State of The Art on Strategic Planning for Maritime Passenger Transport
A Bibliometric Review

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Abstract   This chapter presents the results of a bibliometric analysis in the field of strategic planning for maritime passenger transport, conducted with the goal to critically assess the maturity of the maritime passenger transport scientific literature. Bibliometric analysis provide a portrait of the relevance assigned by the scientific community to specific topics. Through a rigorous and critical evaluation of articles via guided content analysis we have identified four research directions that are gaining increasing attention: 1) maritime tourism, 2) environmental externalities, 3) maritime transport, and 4) marine passenger ports.

Keywords   Maritime passenger Transport. Bibliometric review. Statistical research methodology. Maritime planning. Maritime tourism.

Summary   1 Introduction. – 2 Results of the Bibliometric Analysis Statistical Research Methodology. – 2.1 General Results of the Bibliometric Analysis Statistical Research Methodology. – 2.2 Specific Results of the Bibliometric Analysis Statistical Research Methodology. – 3 Future Research Directions and Discussion. – 3.1 Maritime Tourism. – 3.2 Environmental Externalities. – 3.3 Maritime Transport. – 3.4 Marine Passenger Port. – 4 Conclusion.

1   Introduction

Maritime passenger transport represents an essential mode of passenger transport even though it is an under-researched segment of the maritime industry within the academic community (Stupalo, Jugović, Mrvica 2016). This study critically assesses the maturity of the maritime passenger transport scientific literature from the aspect of strategic planning for maritime passenger transport. Strategic planning is a management technique utilised for assisting economic agents in setting future goals and objectives to achieve more stable and predictable growth (Pérez, Zapata 2020). It is a managerial methodology that develops and employs a business-specific roadmap for creating feasible, coherent, competitive, and strong business operations. It enables economic agents to create long-term plans in consideration of the risks and opportunities associated with the economic agents' business operations. However, the fragmented nature of maritime passenger transport generates challenges in identifying the essential steps and actions required to reach the goals of strategic planning for maritime passenger transport.

In order to address the aforementioned barrier, a thorough investigation of the conceptual and intellectual structure of the scientific field of strategic planning for maritime passenger transport is conducted via bibliometric analysis statistical research methodology. The utilisation of bibliometric analysis techniques, such as historiographic citation, bibliographic coupling, keyword co-occurrence, and thematic mapping via the employment of key bibliometric terms of Total Local Citation Scores, Total Global Citation Scores and Average Total Global Citation Scores, resulted in the identification of impactful research perspectives deemed indispensable for setting future research directions and actions for achieving the goals of strategic planning for maritime passenger transport.

The rigorous and critical evaluation of articles via guided content analysis revealed different innovative and progressive strategic alternatives manifested in four future research directions for strategic planning for maritime passenger transport: 1) maritime tourism, 2) environmental externalities, 3) maritime transport, and 4) marine passenger ports. The four future research directions provide the possibility of aiding economic agents in increasing the extent of the understanding of their business operations in order to better adapt their growing attention to the concept of emerging sustainable transitions in the maritime passenger transport segment of the maritime industry.

2 Results of the Bibliometric Analysis Statistical Research Methodology

Bibliometric analysis is a quantitative and qualitative statistical research methodology utilised to measure the impact of scientific literature in order to ascertain the level of maturity in the inquired research domain in terms of output volume, scientific quality, interdisciplinarity, and network strength (Ellegaard, Wallin 2015). The quantitative aspect of bibliometric analysis manifests itself through the element of science mapping, which is an efficient and powerful quantitative technique for reviewing a copious and extensive amount of scientific literature studies. The main advantages of science mapping are creating the structure of scientific fields and revealing the dynamics of scientific fields (Aria, Cuccurullo 2017). This enables the researcher to find and evaluate the most impactful scientific works with mitigated subjective bias within the inquired scientific field. Thus, it is considered indispensable for conducting a systematic, transparent and replicable literature review as it provides better objective and reliable scientific analyses (Zupic, Čater 2015).

The qualitative aspect of bibliometric analysis manifests itself through the element of guided content analysis, which is also known as performance analysis. Content analysis is a research methodology utilised to intellectually comprehend the unstructured content of recorded human communications media such as texts, images, symbols, or audio data in order to determine their contextual meaning for creating further replicable and valid inferences (Gheyle, Jacobs 2017; White, Marsh 2006). Performance analysis is a research methodology that utilises strict procedural rules in terms of coding in order to create systematic guidelines for intellectual inference from recorded human communications media that results in structured conclusions from the examined media. Thus, it is a specialist discipline involving systematic observations to enhance performance and improve decision making, i.e., to evaluate individual and institutional research and publication performance (Gaur, Kumar 2018; Narin, Hamilton 1996).

