

Analysis of Impact and Hot Topics of Offshore Wind Power in China's Marine Economic Research

Ting Zhou*, Jiahui Xiao, Sheng Chen, Bao Zhou

Guangdong Ocean University, Jiangcheng District, Yangjiang, China

** Corresponding Author.*

Abstract: Offshore wind power is closely related to the national marine economy. In order to scientifically and effectively promote the high-quality development of China's marine economy, this paper samples 988 papers pertaining to the impact and hot topics of offshore wind power in China's marine economy that are published on the China National Knowledge Infrastructure website from 2013 to 2022, and uses CiteSpace to conduct bibliometric analysis from the perspectives of temporal distribution, spatial distribution, knowledge base, research hot topics and research frontiers. Results show that theoretical research on marine economy has experienced “the slow decrease period - the steady increase period - the rapid increase period”, and is now in rapid development. The publishing authors have yet to form a stable cohort. Research by publishing institutions is mainly carried out by universities. Institutions in coastal areas such as Shandong and Tianjin have a higher number of publications, exhibiting an obvious regional characteristic. Research hot topics mainly concentrate on three aspects: offshore wind power and marine economic development, offshore wind power and marine technology innovation, offshore wind power and marine industry development. Future research should fully explore the internal mechanism of offshore wind power to promote the transformation of marine energy structure, explore the channels for offshore wind power to promote the rapid development of offshore engineering equipment manufacturing industry, pay attention to the construction of offshore wind power innovation platform and explore blue finance.

Keywords: Offshore Wind Power, China

Marine Economy, Bibliometric Analysis, Citespace

1. Introduction

The outline of the National Marine Economy Development Plan points out that the marine economy is the sum of the industries and economic activities related to the use of sea. In China, the United States and Korea, the growth of marine economy outpaces the average growth speed of their national economy and the world economy, and makes up an important part of the world economy [1]. Scholars at home and abroad conduct targeted research on the influencing factors of marine economy by focusing on marine economic efficiency, marine industries and various aspects, and found that factors such as marine industrial structure and ports can affect the development of China's marine economy by using a panel model [2]. By summarizing relevant literature, this paper sorts out the research achievements of “marine economy”, and identify the knowledge clusters of marine economic research. China's vast sea area provides a rich trove of marine new energy resources. As one of the emerging marine industries, offshore wind power is a renewable energy technology that utilizes sea wind to generate electricity from offshore-built wind power facilities, and is widely used in large-scale power generation. Statistics show that the added value of emerging marine industries reached 21.08 billion yuan in 2022, with a year-on-year growth of 18.5%. Among them, the newly added installed capacity of offshore wind power reached 1.4 million kilowatts in the whole year, accounting for 26% of the country's total capacity, proving that offshore wind power is a new driving force for the growth in China's marine economy and an important part of China's marine economy development [3].

With the pressing need of economic

development and the proposal of the marine power strategy, it is high time to explain and analyze the impact of strengthening offshore wind power on marine economic development. Through the lens of bibliometrics, this paper is able to produce relevant knowledge maps with the help of CiteSpace – an information visualization software based on the Java language environment. Equipped with a knowledge navigation function, CiteSpace can explore and visually present the research hot topics of a certain academic discipline [4]. It is used by this paper to explore the research situation in China's marine economic research from 2013 to 2022, so as to more objectively grasp the research hot topics and research frontiers, and to provide a useful data reference and new research ideas for future research of how offshore wind power development can impact China's marine economy.

As a method that uses data mining, information analysis and scientific measurement to present knowledge of a certain field, knowledge maps are widely used to analyze the hot topics of disciplinary research. With the help of the visualization of knowledge maps, this paper mines the hot topics within the research results of marine ecological economy [5] and uses bibliometrics to statistically analyze the current state of China's marine culture [6]. This paper also draws up knowledge maps from the perspectives of keywords, collaborative institutions and journal distribution of marine industry economic literatures to analyze the economic development of China's marine industry [7].

2. Data Sources and Research Methodology

2.1 Data Sources

To better reflect the progress of China's marine economic research, this paper uses "marine economy" and "offshore wind power" as search conditions, and selects January 1, 2013 to December 31, 2022 as search period for accurate matches. After sorting out search results and eliminating irrelevant items such as prefaces and book reviews, a total of 988 related articles are retrieved.

