with this topic search in Keywords, 13 in Abstracts and 8 in Publication Titles. The obtained results of the search were categorized according to the Web of Science Categories, Web of Science Index, Paper Document, Publication Year, Open access, Research Area and Countries and observed in relation to each other.

3 RESULTS NAD DISCUSSION

The results of the research were presented through the quantitative method with appropriate content analysis [3, 46]. The figures are arranged according to the categories selected by the authors. The extracted data and the fields of research that seemed important for the purpose of this paper were correlated.

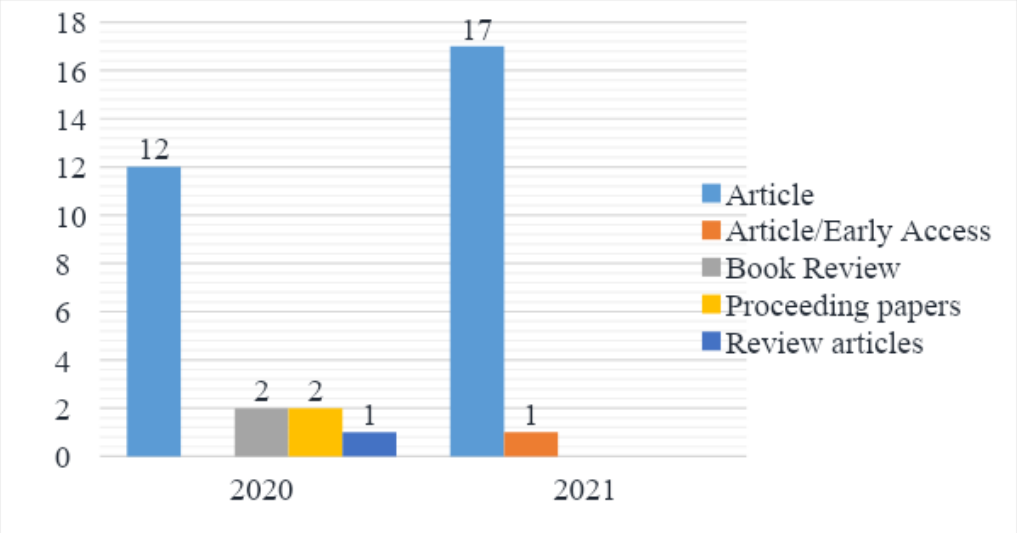

Figure 1 Number of scientific papers according to the Document Types and Publication Year
Source: Authors

Firstly, the filtered scientific journals were examined in relation to the Document Types and Publication Year. From the Figure 1 can be concluded that more scientific papers were published in 2021 than in 2020. According to the dominant document type in 2021, i.e. Article (17 papers), only one paper was published as an Early Access. In 2020 the publications were mainly denoted as Articles; two scientific papers as Book Review and Proceeding paper, and one scientific paper as Review article.