The initial supposition of bibliometric analysis is that researchers publish their most important scientific results in academic journals and embark on new research projects primarily based on articles published in similar academic journals (Munim, Saeed 2019). This creates the condition to establish a four-step approach regarding the state of the art on strategic planning for maritime passenger transport bibliometric analysis. Figure **1** represents a graphical depiction of the four-step approach which is concurrently the workflow of this chapter.

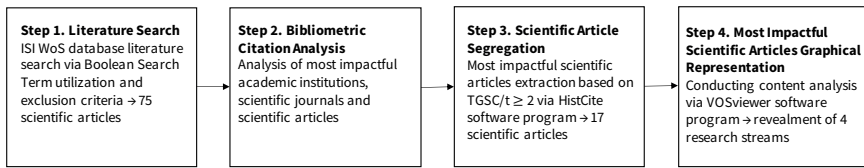| Step 1. Literature Search	Step 2. Bibliometric Citation Analysis	Step 3. Scientific Article Segregation	Step 4. Most Impactful Scientific Articles Graphical Representation
ISI WoS database literature search via Boolean Search Term utilization and exclusion criteria → 75 scientific articles	Analysis of most impactful academic institutions, scientific journals and scientific articles	Most impactful scientific articles extraction based on TGSC/t ≥ 2 via HistCite software program → 17 scientific articles	Conducting content analysis via VOSviewer software program → revealment of 4 research streams

Figure 1   The four-step workflow approach regarding the state of the art on strategic planning for maritime passenger transport bibliometric analysis. Source: graphically arranged by the Author

The observation of figure **1** implies that the first step consists of a thorough and systematic literature search, and a comprehensive evaluation of the scientific field via exclusion criteria. The second step consists of a comprehensive analysis of the most impactful academic institutions, scientific journals, and academic articles in order to identify key publication trends within their respective domains. The third step consists of scientific article segregation with the adherence to the Total Global Citation (TGC) criteria in order to identify the most impactful scientific articles within the scientific field. The fourth and final step is an extension of the third step in terms of graphically representing the most impactful scientific articles within the scientific field in order to synthesise the main findings and provide future research directions.

2.1 General Results of the Bibliometric Analysis Statistical Research Methodology

The primary basis of the bibliometric analysis is the collection of bibliographic citations from the ISI Web of Science (WoS), the most renowned scientific database in the entirety of academia. The ISI WoS is a database of bibliographic citations of multidisciplinary areas that covers the various journals of medical, scientific, and social sciences including humanities.[1] The process of thorough and systematic literature search in terms of impact and relevancy is performed via keyword search in the WoS database with adherence to Boolean search terms. The systematic literature search yielded a total of 75 scientific articles on strategic planning for maritime passenger transport. Table **1** contains guidelines for the thorough ten-step process that resulted in the totality of 75 scientific articles on the strategic planning for maritime passenger transport.

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1 https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/web-of-science#:~:text=Web%20of%20Science%2C%20previously%20known,and%20social%20sciences%20including%20humanities.

Table 1 ISI WoS research findings on the strategic planning for maritime passenger transport. Source: descriptively arranged by the Author

Step	Boolean Search Term	Number of Articles WoS
1.	"Maritime Passenger*"	18
2.	"Maritime Passenger*" OR "Maritime Tourism"	50
3.	"Maritime Passenger*" OR "Maritime Tourism" OR "Passenger Port*"	75
4.	"Maritime Passenger*" OR "Maritime Tourism" OR "Passenger Port*" OR "Marine Passenger Transport"	76
5.	"Maritime Passenger*" OR "Maritime Tourism" OR "Passenger Port*" OR "Marine Passenger Transport" OR "Passenger Accessibility"	81
6.	"Maritime Passenger*" OR "Maritime Tourism" OR "Passenger Port*" OR "Marine Passenger Transport" OR "Passenger Accessibility" OR "Green Transport Planning"	107
7.	"Maritime Passenger*" OR "Maritime Tourism" OR "Passenger Port*" OR "Marine Passenger Transport" OR "Passenger Accessibility" OR "Green Transport Planning" OR "Green Transport Management"	133
8.	Exclusion criteria: Journal Article	88
9.	Exclusion criteria: English Language	80
10.	Exclusion criteria: Article Manual Screening for Inquired Relevance	75

The adherence to the information within table **1** indicates that the initial step of keyword search "Maritime Passenger" resulted in 18 scientific publications. The second step of keyword search conjoins the "Maritime Passenger" keyword and "Maritime Tourism" keyword with a Boolean operator "OR", resulting in 50 accumulated scientific publications. The third step of keyword search includes the third keyword "Passenger Port" with a Boolean operator "OR", resulting in 75 accumulated scientific publications. The fourth step of keyword search adds the fourth keyword "Marine Passenger Transport" with a Boolean operator "OR" and results in 76 accumulated scientific publications. The fifth step of keyword search incorporates the fifth keyword "Passenger Accessibility" with a Boolean operator "OR", resulting in 81 accumulated scientific publications. The sixth step of keyword search involves the sixth keyword "Green Transport Planning" with a Boolean operator "OR" and results in 107 accumulated scientific publications. The seventh and final step of keyword search conjoins the seventh keyword "Green Transport Management" with a Boolean operator "OR" and results in the totality of 133 accumulated scientific publications.