2.2 Research Methodology

This paper uses the bibliometric analysis method and, with the help of CiteSpace, visually analyzes and generates a matrix of the input literature data based on the papers' bibliography information. It explores the research hot topics and frontiers of China's marine economy through analysis of literature characteristics using mathematics and statistics, which helps to macroscopically understand the research of marine economic development.

3. Spatial and Temporal Distribution of China's Marine Economic Research

3.1 Temporal Distribution of the Number of Published Articles

Changes in the number of published articles can measure the publication of a certain discipline within a given period, and can more intuitively reflect the change of research heat within a given period [8]. This paper studies the marine economic research results from "2013 to 2022" to obtain the distribution and percentage statistics of the past decade by analyzing the proportion of relevant papers over the years (see Figure 1).

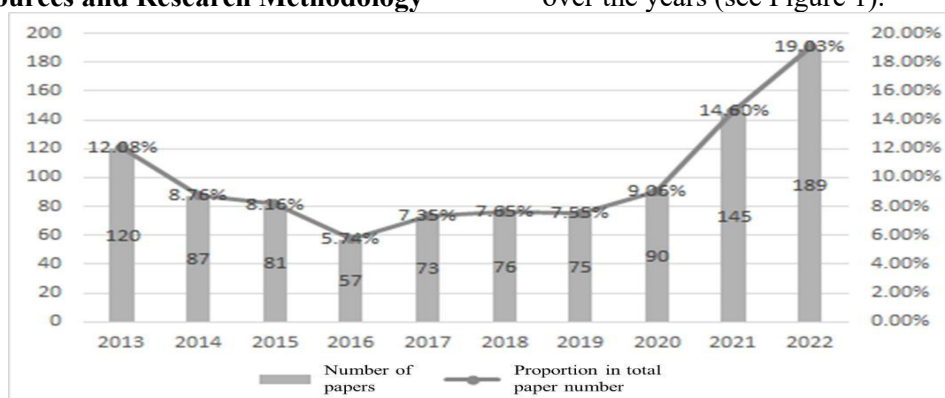


Figure 1. Distribution and Percentage of China's Marine Economic Research Literature in 2013-2022

Figure 1 shows that the number of published literatures on the impact of offshore wind power on China's marine economy in the past decade has mainly been through three stages: "the slow decrease period – the steady increase period – the rapid increase period". From 2013 to 2016, the number of published papers and the frequency of citations relating to the impact of offshore wind power development decreased. As the rise of emerging energy and changes in policies and investments reached a nadir in 2016, it is apparent that scholars' research on offshore wind power experienced a bottleneck. The Notice on Printing and Distributing the National Offshore Wind Power Development and Construction Plan (2014-2016) introduced at the end of 2014 encouraged enterprises to strengthen scientific and technological research and properly carry out the construction work of projects within the plan. After the policy's release, the decline in the number of papers published by scholars in this field slowed down, but was still in an exploratory period. In March 2016, the NPC and CPPCC included the development of new energy in the Government Work Report, signalling a boom for new energy, and the number of published research papers related to offshore wind power steadily increased. From 2017 to 2019, the overall number of published papers and citations stabilized. In 2019, the National Development and Reform Commission issued the *Notice on Improving the Feed-in Tariffs Policy for Wind Power*, which points out that offshore wind power projects not fully connected to the grid before the end of 2021 would no longer receive national subsidies for feed-in tariffs. This sparked a rush of installation for China's offshore wind power projects in 2021 and its installed capacity surged ahead in the global market. The attention to the research on the impact of China's marine economy continues to increase, and the number of articles soared rapidly.

3.2 Spatial Distribution of China's Marine Economic Research

3.2.1 Analysis of publishing authors

Table 1. Core Authors and Their Institutions of Relevant Papers in 2013-2022 (Top 18 Authors)

No.	Author	Published papers	Institution	No.	Author	Published papers	Institution
1	Lin	11	National Marine	10	Yang	5	Guangdong Province

This paper references Price's Law to determine the core authors cohort of this field in China in the past decade according to the distribution of the first authors of relevant papers.

$$M_1 = 0.8(M_{\max})^{0.5} \quad (1)$$

In this formula, M_1 represents the minimum papers the author should publish; M_{\max} represents the maximum papers published by the author from 2013 to 2022;

Statistics show that the highest number of articles published by core authors in the past decade is 11. From the above formula, we can deduce that M_1 equals to at least 3 articles, making authors with more than 3 articles core authors in this field. According to the rankings of the number of articles published, authors in the past decade (only top 18 authors displayed) are shown in Table 1.

