Hindawi

Retraction

Retracted: Comprehensive Management and Coordination Mechanism of Marine Economy

Mathematical Problems in Engineering

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] J. Tian, Q. Xia, and P. Wang, "Comprehensive Management and Coordination Mechanism of Marine Economy," *Mathematical Problems in Engineering*, vol. 2021, Article ID 6616412, 9 pages, 2021.

Research Article

Comprehensive Management and Coordination Mechanism of Marine Economy

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With the rapid development of economy and society and the continuous progress of science and technology, the public demand for marine products and services is increasing, and the marine economic and social benefits are rising. It is very important to improve the management level of marine economy. The purpose of this study is to analyze the comprehensive management and coordination mechanism of China's marine economy. This study selects Lianyungang City as the research object and takes the marine economic data from 2010 to 2019 as the research data. This study establishes three evaluation index systems of marine economic development. Then, according to the influence of the marine industry development, social development, population, marine resources and environment, regional scientific and technological innovation ability, government comprehensive management, and other factors on the regional marine economic management, this paper puts forward a set of marine economy comprehensive coordination management system and method and evaluates the current situation of marine economic development in Lianyungang City. The results show that, in the 10 years from 2010 to 2019, the comprehensive management evaluation value of China's marine economy has increased from 0.20 to 0.33, with an average annual increase of 6.57 percentage points. The system level has been upgraded from the initial "poor" to "average," achieving rapid growth. It is concluded that the index system evaluation of this study well reflects the change of the management level of China's marine economy and has a promoting effect on the development of China's marine economy, making contributions to China's economic management.

1. Introduction

The ocean is the broadest natural geographical area on the Earth, which contains huge marine resources. However, with the vigorous development of China's marine economy, there are also many problems uncoordinated with economic development. In the process of marine economic development, there are still some problems, such as lack of systematic theoretical guidance, lack of coordinated development and scientific planning, imperfect system, and obvious contradiction of industrial structure. There are widespread problems of the traditional marine industry and ecological environment deterioration, low economic efficiency and sustainable development, and how to evaluate the sustainable development of marine economy. If these problems cannot be solved scientifically and timely, it will have a serious impact on the sustainable development of China's marine economy.

From the perspective of national economic development and world environment, the development of national economy and society is inseparable from the marine industry. The world's maritime powers continue to rely on marine management to strengthen their comprehensive competitiveness. China said that regardless of changes in domestic demand and external environment, the ocean plays an important role in the country's total output, highlighting the basic role of marine management systems in marine sustainable development. A sound integrated ocean management system can not only promote the development of marine economy and the sustainability of marine ecology but also protect the marine rights and sovereignty of a country.

In the study of integrated management and coordination mechanism of marine economy, Caiishi S proposed a new method to quantify the vulnerability of marine economy in Bohai rim area. His data envelopment analysis (DEA) is an analysis method combining the relative efficiency and performance of multi-input and multioutput decision-making units, which has been widely used in many fields. On the basis of understanding the vulnerability of marine economy, he combined the pressure state response model (P-S-R) and the exposure sensitivity adaptability model and established the evaluation index system of marine economic vulnerability from three aspects of pressure, sensitivity, and adaptability. His method uses the weighted loose econometric model to measure the marine economic vulnerability of 17 coastal cities in the Bohai Rim region. He used the kernel density estimation method to analyze the dynamic evolution of marine economic vulnerability in the Bohai Rim region. His method is not stable [1]. Li et al. think that the traditional grey relational model directly describes the behavior characteristics of the system based on the connection of sample points because a few grey relational models can measure the dynamic periodic fluctuation law of objects, which leads to the instability of association results. He used the transformation function to fit the system behavior curve, redefined the area difference between the curves, and established the grey correlation model based on discrete Fourier transform (dftgra), applied dftgra to verify its effectiveness, feasibility, and superiority, and studied the correlation between macroeconomic growth and marine economic growth in China's coastal areas. His method is not practical enough [2]. Jing et al.'s research uses the neural network, genetic algorithm, multistage principle, and Monte Carlo simulation to propose a process control and operation planning system based on integrated simulation. By using different time scales and computing scales, the process control can be well realized. The hourly process control strategy forwards the results to the business planning module, where long-term arrangements can be further evaluated. He took marine wastewater management as an example to verify the effectiveness of the method. Six different treatment criteria were examined within 20 days, and the 20 gauge standard seemed to be the most economical option with an average net cost of $18 per day. The accuracy of his method is very low [3].