The refinement process begins at step eight via the applications of exclusion criteria, of which the first consist of incorporating jour-

nal articles only as the examined scientific publications. The pivotal reason contributing to such a decision stems from the rigorous quantitative and qualitative aspects of the peer review process indispensable for the article acceptance within the scientific journal (Gill 2020). The application of the first exclusion criteria compacted the totality of accumulated scientific publications from 133 down to 88 journal articles. The second exclusion criteria consist of considering only the English language in journal articles as the medium for knowledge exchange. The principal reason for this is that the English language is the prevalent international language of scientific publication (Ferguson, Pérez-Llantada, Plo 2011). The application of the second exclusion criteria further constricted the totality of accumulated journal articles from 88 down to 80 journal articles. The third and final exclusion criteria consist of the journal article manual screening for inquired relevance within the selected sample of the ISI WoS database. Journal articles only briefly covering the topic of strategic planning for maritime passenger transport were removed, spanning from historical, biomedical, anthropological, and cultural studies. The application of the final exclusion criteria concludingly narrowed down the totality of accumulated journal articles from 80 journal articles down to 75 journal articles.

Graph **1** is a statistical representation of the remaining totality of 75 journal articles.
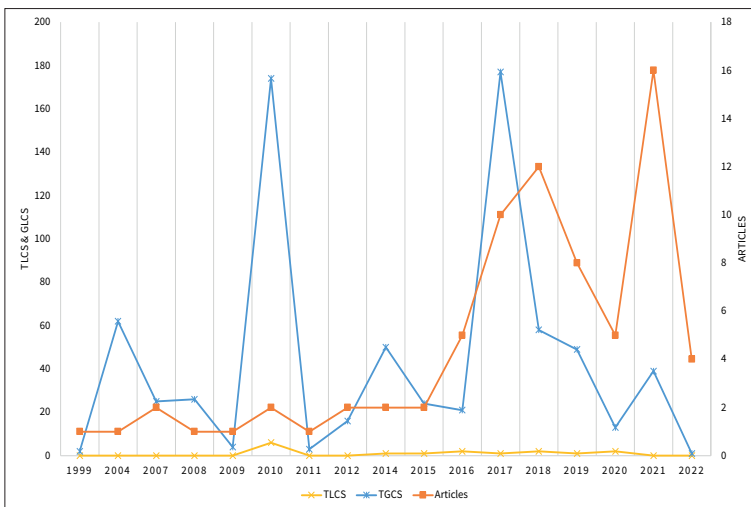
Graph 1 Statistical representation of the remaining totality of 75 journal articles.
Source: graphically arranged by the Author

The examination of graph **1** indicates that the topic of strategic planning for maritime passenger transport constitutes itself in the 75 published journal articles within a time period from 1999 to 2022. Further examination of graph **1** requires knowledge regarding the key bibliometric terms Total Global Citation Score (TGCS) and Total Local Citation Score (TLCS). Total Global Citation Score represents the number of times an article is cited by any other articles that are available on the ISI WoS database (Mustikarini, Adhariani 2021). Total Local Citation Score represents the number of times an article is cited by any other articles in the sample of the study (Mustikarini, Adhariani 2021). Thus, TGCS is a bibliometric term indicating the frequency of cited articles outside the sample of 75 articles on the topic of strategic planning for maritime passenger transport. Accordingly, TLCS is a bibliometric term indicating the frequency of the 75 cited articles on the topic of strategic planning for maritime passenger transport within the academic community researching such topic. Further examination of graph **1** with adherence to the aforementioned key bibliometric terms leads to the following conclusions. The selected time period from 1999 to 2022 indicates a steady and stable growth in the publishing of articles until 2020, when a receding of article publishing occurs. However, the recovery in the publishing of articles follows soon in 2021 and continues throughout 2022. The adherence to the TGCS reveals that the most impactful results occurred in 2004, 2010, and 2017. Further segmentation reveals that in 2004 one article was published representing a 62 TGCS value, in 2010 two articles were published representing a 174 TGCS value, while in 2017 ten articles were published representing a 177 TGCS value. However, it is important to note when the number of published articles is divided by the TGCS for the particular year, better objectivity regarding the impact of the article(s) can be obtained. Thus, 2004 marks 62 TGCS per article, 2010 marks 87 TGCS per article, and 2017 marks 17.7 TGCS per article. This leads to the conclusion that 2010 is the most impactful year regarding the topic of strategic planning for maritime passenger transport. The adherence to the TLCS reveals a low rate of article impact, with only 2010 being the most impactful representing a 6 TLCS value. Pivotal reasons contributing to such a low level of TLCS value may include overreaching research fragmentation due to occurring obstacles regarding the university-industry collaboration, and university-university collaboration (Rowland 2008). Divergences in values, norms, and mindsets between the representative of academic management and knowledge-transfer professionals divide academic and business institutions in terms of culture, expectations, and ultimately knowledge transfer (Muscio, Vallanti 2014).

