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EXAMINING PORT CITY DEVELOPMENT AS A STRATEGY TO ATTRACT CRUISE VISITORS

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ABSTRACT
The expansion of urban development and commercial centers within the geographical boundaries of ports and cities has significantly contributed to the growth of national income. However, maritime-based countries face the challenge of staying competitive in the dynamic port city landscape. To address these issues, this paper employs a bibliometric approach to review existing literature on port cities, identifies challenges faced by port cities as cruise visitor attractions, and proposes a new framework for their sustainable future in the maritime cruise industry. By analysing 73 journal articles through VoS Viewer and employing content analysis with NVivo 12 software. The outcome shows the utilising the hinterland effectively can help alleviate congestion in seaports and cities, leading to reduced air emissions from mobility services.

Introduction

A port city, situated along coastlines or rivers, serves as a pivotal gateway for maritime trade and commerce, providing docking facilities for ships to load, unload, and transport goods and people to diverse destinations (Selvaduray *et al*., 2022a; Selvaduray *et al*., 2022b; Selvaduray 2022c). Across history, numerous countries, including Turkey, Russia, New York, United Kingdom, Spain, China, Korea, and Japan, have thrived as centers of economic activity and cultural exchange (Lin, 2020). These port cities play a multifaceted role, facilitating the smooth movement of goods, acting as tourism and leisure hubs, and significantly contributing to global trade and economic development in today's interconnected world. By serving as transportation hubs, industrial centers, and trade gateways, they generate employment, tax revenues, and overall economic growth. Embracing sustainable practices, many port cities focus on reducing their environmental impact through investments in renewable energy, emissions reduction in shipping, and promoting sustainable tourism (Bozdag, 2022).

In addition to their economic significance, port cities foster cultural exchange, drawing tourists and business travellers from all corners of the world (Ren & Li, 2015; Selvaduray *et al*., 2018). Given their essential role in international trade and economic development, port cities are expected to remain integral to the global economy for years to come.

With the global cruise industry expanding rapidly, understanding the potential benefits and challenges of port city development as a strategy for attracting cruise visitors is crucial. This research will contribute to enhancing the knowledge base for urban planners, policymakers, and stakeholders involved in the tourism and maritime industries, enabling them to make informed decisions that foster sustainable economic growth and tourism development.

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Current Development of Port Cities: A Review of Literature

China stands out as one of the countries that have made substantial investments in port city development, particularly in the southern coastal regions. Cities like Shanghai, Shenzhen, Guangzhou, and Tianjin have undergone significant infrastructure development (Su & Qi, 2020). Singapore, despite being a small island nation, has also made remarkable strides in developing its port infrastructure, transforming it into one of the busiest and most efficient ports globally. The Port of Singapore serves as a major shipping hub in Southeast Asia, earning it the reputation of a prominent port city (Brunero, 2019).

Jeddah, a renowned city in Saudi Arabia, located on the Red Sea coast, has a large population of 3.4 million people heavily invested in port city development. These cities serve as crucial trade and commerce hubs in the Middle East, with Jeddah positioning itself as a key player in the global maritime industry (Bafageeh *et al*., 2022). Busan, South Korea's second-largest city, is another major international port city that has witnessed significant development in its port facilities, including the establishment of the Busan New Port and the growth of port-related industries, aimed at bolstering its position as a global logistics hub and enhancing economic competitiveness (Lin, 2020; Jeong *et al*., 2020).

The perspectives on port cities vary depending on the country and its specific goals and priorities. However, most countries recognize port cities as crucial components of their economic infrastructure and invest in their development to drive growth and increase competitiveness in the global marketplace, leading to various monetary benefits, such as job creation, increased trade, and enhanced access to international markets. Nonetheless, it is essential to acknowledge and address potential problems that may arise now or in the future. In light of this, this research aims to review existing literature on port cities using bibliometric approaches. Additionally, it seeks to identify the challenges faced by port cities as attraction destinations for cruise visitors and proposes a new framework to ensure the sustainable development of port cities in the maritime industry.

The paper is structured as follows; Section 1 provides an overview of the research topic, its significance, and the key research aim of port cities and cruise tourism. In Section 2, the literature review explores existing research on port city development, cruise tourism, and their interactions, identifying gaps and forming the study's foundation. Section 3 outlines the methodology for conducting bibliometric analysis to uncover trends, influential authors, and key concepts related to port cities and cruise tourism. Section 4 presents and discusses findings from the bibliometric analysis, highlighting patterns, themes, and research focal points. Building on these results, Section 5 offers a nuanced discussion and proposes a novel framework for cruise-tailored port city development, integrating literature insights and analysis outcomes. Finally, Section 6 encapsulates the study by summarising contributions, implications, and recommendations, while also reflecting on the research aim's alignment with initial objectives and suggesting future avenues for research in the dynamic realm of port cities and cruise tourism.

Methodology

In this study, bibliometric analysis techniques along with the VoS viewer software served as the primary data mining tools. The data mining results were extracted using content analysis and subsequently coded utilizing the latest version of Nvivo12 software, aligning with the objectives of the research. Specifically, NVivo 12 was employed for tasks such as text searches, word frequency counts, and generating word clouds. On the other hand, the VoS viewer software was utilised to effectively visualize and comprehend the connections among authors, keywords, institutions, and articles.

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Bibliometric Analysis

Bibliometric analysis has found widespread application in various fields, including social science, medicine, psychology, and maritime studies (Ellegaard *et al*., 2015; Moral *et al*., 2020; Jeevan *et al*., 2021; Selvaduray *et al*., 2022b). One of the primary strengths of bibliometric analysis lies in its ability to present results in a numerical and statistical format. As described by Moral *et al*. (2020), bibliometric analysis is a literature review methodology that involves statistically and quantitatively, analysing published studies. This type of analysis encompasses various aspects, including a descriptive analysis of authors, journals, universities, countries, and keywords. The choice to employ bibliometric analysis in this paper stems from its reliability and consistency compared to other methods of literature review (Ellegaard *et al*., 2015; Van *et al*., 2018). According to Selvaduray *et al*. (2022b), bibliometric analysis typically involves nine distinct steps:

Step 1: Define the Scope of Research

Coastal areas serve as important hubs for a wide range of connections between land and marine activities, particularly through water transport facilitating various maritime business activities, including ports and cities (Selvaduray *et al*., 2022c). To obtain comprehensive results, a bibliometric analysis approach is essential to narrow down and specify the sub-sector under investigation. Port and city development strategies represent one of the world's fastest-growing initiatives for numerous oceanic nations, and they significantly contribute to the national income as a major economic driver (Selvaduray *et al*., 2022c). This research specifically focuses on the development of port cities to enhance cruise tourism.

