# A Bibliometric Analysis of Maritime HR Competitiveness Research

**Nirmeen Elsayed [(1)i], Mahmoud Hamza [(2)], Muhammad A. Arfeen [(3)], Ahmed Omar [(4)] and Ahmed Atef [(5)]**

*(1) College of International Transport and Logistics, Arab Academy for Science, Technology and Maritime Transport, Aswan, Egypt, nelsayed@aast.edu*

*(2) College of International Transport and Logistics, Arab Academy for Science, Technology and Maritime Transport, Aswan, Egypt, mahmoud_ahmed.abdo@yahoo.com*

*(3) College of International Transport and Logistics, Arab Academy for Science, Technology and Maritime Transport, Aswan, Egypt, arfeen.aref@gmail.com*

*(4) College of International Transport and Logistics, Arab Academy for Science, Technology and Maritime Transport, Aswan, Egypt, dr.ahmedomar@aast.edu*

*(5) College of International Transport and Logistics, Arab Academy for Science, Technology and Maritime Transport, Aswan, Egypt, ahmed.atef98@adj.aast.edu*

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**ABSTRACT**: This paper aims to explore and delineate the prevailing scientific trends within the domain of "Human Resources Competitiveness in the Maritime Industry." To assemble relevant information, an extensive examination of global literature on the subject was conducted, utilizing databases such as Scopus and Web of Science. In this paper, the R language was applied with the bibliometric package to execute a meticulous bibliometric analysis. Visualization techniques were applied to provide researchers with a clearer overview, facilitating an enhanced understanding of specific subject areas within the research. This investigation furnishes valuable insights into the progression of research on "Human Resources Competitiveness in the Maritime Industry." It identifies significant contributors, including noteworthy authors, countries, and institutions, while also outlining the primary directions for future research. It is essential to acknowledge the limitations of this study: there might be an oversight in retrieving all relevant documents, given the focus on fully published papers in the English language. Moreover, the study recognizes the absence of similar existing research, which may signify a unique contribution. However, it is crucial to note that while no similar studies were found, the assertion of uniqueness would be more robustly supported by emphasizing specific aspects or methodologies that distinguish this study from others. We strived to present a comprehensive panorama of this research field, yet it is imperative to recognize the limitations in data collection, especially concerning potential language bias and the possibility of omitting non-English publications. Additionally, there is a need to provide insight into the management of data privacy and confidentiality within bibliometric analysis, an aspect that demands attention in studies involving diverse data sources.

## 2. INTRODUCTION

Maritime HR refers to the specialized field of human resource management in the maritime industry. This domain plays a pivotal role in enhancing the competitiveness of maritime transportation companies in an ever-evolving business environment (Anggoro and Amrullah 2023). It has all contributed to an increased awareness of human element issues and challenged traditional effective management of human resources, including recruitment, training, and retention of skilled personnel, which constitutes a critical success factor for companies operating in the maritime sector. The deployment of effective HR practices can help organizations cultivate a talented workforce and achieve superior performance outcomes, thereby furthering their growth and development objectives (Djamaludin, Madhakomala, and Tunas 2022). Studies have shown that the human error rate in road transport is 85 % of all disasters, 70 % for air travel and 80 % for maritime transport (Kandemir and Celik 2021). Thus, the quality, dependability, and flexibility of shipping and port services are significantly impacted by human resources management, making the competitiveness of marine human resources a crucial component of service providers' success in the maritime logistics sector (Notteboom et al. 2019). Accordingly, the role of human resources in ensuring the excellence, dependability, and adaptability of shipping and port services is of paramount importance. The efficiency and effectiveness of these services highly depend on the critical role played by human resources(Zaderei, n.d. 2020). Therefore, it is imperative to acknowledge the significance of human resources and invest in their professional development to maintain and enhance the quality of shipping and port services(Autsadee et al. 2023). The expansion and diversification of marine activities have led to a rise in threats and a need to address specific risks to human resources in light of the current circumstances. A competitive human resource in this setting is well-trained, willing to take on little risk, and accountable for both its work and the maritime environment. Competitive maritime companies, for instance, employees hire in many nations after they pass a technical computer exam in English and a structured interview (Stavroulakis, Papadimitriou, and Tsirikou 2021). Various factors, including organizational structure, social climate, technology, and safety, influence the competitiveness of marine human resources (DS, Nugraha, and Ardyanti 2018). Overall, the efficient management of human resources in the maritime industry is imperative for the success of companies and the attainment of high service standards (Fan et al. 2020)

## 3. METHOD

This investigation was executed employing the Web of Science (WOS) bibliographic database. The identification of relevant articles was predominantly influenced by eight fundamental terms: Maritime HR, Maritime Workforce, Maritime Human Capital, Maritime Labor, Labor Competitiveness, Workforce Competitiveness, HR Competitiveness, and Human Capital Competitiveness, in conjunction with the selection of particular Research Areas, namely business economics, transportation, and management.