This study first introduces the meaning and characteristics of marine economy and then describes three marine economic management modes in detail: relatively centralized, decentralized, and centralized. This study also describes the coordination mechanism of marine economy and the relative operation rules. The algorithm of this study is mainly to distinguish the types of marine economic coordinated development. In this study, Lianyungang City is taken as the research object, and the marine economic data in recent ten years are selected for analysis. Three evaluation methods of regional marine economic coordinated development and comprehensive management evaluation index system are also put forward. Based on the experimental results, this paper analyzes the fund demand, development status, comprehensive evaluation, and management of marine economic development. The current situation of marine economic development in China is obtained, and corresponding coordination measures are made.

2. Comprehensive Management and Coordination Mechanism of Marine Economy

2.1. Meaning and Characteristics of Marine Economy

2.1.1. The Meaning of Marine Economy

(1) In a narrow sense, marine economy refers to the economy formed by the development and utilization of marine waters and marine space [4].

(2) In a broad sense, marine economy refers to the economic activities that provide conditions for marine development and utilization, such as industries at the upper and lower boundaries of the narrow marine economy and the manufacturing of land and sea general equipment.

(3) The generalized marine economy refers to the land industry of the island, the land industry of the coastal zone, and the inland river economy of the river ocean system [5, 6].

2.1.2. Characteristics of Marine Economy

(1) Integrity: due to the continuity of marine waters, coastal areas, sea areas, and continental shelf at sea are connected together, and the exploitation and utilization of marine resources are interdependent. This can be illustrated by the mobility of marine living resources and the expansion of marine pollution.

(2) Publicity: marine resources are public resources, and the marine economy for the development and utilization of marine resources is also a public economy [7, 8].

(3) High tech: in order to develop marine resources for production activities, we must rely on special technical equipment, which will increase the technical requirements and high technical dependence on marine economic activities. At the same time, with the help of modern materials and equipment and science and technology, human beings can effectively develop and utilize marine resources, resulting in an independent marine economy [9].

2.2. Marine Economic Coordination Mechanism. One is cooperation, division of labor, and cooperation that can get the most benefits. The use of sea contains many different themes. It is necessary to implement division of labor and adjustment. The second is adjustment. In China, it is very necessary to resolve conflicts and disputes that have occurred. In order to effectively solve the contradiction of marine economic development, we need corresponding laws, deliberative organs, rules, and mechanisms. The third is harmony. Harmony is embodied in the change of development concept and the realization of sustainable development of marine economy [10, 11].

The characteristics of the adjustment mechanism including institutional factors: all relevant personnel must

abide by the fact that the mechanism is a systematic and theoretical method based on various effective methods and methods. Mechanisms generally depend on many methods. All kinds of methods and methods work. The mechanism is an effective and relatively fixed method in practice [12].

2.3. Management Mode of Marine Economy

(1) Relatively centralized type: there is no full-time marine management functional department, there is a national higher marine economic business adjustment organization, the limitation system of marine law is basically sound, and there is a maritime law enforcement department. It will be more flexible and efficient to adjust and implement the change in the system. The contradiction of marine economic management can only be handled passively and cannot be avoided actively through system integration [13, 14].

(2) Decentralized: there is no centralized marine management department, most of them have comprehensive marine economic adjustment institutions such as special committees, and there is no unified maritime law enforcement team. Industry management is more professional, and with a wide range of marine industry characteristics and strong professional awareness, it is difficult to concentrate on one department. If the function of subdividing, repeating, and dispersing these operations is not clear, it will easily cause inefficiency. Level adjustment and comprehensive management are not strong [15].

(3) Centralized: the higher the efficiency of management and coordination, the more conducive to the implementation of a comprehensive marine policy, and the higher the status of the department, the more helpful it is to improve people's marine awareness. It is difficult to achieve complete centralization, and it is easy to cause functional conflicts between new and old departments, and the system change cost is relatively high.

2.4. Operation Rules of Comprehensive Management and Coordination Mechanism of Marine Economy

(1) It is necessary to cut off the meaning of all the subjects to participate in the administrative decision. In the past, the main themes of marine economic management were marine departments and coastal local autonomous bodies. Now, the number of marine enterprises and citizen groups participating in the management and supervision of marine economy is increasing, and the scope of decision-making themes is far beyond the original administrative departments. Range: as a result, representatives of enterprises and citizens have also been incorporated into the design of members of the above-mentioned Marine Economic Commission. Within the scope of extensive participation in decision-making, all maritime institutions can provide the opportunity to resolve disputes; represent the opinions and suggestions of governments, industrial departments, enterprises, and ordinary citizens in different administrative regions; and reflect them in the final adjustment decision-making [16, 17].

(2) It is necessary to improve the decision-making process, deepen the understanding of the sea, and improve the scientific nature of decision-making. The sea is still the least understood area. The traditional detailed management of maritime industry artificially creates barriers to marine information. Lack of knowledge and information will affect the science and rationality of decision-making. Therefore, in the decision-making process of comprehensive management and adjustment mechanism of marine economy, the government as the "leader" must increase investment, strengthen marine research, learn more knowledge, and share with other topics. It must break the information barriers of various maritime industries, share marine economic data and research results, and make scientific and reasonable adjustment decisions based on sufficient information [18].