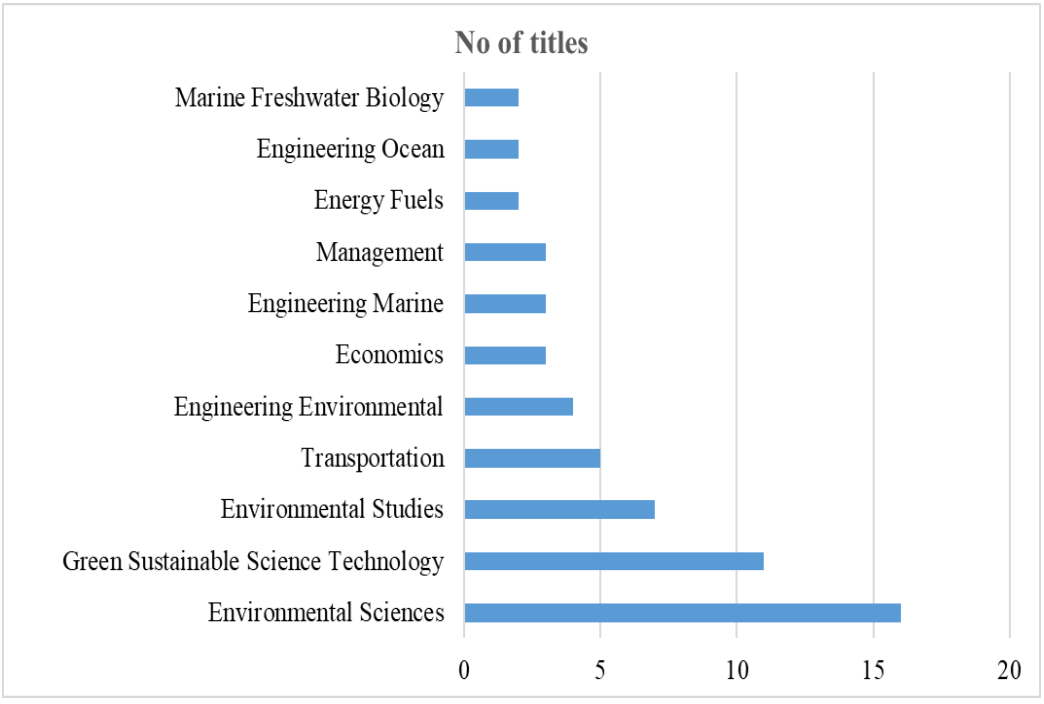

Figure 2 Number of scientific papers according to the Web of Sciences Categories
Source: Authors

As seen in Figure 2, the extracted scientific papers were also observed according to the Web of Science Categories. Since the topic search was sustainable shipping it was expected that the most of the scientific papers would be categorized as Environmental Studies, Environmental Sciences, Green technologies etc.

As assumed, the most of publications were categorized as scientific papers in mentioned categories - Environmental Sciences (more than 15), Green Sustainable Science Technology (more than 10) and Environmental Studies (more than 5). Up to five scientific papers were published in Management, Engineering Marine and Economics category as well as in Energy Fuels, Engineering Ocean and Marine Freshwater Biology. The scientific papers with less than five publications were not taken into account.

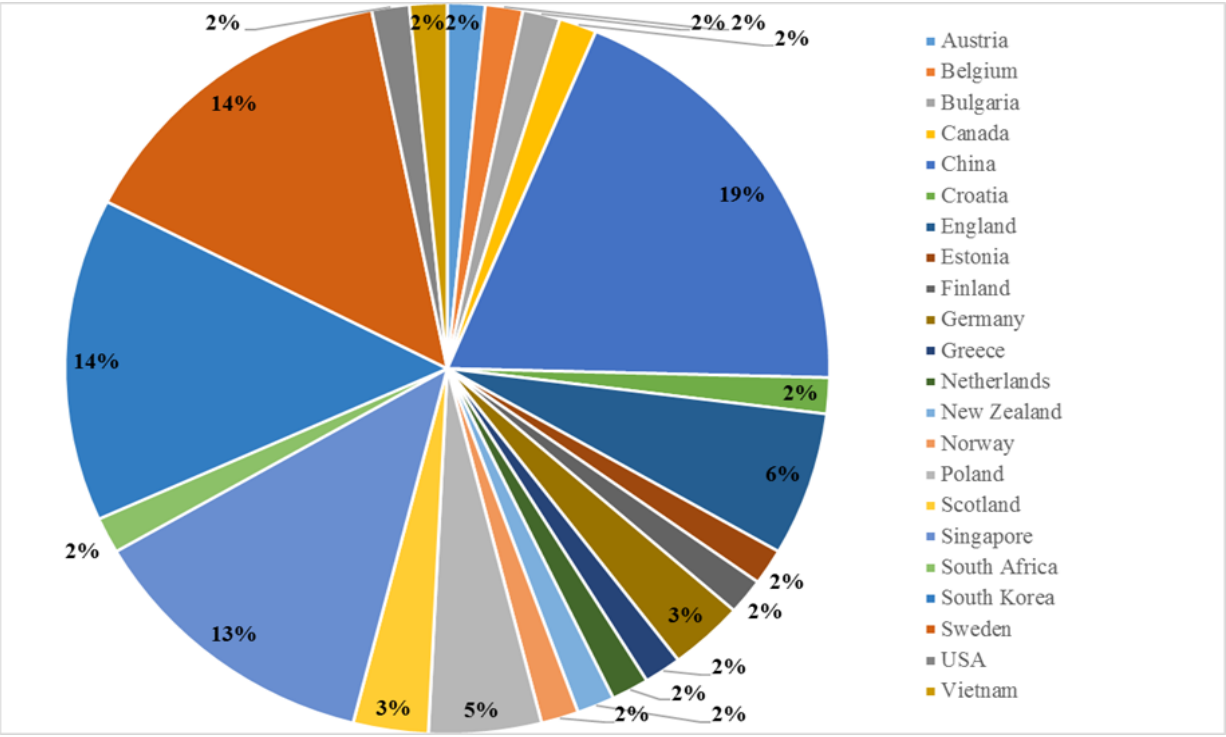

Figure 3 Percentage of scientific papers according to the Countries/Regions
Source: Authors

Further on, scientific papers were classified according to the Countries of the researchers. As seen in Figure 3, certain countries predominate in the percentage of scientific paper publications. Majority of researchers are from China (19%), Sweden (14%), Singapore (14%) and South Korea (13%). They are followed by researchers from England (6%) and USA (5%). The other countries mentioned in this research took part in publications in 2021 and 2020 with 3% or 2%.