The primary source of data for this study is the bibliometric profile of studies on Maritime HR Competitiveness, which can be found in various types of documents. Table 2 provides specific details regarding the data sources and types of papers analyzed, illustrating the bibliometric profile of global MHRC research conducted worldwide from 2000 to 2023. The data sources were obtained through Biblioshiny and encompass 58 distinct types of documents, gathered from 44 different sources, resulting in 1986 references contributed by 148 authors/researchers. As proven, of the 58 documents assessed for the study there are 7 single-authored and 51 multi-authored documents. In terms of author collaboration, each document has an average of 2.71 Co-Authors, with international co-authorships accounting for

15.52% of the total, as highlighted in table 1.

**Table 1**. Data Sources

| *Description* | *Results* |
|---|---|
| *Main Information* | |
| *Timespan* | *2000:2023* |
| *Sources (Journals, Books, etc.)* | *44* |
| *Documents* | *58* |
| *Annual Growth Rate %* | *7.25* |
| *Document Average Age* | *7* |
| *Average citations per doc* | *7.345* |
| *References* | *1986* |
| *Document Types* | |
| *article* | *42* |
| *article; proceedings paper* | *15* |
| *editorial material* | *1* |
| *Document Contents* | |
| *Keywords Plus (ID)* | *121* |
| *Author's Keywords (DE)* | *217* |
| *Authors* | |
| *Number of Authors* | *148* |
| *Authors of single-authored documents* | *7* |
| *Authors Collaboration* | |
| *Single-authored documents* | *7* |
| *Co-Authors per document* | *2.71* |
| *International co-authorships %* | *15.52* |

Note: Table created by the author

## 4. RESEARCH OVERVIEW

### *4.1. Number of publications by year*

To examine the trajectory of development in this specific academic discipline, we have compiled and presented the number of publications in the MHRC domain over several years, as depicted in Figure 1. According to the information that has been collected, it seems highly unlikely that the initial academic paper in this area was published in 2000. Only in 2009 did a remarkable growth in the number of publications become apparent. However, this upward trend experienced a decline in the subsequent two years, until 2011 when a resurgence in publication numbers indicated a growing interest in these topics within the academic community. Additionally, it is noteworthy that just 46.6% of all articles (27 out of 58 articles) were released in the last six years (2018-2023). This signifies the innovative nature of

research on MHRC.

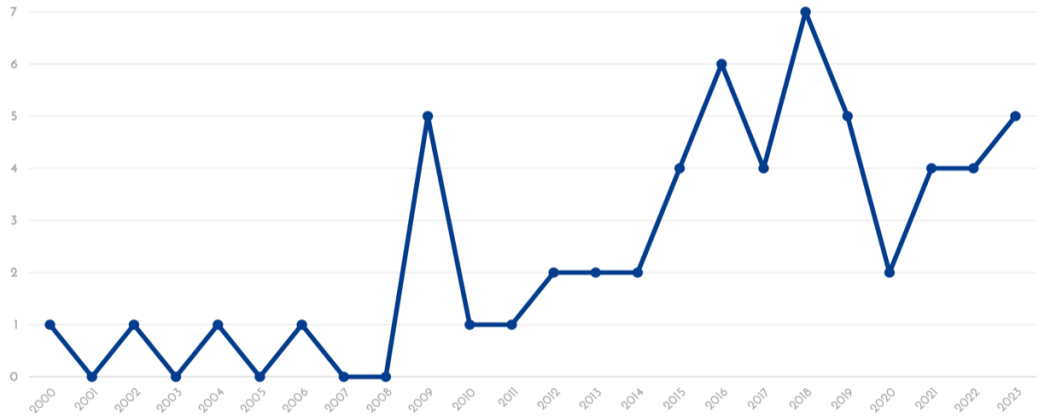


**Figure 1.** Numbers of publications by year

Note : Figure created by the author

### *4.2. Source of publication*

Table 2 exhibits the foremost 8 sources of bibliometric, these leading 8 sources had collectively generated 22 documents, which constituted 38 % of the total recovered documents. Maritime policy & management was recorded as the most prolific journal with 5 (8.33 %) publications, pursued by International journal on marine navigation and safety of sea transportation with 4 (6.67 %), Journal of coastal research with 3 (5 %), Explorations in economic history, international journal of shipping and transport logistics, Maritime economics & logistics, Transportation research record, and WMU journal of maritime affairs with 2 documents and (3.33%) for each source.