(3) It is necessary to change the idea of decision-making and make decisions based on the sustainable development of national marine economy. In order to realize scientific and reasonable decision-making, it is necessary to change the thinking of decision-makers into the practical decision-making thought with the highest interests of regions and departments and establish the decision-making idea of taking economic development as the priority and taking sustainable development as the goal in order to maximize the limited aquatic resources. It not only meets the needs of current economic development but also provides the possibility of foreseeable sustainable development in the future, so as to generate the maximum benefits [19, 20]. Sustainable development is the basic basis and principle of adjusting the interests of various departments and the ultimate goal of making scientific decisions. Therefore, government departments must carry out extensive publicity and education among different themes, strengthen the overall image of each theme, and create a good ideological environment for the implementation of coordinated decision-making [21, 22].

2.5. Criteria for Judging the Types of Coordinated Development of Marine Economy.

Through the analysis and verification of the interaction stress relationship among the three subsystems of the marine eco-economic system, it can be seen that there are objectively various dynamic stress and constraint interaction relationships among the subsystems of China's marine eco-economic system [23, 24]. With the help of system science theory, a dynamic coupling model is established to measure the coordination of the marine ecological-economic systems, and the development of 11 coastal and urban marine ecological-economic systems

under the pressure of systems is discussed quantitatively. The basic derivation process of the model formula is as follows [25].

The interaction stress and evolution process of any two subsystems of the marine eco-economic system can be regarded as a nonlinear process, and its evolution equation can be expressed as follows:

$$\frac{dx(t)}{dt} = f(x_1, x_2, \ldots, x_n); \quad i = 1, 2, \ldots, n. \quad (1)$$

F is a nonlinear function of x_i.

The motion adjustment of a nonlinear system depends on the property of the characteristic root of the first-order approximate system. Therefore, on the premise of practical use of the adjustment, the approximate expression of the above evolution equation can be obtained by using the Taylor series expansion near the origin and omitting the higher-order term $e(x_1, x_2, \ldots, x_n)$:

$$\frac{dx(t)}{dt} = \sum_{i=1}^{n} a_i x_i; \quad i = 1, 2, \ldots, n. \quad (2)$$

According to this formula, the marine eco-economic system can establish the representation function of the development of any two subsystems:

$$f(G) = \sum_{k=1}^{n} b_k g_k; \quad k = 1, 2, \ldots, m,$$
$$f(H) = \sum_{j=1}^{n} c_j h_j; \quad j = 1, 2, \ldots, l. \quad (3)$$

Among them, G and H are the evaluation indexes of the development status of the two subsystems, and B and C are the weight of each index.

Considering the interaction pressure relationship among the subsystems of the marine eco-economic system, it can be regarded as a composite system. Obviously, $f(G)$ and $f(H)$ can reflect the development and evolution of any two composite systems, regardless of the influence of the third subsystem. According to the general system theory, the evolution equation of the interaction stress relationship between the two subsystems expressed by the adjustment degree can be obtained:

$$A = \frac{df(G)}{dt} = \alpha_1 f(G) + \alpha_2 f(H),$$
$$V_A = \frac{dA}{dt},$$
$$B = \frac{df(H)}{dt} = \beta_1 f(G) + \beta_2 f(H), \quad (4)$$
$$V_B = \frac{dB}{dt},$$
$$\alpha = \arctan\left(\frac{V_A}{V_B}\right),$$

where A and B denote the evolution states of any two given systems of the marine eco-economic system affected by itself and another system, and V_A, V_B are the evolution speeds of

two subsystems affected by itself and other systems. In the marine environmental economic system, A and B interact with each other. If you modify a subsystem, the entire composite system will be modified, and the third subsystem will be retained. In the subsystem, the evolution speed V of the two subsystems can be regarded as a function of V_A, V_B; that is, $V = f(V_A, V_B)$. By analyzing the change value of V, we can investigate the adjustment of the two subsystems.

3. Marine Economic Management Index System

3.1. Subjects.
In this survey, from 2010 to 2019, the marine economic data of Lianyungang City were selected as the survey data. According to the factors of marine industry development and social development in Lianyungang City, a series of evaluation index methods are put forward to evaluate the influence of sustainable development of regional marine economy on marine economy, and the development status of marine economy in Lianyungang City is evaluated.