2.2 Specific Results of the Bibliometric Analysis Statistical Research Methodology

The specific results of the bibliometric analysis constitute the activity of evaluating the scientific output and the scientific impact of the most prominent academic institutions, scientific journals, and scientific articles regarding the topic of strategic planning for maritime passenger transport. The detailed analysis of the ISI WoS key scientific discipline categories reveals that the sample of 75 articles belongs to the following top five categories: 1) Transportation Science Technology (25.3%); 2) Transportation (21.3%); 3) Engineering Marine (20.0%); 4) Environmental Sciences (16.0%); 5) Environmental Studies (14.6%). The remaining 3% accounts for a multiplicity of economic, oceanography, geography, and hospitality scientific discipline categories. The interconnectedness of the diversity of scientific discipline categories indicates the multidisciplinarity and interdisciplinarity of the topic of strategic planning for maritime passenger transport.

2.2.1 The Most Prestigious Academic Institutions

The identification and evaluation of the most prestigious academic institutions regarding the topic of strategic planning for maritime passenger transport is performed with adherence to two crucial bibliometric analysis citation score objective measures. The first objective measure is the total aggregate sum of the published articles associated with the respective prestigious academic institution. The second objective measure is the key bibliometric term of Total Global Citation Score (TGCS) which represents the number of times an article is cited by any other articles that are available on the ISI WoS database. The principal reason for evaluating the scientific performance and output of the most prestigious academic institutions by comparison analysis of the aforementioned two objective measures stems from the fact that even though certain prestigious academic institutions may have a higher publication rate, not all of the published articles have the same scientific impact.

Even though the Total Local Citation Score (TLCS) is equally important as the TGCS, the general results of the bibliometric analysis reveal a low level of frequency in the respective key bibliometric term. This resulted in the exclusion of this criteria in the evaluation of the scientific performance and output of the most prestigious academic institutions regarding the topic of strategic planning for maritime passenger transport. Table 2 contains the top 10 prestigious academic institutions regarding the topic of strategic planning for maritime passenger transport based on the total aggregate sum of the published articles and the key bibliometric term of TGCS.

Table 2 The top 10 prestigious academic institutions regarding the topic of strategic planning for maritime passenger transport based on the total aggregate sum of the published articles and the key bibliometric term of TGCS. Source: descriptively arranged by the Author

No.	Evaluation criteria: total aggregate sum of the published articles			Evaluation criteria: the key bibliometric term of TGCS		
	Institution	Article No.	TGCS	Institution	Article No.	TGCS
1.	University of Split, Faculty of Maritime Studies	8	17	University of Piraeus	1	144
2.	St Petersburg State University Aerospace Instrumentation	5	11	University of Pavia	1	66
3.	University of Dubrovnik, Faculty of Maritime Studies	5	8	Yarmouk University	1	62
4.	University of Rijeka, Faculty of Maritime Studies	4	10	Bournemouth University	1	42
5.	National Technical University of Athens	3	33	University of West London	1	42
6.	University of Las Palmas de Gran Canaria	3	18	Cardiff University	1	39
7.	University of Zagreb, Faculty of Transport and Traffic Sciences	3	2	Iran University of Science and Technology	1	39
8.	University of Bologna	2	4	National Technical University of Athens	3	33
9.	University of Montenegro	2	8	National Research Council of Italy	1	30
10.	Admiral Makarov State University of Maritime and Inland Shipping	1	1	University of the Aegean	1	30

The adherence to the information within table **2** indicates a great level of heterogeneity among the most prestigious academic institutions regarding the topic of strategic planning for maritime transport. Further analysis of table **2** on the basis of the total aggregate sum of the published articles reveals that the University of Split, St Petersburg State University Aerospace Instrumentation, University of Dubrovnik (Faculty of Maritime Studies), University of Rijeka (Faculty of Maritime Studies), and National Technical University of Athens belong to the top five most prestigious academic institutions.