**Table 2.** Source of publication

| *Journal Name* | *No. of articles* | *%* |
|---|---|---|
| Maritime Policy & Management | 5 | 8.33 |
| International Journal on Marine Navigation and Safety of Sea Transportation | 4 | 6.67 |
| Journal of Coastal Research | 3 | 5 |
| Explorations in Economic History | 2 | 3.33 |
| International Journal of Shipping and Transport Logistics | 2 | 3.33 |
| Maritime Economics & Logistics | 2 | 3.33 |
| Transportation Research Record | 2 | 3.33 |
| WMU Journal of Maritime Affairs | 2 | 3.33 |

Note: Table created by the author

### *4.3. Source citations.*

The citation analysis is crucial for researchers seeking to publish in the most impactful journals within the field of MHRC. It also offers insights into the core areas of interest and influence within the community, guiding researchers towards the most recognized and authoritative sources of maritime research. from Figure 2, it is clear that there is a drastic decrease in the number of citations from the most cited source The Journal of Maritime Policy and Management with 52 citations to the second MARINE POLICY with 20 citations, and a gradual decrease following that, which suggests a few sources are highly influential within research or practices. This model is characteristic of scholarly citations and frequently obeys a power-law distribution, where a small fraction of works gains a large number of citations while the majority receive only a few.

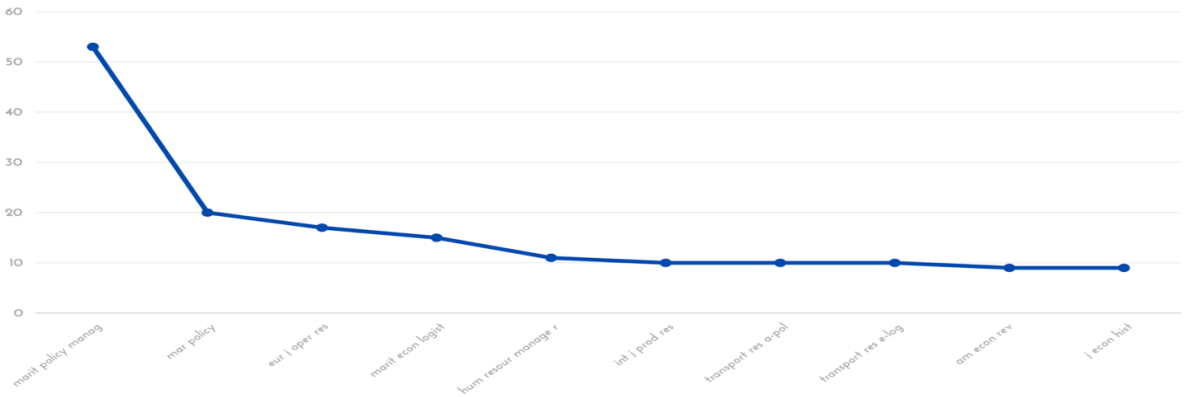


**Figure 2.** Source citations

Note : Figure created by the author

### *4.4. Author influence*

Figure 3 presents a visual representation of the top 9 authors who have demonstrated exceptional productivity in their contributions to MHRC research. These authors have collectively published a total of 18 documents, which accounts for approximately 31% of the 58 papers in our portfolio. It is noteworthy that none of these authors have attained the same level of productivity, with none of them having any published documents to their credit. This uniformity in publication frequency suggests the presence of a budding or highly specialized field, wherein a diverse group of researchers contribute equally to the advancement of knowledge.