3.2. Evaluation of Coordinated Development of Regional Marine Economy

3.2.1. Index Analysis. The index of the evaluation object is selected as the base number, the remaining index of the evaluation object is calculated as a percentage, the weight of each index is determined, and the included indexes are calculated and sorted. The index analysis method is easy to calculate and the evaluation result is intuitive. However, this method requires a subjective determination of the reference object. From this, we can get the evaluation result of subjective mediation. In addition, in the distribution of weights, the differences in the influence of indicators on the ability of scientific and technological innovation are not considered. Basically, the primary and secondary relations of factors cannot be highlighted, and the differences that can not truly reflect the importance of the overall indicators of the scientific and technological innovation system can be adopted.

3.2.2. Factor Analysis. Firstly, the original index is standardized to exclude the influence of size on the evaluation results, and the calculation principle is based on the principle that the characteristic root is greater than 1. In order to make the main factors have a clear meaning, the factor load matrix is rotated orthogonally, and the load of each primary variable of the main factor is divided into 0 and 1. The relationship between the factors and the original variables and the scores of various common factors were calculated, and the total score was calculated. The comprehensive score is based on the weighted sum of the scores of the main reasons. Here, the weighting is determined by the ratio of the contribution rate of the main factors in the cumulative contribution rate.

3.2.3. Fuzzy Mathematics Analysis. Using correct mathematical language can explain the ambiguity that traditional mathematics cannot explain. Among them, fuzzy comprehensive evaluation can integrate various factors of nature to

correctly evaluate the objective things. The fuzzy comprehensive evaluation method is suitable for linear and non-linear problems.

3.3. Establishment of Evaluation Index System for Comprehensive Management of Marine Economy

3.3.1. Marine Ecosystem Subsystem. Marine biological community and marine abiotic inorganic environment are natural organic whole which are connected by energy flow and material circulation, which are interdependent and interactive and have an automatic regulation mechanism.

3.3.2. Marine Economic Subsystem. Marine economy takes the ocean as the labor object and the development of marine resources as the core. Marine resources refer to marine organisms, minerals, chemistry, cosmos, energy, and so forth, which exist in the marine ecosystem and can be used by human beings now or in the future. All resources and marine economy are industrial activities and output processes to develop or redevelop marine resources, which are available in the ocean and its space.

3.3.3. Marine Society Subsystem. Marine social system refers to the social groups that gather in specific coastal areas, mainly engaged in marine production and operation activities and related activities, or rely on marine economic products and ecological services. According to specific restrictions, it depends on the corresponding marine ecological environment and economic basis. All artificial organic system combined with the system. Specifically speaking, the marine social system is human-centered, which is composed of people who rely on the sea for production and life and have unique marine thinking.

4. Comprehensive Management Effect of Marine Economy

4.1. Financial Demand for Marine Economic Development. The analysis of the financial correlation rate in 11 coastal and 11 cities shows that the relatively small indicators, such as deposit and loan data, are used to measure financial assets and to clarify the level of financial development in coastal areas. There are two main reasons for choosing deposits and loans as indicators. One is that there are no special financial assets statistics in various regions of China, so data collection is limited, and the other is one of the most important factors in the current financial development process. As more than 90% of the social financing methods are carried out through bank loans, the main financial assets are concentrated in banks, and the most important assets for banks are deposits and loans. Table 1 shows financial assets in coastal areas and across the country.

From Table 1 to 2019, the financial assets in China's coastal areas will increase year by year. Before 2003, the proportion of coastal financial assets in national financial assets continued to increase, reaching the highest value of 58.92% in 2013. After 2014, although the proportion of financial assets of coastal areas in national financial assets decreased as a whole, there was no change, basically about 57% every year. Through the implementation of China's regional economic coordinated development strategy, we can see that the growth of financial assets in the central and western regions is accelerating. However, the proportion of about 57% fully shows that coastal areas are still the main collection areas of domestic financial assets. Figure 1 shows the GDP of coastal areas and its proportion in the whole country.

It can be seen from Figure 1 that after China's entry into WTO, the development of coastal areas has made great progress. From 2011 to 2019, the GDP of coastal areas basically accounts for 60% of annual GDP, especially 62.32% in 2016, which fully shows the economic growth of China's coastal areas. The development speed is faster than the national average speed, and the development gap between inland and coastal areas tends to expand continuously. In 2017 and 2018, mainly affected by the US financial crisis, the proportion decreased. The financial crisis has had a greater impact on coastal areas than inland areas.

4.2. Current Situation of Marine Economic Development in Lianyungang City. The total area of Lianyungang sea area is more than 670 square meters. It has a total land area of 5194 square kilometers and a population of 35.44 million, accounting for 70% and 75.6% of the city, respectively. In 2016, Leon marine economy realized 26 billion yuan of total output value and 10 billion yuan of added value. The added value of the marine industry is equivalent to 19.1% of the total output of the city in the same period, and the added value of the marine industry increases steadily year by year. Figure 2 shows the change of the added value of marine industry.