The consecutive analysis of table **2** on the basis of the key bibliometric term of TGCS reveals that the University of Piraeus, University of Pavia, Yarmouk University, Bournemouth University, and University of West London belong to the top five most prestigious academic institutions. This leads to the conclusion that, on the basis of the total aggregate sum of the published articles, Croatia is the leading country in prestigious academic institutions, while, on the basis of the key bibliometric term of TGCS, Greece is the leading country in prestigious academic institutions.

2.2.2 The Most Prominent Scientific Journals

Maritime organisational sciences characterise a diversity of scientific discipline categories that are the research focus of various scientific journals. The application of bibliometric analysis software programs is utilised to identify and evaluate the most prominent scientific journals regarding the topic of strategic planning for maritime passenger transport. The identification and evaluation are conducted on the basis of the objective measures of the total aggregate sum of the published articles associated with the respective prominent scientific journal, and on the basis of the key bibliometric term of TGCS. Table **3** contains the top 10 most prominent scientific journals regarding the topic of strategic planning for maritime passenger transport based on the total aggregate sum of the published articles and the key bibliometric term of TGCS.

Table 3 The top 10 most prominent scientific journals regarding the topic of strategic planning for maritime passenger transport based on the total aggregate sum of the published articles and the key bibliometric term of TGCS. Source: descriptively arranged by the Author

No.	Evaluation criteria: total aggregate sum of the published articles			Evaluation criteria: the key bibliometric term of TGCS		
	Scientific Journal	Article No.	TGCS	Scientific Journal	Article No.	TGCS
1.	*Naše More*	6	18	*Atmospheric Environment*	1	144
2.	*Sustainability*	5	15	*Transportation Research Part D – Transport and Environment*	4	85
3.	*Transactions on Maritime Science – TOMS*	5	6	*Biofouling*	1	66
4.	*Transportation Research Part D: Transport and Environment*	4	85	*Marine Environmental Research*	1	62
5.	*Pomorstvo – Scientific Journal of Maritime Research*	3	8	*Current Issues in Tourism*	1	42
6.	*Promet – Traffic & Transportation*	3	12	*Ocean & Coastal Management*	2	35
7.	*Transport Problems*	3	3	*Maritime Policy & Management*	2	31
8.	*Transportation Research Record*	3	4	*Marine Pollution Bulletin*	1	27
9.	*Energies*	2	3	*Tourism Economics*	1	26
10.	*Journal of Coastal Research*	2	3	*Journal of Transport Geography*	1	25

The adherence to the information within table **3** indicates a substantial occurrence of heterogeneity among the most prominent scientific journals regarding the topic of strategic planning for maritime transport. Further analysis of table **3** on the basis of the total aggregate sum of the published articles reveals that *Naše More, Sustainability, Transactions on Maritime Science – ToMS, Transportation Research Part D: Transport and Environment,* and *Pomorstvo – Scientific Journal of Maritime Research* belong to the top five most prominent scientific journals. The successive analysis of table **3** on the basis of the key bibliometric term of TGCS reveals that *Atmospheric Environment, Transportation Research Part D: Transport and Environment, Biofouling, Marine Environmental Research,* and *Current Issues in Tourism* belong to the top five most prominent scientific journals. The basis of the total aggregate sum of the published articles suggests that Croatia is the leading country regarding the most prominent scientific

journals. On the other hand, the basis of the key bibliometric term of TGCS indicates that Netherlands is the leading country regarding the most prominent scientific journals.

2.2.3   The Most Impactful Scientific Articles

The ranking of the most impactful scientific articles and their respective authors is conducted with adherence to a two-step approach utilising the key bibliometric terms of TGCS and Average Total Global Citation Score (TGCS/t). TGCS/t represents the published article average global citation count per year beginning at the designated article publication year and ending at the designated year of the conducted study. Thus, TGCS/t is a bibliometric term indicating the average frequency of cited articles outside the sample of 75 articles on the topic of strategic planning for maritime passenger transport beginning from the article publication year to 2022 which is the final year of the bibliometric review. Table **4** contains the top 10 most impactful scientific articles regarding the topic of strategic planning for maritime passenger transport based on the key bibliometric term of TGCS.

