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Word Cloud Analysis of Special Issues in Maritime Transportation Journals



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Abstract

Due to the dynamic structure of maritime transportation, research in this field must proceed in parallel with current sectoral developments. In this sense, the regular issues of maritime transportation-themed academic journals undoubtedly contribute to sectoral development. However, unlike regular issues, journal special issues, which direct the research focus of the scientific community with thematic calls that reflect sectoral development, undertake a valuable function in order to produce rapid scientific solutions to the sectoral needs. Therefore, an examination of the articles brought together in special issues can be used to follow the emerging themes in the relevant field. To conduct word cloud analysis on special topics in maritime transportation-related journals, 353 articles in 73 special issues of 17 journals published between 2013-2023 were compiled. By interpreting the word clouds obtained from the titles and keywords of relevant publications, the themes that came to the fore were identified. Findings show that words related to environmental sustainability, China's Belt and Road Initiative, risk management and network design are the prominent themes. Besides demonstrating the trends in maritime transportation research, this article also proposes a method to conduct a word cloud-based preliminary analysis, aiding researchers in detecting current themes to direct their academic focus.

Keywords

Maritime Transportation · Special Issues · Word Cloud

Author Note

The study has been developed by expanding the paper titled "Emerging Areas in Maritime Transportation Research: Word Cloud Analysis on Journal Special Issues," which was presented at the 1st International Maritime and Logistics Congress.



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As a result of being a dynamic industry, maritime transportation is constantly evolving under the influence of socio-cultural, economic, regulatory and technological changes (Cerit, 2000). The dynamic features of the industry drive its actors to remain in the competition through persistent research and development efforts, adaptation strategies and collaboration in the name of solving industry-wide problems. Besides its dynamic features, the industry is also viewed as a complex one, as it encompasses a vast number of actors consisting of shipping companies, agents, brokers, port operators, freight forwarders and other related stakeholders (Akpınar & Caylan, 2021). Furthermore, the industry has a global nature, which also adds to its dynamism and complexity (Almklov & Lamvik, 2018). As a result, reaching the common goals set by the industry becomes much more difficult and necessitates a coordinated effort among the stakeholders.

Due to both its dynamism and complexity, the academic research regarding maritime transport is bound to feed from different disciplines. Thus, studies from various disciplines, such as geography, economy, engineering, politics, operations research and law, play a crucial part in revealing the challenges and opportunities for the industry and guide industry leaders, policy makers and related stakeholders collaboratively. To perform accordingly, the academic research field of maritime transportation, including a substantial number of journals, acts as a medium to create the change for industrial development.

Research in the field of maritime transportation began to be published in academic journals under the theme of transportation in the middle of the 20th century. “Defense Transportation Journal” and “Transportation Journal”, initially published in 1945 and 1961 (Farris, 1997), can be viewed as pioneering journals that involve scientific publications on maritime transport. In the following era, journals specifically defining maritime transport as their major field started to be published and the research in this field gained depth. First published in 1973, the journal titled “Maritime Studies and Management (currently known as Maritime Policy & Management) is valued greatly because it is one of the earliest and well-established journals, specifically focused on maritime transportation (Taylor & Francis Online, 2023).

Today, the research field in question is scientifically fueled from many branches, since both maritime transport-oriented journals and journals with broader scopes regularly include academic studies on maritime transport exist. In addition to the regular issues of these journals, the special issues they publish also represent scientific knowledge. Different from regular issues, special issues involve publications that are in harmony with the themes determined by the editors of the journal (or the guest editors) (Knöchelmann et al., 2022). The “call for papers” written by the editors in the publication of the relevant issues determine the framework of the theme in question as well as guide the researchers by justifying and demonstrating the lack of research about this theme in the relevant field. This guidance helps to solidify the bond between scientific research and application areas, in addition to directing a collective scientific effort toward questions that need answers. As this mechanism of scientific publication conforms with the dynamic nature of the maritime industry, there has been a substantial increase in the quantity of special issues, which allows researchers to better reflect and react to the recent rapid changes taking place within the industry.