From Figure 2, we can see the changes of various marine industries in Lianyungang.

4.2.1. Marine Fishery and Related Industries. Due to the rapid development of Marine Fisheries and tidal plain agriculture, forestry, and animal husbandry in Lianyungang City, the adjustment of marine fishery structure has been accelerated, and the marine fishery has gradually expanded to the outer ocean and sea area, and the area and species structure of marine aquaculture have been continuously optimized. The proportion of aquaculture in marine fishery is increasing year by year. The production capacity has been steadily improved, significant achievements have been made in the adjustment of fishery structure, and the income level of fishermen has continued to rise. From 2012 to 2018, the city completed a total of 18.73 million tons of aquatic products, with a total fishery output value of 17.67 billion yuan. This is an increase of 32% compared with 2003. In 2018, the average net income of fishermen in the city was 18160 yuan, 4.6 times the average net income of farmers in the city.

TABLE 1: Financial assets of coastal areas and the whole country.

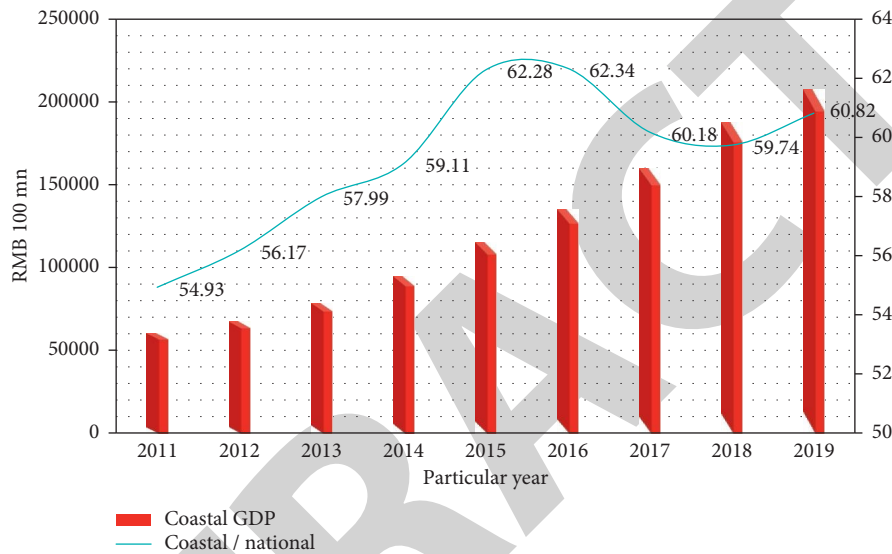| Particular year	Coastal financial assets	National financial assets	Coastal area/national (%)
2011	140068.75	255933.87	54.82
2012	170517.38	302217.35	56.51
2013	216270.33	367053.83	57.85
2014	243496.01	419623.15	58.12
2015	277343.82	481858.97	57.65
2016	319662.44	560717.36	57.23
2017	367082.15	651062.14	56.42
2018	432867.94	769598.84	56.16
2019	558791.69	1197453.62	55.98

FIGURE 1: Coastal GDP and its proportion in China.

4.2.2. Marine Industry.

In 2018, the city's marine industry realized an industrial output value of 8.9 billion yuan, with an added value of 2.4 billion yuan. The output value and added value of marine industry are 2.44 times and 3.77 times those of 2012. The operation capacity of major enterprises has been strengthened, and the support capacity for economic development has been further strengthened. The production of salt industry has developed steadily, and its output has increased from 180 million yuan in 2012 to 260 million yuan in 2018. With the rapid development of marine chemicals, the continuous acceleration of technological change of marine industrial enterprises and the further enhancement of research and development capacity, the production volume increased from 2.43 billion yuan in 2012 to 4 billion yuan in 2018.

4.2.3. Port Construction and Marine Transportation.

Lianyungang port infrastructure construction increased significantly, with a total investment of 1.76 billion yuan, 3 new production bases, 1 berth's expansion, 3 berths' upgrading, 11 berths' upgrading, and 70000-ton berths entering the port. The new capacity of this channel is 7.98 million tons. With the goal of developing a 100-million-ton port, Lianyungang has built the first 100000-ton deep-sea

terminal and the largest container terminal in Lianyungang. There are now more than 10000 tons of 30 berths, as well as infrastructure such as railways and highways supporting port 13. Construction has been continuously improved, and a three-dimensional ocean, land, and air transport network centered on the port has initially taken shape. The port transport capacity has continued to increase, and new European routes to Rotterdam, the Netherlands, Hamburg, and Germany have been opened successively, and the sea transportation routes to the west coast of the United States have been opened. The production of the maritime transportation industry increased from 840 million yuan in 2012 to 1180 million yuan in 2018. The added value increased from 240 million yuan to 455 million yuan.