Table 4   The top 10 most impactful scientific articles regarding the topic of strategic planning for maritime passenger transport based on the key bibliometric term of TGCS. Source: descriptively arranged by the Author

No.	Author(s)/ Article Title/ Publication Year	Journal	TGCS
1.	Tzannatos, E. "Ship Emissions and their Externalities for the Port of Piraeus-Greece" (2010)	*Atmos. Environ.*	144
2.	Ferrario, J. et al. "Role of Commercial Harbours and Recreational Marinas in the Spread of Non -indigenous Fouling Species" (2017)	*Biofouling*	66
3.	Abu-Hilal, A.; Al-Najjar T. "Litter Pollution on the Jordanian Shores of the Gulf of Aqaba (Red Sea)" (2004)	*Mar. Environ. Res.*	62
4.	Bowen, C. et al. "Maritime Tourism and Terrorism: Customer Perceptions of the Potential Terrorist Threat to Cruise Shipping" (2014)	*Curr. Issues Tour.*	42
5.	Eshtehadi, R. et al. "Robust Solutions to the Pollution-Routing Problem with Demand and Travel Time Uncertainty" (2017)	*Transp. Res. D. Transp. Environ.*	39
6.	Vaggelas, G.K.; Pallis, A.A. "Passenger Ports: Services Provision and their Benefits" (2010)	*Marit. Pol. Manag.*	30

No.	Author(s)/ Article Title/ Publication Year	Journal	TGCS
7.	Menegon, S. et al. "Addressing Cumulative Effects, Maritime Conflicts and Ecosystem Services Threats Through MSP–Oriented Geospatial Webtools" (2018)	*Ocean Coast. Manag.*	30
8.	Mali, M. et al. "Assessment and Source Identification of Pollution Risk for Touristic Ports: Heavy Metals and Polycyclic Aromatic Hydrocarbons in Sediments of 4 Marinas of the Apulia Region (Italy)" (2017)	*Mar. Pollut. Bull.*	27
9.	Diakomihalis, M.N. "Estimation of the Economic Impacts of Yachting in Greece Via the Tourism Satellite Account" (2008)	*Tour. Econ.*	26
10.	Grubesic, T.; Zook, M. "A Ticket to Ride: Evolving Landscapes of Air Travel Accessibility in the United States" (2007)	*J. Transp. Geogr.*	25

The adherence to the information within table **4** reveals the most impactful articles being the foundation and highly influencing the topic of strategic planning for maritime passenger transport.

Even though identifying the foundations of the topic of strategic planning for maritime passenger transport regarding where it stems from is essential, identifying future research directions regarding where it is heading is considered indispensable. Thus, the application of the key bibliometric term of TGCS/t revealed what articles are frequently cited on the basis of average cite frequency. The rate of cite occurrence enables to indicate an emerging future research direction in conjunction with the TGCS/t ≥ 2 exclusion criteria, resulting in the identification of 17 articles representing a sample size of the top 22.6% most frequently cited articles. Table **5** contains the top 10 most impactful scientific articles regarding the future research directions on the topic of strategic planning for maritime passenger transport based on the key bibliometric term of TGCS/t.

Table 5 The top 10 most impactful scientific articles regarding the future research directions on the topic of strategic planning for maritime passenger transport based on the key bibliometric term of Average Total Global Citation Score (TGCS/t). Source: Descriptively arranged by Author

No.	Author(s)/ Article Title/ Publication Year	Journal	TGCS/t
1.	Tzannatos, E. "Ship Emissions and their Externalities for the Port of Piraeus-Greece" (2010)	*Atmos. Environ.*	11.08
2.	Ferrario, J. et al. "Role of Commercial Harbours and Recreational Marinas in the Spread of Non -indigenous Fouling Species" (2017)	*Biofouling*	11.00

No.	Author(s)/ Article Title/ Publication Year	Journal	TGCS/t
3.	Eshtehadi, R. et al. "Robust Solutions to the Pollution-Routing Problem with Demand and Travel Time Uncertainty" (2017)	*Transp. Res. D. Transp. Environ.*	6.50
4.	Menegon, S. et al. "Addressing Cumulative Effects, Maritime Conflicts and Ecosystem Services Threats Through MSP–Oriented Geospatial Webtools" (2018)	*Ocean Coast. Manag.*	6.00
5.	Progiou, A.G. et al. "Air pollutant emissions from Piraeus port: External costs and air quality levels. 2021	*Transp. Res. D. Transp. Environ.*	5.50
6.	Gedik, S.; Mugan-Ertugal, S. "The Effects of Marine Tourism on Water Pollution" (2019)	*Fresenius Environ. Bull.*	5.25
7.	Bowen, C. et al. "Maritime Tourism and Terrorism: Customer Perceptions of the Potential Terrorist Threat to Cruise Shipping" (2014)	*Curr. Issues Tour.*	4.67
8.	Mali, M. et al. "Assessment and Source Identification of Pollution Risk for Touristic Ports: Heavy Metals and Polycyclic Aromatic Hydrocarbons in Sediments of 4 Marinas of the Apulia Region (Italy)" (2017)	*Mar. Pollut. Bull.*	4.50
9.	Storkersen, K.V. et al. "One Size Fits All? Safety Management Regulation of Ship Accidents and Personal Injuries" (2017)	*J. Risk. Res.*	4.00
10.	Vazques, R.M. M. et al. "Analysis and Trends of Global Research on Nautical, Maritime and Marine Tourism" (2021)	*J. Mar. Sci. Eng.*	4.00

The information within table **5** reveals the top 10 most impactful articles pivotal for identifying the future research directions regarding where the topic of strategic planning for maritime passenger transport is heading and how it is evolving. A thorough discussion of the entirety of the 17 most impactful articles is outlined in the upcoming section in order to address the main future research directions.