As can be seen from Table 1, Lin Xianghong is the first author with the most published articles of 11, followed by Zhai Renxiang with 8 and Xu Congchun with 7. According to statistics, there are 39 first authors with more than 3 published papers, totalling 169 papers, which only accounts for 17.10% of the entire literature sample. Price's law, however, stipulates that the published articles by the core authors cohort in a certain field should account for 50% of the total number, which is a far greater number. It is obvious that the research on the impact of offshore wind power on China's marine economy has not yet formed a stable core authors cohort.

3.2.2 Analysis of authors collaboration

This paper uses CiteSpace to analyze and obtain a map of authors collaboration. There are 189 nodes and 142 connections in Figure 2 with a network density of 0.008. It can be seen that many scholars have been studying this field in China in the past decade, and their collaborative relationship exemplifies a state of "partly concentrated and overall dispersed". Different academic groups have relatively loose cross-citation relations and weak academic links, unable to form a scientific research cohort with a strong cohesion, which will affect the development of China's marine economic disciplines in the long run.

	Xianghong		Data Information Center of the State Oceanic Administration		Lunqing		Marine Development Planning Research Center
2	Zhai Renxiang	8	Jiangsu Ocean University	11	Yuan Feng	5	Guangdong Province Marine Development Planning Research Center
3	Xu Congchun	7	National Marine Data Information Center of the State Oceanic Administration	12	Li Xianjie	5	National Marine Data Information Center of the State Oceanic Administration
4	Song Weiling	6	National Marine Data Information Center of the State Oceanic Administration	13	Han Limin	4	Ocean University of China
5	Yi Aijun	6	Jiangsu Ocean University	14	Sheng Chaoxun	4	China Macroeconomic Research Institute
6	He Guangshun	5	National Marine Data Information Center of the State Oceanic Administration	15	Li Dahai	4	Ocean University of China
7	Zhu Ling	5	National Marine Data Information Center of the State Oceanic Administration	16	Li Shuangjian	4	National Marine Data Information Center of the State Oceanic Administration
8	Zhao Xin	5	Ocean University of China	17	Zhang Hongyuan	4	Jiangsu Ocean University
9	Zhang Wenliang	5	Tianjin Oceanic Administration	18	Lu Yayun	4	Guangdong Province Marine Development Planning Research Center

3.2.3 Analysis of publishing institutions

There are 59 nodes and 9 connections in Figure 3 with a network density of 0.0053, which indicates relatively weak connections among publishing institutions of this field in China, and the academic exchanges among them need to be further strengthened. The numbers of articles published by institutions in different regions differ greatly from each other. Institutions in coastal areas such as Shandong, Tianjin, Guangdong and Jiangsu have relatively higher numbers of published articles, while other areas are weaker in scientific research of marine economy, which to a certain extent indicates a positive correlation between the scientific research ability and the development level of marine economy, with pronounced regional characteristics.

Universities and scientific research institutes are ranked by their number of published articles and the top 22 high-yield institutions are listed in Table 2.

On the whole, universities are the dominant force of research. Ocean University of China has the highest frequency of publishing with 64 articles, which has made a great contribution to the research in this field. The National Marine Data Information Center of the State Oceanic Administration followed with 40 articles. Guangdong Ocean University ranked third with 32 articles. These institutions, located in Shandong, Tianjin, Guangdong, Jiangsu and Zhejiang, are strongly equipped in terms of scientific research in offshore wind power and have provided strong intellectual support for the marine economic development of the four

major bay areas, namely, Bohai Rim, Guangdong-Hong Kong-Macao Bay Area,

Beibu Gulf and Hangzhou Bay.