Step 2: Determine the Search Database Platform

Scopus and Web of Science (WoS) are reputable scientific research platforms equipped with reliable databases and a diverse array of search filters (Ferreira *et al*., 2023). Being among the largest databases of abstracts and citations from peer-reviewed literature, they encompass thousands of journals published by various publishers worldwide (Smith *et al*., 2023). Due to their extensive coverage of academic articles, they are widely utilised as databases for literature searches (Ortega *et al*., 2023). To ensure comprehensive and meaningful results, this paper has employed bibliometric analysis by integrating two distinct databases: Scopus and Web of Science (De Oliveira *et al*., 2019).

Step 3: Explore the Search Criteria

The selection of search criteria is usually guided by the research objectives. In line with the nature and purpose of this paper, several relevant keywords were extracted from previous studies to ensure more robust outcomes. The search string strategies employed for the Scopus and Web of Science (WoS) databases are presented in Table 1 below.

Table 1: Search string strategies used on the Scopus and WoS databases

No	Keywords Search			No. of Articles (Scopus)	No. of Articles (WoS)
1.	'Port City'	AND	Cruise	57	21
2.	'Port Cities'	AND	Cruise	0	27
3.	'Maritime City'	AND	Cruise	1	0
4.	'Maritime Cities'	AND	Cruise	0	0

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5.	'Seaport City'	AND	Cruise	1	0
6.	'Seaport Cities'	AND	Cruise	0	1
		Total		***59***	***49***
		After removing duplicates		***58***	***42***
		Total from both databases			***100***
		Remove duplicate after combing both articles			***73***

Step 4: Define, Review, and Save

In this study, a focus was placed on examining the recent 5 years of data to explore current changes over time. To ensure the quality of the outcomes, book series, books, chapters, and conference papers were excluded from the analysis (Jin *et al*., 2023). Additionally, only English-language articles were considered in the search process to minimize confusion and translation difficulties (Samiee & Chabowski, 2012; Jia *et al*., 2020). The inclusion criteria utilised in this research are summarised in Table 2 below:

Table2: Summary of Inclusion Criteria

No.	Inclusion Criteria	
1.	Access Type	All
2.	Years of Publications	5 Years (2018 – 2023)
3.	Subject Areas	Social Science, Business and Management, Maritime and Logistics
4.	Document Type	Article
5.	Publication Stage	Final
6.	Source Type	Journals from Scopus and WoS
7.	Language	English

Step 5: Export the Data

Various export options in different file formats are available on scientific platforms. Among these options, the comma-separated values (CSV) format is deemed the most suitable for bibliometric data analysis in VoS viewer. This format facilitates uninterrupted analysis, making it a preferred choice (Tigre and Henriques, 2023).

Step 6: Import Data

For researchers engaged in bibliometric analysis research, VoS viewer is a highly recommended open-source software with a free license. By utilizing VoS viewer, scientific databases become more accessible and manageable, offering numerous benefits to researchers (VOS, 2023).

Step 7 Bibliometric Data Analysis

The findings from the bibliometric analysis presented in this paper offer researcher's valuable insights into previously unexplored aspects, notably the integration of port cities with cruise tourism. Six main types of bibliometric analysis were employed in this study: (1)

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the evolution of publications, (2) keywords, (3) countries, (4) authors, (5) articles, and (6) institutions (Tigre and Henriques, 2023; Jin *et al*., 2023). Table 3 below provides a detailed explanation of the bibliometric data analysis methods utilised in this research:

Table 3: Type of bibliometric data analysis

No.	Type of Bibliometric Data Analysis	Explanation
1.	Evolution of publication	Allows to track the contribution of different groups or themes to the state-of-the-art over many years of research.
2.	Keywords	Able to identify the main research areas in various scientific fields and to provide a succinct summary of a text, allowing readers to gain a better understanding of the research.
3.	Countries	Research articles based on specific nations can demonstrate research collaboration and illustrate how different entities can share scientific knowledge.
4.	Authors	Helps to identify experts who frequently publish papers on a specific subject matter.
5.	Articles	Dedicated to answering the purpose of this paper.
6.	Institutions	The institutional analysis can identify institutions that consistently conduct research in a particular field, demonstrating their capacity to exchange scientific knowledge and collaborate with other entities.

Source: Selvaduray *et al*. 2022b

Step 8: Analyse and Review the Selected Articles

In this step, the three objectives are pursued by conducting content analysis and utilizing the NVivo 12 coding process. Since the data may not be explicitly stated in the text, identifying gaps could be challenging. Hence, the researcher's experience and familiarity with the subject are crucial in accurately detecting these implicit gaps. Researchers with extensive maritime experience can better comprehend the content, leading to more precise and understandable results for this paper with the assistance of NVivo 12.

Step 9: Conclusion

Finally, it is important to note that the results and new framework obtained through bibliometric analysis are justified. Figure 1 depicts the bibliometric analysis methodology used in this paper.