By evaluating the articles published in special issues in an integrated manner, researchers can reach an understanding of the changes in trending topics within the time frame that is included in the analysis. In this context, the titles, texts (as a whole or partly) and keywords of the mentioned publications can be considered as input data, and the emerging concepts in these publications can be determined by different methods. Word cloud analysis is one of these methods that is based on visualization and has the advantage of its ease of application.

In this paper, the purpose is to conduct a word cloud analysis on special issues in maritime transportation-related journals, with an effort to reveal emerging areas within the literature and demonstrate how these publications establish the dynamic and evolving nature of the maritime industry. The analyzed data from 73 special issues, encompassing 353 articles published between 2013 and 2023 across 17 academic journals, was used. The titles and the keywords of these articles were used as input data and the separate word clouds were generated on each input type in detail.

The application of word cloud analysis on special issues of maritime transportation journals helps researchers to visually analyze the trending topics in the investigated period. Since it is one of the challenges for maritime researchers to stay up to date and direct their academic efforts to benefit the solution of current industrial challenges, such preliminary analysis can be used as a means to find the right research question. Moreover, said analysis can help researchers to become familiar with the themes discussed within the scope of emerging research agendas. Through these advantages, researchers can increase the chance of their upcoming scientific work being published. Therefore, the value of this paper lies not only in demonstrating emerging areas in maritime transportation research but also in proposing a method for researchers to conduct a word cloud-based preliminary analysis, aiding them in detecting current themes to direct their academic focus.

A detailed briefing about the method will be given and the findings will be interpreted accordingly in the following parts of the study.

Background Of The Study

Scientometrics is a field of study concerned with the quantitative analysis of the textual features and content characteristics of scientific literature as well as its communication (Mingers & Leydesdorff, 2015). It has been widely used by scholars with various aims such as identifying the emerging themes within a literature, revealing the collaboration networks of authors, and measuring authors', journals' and institutions' productivity (Brindha and Murugesapandian, 2016). Since the field focuses on the scientific literature from a production perspective, it helps clarify the research direction in any field under investigation and improves scientific quality. The indicators on the quality of scientific journals (e.g. rankings and impact factors) (Argento and van Halden, 2022) and the indicators on the performance of researchers (e.g. h and g indexes) (Linton et al. 2012) are becoming more important day by day, since the expectations of academic institutions from their researchers are shaped by performance criteria based on these concepts (Khoklov, 2020). Therefore, the researchers are looking for ways to publish their articles in the most highly ranked journals so that their citation scores would increase and meet their institutions' expectations.

The research field of maritime transportation is not different. Although there are many journals now that are specifically focused on the maritime industry, the ones with high journal rankings are quite limited. Moreover, the acceptance rates of the said journals are lower than the average. It is possible to make this inference when it is seen that the acceptance rate of the journal "Maritime Policy & Management" (as an exemplary journal in the research field) is 19%, and in Herbert (2020) calculation on 2300 journals covering different disciplines, the average acceptance rate is 32%. From this point of view, it would be a correct strategy for researchers to determine their research topics in line with the calls of the journal editors in order to publish in high-quality journals. Therefore, in addition to the special issue calls of these journals, the contents of the articles accepted in these issues are very useful in guiding researchers. This is because these special issues not only reveal current academic issues in the maritime sector but also reveal the journals' priorities, with justifications.

In summary, it is to the advantage of researchers in the relevant field to follow special issues in order to stay up-to-date and to be familiar with research topics that will increase the possibility of publication in target journals. While it is possible for researchers to stay up to date by carefully following (through subscription) the journals in question, it would also be beneficial to follow the journals more systematically with certain tools and thus identify the emerging areas in the relevant field. Considering the quantity of scientific publications being too large for scientists' capacity to easily comprehend (Larsen & von Irs, 2010), the use of such tools has become a necessity to track what is new and what needs more scientific attention.