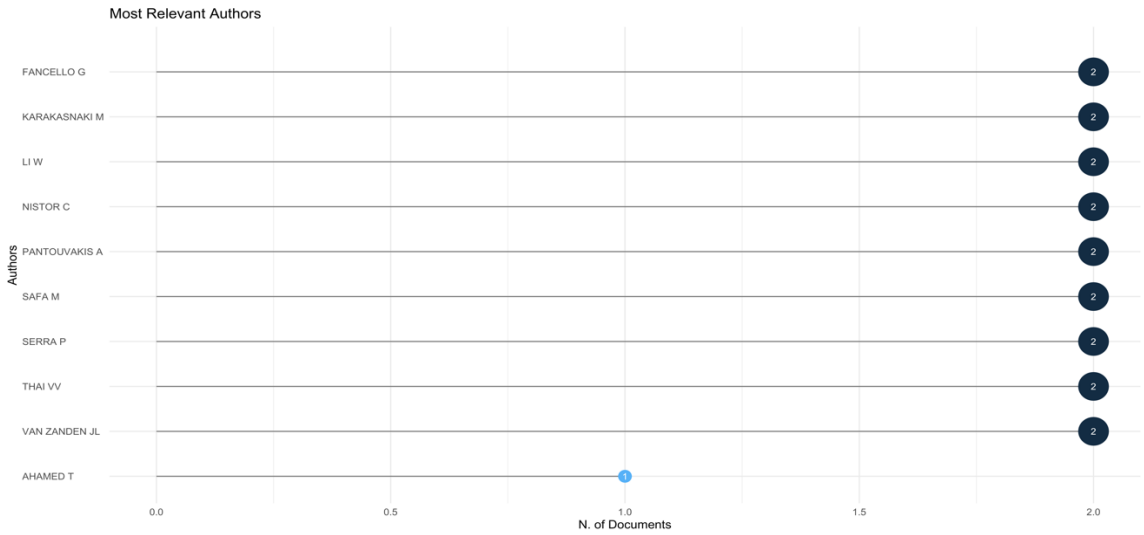


**Figure 3.** Most Relevant Authors

Note : Figure created by the author

### *4.5. Three-fields plot (Authors – Keywords - Sources)*

This three-field plot offers a multifaceted view of the research landscape in MHRC, mapping the interconnectedness between authors, their thematic focuses as indicated by keywords, and the sources where their work is published. The bands connecting the authors to specific keywords and sources suggest areas of concentration and potential expertise. For instance, certain authors appear to have a strong association with terms like 'competitiveness' and 'productivity', and their work is prominently featured in journals dedicated to shipping and transport logistics. This pattern underscores the strategic areas of research and can point to the leading conversations and debates within the field. Additionally, the presence of keywords such as 'human capital' and 'port labor' in close association with academic sources like 'International Journal of Shipping and Transport Logistics' and 'WMU Journal of Maritime Affairs' indicates a research focus that aligns closely with practical aspects of maritime economics and workforce management. The linkages between 'early modern period' and 'shipping explorations in economic history' reflect a historical dimension to the research, implying a subset of the academic community is engaged in understanding the roots and evolution of maritime competitiveness.

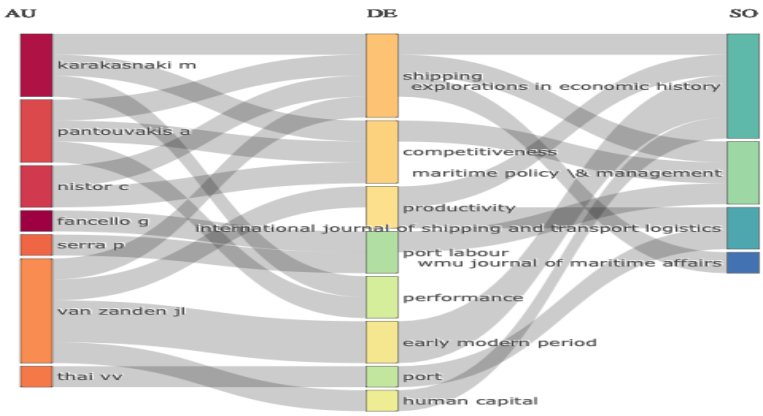


**Figure 4.** Three-fields plot (Authors – Keywords - Sources)

Note : Figure created by the author

### *4.6. Author collaboration network analysis*

This graphical representation displays the collaborative connections among authors in the MHRC field through network analysis. The nodes, represented by circles, symbolize individual authors. The magnitude of each node is proportionate to the number of partnerships or publications assigned to the individual author, with larger nodes indicating a greater degree of collaborations. The lines connecting the nodes indicate co-authorship links, suggesting instances where authors have collaborated on research papers.