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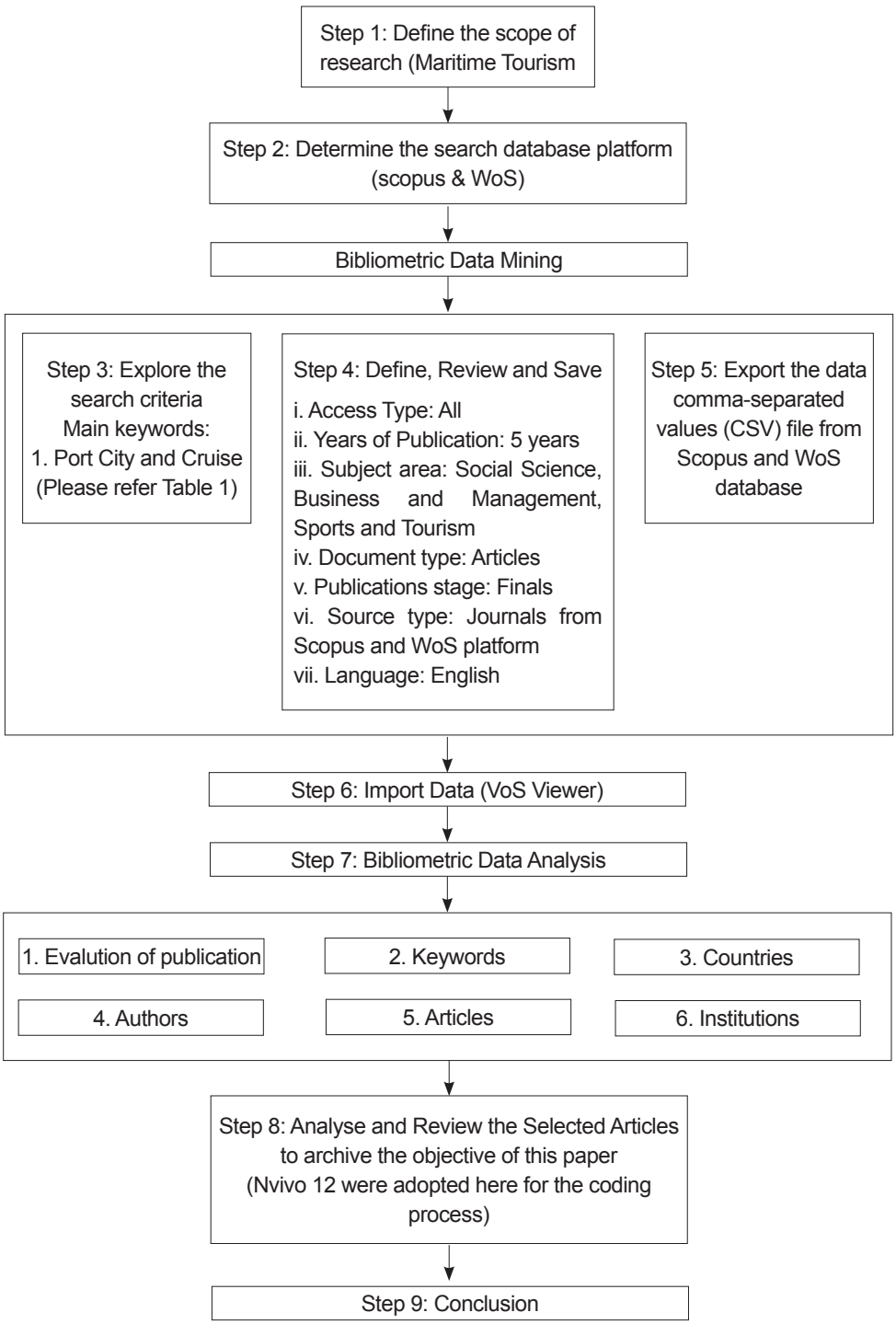

Figure 1: Flow for the Bibliometric analysis
Source: Adapted from Selvaduray *et al*. 2022

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Results

Once the articles were collected from the two different databases using the search strategy outlined in Table 1, the subsequent step involved merging the datasets and removing any duplicates. This essential process ensures that the same article is not analysed multiple times, thereby safeguarding the validity of the results. Table 1 provides a comprehensive overview of the search strategy utilised, along with the number of articles obtained from each database. Ultimately, a total of 74 unique articles were selected after the removal of duplicates. These 74 articles were then subjected to bibliometric analysis techniques to achieve the research objectives of the study. The final number of articles chosen for analysis holds significant importance as it directly influences the validity and reliability of the study's findings.

Evolution of Publications of Scopus and WoS

As depicted in Figure 2, the number of publications from the Scopus and WoS databases is illustrated over 5 years, from 2018 to December 2022, as explicitly indicated in Table 1. The results reveal that a majority of the research on port cities was concentrated in the initial phase, followed by a decline towards the end of the 5 years. This observation underscores the necessity for additional research in the field of port cities, as emphasised by this paper.

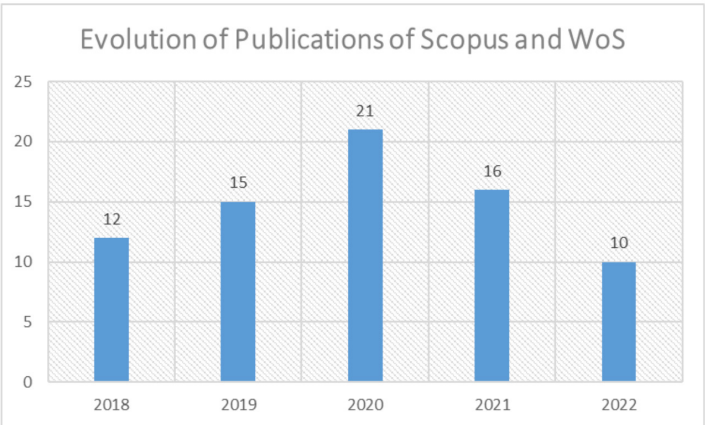

Figure 2: Evolution of Publications of Scopus and WoS
Source: Authors based on Excel view output

Keywords on the Port Cities and Cruise in Scopus Databases

Figures 3 provide a visual representation of the most frequently utilised keywords within the research scope. Notably, the figure below distinctly showcases that cruise tourism, tourism, port, and shipping are highly relevant to port cities development. While keywords related to tourism were prominently featured, it is noteworthy that sustainability and environmental concerns were also considered. This highlights the significance of sustainability as a pioneering element across various sectors.