Therefore, different methods have been proposed depending on variables such as the size of the data to be handled and the scope of the analysis. The number of publications using these tools to identify current themes in different scientific fields is increasing in parallel with the increase in need. Text mining tools, as they offer one of the ways to detect emerging themes, are gaining popularity with their capacity of handling large sample sizes (Thakur & Kumar, 2021). It is possible to see that the amount of text mining-based research is increasing in the maritime transportation literature as well. As an example, the study of Bai et al. (2021) examined 3199 academic studies in the field of maritime transportation using the latent Dirichlet allocation method. The authors found that "port management", "container operations" and "liner shipping" are the major areas of focus in the examined literature. Shin et al. (2018) also used the latent dirichlet allocation method, but the authors focused on academic articles addressing the sustainability aspect of maritime transportation. In this study conducted in a narrower area, 155 articles were discussed and the themes that emerged in the study were reported as "green port", "environmental regulations" and "carbon emissions". The study of An (2024) focused on the use of big data in maritime transportation and identified the prominent themes in this specific field. In this study, the authors determined the themes using keyword co-occurrence and clustering techniques.

Applying the methods mentioned above will help to obtain much more robust results in determining the themes of the relevant literature, but these methods require a certain level of mastery of text mining tools. Therefore, it may also be preferable to use word cloud analysis (in relatively smaller samples), which is a module within various qualitative research softwares such as MAXQDA, AtlasTi and NVivo. In particular, the fact that it does not require specialized technical skills or knowledge of computational methods as text mining tools would require, creates an advantage in choosing the method. In the remainder of this study, detailed information on the use of this analysis is presented as a recommendation to researchers in the relevant field.

Method

Word clouds provide a quick summary of the most frequently used terms in a text, presenting them visually for enhanced accessibility compared to a conventional table listing words and their frequencies (Kuckartz & Rädiker, 2019; 57). Thanks to these features, it has been considered as a useful analysis method to visualize trends in various fields of study. Abazi-Bexheti et al. (2020)'s analysis on computer science research, Kalmukov (2021)'s analysis on the papers of a particular conference and Alam et al. (2023)'s analysis on halal hotel literature in the Scopus database are examples adopting a similar approach since they are also in the pursuit of comprehending how word clouds can be used in revealing emerging trends.

The first step of the analysis was to determine the special issues published between 2013 and 2023, which have their complete focus on maritime transportation or involve articles within this field of study. For this purpose, the list of journals focusing on this research field was reached by searching the web of science master journal list with the keyword "maritime transportation".

Afterwards, the core collection selection was determined as SSCI and the search was narrowed. Later, the websites of the 37 listed journals were accessed and the special issues published within the specified period were examined. If the special issue had purely been based on maritime transport, all articles in that issue were gathered for analysis. As for the special issues concentrating on broader subjects, only the articles focusing on maritime transport were chosen. Throughout the data collection process, which was conducted with this approach, 73 special issues were identified in 17 academic journals. In total, 353 articles solely focusing on maritime transport were identified from these issues. Table 1 shows the distribution of articles in the selected journals.

The titles and keywords of these articles were compiled into two separate text files. To put it differently, a total of two separate text documents were included, one of which compiled all the titles and the other compiled all the keywords. The files were then uploaded to the MAXQDA 2020 software for word cloud analysis. Before the generation of word clouds, a list that consists of words that need to be omitted, such as pronouns, prepositions and conjunctions, was prepared and inserted as a “stop list”. In the final step, separate visuals of word clouds for each of the input data mentioned above were generated.

Word cloud analysis was carried out in two different ways. While both word clouds were examined integrated in the first analysis, a comparative analysis was carried out in 5-year periods in the second analysis. The first analysis helps visualize the themes that come to the fore in the 10-year period, whereas the second analysis provides the opportunity to determine whether there is any change in the 5-year periods. Therefore, the findings of both applications were compiled under relevant headings ("Overall Assessment of Article Titles and Keywords" for the first analysis and "Comparative Assessment of Article Titles and Keywords" for the second analysis).