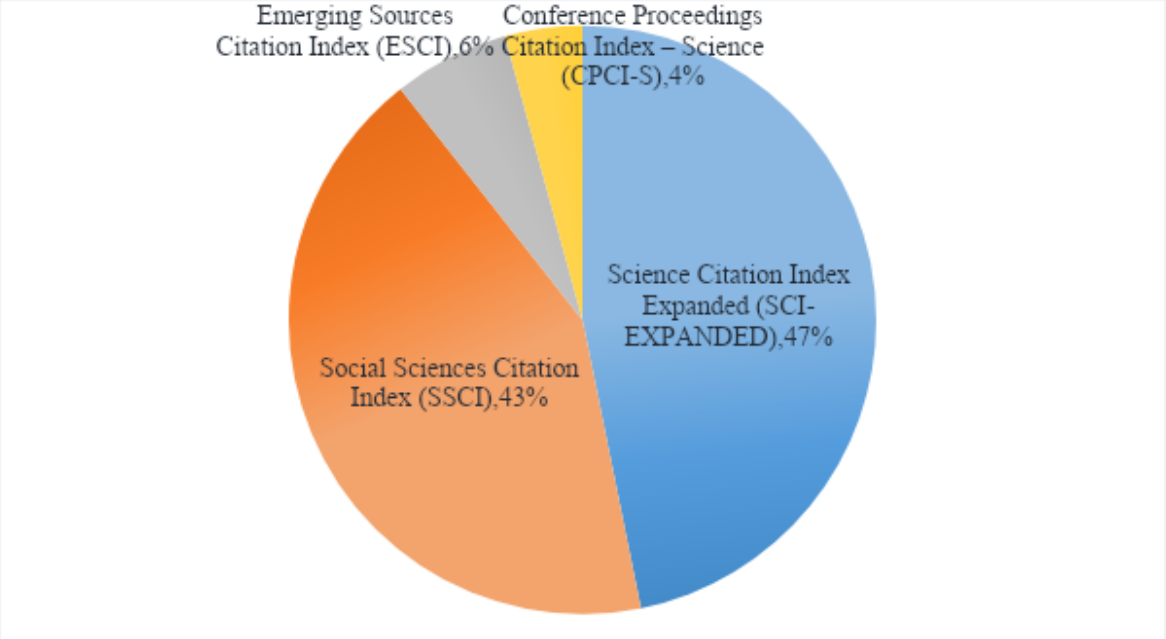

Figure 4 Percentage of scientific papers according to the Web of Science Index
Source: Authors

When observing publications in relation to the Web of Science Index in Figure 4 the most of the scientific papers in 2020 and 2021 were addressed as Science Citation Index Expanded - SCI-Expanded, 47%. 43% of the papers are categorized as Social Sciences Citation Index – SSCI; 6% as Emerging Sources Citation Index – ESCI; and 4% as Conference Proceedings Citation Index - CPCI-S.