**Figure 5.** Author collaboration network analysis

Note : Figure created by the author

The clustering of specific nodes, such as the subgroup comprising 'Fancelli G', 'Serra P', 'Pantouvakis A', and 'Karakasnaki M', signifies a stronger collaborative bond within this particular group. This clustering may indicate a shared research interest or institutional affiliation. This central cluster could potentially represent a core research group within the field, influencing the direction and focus of MHRC research. Conversely, authors depicted with smaller nodes and fewer connections, such as 'Chetri P' and 'Gekara VV', could be considered newcomers to the field or researchers who work independently. The presence of isolated nodes or those with few connections could also suggest opportunities for further collaboration and integration into the wider research network.

The diverse colors in the graph may represent different research clusters or institutional affiliations, highlighting the multidisciplinary nature of the field and the various academic communities contributing to this area. The distribution of nodes across the graph reflects the breadth of the field, with contributions from international sources and cross-institutional collaborations.

### *4.7. Influential papers*

This table presents a comprehensive compilation of pivotal scholarly works that have profoundly influenced the ongoing discourse on the competitiveness of Human Resources (HR) in the maritime domain. It offers a concise overview of the most influential papers based on citation metrics. The paper with the highest number of citations was (Pang and Lu 2018) has garnered a remarkable number of global citations totaling 56, thereby signifying its substantial impact and relevance in the field, particularly within the context of the Taiwanese maritime industry.

**Table 3.** Influential papers

| *#* | *GC* | *LC* | *Title* | *Author/s* | *Year* |
|---|---|---|---|---|---|
| 1 | 56 | 0 | Organizational motivation, employee job satisfaction and organizational performance : An empirical study of container shipping companies in Taiwan | Kelvin Pang, Chin-Shan Lu | 2018 |
| 2 | 43 | 2 | Human resources management at a marine container terminal | P Legato, MF Monaco | 2004 |
| 3 | 31 | 1 | Roots of growth and productivity change in Dutch shipping industry, 1500–1800 | JL Van Zanden, M Van Tielhof | 2009 |
| 4 | 31 | 0 | Labour productivity and human capital in the European maritime sector of the eighteenth century | J Van Lottum, JL Van Zanden | 2014 |
| 5 | 20 | 3 | Labour Regulation and Competitive Performance in the Port Transport Industry : The Changing Fortunes of Three Major European Seaports | H Barton, P Turnbull | 2002 |

Note: Table created by the author

The subsequent document, (Legato and Monaco 2004) centers its attention on the management of human resources within a marine container terminal. It maintains a continued pertinence with an impressive count of 43 global citations, thereby implying that fundamental practices of HR management within maritime contexts possess enduring importance.

The subsequent articles offer a historical viewpoint on efficiency and human resources, (van Zanden and van Tielhof 2009) and (van Lottum and van Zanden 2014) both receiving 31 global citations. These

publications emphasize the sector's long-term historical trajectory and its implications for contemporary practices.

Lastly, the research article (Barton and Turnbull 2002) exhibits a lower number of citations on a global scale; however, it has been cited on a local level three times, indicating a focused influence on local references network.

### *4.8. Influential Affiliation*

Analyzing the affiliations implicated in MHRC, a total of 84 institutions were found to publish 58 documents, out of which 28 have contributed singularly towards the publication. Figure 6 demonstrates the top 10 most prolific institutions based on the number of publications. The compilation consists of two institutions located in Italy and additionally two from the United States and China. This once again emphasizes the notion that Italian, American, and Chinese researchers are actively involved in the field of MHRC. The other institutions hail from countries such as Egypt, Greece, Netherlands, and Finland. Each of these nations is associated with at least one institution on this list.