4.3. Comprehensive Evaluation of Marine Economic Development Status.

As shown in Figure 3, the sustainable development state index of each subsystem.

It can be seen from Figure 3 that from 2015 to 2019, the sustainable development index value of the regional economic marine industry development subsystem has steadily increased from 0.593 to 0.863, and the corresponding sustainable development level has also transferred from the medium level sustainable development state to the strong
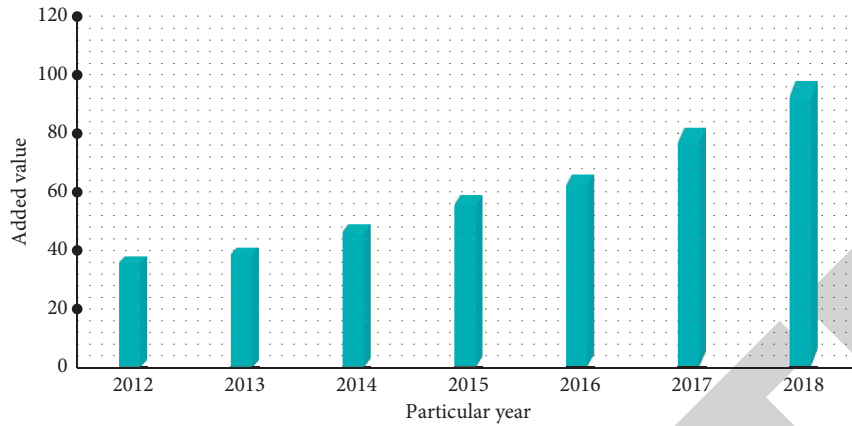
Figure 2: Change of the added value of marine industry.

sustainable development state. The state of continuous development: the sustainable development index value of the social development subsystem increased steadily from 0.63 to 0.714. The sustainable development index value of population, marine resources, and environment subsystem changes first increases, then decreases, and after that slowly increases. In 2018, it will fall into a low sustainable development state, and in 2019, it will enter a development state with medium sustainability. However, the current sustainability index has not exceeded its peak in 2017. The sustainable development index value of the government integrated management subsystem changes. At first, it drops to the bottom, then increases, and after that decreases slightly. However, in the state of sustainable development, even the bottom can maintain a strong level of sustainable development. The subsystem index also exceeded the key value of 0.75 sustainable level.
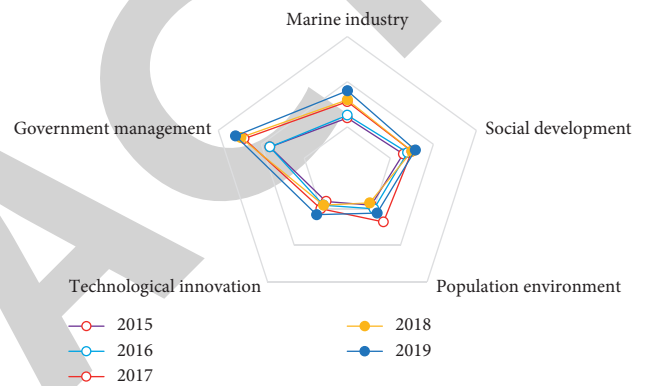
4.4. Evaluation of Integrated Management of Marine Economy. The development of China's marine resources is gradually booming, maintaining the momentum of rapid progress. With the large-scale development of marine resources, especially the rapid rise of secondary marine industry with high investment, high consumption, and high emission, the marine ecological environment in coastal areas is deteriorating. Figure 4 shows the comprehensive evaluation value of the marine economic system.

As can be seen from Figure 4, in the 10 years from 2010 to 2019, the evaluation value of China's marine economic system has increased from 0.20 to 0.33, with an average annual increase of 6.57 percentage points, and the system level has upgraded from "bad" at the initial stage to "average." Rapid growth: at the same time, the evaluation value of the marine social subsystem increased from 0.13 to 0.47, with an average annual growth of 26.11%. In addition, the system level has been upgraded from "poor" to "ordinary," and the development momentum is good.

However, China's marine economic subsystem and social subsystem are developed on the basis of large-scale utilization of marine resources and the environment at the cost of the large consumption of nonrenewable resources.
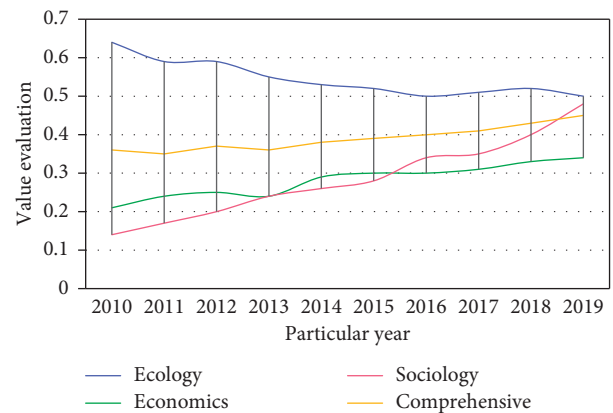

Figure 3: Sustainable development state index of each subsystem.