Table 1

List of Journals and Number of Selected Articles

List of Journals	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Accident Analysis & Prevention	0	0	0	0	0	0	0	0	7	0	0
European Journal of Operations Research	0	10	0	0	0	0	0	0	0	0	0
International Journal of Logistics Research and Applications	0	0	6	0	0	0	0	3	0	0	0
International Journal of Shipping and Transport Logistics	17	18	10	15	12	11	12	6	0	3	0
Journal of Transport Geography	5	2	0	0	0	4	0	0	0	7	0
Maritime Policy and Management	7	11	6	0	0	0	0	0	0	8	0
Marine Policy	0	0	0	0	0	0	0	0	0	2	0
Maritime Economics and Logistics	0	0	5	0	0	0	0	5	7	18	0
Physical Distribution&Logistics Management	0	0	0	0	0	0	0	0	1	0	0
Research in Transport Business and Management	0	0	0	0	0	0	0	0	0	13	6
Transport Policy	0	0	0	0	0	0	0	0	7	11	3
Transport Reviews	0	0	0	0	0	4	1	0	0	0	0
Transport Science	0	2	8	0	0	0	0	0	0	0	0
Transportation Research Part A.Policy and Practice	0	0	0	0	0	8	0	3	0	0	0
Transportation Research Part B Methodological	0	0	0	6	0	0	0	0	0	0	
Transportation Research Part D. Transport and Environment	0	8	0	1	0	0	0	0	18	0	9

Findings related to the word cloud based on articles' keywords can be found in Figure 2. The words with more than 50 repetitions in the keyword-based analysis are also the words "port", "shipping" and "container", which coincide with the analysis based on titles. Similarly, it is possible to see the words "network", "environmental", "carbon" and "emission" among the words with 15-30 repetitions, as in the previous analysis output. In this analysis, it can be seen that the word "risk" is among the frequently repeated words. If we are to analyze the usage areas of the word in depth, it can be observed that it is used within concepts such as "risk analysis", "risk assessment" and "risk management". Another word that can be highlighted in the word cloud is "programming". Similarly, after an in-depth examination, it can be concluded that it is a keyword with a sheer number of repetitions due to the frequent use of the linear programming method in the relevant research field.