Figure 2. Authors Collaboration Map



Figure 3. Publishing Institutions of This Field in 2013-2022

4. Analysis of the Knowledge Base of Offshore Wind Power Research

A knowledge base helps to illuminate the nature of research frontiers, and researchers can better understand the relevant topic concepts and organize their research context by analyzing the knowledge base [9]. The number of journal article downloads has

gradually become an important indicator of the journal's influence, which to a certain extent can reflect the importance of the literature in this field or the important conclusions drawn by it, laying a knowledge foundation for exploring a certain field. Through sample statistics, this paper retrieves 10 articles with the most downloads, as shown in Table 3.

Table 2. Top 22 Institutions with the Most Published Papers in 2013-2022

No.	Institution	Published papers	No.	Institution	Published papers
1	Ocean University of China	64	12	Qingdao University	8
2	National Marine Data Information Center, State Oceanic Administration	40	13	Tianjin University	8
3	Guangdong Ocean University	32	14	Sun Yat-sen University	7
4	Jiangsu Ocean University	21	15	Guangdong University of Finance and Economics	7
5	Liaoning Normal University	19	16	Zhejiang Ocean College	7

6	Guangdong Ocean Development Planning Research Center	14	17	Ningbo University	7
7	Yancheng Teachers University	13	18	South China Sea Branch of State Oceanic Administration	6
8	Guangdong General Station of Aquatic Technology Promotion	12	19	Hainan University	6
9	Shanghai Ocean University	12	20	Huaihai University of Technology	6
10	Nanjing University	8	21	Zhejiang Ocean University	6
11	Dalian Maritime University	8	22	Zhejiang University	6

It can be seen from Table 3 that the articles with high downloads approach the topic from different perspectives. The ten articles above on China's marine economic research illustrate the impact of offshore wind power on marine economy from various angles, including: research on market demand and capacity surplus in emerging industries such as China's offshore wind power during its early stage of development [10]; discussion on the development history and current situation of China's offshore wind power [11]; elaboration on offshore wind power's drive for marine energy industrialization [12]; analysis of optimizing marine industrial structure by building marine renewable energy bases such as offshore wind power and

seawater comprehensive utilization pilot zones [13]; technological innovation analysis of marine energy industry on offshore wind energy ; research on resource elements integration of offshore wind power [14]; review on the trend of China's offshore wind power development scale [15]; discussion of offshore wind power's promotion to high-quality development of marine economy ; analysis of the development impact of emerging marine energy industries such as offshore wind power and ocean tidal energy ; exploration on the integration of digital economy and emerging industries such as offshore wind power to promote the high-quality development of marine economy [16], etc.

Table 3. List of Articles with the Most Downloads

No	Title	Downloads	Year	Author	Source
1	A Study on Fiscal Policy for Promoting China's Economic Structure Adjustment	7257	2014	Zhu Litao	Research Institute for Fiscal Science, Ministry of Finance
2	A Study on the Cultivation Mechanism of China's Marine Strategic Emerging Industries	5226	2013	Liu Kun	Ocean University of China
3	A Study on the Development of Sea-Land Economic Integration in Guangdong-Hong Kong- Macao Greater Bay Area	4488	2018	Li Zhengdao	Liaoning University
4	A Study on the Adjustment and Optimization of Marine Industry Structure in Bohai Rim Region	4322	2013	Huang Sheng	Ocean University of China
5	A Study on Technological Innovation System of China's Marine Energy Industry	2642	2013	Ding Yingying	Harbin Engineering University
6	Element Flow, Resource Fusion and Open Cooperation - The Role of Marine Economy in the Construction of Guangdong-Hong Kong- Macao Greater Bay Area	2398	2018	Chen Mingbao	Journal of South China Normal University (Social Sciences section)
7	A Study on the Development of China's Marine Economy	2372	2021	Sun Jiuwen; Gao Yujie	Regional Economic Review
8	Coupling Coordination Mechanism and Measure of Marine Economy and High-quality Economic Development	2277	2022	Lu Yayun; Yuan Feng	Statistics and Decision Making

9	A Study of Marine Development and Coastal Urban Spatial Organization Evolution and District/County Management	2234	2013	Shen Li	East China Normal University
10	Digital Economy, Industrial Upgrading and High-quality Development of Marine Economy	2173	2022	Fu Kaibao; Ding Zhengshuai; Guo Yuhua	Price Theory and Practice

5. Analysis of Hot Topics and Frontiers in China's Marine Economic Research

5.1 Analysis of Hot Topics in China's Marine Economic Research

Keywords are a highly condensed summarization of the article's theme. This paper uses CiteSpace to perform a cluster analysis on keywords, and can visually display the hot topics of research articles [17].