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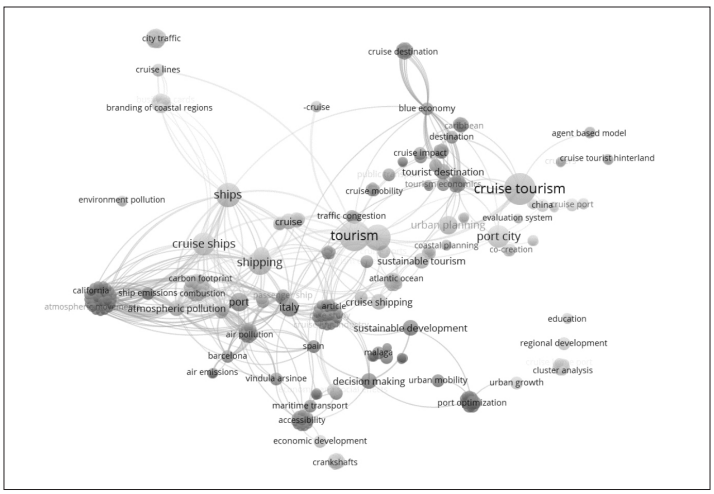

Figure 3: Keywords of port cities in Scopus database
Source: Authors based on VoS view outputs

Countries on the Port City and Cruise in Scopus and WoS databases

The research examined countries that have conducted studies on port cities development in the Scopus and WoS databases. However, it was observed that there is a dearth of research in this area. Figures 4 and 5 indicate a growing interest among countries in exploring port cities development. Notably, the United States and United Kingdom (England) are actively engaged in rigorous research on port cities development, aiming to unveil the potential benefits associated with this type of development.

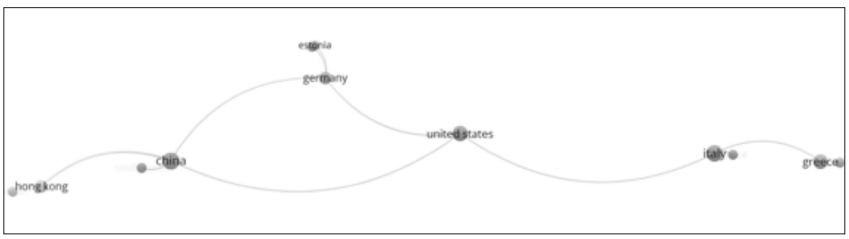

Figure 4: Countries that started to develop port cities on the Scopus database.
Source: Authors based on VoS view outputs

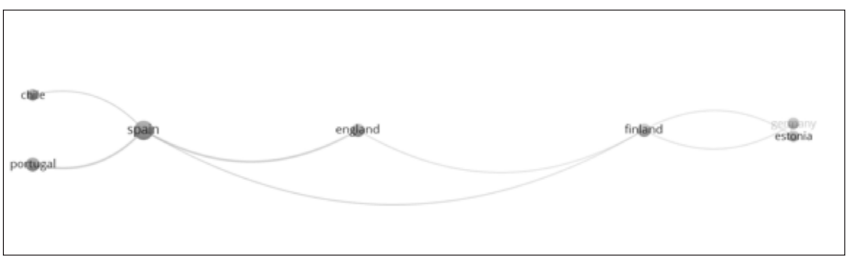

Figure 5: Countries that started to develop on port cities on the WoS database
Source: Authors based on VoS view outputs

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Author collaboration on the Port City and Cruise in Scopus and WoS databases

Figures 6 and 7 illustrate the leading authors who have delved into port cities development, and the connections depicted in both figures indicate their collaboration and shared expertise in this particular field. Additionally, the figures showcase those international connections, as evident in WoS, yield greater benefits compared to those observed in Scopus.

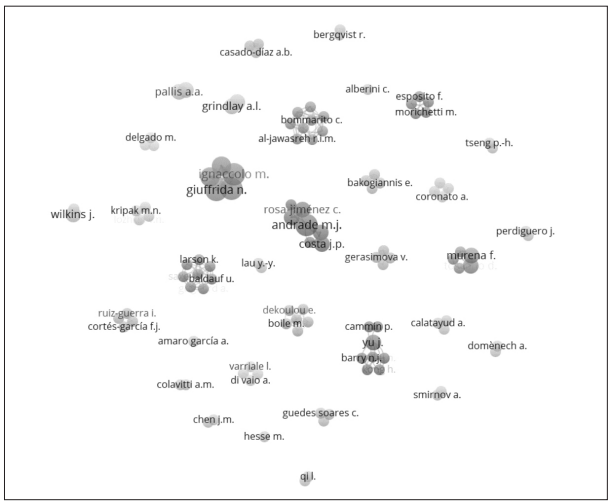

Figure 6: Collaborations among authors on the Scopus database
Source: Authors based on VoS view outputs

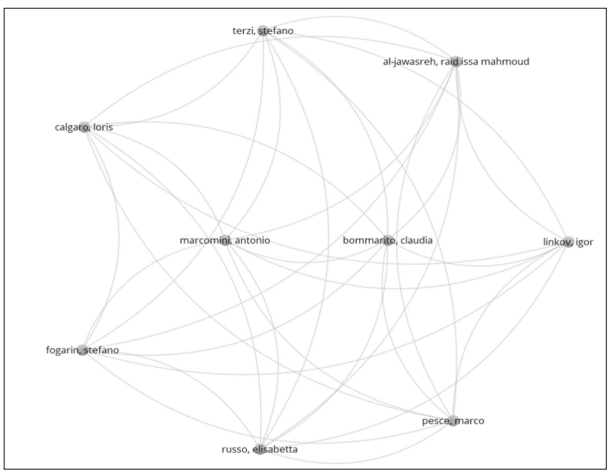

Figure 7: Collaborations among authors on the WoS database
Source: Authors based on VoS view outputs

Productive Institutions on the Port City and Cruise in Scopus and WoS Databases

As seen in Figures 8 and 9, each institute is keen on advancing its studies on port cities and has begun to explore this area further. The reason behind this enthusiasm lies in the potential contributions of port cities to a country's GDP. Governments should take a

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proactive approach in identifying the actual benefits and potential threats, and how these factors impact the income of the maritime industry or national income as a whole. Lastly, researchers who have recently embarked on studying, the maritime sector may find it beneficial to consult and seek guidance from experts within these institutions, as the information they acquire from such sources is likely to be more significant and dependable.