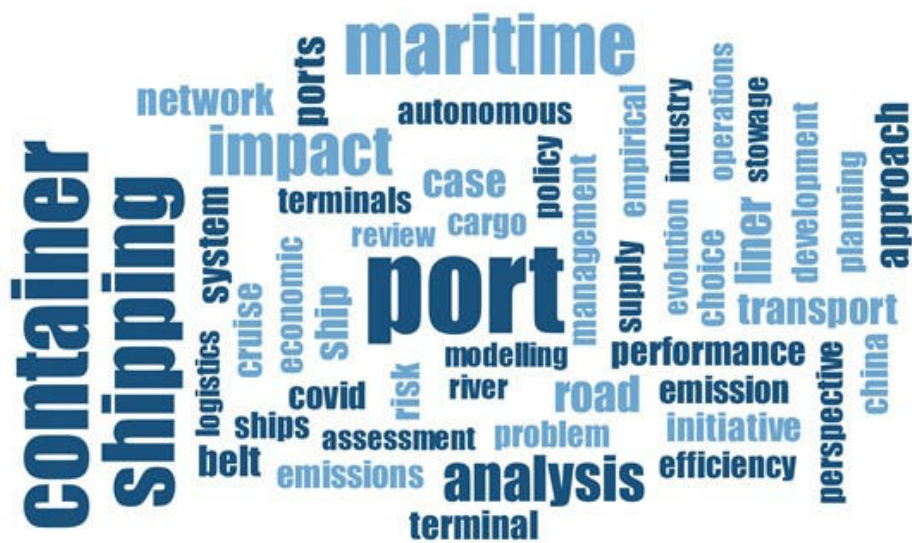
Figure 2

Word Cloud based on Keywords



Comparative Assessment of Article Titles and Keywords

As already mentioned in the method section, word cloud analysis also allows researchers to track changes in trending topics between periods by dividing the documents and generating separate word clouds. In this analysis, publications for the period 2013-2017 and publications for 2018-2024 were divided into two groups to observe the difference between them. The analysis outputs of both periods, based on the article titles, are shown in Figure 3 and Figure 4. While the words with the highest frequency in both figures are generic concepts such as "maritime", "port" and "container", as the frequency values decrease, it becomes possible to follow the periodic changes of the prominent concepts. When we go beyond generic words in the word cloud of 2013-2017, it is seen that concepts related to environmental sustainability, which are gaining importance in the sector, such as "green", "compliance" and "emission", are at the forefront. When looking at the word cloud for the years 2018-2023, it is seen that there is no decrease in importance due to the existence of these concepts. However, during this period, the diversity of concepts increased and, unlike the previous 5-year period, the words "Covid", "autonomous" and "belt" and "road" reflecting China's Belt and Road Initiative project emerged. In this regard, it is possible to see that studies covering the Covid-19 pandemic in the context of its impact on maritime transportation, examining the impact of autonomous technologies on maritime transportation and port management, and dealing with China's Belt and Road Initiative from different dimensions constitute the themes of the special issue calls of the period.

Figure 3*Word Cloud based on Article Titles between 2013 and 2017***Figure 4***Word Cloud based on Article Titles between 2018 and 2023*

The analysis outputs performed on keywords with the same periodic separation can be seen in Figure 5 and Figure 6. Although there is not much difference from the analysis of titles, this analysis broadens the scope as method-based trends can also be observed due to the fact that research methods are frequently included in keyword lists. For instance, while both word clouds have the word "programming" as a result of the continuity in popularity of linear programming, words in "data envelopment analysis" show increased frequencies in the latter word cloud.

Figure 5*Word Cloud based on Keywords between 2013 and 2017***Figure 6***Word Cloud based on Keywords between 2018 and 2023*

Discussion And Conclusion

It is highly expected that academic journals will swiftly adapt to evolving trends within their scope and offer proactive agendas for discussion. Special issues are usually employed as an instrument to address these rapid changes, providing a more flexible approach that is beneficial for academia and society as a whole. There has been a noteworthy increase both in the quantity of publications and the number of special issues by means of maritime transportation-related journals, which allows them to better reflect and respond to the rapid changes occurring within the industry in the last decade. With the aim of conducting a word cloud analysis of the mentioned special issues in maritime transportation-related journals, the findings demonstrated emerging areas within the field of study between the years 2013 and 2023. Both the world clouds of keywords and article titles indicate that port and container transportation research stands out as the most prominent part of the maritime transportation literature. Concepts related to environmental sustainability, China's Belt and Road Initiative project, risk management and network design have also been frequently studied and addressed in the examined pieces of literature. These findings are quite parallel to the findings of Bai et al. (2021) with only one exception which is "Belt and Road Initiative". This shows

that the relevant subject is not studied intensively enough to constitute a single theme in the corpus of maritime transport literature, but its importance is rather reflected through special issues. Among the special issues examined, 5 of them compiled research directly related to China's initiative in question. It is possible to determine that there are overlapping points with the findings of Shin et al. (2018) as well, since the authors also found out that sustainability issues in the literature are mostly studied on the basis of "carbon reduction". In other words, it is possible to state that environmental sustainability is at the forefront of sustainability issues and that its social aspect has not been sufficiently studied to become an emerging theme.

The findings of this paper can be interpreted as proposals for further research, as the analysis visually represents the trending topics in the field. Thus, the main practical contribution made by this study is for the sake of the researchers in the field since the word clouds reflect the journal editors' guidance for the academia in the name of developing the existing studies.

This study not only reveals the emerging trends in the field but also helps comprehend how word cloud analysis can serve as a guide to the researchers in their pursuit of research areas to drill. Further studies can adapt this tool in various ways and with different aims. For instance, narrowing down the scope of the research (i.e. focusing solely on port research) or the scope of the data (i.e. focusing solely on a specific journal) can also offer practical ways, since such an approach would require less time in the generation of word clouds and allow rapid identification of the related themes.



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