Figure 4: Comprehensive evaluation value of the marine eco-economic system.

Although the two subsystems grow rapidly in a short period of time, they have achieved rapid growth in the long term. From this point of view, the potential crisis of the overall degradation of marine ecosystem subsystems has been recognized. The "sustainable development" of China's marine ecosystem has declined from "good" to "normal" from 10.51% in the initial assessment, and the "sustainable development" of China's marine ecosystem has declined from 10.51% in the first year. However, the comprehensive

assessment value of China's marine eco-economic system increased from 0.35 in 2010 to 0.44 in 2019, with an average annual increase. Although it is 2.70 percentage points, the development speed is relatively slow.

5. Conclusion

The theme of the comprehensive management and coordination mechanism of China's marine economy mainly includes all levels of government, scientific research institutions, marine enterprises, and ordinary citizens. The relationship between the themes is the object of the adjustment mechanism. According to the governance theory, through the application of the cooperation network, we can form a good interaction between the main bodies, adjust the plans and objectives of the main bodies, and achieve the development and management objectives of the overall adjustment of the marine economy. The adjustment mechanism in the form of a committee should be established in the organizational model, and the Marine Economic Commission should be set up at all levels. The application rules are formulated from the perspectives of decision-making, negotiation, profit adjustment, and dispute resolution. From the perspective of system protection, it is suggested to establish a complete conference adjustment system, information sharing system, and temporary meeting adjustment system. Adjust the institution establishment system, supervision and evaluation system, and so forth.

The marine economic system is a special composite system with a specific structure and function formed by the interaction, interweaving, and mutual penetration of the marine ecosystem and marine social system. Its coordinated development makes the subsystems influence each other, which means that the functions of marine ecological structure, marine economic structure, and marine social structure can be integrated after feedback and cooperation. This makes it possible to maintain an effective dynamic balance between the fixed structure and the orderly function.

In order to manage the ocean thoroughly and effectively and realize the economic and cultural value of the ocean, China needs to further improve the integrated ocean management system, refine the division of the functions of the integrated ocean management, standardize the establishment of the marine management organs, and improve the construction of the system of the law of the sea. In order to establish a characteristic marine integrated management system in line with China's basic national situation, this paper proposes to improve China's comprehensive marine management system; promote the rapid, healthy, and sustainable development of marine economy; protect marine life, resources, and sovereign rights and interests; safeguard marine ecological culture; protect the Ming Dynasty; optimize the environment; and finally build a socialist maritime power with Chinese characteristics.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

References

[1] S. Caizhi, Q. Xionghe, L. Bo et al., "Assessment of marine economy vulnerability of coastal cities in Bohai sea ring area based on WSBM model," *Entia Geographica Sinica*, vol. 36, no. 5, pp. 705–714, 2016.

[2] X. Li, Y. Zhang, and K. Yin, "A new grey relational model based on discrete Fourier transform and its application on Chinese marine economic," *Marine Economics and Management*, vol. 1, no. 1, pp. 79–100, 2018.

[3] L. Jing, B. Chen, B. Y. Zhang et al., "An integrated simulation-based process control and operation planning (IS-PCOP) system for marine oily wastewater management," *Journal of Environmental Informatics*, vol. 28, no. 2, pp. 126–134, 2016.

[4] K. Nazir, M. Yongtong, K. Hussain et al., "A study on the assessment of fisheries resources in Pakistan and its potential to support marine economy," *Indian Journal of Geo-Marine Sciences*, vol. 45, no. 9, pp. 1181–1187, 2016.

[5] D. I. Qianbin and D. Shaoyu, "Symbiotic state of Chinese land-marine economy," *Chinese Geographical Ence*, vol. 27, no. 2, pp. 176–187, 2017.

[6] J. L. Gan, X. L. Gu, L. D. Li et al., "Oil pollution and its relation to marine economy along Guangdong province coast of China during 2001–2010 based on oyster as a bio-indicator," *Journal of Ecology and Rural Environment*, vol. 34, no. 10, pp. 897–902, 2018.

[7] Z. Li, "Impact of educational expenditure on the development of regional marine economy: evidence from Chinese coastal provinces," *Journal of Human Resource and Sustainability Studies*, vol. 6, no. 1, pp. 108–117, 2018.