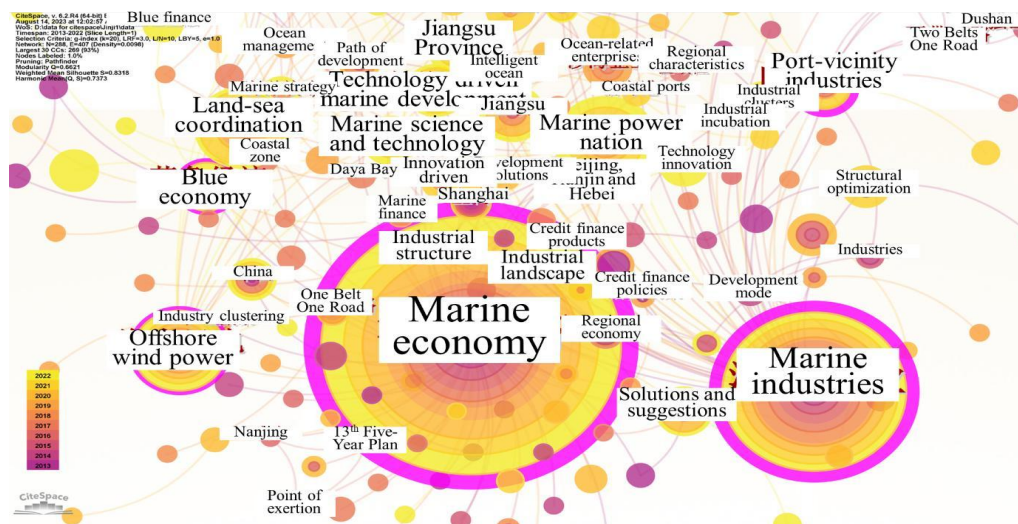


Figure 4. Map of High Frequency Keywords Co-Occurrence 2013-2022

There are 288 nodes and 407 connections in Figure 4 with a connection density of 0.0098. Keywords relating to the impact of offshore wind power on marine economic development are relatively concentrated on "marine economy", "marine science and technology", "marine industries", "offshore wind power", "marine power" and "sea-land coordination", etc. Their connections with other nodes are also dense, putting them at the central position of the relationship network and making them the core research topics in this field. Through statistics and sorting of relevant articles corresponding to important nodes within the keywords co-occurrence map, this paper summarizes three research hot topics based on high-frequency keywords and their degree of association:

5.1.1 Offshore wind power and development of marine economy

The report of the 18th National Congress of the CPC explicitly puts forward the notion of "building a marine power", and the report of the 19th National Congress reiterates with

"accelerate building a marine power", which sets off a trend of marine economic research. China's marine economic landscape is divided into three marine economic circles in the north, east and south [18], with the southern circle made up of Fujian, Guangdong, Guangxi and Hainan Province. Guangdong has a solid foundation for offshore wind power development. Its newly added installed capacity of offshore wind power accounts for 26% of the country's total, increasingly widening its gap with Guangxi, Hainan and other places in terms of offshore wind power development, a sign of unbalanced regional development. A reasonable and orderly arrangement of offshore wind power construction within China while taking into account both immediate and long-term interests [19] shall provide more opportunities for the sustainable development of marine economy.

5.1.2 Offshore wind power and marine technology innovation

In the past decade, China has been vigorously

promoting marine technology revolution, upgrading offshore wind power technology innovation, and optimizing its industrial structure, which effectively facilitated the development of China's marine economy. To tackle the technical problems in this field, China integrates production, learning and research, develops specialized research institutes, and pools resources together to implement technological innovation in an effort to foster innovative clusters that put high-tech enterprises at the central position. Currently, research institutions aimed at studying offshore wind power to promote the development of marine economy are rather limited, and the top three institutes are located in Shandong, Tianjin and Guangdong. Talent is an important human resource for technological innovation. Formulating long-term and scientific development plans, strengthening the echelon reserve of offshore wind power talents, and improving the profitability of offshore wind power projects [20], all help to promote the high-quality development of China's marine economy.