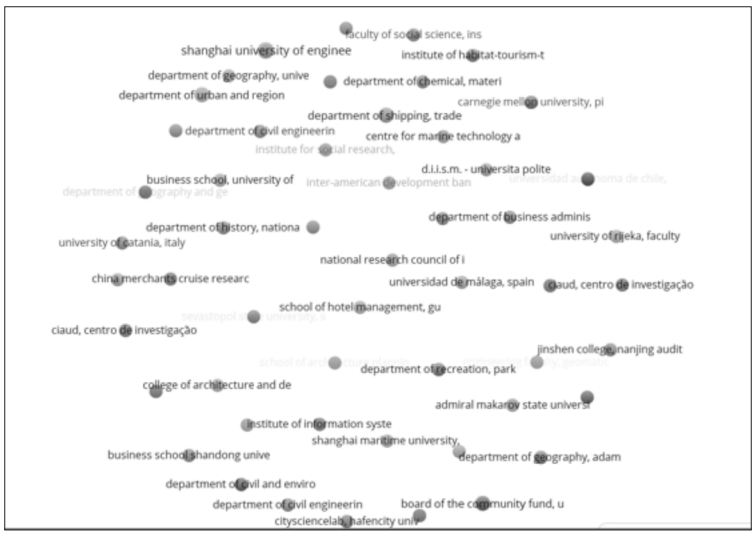

Figure 8: Productive institutions researched on the Scopus database
Source: Authors based on VoS view outputs

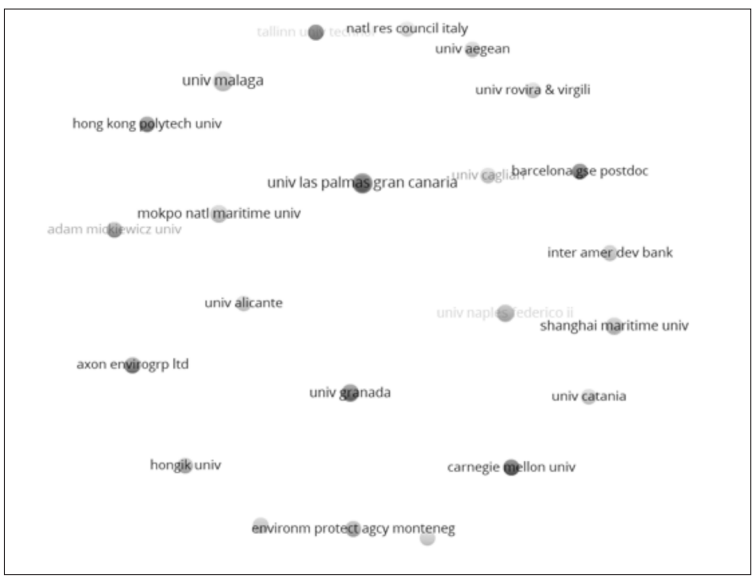

Figure 9: Productive institutions researched on the WoS database
Source: Authors based on VoS view outputs

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Results of the Analysis and Review of the Selected Articles

This research examined a total of 73 articles to accomplish its research objectives, which were as follows: (a) to conduct a bibliometric review of existing literature on port cities, (b) to identify the challenges faced by port cities as attractions for cruise visitors, and (c) to propose a new framework for the future development of port cities to sustain the maritime industry. The data was analysed using content analysis and coded with the aid of NVivo 12. In this study, concepts extracted from the original data were coded and further developed in terms of their properties and dimensions, following the methodology outlined by Corbin and Strauss (2008). The findings obtained through NVivo 12 were included in Figures 10 and 11, and a summarised outcome was presented in Table 4 at the end of the section.

Current Problems

Based on the research outcomes, port cities currently face 21 major problems. Among these challenges, issues such as congestion, urban traffic, and poor management of cruise shipping traffic pose significant difficulties due to the pressures of touristification and overcrowding (Grindlay & Martinez, 2022). Cruise tourism contributes to crowding, leading to increased city traffic, overloaded public transportation, and discomfort for residents (Navarro *et al*., 2020; Coronato *et al*., 2021). Another significant problem is cruise ship emissions, which can have adverse environmental effects (Tascano *et al*., 2021). Lack of proper planning can exacerbate these issues (Ji *et al*., 2021), whereas some post-industrial cities have successfully reopened their ports while maintaining port activity and gaining approval from residents (Alberini, 2021). On the other hand, smaller ports often struggle with poor planning concepts (Santos *et al*., 2021; Di *et al*., 2021).

The relationship between ports and cities is complex, influenced by recent changes in maritime transport, traffic volumes, and port infrastructures (Giuffrida *et al*., 2020). The coexistence of various activities offers great potential for transformation and economic growth, but it also generates several externalities impacting the urban mobility system and safety (Ignaccolo *et al*., 2020; Cui, 2020). However, the benefits from the cruise market are not always equally balanced within cities, as tourists tend to spend most of their money on board, limiting the overall benefits for cities and ports (Bartlomiejski *et al*., 2020; Lopez *et al*., 2020).

The cruise industry is facing environmental challenges, particularly related to air pollution (Lozhkin, 2020; Ignaccolo *et al*., 2020). Ships emit atmospheric pollutants, such as NOx, SOx, PM, and VOCs, during manoeuvring in ports, arrival or departure, and while moored at wharves, significantly impacting air quality and the environment (Perdiguero, 2020; Ruiz *et al*., 2019).