[8] M. Cavallo, Á. Borja, M. Elliott, V. Quintino, and J. Touza, "Impediments to achieving integrated marine management across borders: the case of the EU marine strategy framework directive," *Marine Policy*, vol. 103, no. 5, pp. 68–73, 2019.

[9] P. Burbridge, "Commentary 7 to the Manifesto for the marine social sciences: integrated coastal zone management," *Maritime Studies*, vol. 19, no. 2, pp. 139-140, 2020.

[10] X. Liu, W. Shi, S. Yuan et al., "Integrated management strategies analysis of marine disaster risk in China," *International Journal of Offshore and Polar Engineering*, vol. 26, no. 2, pp. 192–198, 2016.

[11] A. Lara-Lopez, T. Moltmann, and R. Proctor, "Australia's integrated marine observing system (IMOS): data impacts and lessons learned," *Marine Technology Society Journal*, vol. 50, no. 3, pp. 23–33, 2016.

[12] J. I. Ulrikke, "Integrated Ocean management in the arctic: comparative analyses of the implementation and use of marine protected areas in Canada and Norway," *Ocean Yearbook*, vol. 32, no. 1, pp. 206–238, 2018.

[13] W. L. Balthis, J. L. Hyland, C. Cooksey et al., "Sediment quality benchmarks for assessing oil-related impacts to the deep-sea benthos," *Integrated Environmental Assessment & Management*, vol. 13, no. 5, pp. 1–15, 2017.

[14] T. A. Palmer, P. A. Montagna, R. H. Chamberlain et al., "Determining the effects of freshwater inflow on benthic macrofauna in the Caloosahatchee Estuary, Florida," *Integrated Environmental Assessment and Management*, vol. 12, no. 3, pp. 529–539, 2016.

[15] G. Mancinelli, P. Chainho, L. Cilenti et al., "The Atlantic blue crab *Callinectes sapidus* in southern European coastal waters:

distribution, impact and prospective invasion management strategies," *Marine Pollution Bulletin*, vol. 119, no. 1, pp. 5–11, 2017.

[16] M. Mateo, L. Pawlowski, and M. Robert, "Highly mixed fisheries: fine-scale spatial patterns in retained catches of French fisheries in the Celtic Sea," *ICES Journal of Marine Science*, vol. 74, no. 1, pp. 91–101, 2017.

[17] N. V. Shadrin, "The alternative saline lake ecosystem states and adaptive environmental management," *Journal of Oceanology and Limnology*, vol. 36, no. 6, pp. 2010–2017, 2018.

[18] B. Paterson, B. Neis, and R. L. Stephenson, "A social-ecological study of stock structure and fleet dynamics in the Newfoundland herring fishery," *ICES Journal of Marine Science*, vol. 75, no. 1, pp. 257–269, 2018.

[19] D. J. Packer, C. T. H. Miners, and N. D. Ungson, "Benefiting from diversity: how groups' coordinating mechanisms affect leadership opportunities for marginalized individuals," *Journal of Social Issues*, vol. 74, no. 1, pp. 56–74, 2018.

[20] M. Drosou, F. Kamatsos, and C. A. Mitsopoulou, "Recent advances in the mechanisms of the hydrogen evolution reaction by non-innocent sulfur-coordinating metal complexes," *Inorganic Chemistry Frontiers*, vol. 7, no. 1, pp. 37–71, 2020.

[21] D. Zissis, G. Ioannou, and A. Burnetas, "Coordinating lot sizing decisions under bilateral information asymmetry," *Production and Operations Management*, vol. 29, no. 2, pp. 371–387, 2020.

[22] Q. F. Li, J. Lu, J. W. Yu et al., "Advances in molecular mechanisms of brassinosteroid-abscisic acid crosstalk coordinating plant growth and stress tolerances," *Zhiwu Shengli Xuebao/Plant Physiology Journal*, vol. 54, no. 3, pp. 370–378, 2018.

[23] J.-M. Li, Y.-H. Wang, Y. Yu, R.-B. Wu, J. Weng, and G. Lu, "Copper-catalyzed remote C-H functionalizations of naphthylamides through a coordinating activation strategy and single-electron-transfer (SET) mechanism," *ACS Catalysis*, vol. 7, no. 4, pp. 2661–2667, 2017.

[24] R. U. Osarogiagbon, H. P. Rodriguez, D. Hicks et al., "Deploying team science principles to optimize interdisciplinary lung cancer care delivery: avoiding the long and winding road to optimal care," *Journal of Oncology Practice*, vol. 12, no. 11, pp. 983–991, 2016.

[25] A. Lindberg, N. Berente, J. Gaskin, and K. Lyytinen, "Coordinating interdependencies in online communities: a study of an open source software project," *Information Systems Research*, vol. 27, no. 4, pp. 751–772, 2016.