5.1.3 Offshore wind power and marine industry development

The National Energy Administration proposed that beginning from 2019, feed-in tariffs of all

offshore wind power projects would be configured and determined through competition, and the pressure of "cost reduction" in the wind power industry continued to be transmitted to middle- and down-stream enterprises [21]. Enterprises need to ensure profitability through technological innovation and resource integration. The government can set up resource sharing platforms such as offshore wind power industry alliances and industrial parks to accelerate regional resource deployment, thereby facilitating information exchange and cooperation for cost reduction and integrated development with related industries, so that the industry clustering effect can be fully realized. The offshore wind power industry has a large demand for capital and comes with high investment risks. The traditional financing model is inadequate for marine production activities, so it is crucial to formulate reasonable industrial policies and improve the marine financial support system.

5.2 Analysis of China's Marine Economic Research Frontiers

This paper uses CiteSpace to statistically analyze keywords and derive a timeline of keywords co-occurrence (see Figure 5).

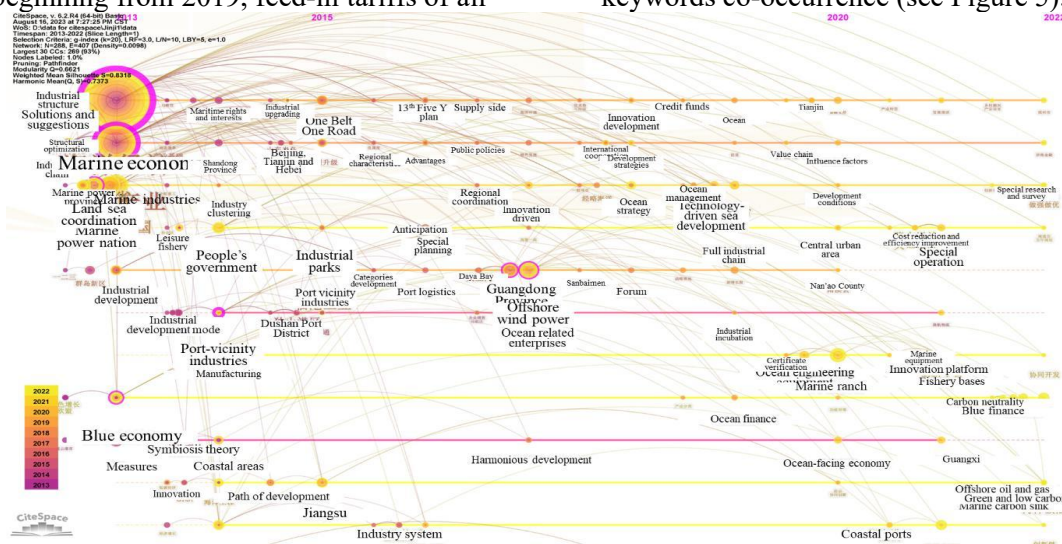


Figure 5. Timeline of Keywords Co-Occurrence 2013-2022

It can be seen from Figure 5 that in 2013 keywords were relatively monotonous, mainly related to the industrial structure and countermeasures and suggestions of offshore wind power. As time passes, the development of China's marine economy becomes more important, the keywords grow to be more abundant, and the research fields continue to

expand. Since 2020, "carbon neutralization", "marine engineering equipment", "innovation platform", "blue finance" and "marine ranch" have become the focus of research in this field, and in-depth exploration of relevant topics has formed the research frontiers on offshore wind power's promotion of China's marine economy.