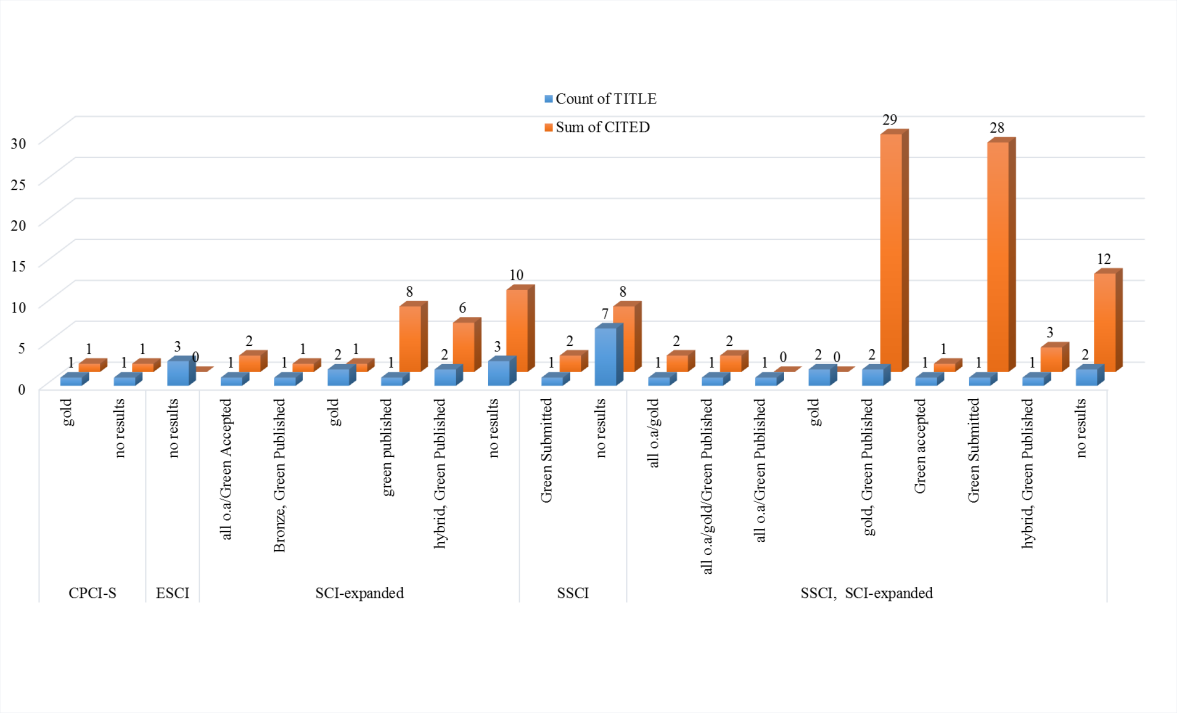

Figure 5 Number of scientific papers according to the Open Access, Web of Science Index and Number of citation
Source: Authors

In Figure 5 scientific papers were analysed according to their Open Access, Web of Science Index and Number of citations. It can be concluded that the highest number of citations have papers with SSCI/SCI - Expanded Web of Science Index. It is interesting that in Open Access, they entered categories Gold and Green published (29 times cited) and Green submitted (28 times cited). There are scientific papers cited 12 times and categorized as SSCI/SCI-Expanded but with no results on Open Access. Scientific papers with SCI - Expanded Web of Science Index follow with 10 citations and no results on Open Access as well as scientific papers with 8 citations and Green published Open Access. There are two scientific papers with one citation and Gold Open Access in the same Web of Science Index Category. Bronze Open Access has one scientific paper with one citation. Scientific papers indexed as SSCI papers with no results on Open Access have 8 citations and two citations have a scientific paper with Green submitted Open Access. There are no results on citation for the scientific papers sorted in ESCI Web of Science Index. A scientific paper indexed CPCI - S has one Gold Open Access and one citation.

5 CONCLUSION

Through the paper the authors tried to identify hot research topics related to the *sustainable shipping* in the scientific journals published in the Web of Science Core Collection database in the year 2020 and 2021.

The research of this paper provided basic information on how many papers contain the words sustainable shipping in their title, abstract and keywords. Only scientific papers containing two words arranged in this way were taken into account. The search resulted in a total of 35 papers in the last two years with topic search *''sustainable shipping"* or *sustainable shipping**.

Through the Web of Science database it is possible to use specific topic search through all fields or to select one of the researcher's most interest. For the purpose of this paper, the authors put certain topics, such as Research Area, Publication Year, Open Access, Countries, Web of Science Index, Web of Science Categories.., into correlation.

Based on the carried research the following conclusion could be drawn:

- more papers were published in 2021 than in 2020,
- the dominant Document Type was Article,
- majority of researchers published in the field of Environmental Sciences and Ecology, Engineering and Environmental Science Technology,
- the highest number of citations had papers with SSCI/SCI - Expanded Web of Science Index,
- the most of the scientific papers in 2020 and 2021 were indexed as Science Citation Index Expanded.

The paper showed that through the science mapping method i.e. a systematic review of the literature or scientific papers, any of the fields that are the area of researcher's interest could be compared and could help in sorting the data on a specific topic in order to answer a specific research question. The aim of the paper was also to filter all the relevant scientific papers on the given topic in certain period in order to ease someone's search and reduce the amount of unnecessary information at a given time.

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