3   Future Research Directions and Discussion

The selected 17 articles representing a sample size of the top 22.6% most frequently cited articles on the basis of the TGCS/t ≥ 2 exclusion criteria are subjected to the VOSviewer bibliographic software program via keyword co-occurrence analysis matrix. VOSviewer enables the researcher to evaluate the strength of the co-occurrence relationship between article keywords by combining the graph-based and distance-based approach. This constructs a map in which the

graph-based approach represents the lines between the items to in-dicate relations, whereas the distance-based approach represents the distance between items to reflect the strength of the relation be-tween the items (Jan van Eck, Waltman 2010). Figure **2** represents a graphical depiction of the co-occurrence relationships between the keywords of the selected 17 articles in order to indicate the future research directions on the topic of strategic planning for maritime passenger transport.
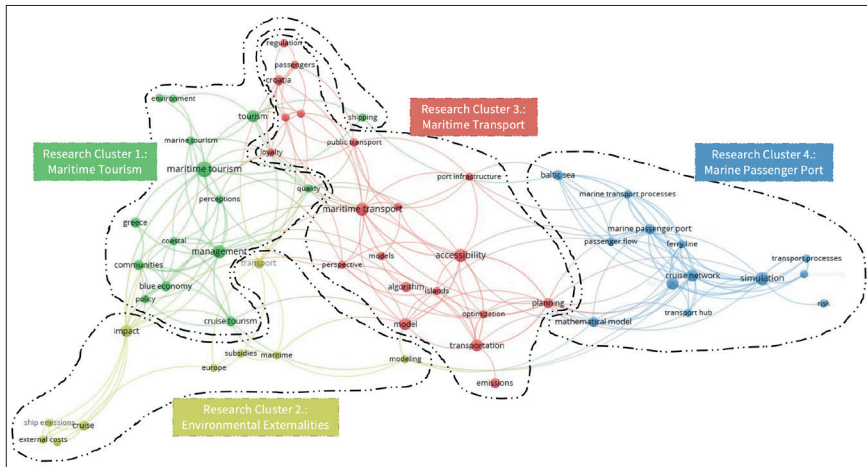

Figure 2   Keyword co-occurrence map regarding the future research directions on the topic of strategic planning for maritime passenger transport. Source: graphically arranged by the Author

The examination of figure **2** reveals that co-occurrence linkages are depicted by the lines connecting the nodes. The node size and the colour reflect the influence and distinction of the articles on the ba-sis of total global citation scores received. This creates the condi-tion to conduct a guided content analysis, which is a critical review of each article's title, author, journal, research question(s), theo-ry, data sources, variables, category and key findings (Bahoo, Alon, Paltrinieri 2020). The combination of the keyword co-occurrence map and the guided content analysis resulted in the identification and clustering of four distinct but interrelated future research direc-tions on the topic of strategic planning for maritime passenger trans-port: 1) maritime tourism, 2) environmental externalities, 3) mari-time transport, and 4) marine passenger ports.

3.1   Maritime Tourism

Tourism is highly perceived in policy creation regarding its function in fostering economic growth via employment generation and its potential in valorising natural and cultural assets. Gedik and Mugan-Ertugal (2019) state that sustainable tourism development is not feasible without considering the contemporary challenge of improving resource management in maritime and coastal areas. Their main contribution is prominent in showcasing constructive guidelines regarding the individual and economic agent approaches in interaction with the physical environment regarding the mitigation of unplanned tourist enterprises in coastal areas, waste/refuse problems, and marine vehicle effects on the coastal and marine ecosystems. Mali et al. (2017) centre their research on the maritime tourism segment and its close relationship with the physical environment in natural and anthropogenic interactions on a more detailed level. They determined the concentration levels of 10 metals, 16 PAH congeners, and main nutrients regarding pollution risk in four representative touristic ports of the Apulia region in Italy. Effects range-median quotient assessed the hazard degree while the principal component analysis indicating anomalous pollution trend.