As the development of traditional marine industries brings increasingly prominent problems to the marine environment and resources, China proposed at the 75th United Nations General Assembly that it aimed to achieve “carbon peaking” by 2030 and “carbon neutralization” by 2060, setting new goals for China's energy revolution and low-carbon transformation. As the main force of new energy, offshore wind power plays an important part in China's endeavor to achieve the “double carbon” goal. Offshore wind power involves marine engineering which requires professional marine equipment. Relevant enterprises should seize the opportunity of offshore wind power development to accelerate deployment of wind power installation ships and other equipment for more market share. It is also time to build an innovation ecological chain of "independent innovation platform - test base public service platform" [22], strengthen collaborative research among innovation entities in various fields, build an efficient and stable supply chain, implement structural reforms on the supply side, stimulate new economic growth, fully play out the advantages of offshore wind power in promoting coastal marine economy, and promote high-quality development of China's marine economy. Guangdong Province has established three “blue finance” innovation pilot zones that provide financial support to marine industries with varied focus to improve the financial service efficiency in marine industries. These include the eastern Guangdong “blue finance” innovation pilot zone with a focus on offshore wind power and marine transportation, the western Guangdong “blue financial” innovation pilot zone with a focus on offshore oil and gas, and offshore wind power, as well as the Pearl River Delta “blue finance” pilot zone with a focus on high-end marine manufacturing and emerging marine industries [23]; The new mode of integrated development of marine ranch and offshore wind power enables synchronous and efficient output of clean energy and safe aquatic products, making it an important new mode and future development direction for the economical and intensive use of sea. China is studying the interaction mechanism between offshore wind power and marine ranch as preliminary preparations for projects

roll-out.

6. Conclusion

This paper uses CiteSpace to sort out and analyze the temporal distribution, spatial distribution, knowledge base, research hot topics and research frontiers of marine economy-related research in China. Research finds that, firstly, the research on offshore wind power to promote the development of marine economy in China has mainly experienced three stages: "slow decrease period - steady increase period - rapid increase period", and the change in the number of publications is closely related to the support of national policies and the needs of realistic development. Secondly, in terms of publishing authors, the cross-citation relationship between different academic teams is relatively loose, and the academic connection is weak. Research by publishing institutions is mainly carried out by universities, and the institutions in coastal areas such as Shandong, Tianjin and Guangdong have a higher number of published articles, showing an obvious regional characteristic. Thirdly, according to the statistical analysis of highly downloaded articles, offshore wind power contributes to "promoting the industrialization of marine energy, promoting integration of emerging industries, expanding research on the diversification of marine economic systems", providing a theoretical foundation for researches related to promoting the high-quality development of marine economy. Fourthly, according to the high-frequency keywords co-occurrence map, research hot topics can be categorized into three groups: offshore wind power and marine economic development, offshore wind power and marine technology innovation, offshore wind power and marine industry development. Fifthly, by referring to the timeline of keywords co-occurrence, it can be seen that China's research frontiers include offshore wind power's contribution to achieving the "double carbon" goal, offshore wind power and development of offshore equipment industry, construction of offshore wind power innovation platform and exploration of blue finance, and the integrated development of offshore wind power and marine ranch.

Acknowledgements

This work was supported by a project grant from Guangdong Province Philosophy and Social Science Planning Project ("Study on the Path of Building a Modern Industrial System for Offshore Wind Power in Guangdong Province under the Dual Carbon Goals – A Case Study of Yangjiang City") [GD23YDXZGL03]; Guangdong Province Science and Technology Innovation Specialized Fund ("Themed Topics + Task List") Project ("Training Mode of Innovative and Entrepreneurial Scientific and Technological Talents under the Perspective of Industry-Education Integration") [SDZX2023010]; Guangdong Undergraduate Colleges and Universities Teaching Quality and Reform Project ("Guangdong Ocean University – Mingyang Intelligent Energy Group Teaching Base for Science-Industry-Education Integration Practice") [YJGH [2024] No. 9]; Guangdong Ocean University Humanities and Social Sciences Research Project ("Evaluation of Comprehensive Economic Strength of the Guangdong Coastal Economic Belt") [310201052304]; Guangdong Ocean University Scientific Research Initiation Fee Funded Project ("Construction of China's Modern Marine New Energy Industry System: Research on Theory, Empirical Evidence and Path") [360302052303]; Guangdong Ocean University Undergraduate Innovation Team Project ("Haifeng Linghang Innovation and Entrepreneurship Team") [CXTD2023027].

References

- [1] Lin, X. H, Gao J., Wang Z. K. Summary on the Current Situation and Characteristics of the World Marine Economy After the Financial Crisis. *Science and Technology Management Research*, 2015, 35(23):119-125.
- [2] Chang Y. M. Factors Influencing the Development of China's Marine Economy: An Empirical Study Based on Panel Data of Coastal Provinces and Cities. *Resources and Industries*, 2011, 13(05):95-99.
- [3] Yao, Z. Y.. Research on the Development Status of Offshore Wind Power in China. *China Electric Power Enterprise Management*, 2019(22):24-28.
- [4] Du, J., Su X. L., Yan, B. Analysis on the

Research Hot topics of Financial Support for Marine Economic Development – Based on CiteSpace Knowledge Map. *Times Economic and Trade*, 2022,19(02):10-16.