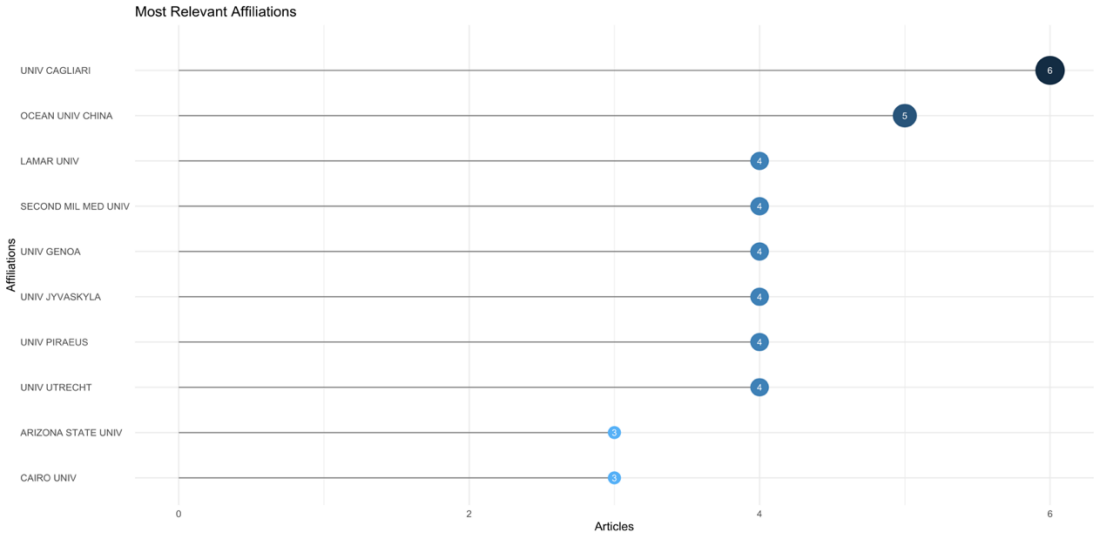


**Figure 6.** Influential Affiliation

Note : Figure created by the author

### *4.9. Three-fields plot (Affiliations-Countries-Sources)*

This plot with three fields provides a clear depiction of the worldwide academic landscape of research on MHRC. It establishes the connections between institutions, their respective countries, and the sources where their research is published. The leftmost column (AU_UN) showcases a register of universities and research institutions, while the middle column (AU_CO) denotes the countries in which these institutions are situated. The rightmost column (SO) displays the journals or publication sources utilized.

The plot effectively demonstrates the international scope of maritime research, highlighting institutions from various countries that contribute to a range of specialized publications. For instance, the presence of 'Univ Jyvaskyla' in Finland as a strong link to the 'International Journal of Shipping and

Transport Logistics' suggests that the research outputs of this institution are frequently published in that source. Similarly, 'Ocean Univ China' exhibits a relationship with 'Maritime Economics & Logistics' and 'Transportation Research Record', indicating active engagement in these specific areas of maritime research.

The visualization also indicates that certain countries, namely China and the USA, have multiple institutions contributing to the field. This is evident from the multiple bands extending from these countries to various journals. This phenomenon could be attributed to the larger size of the academic sectors in these countries or their particular interest and investment in maritime studies. Furthermore, the diverse range of journals, ranging from 'Maritime Policy & Management' to 'Journal of Coastal Research', reflects the interdisciplinary nature of research on MHRC. It involves diverse sectors like governance, money matters, shipping, and the exploration of the natural environment.

The distribution of affiliations and publications showcased in this plot indicates a well-connected research network that thrives on strong international collaboration and contribution. Such a visualization can be immensely valuable for new researchers as it enables them to identify potential institutions for collaboration and gain an understanding of the geographic dispersion of expertise within the field.

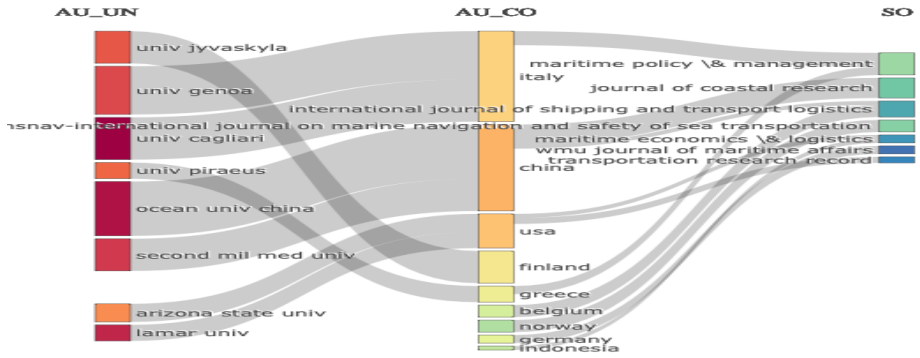


**Figure 7.** Three -fields plot (Affiliations-Countries-Sources)

Note : Figure created by the author

## *4.10. Influential countries*

With the assistance provided by Biblioshiny, it has been ascertained that a multitude of organizations hailing from 28 different countries have undertaken the task of publishing scientific articles on the subject matter of MHRC. It is worth noting that a mere two countries have contributed a solitary article each. In table 4., the ten most productive countries have been listed based on the overall number of publications. China has surprisingly become the top country in terms of total publications as determined by the country of the institution, encompassing both collaborative and non-collaborative works. This can be attributed primarily to the conscientious and enduring maritime policies implemented by the Chinese government, which have propelled them into the position of leadership within the MHRC domain. Additionally, it is imperative to acknowledge that the United States of America has also demonstrated productivity, as evidenced in Table 4. Moreover, Table 4. further emphasizes the

significance accorded to research pertaining to MHRC within European nations, particularly Italy, Russia, Finland, Germany, Belgium, Norway, and Greece.