3.2   Environmental Externalities

Environmental externalities are the economic result of unaccounted environmental impacts of production and consumption that affect enterprise cost and consumer utility outside the market mechanism. Carreño and Lloret (2021) address and rate the environmental impacts of passenger ships in Mediterranean coastal regions by their classification in different categories following a risk assessment matrix. High impacts include anchoring impacts on seagrass meadows, toxic antifouling products, motor noise disturbance, and transport of exotic species. Moderate impacts include air pollution, oil leaks, fuel leaks, and grey water discharge. Low impacts include black water discharge, marine litter, sediment resuspension, animal feeding, and artificial light emissions. Menegon et al. (2018) examine the cumulative effects, maritime conflicts and ecosystem services threats by utilisation of MSP-oriented geospatial webtools in the Northern Adriatic Sea. They apply cumulative effects assessment and maritime use conflict webtools to conduct a marine ecosystem service threat analysis. Their main research findings indicate that the anthropogenic activities of ports, fisheries, coastal and maritime tourism, and maritime shipping require the most effort in regional planning and resource management in order to preserve marine biodiversity.

3.3 Maritime Transport

Maritime passenger transport consists of a transportation mode encompassing the relationship between tourism aspects and marine-based travels. It indicates the role of passenger ships in the provision of sea crossings for tourist travel and where the maritime context is the focus of the tourist experience. Bowen, Fidgeon and Page (2014) highlight maritime terrorism as a neglected area of research in maritime tourism, specifically the utilisation of scenario planning to comprehend and assess potential threats to the cruise industry. They advance the notion that even though the fact of safety and security being the hallmark of cruising in the maritime passenger transport segment, cruise shipping companies are obliged to improve further safety and security aspects due to passenger resignation to the fact that risk is associated with maritime travel in the twenty-first century. Storkersen, Antonsen and Kongsvik (2014) address safety management regulation as an essential supplement to market forces to establish a sufficient safety level in high-risk industries such as the short sea shipping sector. They examine the peculiar fact of personal injuries experiencing a decrease while ship accidents experiencing an increase in occurrence in the period during which safety management regulation was implemented. The semi-structured interview of key maritime passenger transport stakeholders concluded that the negative consequences of regulation, such as proceduralisation, specifically influence the performance of safety-critical tasks, such as navigation in fairway channels and coastal areas. Thus, ship accidents have continued to increase regardless of the regulations aimed at improving safety.

3.4 Marine Passenger Port

Modern passenger seaports are value-adding nodes in global passenger flows networks characterised by preeminent maritime attributes and a functional and spatial clustering of port-related activities. Contemporary notions of seaport governance and management demand sustainable transitions in the seaport sector in terms of defining strategies and activities the seaport must undertake to meet the current and future needs of passengers while at the same time preserving human and natural resources. This is mainly prevalent in air pollution from ships in seaports due to the ships' direct effect on the human population and the built environment in many urbanised ports. Tzannatos (2010) applies an in-port ship activity-based emissions calculation methodology for manoeuvring and berthing coastal passenger ships and cruise ships calling at the passenger port of Piraeus. Research findings estimate that between 2008 and 2009

overall ship emissions in the Port of Piraeus reached 2,600 tons annually with evaluated externalities of €51 million. Further segmentation analysis reveals that coastal passenger shipping exceeds cruise shipping in terms of associated externalities share. Vaggelas and Pallis (2010) provide important insights on the ongoing sustainable transformation of passenger ports regarding the modern port product and the optimum interface of the public and private sector in the port industry. They employ a literature review and brainstorming sessions with experts along with the application of a modified Analytical Hierarchical Process in the 20 major European passenger ports. The research results provide a useful tool for formatting port policies in two sustainable pathways: 1) ex-post cost recovery "long-run marginal costs" pricing method, and 2) ex-ante "full distributed costs" method that stems from the share of the service output in the total output of the passenger ports.

4 Conclusion

The bibliometric analysis statistical research methodology is conducted to identify the origins of the topic of strategic planning for maritime passenger transport and to address its future research directions. The critical examination of the selected 75 articles from the ISI WoS database is performed on the basis of the key bibliometric terms of Total Local Citation Score (TLCS), Total Global Citation Score (TGCS) and Average Total Global Citation Score (TGCS/t). The maturity of the topic of strategic planning for maritime passenger transport is assessed via impact ranking of academic institutions, scientific journals, and articles. According to the TGCS, the University of Piraeus (Greece) is the most prestigious academic institution; Atmospheric Environment (Netherlands) is the most prominent scientific journal; and the most impactful article is from Tzannatos (2010). TGCS/t revealed four future research streams regarding the evolution of the topic of strategic planning for maritime passenger transport: 1) maritime tourism, 2) environmental externalities, 3) maritime transport, and 4) marine passenger port. TLCS indicated low levels of researcher collaboration along with research direction fragmentation. This further strengthens the claim that maritime passenger transport is an under-researched segment of the maritime industry within the academic community. Thus, future research on the topic should focus on researcher collaboration via the convergence of the four future research streams.

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