- [5] Ke, L. N, Yin, S. S., Liu, W. B.. Bibliometric Analysis of China's Marine Ecoeconomy Based on CiteSpace. *Journal of Ecology*, 2018,38(15):8.
- [6] Zhao, L., Wu, Y. P. Review of the 20-year Studies on China's Marine Culture Based on Bibliometrics. *Journal of Shanghai Ocean University*, 2021, 30(02):10-13.
- [7] Xu, R. H., Jiang, X. C. Dynamic Evolution of Economic Research Hot Topics in China's Marine Industry – Analysis based on CNKI Database. *Chinese Fisheries Economics*, 2020, 38(01):84-91.
- [8] Du, J., Su, X. L., Yan, B. Analysis on the Research Hot topics of Financial Support for Marine Economic Development--Based on CiteSpace Knowledge Map. *Times Economic and Trade*,2022, 19(02):10-16.
- [9] Qiu, J. P., Lv, H. Research Hot topics, Frontiers and Knowledge Bases of International Library and Information Science in Recent Five Years – Visual Analysis Based on Knowledge Map of 17 Foreign Journals. *Library Information and Knowledge*, 2013(03):4-15+58.
- [10]Zhu, L. T. A Study on Fiscal Policy for Promoting China's Economic Structure Adjustment. *Institute of Fiscal Science, Ministry of Finance*, 2014:186.
- [11]Liu, K. Study on the Cultivation Mechanism of China's Marine Strategic Emerging Industries. *China Ocean University*, 2014:206.
- [12]Li, Z. D. A Study on the Development of Sea-Land Economic Integration in Guangdong-Hong Kong-Macao Greater Bay Area. *Liaoning University*, 2019:183.
- [13]Huang, S. Study on the Adjustment and Optimization of Marine Industry Structure in Bohai Rim Region. *China Ocean University*, 2014:129.
- [14]Chen, M. B. Element Flow, Resource Fusion and Open Cooperation – The Role of Marine Economy in the Construction of Guangdong-Hong Kong-Macao Greater Bay Area. *Journal of South China*

- Normal University (Social Sciences Section), 2018(02): 21-26+191.
- [15]Sun, J. W., Gao, Y. J. Research on China's Marine Economy Development. *Regional Economic Review*, 2021(01):38-47.
- [16]Fu, K. B., Ding, Z. S., Guo, Y. H. Digital Economy, Industrial Upgrading and Highquality Development of Marine Economy. *Price Theory and Practice*, 2022(05): 78-81+205.
- [17]Luan, C. J., Jiang, C. L (2008). Status and Visualization Analysis of China-published SSCI Papers in Recent Years. *Information Work*, 2008(3):60-63.
- [18]Wu, M., Wen, L. L. Experience and Trend Analysis of Marine Economic Development in China and Foreign Countries. *China Land and Resources Economics*, 2021, 34(10):60-66.
- [19]Sun, R. J., Yang, X., Yu, B. H. Comparative Analysis of Marine Economic Development Expectations Between the State and Coastal Regions. *Ocean Development and Management*, 2015,32(02):77-79.
- [20]Lu, Y. X. Study on Comprehensive Post-evaluation of Offshore Wind Power Projects. *Shenyang University of Technology*, 2023:96.
- [21]Jiang, X. C., Ma, Y. K., Chen, Y. Summary of Offshore Wind Power Industry Chain Development in China. *Ship Supplies and Markets*, 2018(06):44-49.
- [22]Gu, Y. J., Zhou, H. F., Fang, Y., et al. Study of Countermeasures for the Development of Offshore Wind Power Industry Chain – Analysis Based on Domestic and Foreign Experience. *Ecological Economics*, 2022, 38(09):80-86.
- [23]Zhu, J. Z., Lin, D. Y., Xie, L. F. Research on High-quality Development Path of Guangdong's Marine Industry Empowered by Blue Finance Innovation. *New Economy*, 2023(07):94-112.