Managing cruise tourism in historic cities presents a major challenge for some nations due to the lack of jurisdiction over port operations, which are typically run by state or national port authorities. Cruise tourism also has a negative impact on local communities, with cruise destinations often being neglected (Ignaccolo *et al*., 2019; Lau & Sun, 2020). In many cases, strong car dependency and the neglect of public facilities contribute to air pollution (Bakogiannis *et al*., 2018; Pesce *et al*., 2018; Gagic *et al*., 2022). Furthermore, port expansion toward deeper waters and the subsequent increase in traffic flows have further exacerbated the aforementioned problems (Chen *et al*., 2018; Chen & Nijkamp, 2018; Tovar *et al*., 2019; Spengler & Tovar, 2021).

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The issue of atmospheric pollution from transportation is particularly prominent in dense hub port cities, impacting air quality conditions (Progiou *et al*., 2021; Salleh *et al*., 2023). Emissions from ships at berth significantly contribute to atmospheric pollutants in densely populated urban areas, further worsening air quality conditions in port cities. Additionally, ship gas emissions pose a threat to the health of coastal residents, particularly during high ship speeds when leaving or arriving at the port (Wu & Im, 2021b).

Current Solutions

Numerous research studies have embraced Industrial Revolution (IR) 4.0 intelligence techniques to address various challenges related to port cities and cruise tourism. Big Data has been utilised to estimate the impact of cruise activity on congestion in port cities, while crowdsourced mobility platforms and GPS devices have been employed to identify areas in the road network that require traffic flow improvements. Researchers have also used temporal dynamics to identify traffic flows and ease congestion (Ruiz *et al*., 2019; Salleh *et al*., 2020; Coronato *et al*., 2021; Calatayud *et al*., 2022; Grindlay & Martinez, 2022; Selvaduray & Bandara, 2023).

Deep Reinforcement Learning has been applied to plan onshore touristic itineraries and intelligently distribute cruise passengers within a city, contributing to strategic aspects of cruise lines' itinerary planning (Chen & Nijkamp, 2018; Ji *et al*., 2021; Jeevan *et al*., 2023). Moreover, optimizing cruise travel routes based on wireless communication networks and genetic algorithms has been studied concerning economic development (Ji *et al*., 2021). Novel e-marketplaces are being designed to facilitate direct connections between cruise companies and local producers, streamlining transport and logistics processes (Sdoukopoulos *et al*., 2021; Ngah *et al*., 2022).

The International Maritime Organization (IMO) has introduced decarbonization targets for the shipping sector until 2050, emphasizing the need for shipping companies to adopt sustainability priorities and environmental regulations beyond international requirements (Toscana & Murena, 2019; Di Vaio *et al*., 2021; Olaniyi *et al*., 2022; Bozdag, 2022). Port-based strategies have been explored to improve environmental performance and promote sustainable solutions in large urban areas (Ignaccolo *et al*., 2019; Supersudaca *et al*., 2020; Gonzalez & Bergqvist, 2020).

The use of the Walkability Comprehensive Index has been employed to evaluate the quality of facilities near port areas, considering accessibility, level of service, and places of interest for visitors entering the city from the port (Giuffrida *et al*., 2020). The Avoid-Shift-Improve approach and Port City Model (PCM) are utilised in agent-based simulations to enhance port city development in planning (Bu *et al*., 2020; Ignaccolo *et al*., 2020; Cui, 2020).

Establishing positive alliances between cruise port cities and implementing a multi-turnaround cruise chain cruising strategy present significant opportunities (Lin, 2020). Innovative strategies like the 'T-type' approach have been applied in various destinations to provide comfortable route strategies for diverse tourist groups (Sun, 2020). Initiatives such as the 'One Belt and Road' are reshaping the cruise economy and improving specialised cruise material supporting systems (Yan *et al*., 2020; Su & Qi, 2020; Ignaccolo *et al*., 2020; Lau & Sun, 2020).

Launching a Bike Sharing System (BSS) has been perceived as an excellent tourist attraction and a smart policy that can benefit the local economy (Bakogiannis *et al*., 2018).

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Urban integration agreements between municipal and port authorities have been drafted to address sustainable traffic management and new mobility flow demands (Chen *et al*., 2018; Tovar & Tichavska, 2019). Ensuring effective regulation for vessel compliance and enforcement adequacy despite geographic jurisdiction differences is crucial (Boji *et al*., 2022).

Addressing air quality degradation, particularly in traffic-dense port areas, has been the focus of several studies. Green policies, such as local emission control areas, Vessel Speed Reduction (VSR) programs, and cold ironing, have been proposed and simulated to mitigate the impact (Progiou *et al*., 2021). Policies like Emission Control Areas (ECA) have been suggested to mitigate marine atmospheric pollution and protect coastal residents' health in densely populated port cities (Woo & Im, 2022b).

Current Outcome

The development of port cities is leading to increased job opportunities for older women and providing additional income (McWay, 2022). It also fosters the growth of infrastructure supporting cruise tourism, leading to more sustainable urban and port planning. This development facilitates improved transport routes for different-age cruise passengers and promotes enhancements in public transport infrastructure on specific routes (Alberini, 2021; Jeevan *et al*., 2020; Yan *et al*., 2020; Yu *et al*., 2022).

The "Belt and Road" strategy has promoted cooperation between international cruise port cities and regions (Su & Qi *et al*., 2020). This development has facilitated the improvement of cruise terminals, paving the way for the cruise tourism industry to adopt more sustainable models in the long term (Ruiz *et al*., 2019; Lau & Sun, 2020). Previous research studies have proposed various solutions, guiding to transport and urban planners, local and port authorities, and decision-makers in port city planning. These solutions identify criticalities and propose measures to enhance the non-motorised accessibility and sustainability of port systems and urban areas (Ignaccolo, 2019). Furthermore, planning efforts have been directed at improving sustainable mobility patterns for citizens and visitors in places like Piraeus (Bakogiannis *et al*., 2018).