**Table 4.** Influential countries

| # | *Country* | *Number of articles* |
|---|---|---|
| 1 | China | 27 |
| 2 | USA | 22 |
| 3 | Italy | 15 |
| 4 | Russa | 9 |
| 5 | Finland | 8 |
| 6 | Greece | 8 |
| 7 | Germany | 7 |
| 8 | Belgium | 6 |
| 9 | Indonesia | 6 |
| 10 | Norway | 6 |

Note: Table created by the author

### *4.11. Country collaboration network analysis*

This network diagram offers a visual depiction of the collaborative connections between nations in the realm of MHRC. The nodes serve as representations of individual nations, with their respective sizes potentially indicating the magnitude of research output or the number of collaborations that each country engages in within this domain.

Countries such as China and the USA are depicted by larger nodes, implying that they serve as central hubs of research activity with a substantial level of international collaboration. This observation may reflect their significant investment in maritime research and the global influence of their scholarly endeavours. Conversely, smaller nodes, exemplified by Bulgaria and Romania, might suggest that these nations possess a more fledgling presence in this field or partake in fewer international collaborations. Nevertheless, their inclusion in the network emphasizes the worldwide nature of maritime research, with contributions spanning various regions and economies. Additionally, the diagram indicates the presence of regional clusters, with European countries like Italy, France, the Netherlands, and the United Kingdom forming a dense network of collaboration. Similarly, the proximity of Finland, Germany, and Sweden suggests robust research connections within the Nordic region.

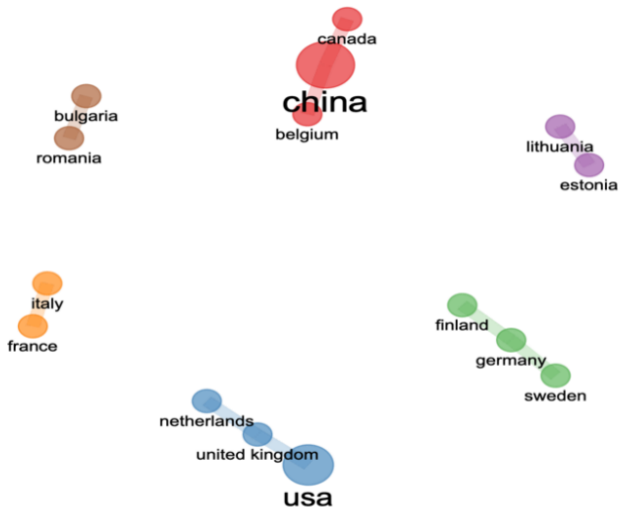


**Figure 8.** Country collaboration network analysis

Note : Figure created by the author

This type of network analysis holds great significance in comprehending the geopolitical dynamics of maritime research collaborations. It aids in identifying which countries take the lead in this field, potential partnerships for future research endeavours, and the exchange of knowledge between different regions. Moreover, it underscores the importance of international cooperation in addressing global challenges in maritime HR and competitiveness.

### *4.12. Evolution of Author's Keywords*

This line chart tracks the cumulative occurrences of key terms in the maritime research literature over more than two decades, from 2000 to 2023. It illustrates the shifting trends and emerging themes within the field as reflected by the authors' choice of keywords in their publications.