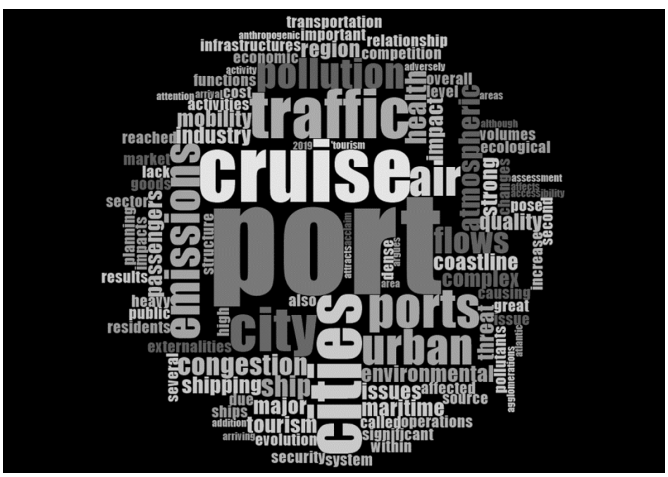

Figure 10: Summary of Word Cloud from NVivo 12

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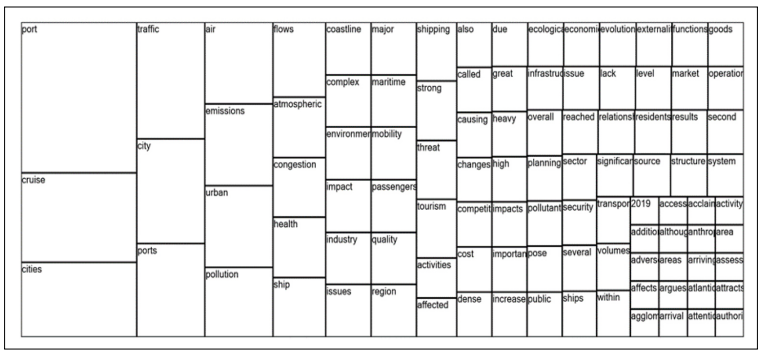

Figure 11: Summary of Word Tree from NVivo 12

Table 4: Summary of the outcome from 73 selected articles

Current Identified Problem	Overall Impacts of the Problems	Overall Suggested Solutions from Literature Review	Overall Current Outcome
1. Congestion at the port during embarking and disembarking. 2. Congestion in the city while visiting. 3. Air pollution from the cruise vessels and local vehicles 4. Unforeseen factors such as COVID-19, other diseases 5. Touristification also known as crowding. 6. Great competition to be a destination (competitiveness of cruise ports) 7. Lack of relevant planning on the port expansion 8. Limitations in smaller ports 9. Lack of overall planning for waste of resources management 10. Evolution of maritime transport, traffic volumes, and port infrastructures 11. Accessibility, security, and safety issues on the mobility system	• Traffic peaks impacted the management of urban mobility in port cities, and this created a major difficulty in the city-port relationship. • Overloading of public transportation means discomfort generated for residents. • Heavy traffic in cruise shipping • Complex daily activities at the port. • An increase in traffic flows has served to exacerbate the above problems. • Pose a threat to the ecological structure of the coastline. • Threatening its natural protected areas • A complex of functions and interactions with the city sharing its commercial, recreational, tourist, cultural, and urban spaces and places for leisure. • Slowing down the port operation.	• Using Big Data to estimate the impact of cruise activity on congestion in port cities. • Using Crowdsourced Mobility Platforms and GPS devices to identify the congestion area. • Initiate a conservation development planning zone. • Identify key areas in the road network that need traffic flow improvement. • Ease the congestion according to the temporal dynamics of traffic flows. • Improve the local environmental regulations. • The 'Belt and Road' developing strategy has promoted cooperation between international cruise port cities and regions.	• Job opportunities for older women • Improved employment prospects • Able to provide a flexible public transport infrastructure in specific transport routes. • More development of infrastructures supporting facilities can support the growth of cruise tourism and can represent a trigger for more sustainable urban and port planning. • Improving the social and economic growth of tourist port cities • Enabling the government to avoid regional conflicts and achieve win-win regional development. • Able to compete with new development done by other countries and gain the participating opportunity in the development of the Asia-Pacific cruise economy and cooperation of cruise port cities.

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12. The level of ports in developing cities is still poor.	• ntroducing a novel e-marketplace that is being outlined, cruise companies can directly connect with local producers and suppliers and place their orders.	• Improve the port's revenue and enhance any port as a tourism attraction center.
13. Redistribution of the sources within the cities and port is not equally balanced.	• Plan an appropriate promotion of public policies that focuses on sustainability.	• For the cruise tourism industry to develop more sustainable models in the long term.
14. Harbors are complex sociotechnical systems.	• Developing a Deep Reinforcement Learning based planner for the onshore touristic itineraries and the intelligent distribution of cruise passengers in a city.	• Providing a guide to transport and urban planners, local and port authorities
15. Cities and ports only benefit from it to a small extent as tourists spend most of their money on board.	• Planning to optimize the design of cruise travel routes based on wireless communication networks and genetic algorithms.	• Decision-makers in port city planning, identifying criticalities and solutions to enhance the non-motorised accessibility and sustainability of the port systems and urban areas.
16. A mismatch between different vehicle flows (of goods, citizens, cruises, passengers, private cars, and heavy vehicles)	• International Maritime Organization (IMO) introduces decarbonisation for all sectors till 2050 and has further shifted attention to the activities and policies that shipping companies adopt and implement not only for complying with international regulations but moving beyond.	• Improving citizen's and visitors' sustainable mobility patterns in a city
17. Difficult to manage historic cities which has no jurisdiction over the operations of the port, (unclear authorities - state or national port authority)	• Pre-plan the urban development plan and industrial development plans	• Introducing a new port configuration also attracts important flows of people linked to the cruise sector, passenger traffic, and tourism.
18. Unplanned activities result in overlapping and intersecting flows of freights/ passengers.	• Developing a set of measurable and operable classification development model evaluation systems is developed for the new entrants.	• Inducing a great potential for transformation and strong changes in the urban economy
19. Strong car dependency (not a user-friendly public transport)	• IWalkability Comprehensive Index to evaluate the quality of facilities in proximity to port areas.	• Speed up the improvement of the specialised cruise tourism industry.
20. High ship speeds when leaving or arriving at the port.		• Playing a key role as intermediaries and knowledge brokers
21. Threat to coastal residents' health		• Seamless information may also provide benefits concerning improving transport and logistics processes.

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	• Develop a Port City Model (PCM) project and Avoid-Shift-Improve approach. • Using an Agent-Based simulation to model flows and routes linking. • Introducing a multi-turnaround cruise • Expansion of the total number of cruises shall be achieved through the alliance between the cruise port cities. • Development strategies for the diversification of cruise route themes and the differentiation of cruise port circles as well as the differentiation of onboard services. • Adopting a 'T-type' strategy, the destination less route strategy, the comfortable route strategy for the young and old, and the multi-point tourism shopping strategy • Focusing on effective regulation for vessel compliance and enforcement adequacy in despite of geographic differences in jurisdiction • Suggesting and simulating an applicable green policy in the practice • Developing a local emission control area • Initiating vessel speed reduction program and application of cold ironing • Exploring strategic aspects of cruise lines' itinerary planning and model the determinants of their lengths of stay in ports, based on extensive observations of network data.

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		• Planning on urban integration as outlined in an agreement between the municipal and port authorities that was drafted in an urban plan. • Proposal for sustainable traffic management concerning the new demands of the expected mobility flows • Developing a calculation method for monitoring and predicting the negative impact of emissions from vehicles, sea and river vessels • Establishment of a national integrated emission platform. E-combination of the three first policies could help reduce the significant volume of emitted CO. • A framework of responsible cruise tourism, including non-profit organizations, governments, cruise passengers, local communities, and cruise liners is proposed. • Port-based strategies that improve environmental performance and promote sustainable solutions for combating climate change in the context of large urban areas. • the promotion of cycling has been decided, by launching a Bike Sharing System (BSS)

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Discussion

Figure 12 presents a novel framework for the future direction of port cities to ensure the sustainability of the maritime industry. While previous research has extensively explored and proposed solutions for existing problems, the focus on sustainability remains crucial. Interestingly, none of the past research appears to have explored the potential of utilizing dry port areas, also known as hinterland areas, to mitigate congestion and other challenges. From a seaport perspective, the hinterland refers to the area encompassing businesses engaged in import and export activities. It serves as a vital link between the seaport and the cities, facilitating inland transport and passenger stations that enhance transport quality of service providers' operational efficiency. This framework emphasizes enhancing seaport services, hinterland accessibility, applying IT in transportation networks, and establishing vertical integration in the supply chain. Effectively utilizing the hinterland can alleviate congestion in the seaport and city, thereby reducing air emissions from mobility services. The desired outcome of this research is to incorporate the advantages of hinterlands, inlands, and dry ports for future developments, ultimately creating a 'Sustainable Maritime Tourist-Based Community'. By leveraging these potential benefits, the framework aims to ensure a sustainable and thriving future for port cities and the maritime industry.

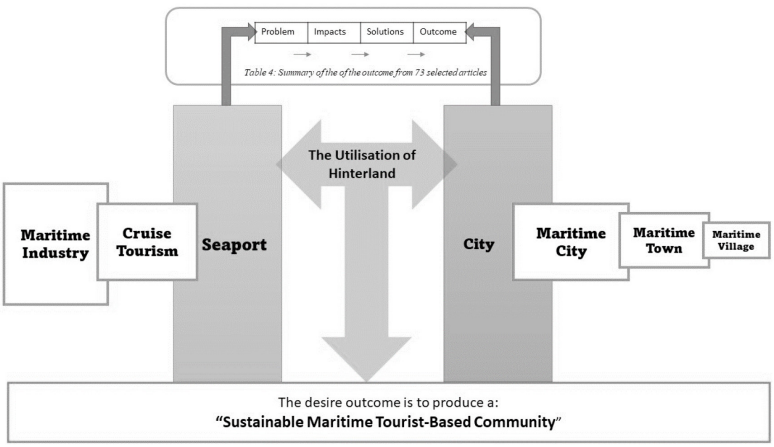

Figure 12: New framework for the future direction of port cities to sustain the maritime industry

The symbiotic relationship between port cities and cruise tourism presents economic prospects and challenges. Integrating Environment, Social, and Governance (ESG) principles can align development with sustainability. Balancing economic growth and ecological responsibility demands collaboration among stakeholders. ESG strategies, from waste management to cultural preservation, can harmonise prosperity and environmental consciousness in port city cruise tourism, fostering responsible progress. ESG integration addresses environmental impact, socio-cultural preservation, and transparent governance in port city cruise tourism. Striking a balance between economic growth and sustainable practices is paramount. Collaborative efforts among stakeholders, including governments, cruise operators, and communities, are essential for realising responsible and enduring development in these dynamic urban centers.

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Conclusion

In conclusion, the development of port cities holds significant importance for maritime nations, offering numerous benefits to their local and national economies. Port cities serve as vital centers for cruise tourism, international trade, and commerce, providing countries with opportunities to participate in the global economy and access worldwide markets. This, in turn, attracts investments and generates employment opportunities, contributing to economic growth and development. Despite the challenges that may arise, these issues can be addressed through thorough research and proper planning. Additionally, port cities play a crucial role in supporting various industries such as manufacturing, agriculture, and tourism by providing essential infrastructure for the transportation of goods and people. This infrastructure also enables efficient resource movement, which is critical for disaster relief and emergency response efforts.

Furthermore, incorporating the development of hinterland areas between seaports and cities can have positive economic and social impacts on the surrounding regions. For instance, increased economic activity resulting from seaport and hinterland development can create jobs and boost local businesses. Improved connectivity and accessibility can also lead to increased tourism and cultural exchange, further enhancing economic growth and social development. Considering the significance of hinterlands, policymakers, and stakeholders must continue prioritizing and investing in their development to ensure the long-term success and sustainability of port cities and their hinterlands, ultimately contributing to the establishment of a 'Sustainable Maritime Tourist-Based Community'. By doing so, these regions can thrive and contribute to the overall prosperity and progress of the maritime industry and the nations they belong to.

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