The term 'Competitiveness' shows a consistent upward trajectory, highlighting its crucial importance to the field throughout the years. This suggests a continuous and growing focus on the competitive factors of the maritime industry. Similarly, 'Human Capital' and 'Strategic Management' have experienced a noticeable increase, particularly in recent years, possibly indicating a heightened interest in the strategic aspects of managing human resources within the maritime sector. This aligns with the broader understanding of the critical role human factors play in the competitiveness and operational efficiency of maritime businesses. Interestingly, the 'Early Modern Period' and 'Maritime History' keywords experienced some attention, peaking around 2009 and 2014 respectively, possibly correlating with the anniversaries of significant historical events or the publication of influential historical research during those times. The keyword 'Port Labour' shows a steady increase over the years, emphasizing the importance of labour dynamics in port operations and their impact on the overall maritime industry. Meanwhile, 'Productivity' and 'Performance' reflect an ongoing concern with operational efficiency and output, key metrics of success in any industry. Lastly, the term 'Shipping' appears to maintain a steady presence over the years, underscoring its fundamental role as the subject matter of the maritime field.

Overall, the graph provides a visual narrative of the changing landscape of research focus areas, signalling where the academic and possibly policy-making attention has been directed and where it might be moving in the future. Such insights are exceedingly valuable for researchers and practitioners alike, providing them with knowledge of past trends and potential future directions for research and development.

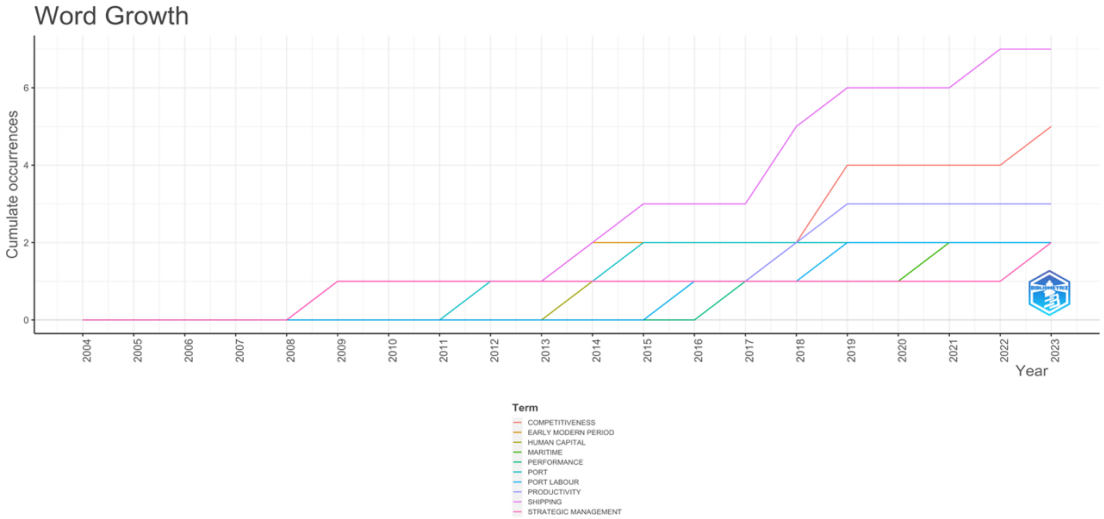


**Figure 9.** Evolution of Author's Keywords

Note : Figure created by the author

## 5. CONCLUSIONS

This research paper conducted a methodical examination of the relevant literature on research related to maritime human resources competitiveness (MHRC). A bibliometric analysis effectively illustrated the trends in research, primary research institutions, key authors, research topics, and focal points in the field of MHRC. The number of published papers on MHRC has demonstrated exponential growth. The major findings can be summarized as follows:

(1) Primary Subjects: The current research on MHRC mainly revolves around the competitiveness of shipping, the productivity of port labour, and the human capital in the maritime industry.

(2) Publication Sources: A total of forty-four journals have actively disseminated research on MHRC, with "Maritime Policy & Management," "International Journal on Marine Navigation and Safety of Sea Transportation," and "Journal of Coastal Research" being the most productive ones.

(3) Influential Institutions: The study highlights the prominent role of certain institutions such as the University of Cagliari, Ocean University of China, Lamar University, University of Piraeus, and Utrecht University in researching MHRC.

(4) Influential Authors: The study identifies the most influential authors in this field, including Fancello G, Karakasnaki M, Li W, Nistor C, and Pantouvakis A.

The research holds significant value for maritime enterprises seeking to augment their competitive advantage, educational establishments revising their maritime-related curricula, and policymakers devising industry-relevant policies. Moreover, the research promotes collaborative research and development by emphasizing prominent institutions and authors in MHRC. It also emphasizes the necessity for more comprehensive research to obtain a holistic global outlook on maritime human resources. Overall, the research functions as a crucial resource for shaping efficacious strategies, policies, and educational initiatives in the maritime sector on a global scale.

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