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Article

Research on Financial Support for Transformation and Upgrading of Guangxi's Marine Industrial Structure

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Abstract: Guangxi is the only province in China that is connected with the land and sea of the ASEAN countries. It is also the front and window of China's opening and cooperation to the ASEAN, and an important gateway for the land and sea convergence of the new land and sea channel in the west. Guangxi's marine economy continues to grow rapidly, and the transformation and upgrading of its marine industrial structure are facing both opportunities and challenges. Firstly, this paper reviews and analyzes the development process of Guangxi's marine industry, introduces the resource advantages and basic conditions of Guangxi's marine industry in detail, and focuses on issues such as marine scientific, technological innovation, and personnel training. Secondly, the paper puts forward some suggestions and measures on financial support for the transformation and upgrading of Guangxi's marine industry structure, including increasing credit investment in the marine industry, innovating the financial service model, supporting scientific and technological innovation and personnel training, etc., which provide new paths for Guangxi's marine industry to achieve sustainable development.

Keywords: Guangxi marine economy; the structure of marine industry; financial support

1. Introduction

In recent years, China's marine economy has continued to grow, with the gross marine product increasing from 8341.5 billion yuan in 2018 to 9462.8 billion yuan in 2022. Under the influence of the complex international environment, the marine economy is encountering unparalleled obstacles, resulting in a decline in the total volume of the marine economic. After preliminary calculation, China's national marine GDP in 2022 was 9462.8 billion yuan, an increase of 1.9% over the previous year, accounting for 7.8% of the GDP. The marine economy maintained a steady development trend. However, the problems of unbalanced, uncoordinated and unsustainable development of China's marine economy still exist, the pressure on restructuring, transformation, and upgrading of the marine industry has increased. For example, some marine industries have overcapacity problems, the capability of independent innovation and transformation of technological achievements needs to be improved, the pressure on the marine ecological environment has been increasing, the marine ecological environment has been degraded, land-sea cooperative protection needs to be strengthened, and the risks of marine disasters and safe production have become increasingly prominent. These factors still

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restrict the sustainable and healthy development of China's marine economy. As a key input element, finance plays an important role in transforming and upgrading marine industrial structure, such as financial support, risk management, technological innovation support, market development and policy support, which are of great significance to the development of the marine economy.

Guangxi is located at the southern tip of China's urban development axis, promoting the development of marine industry, practicing the "Three Positions" and creating two core growth poles of Guangxi's Beibu Gulf Economic Zone and the Pearl River-Xijiang Economic Zone, which have created a new historical opportunity to promote the development of Guangxi's marine economy. Based on the analysis of the current development situation of Guangxi's marine economy, this paper clarifies the existing problems of Guangxi's marine industry, and puts forward countermeasures and suggestions of financial support for the upgrading of Guangxi's marine industry structure under the current policy background, industrial structure and financing environment.

2. Literature Discussion

2.1. Domestic and Foreign Literature Review

The transformation and upgrading of marine industrial structure refer to the leap-forward development of marine economy at home and abroad in the process of marine economic development by changing the industrial structure, optimizing the allocation of resources and upgrading the technological level to adapt to the new economic situation and demand. Presently, domestic and foreign scholars' researches on marine industry are mainly from structural adjustment, technological innovation and financial support.

From the perspective of structural adjustment, Ye Shujun proposed a method to develop marine industry in Guangxi Beibu Gulf Economic Zone and improve its competitiveness [1]. Gou Loufeng proposed that new and old kinetic energy can be converted by the marine science and technology progress, industrial structure adjustment and marine growth impetus [2]. Based on the relevant data of the coastal provinces, Wang Yinyin obtained the effect of the adjustment of marine industrial structure on the development of marine economy [3]. Chen Xiaofeng used the revised E-G index and Mo Landi index to comprehensively evaluate the degree of collaborative agglomeration and spatial pattern of marine industries in China, and obtained the spatial correlation of agglomeration of marine secondary and tertiary industries [4]. Furthermore, Du Jun has formulated policies that are conducive to the sustainable development of marine industry in the southern marine economic circle and promote the coordination of marine economic development and marine ecological environment, which are of important, significance [5].

In the aspect of technological innovation, Yan Shi suggested increasing the scale of the marine economy and the level of educational development to boost the efficiency of marine technological innovation in China [6]. Zhang Yi proposed support for the development of emerging industries under the ocean strategy [7]. Wang took the coastal area as an example, and used coupling analysis to analyze the relationship between marine science and technology innovation and marine finance and education [8]. Moreover, Fukaibao obtained that the digital economy can promote the upgrading of the industrial structure of the marine economy through the impact path [9]. Ningling proposed to improve the technological progress and innovation efficiency in the regional marine high-tech industry by combing the triple helix theory and analyzing the static and dynamic efficiency of the innovation capability of the coastal high-tech industry [10].

In terms of financial support, Ma Shucai studies the contribution rate of credit funds to support the development of marine economy [11]. At the same time, Ningling estimates the impact of marine environmental regulations and marine financial support on the upgrading of marine industrial structure based on the dynamic panel GMM [12]. Based on the DEA study on the efficiency of financial support for China's marine industry, Cao has concluded that financial support plays a decisive role in the development of marine industry [13]. Thompson analyzed of the current situation and trend of the blue debt [14]. Pieter proposed to use the funds for sustainable blue economic projects related to oceans and freshwater [15].

Overall, domestic and foreign research has provided some useful ideas and experiences for the transformation and upgrading marine industrial structure, among which the importance of industrial structure

optimization, balance between resource development and environmental protection, innovation-driven development and other aspects are emphasized. These studies significantly guide this paper to study the transformation and upgrading of marine industrial structure from the perspective of financial support.

2.2. Relevant Domestic and Foreign Policy Support

In order to ensure the sustainable development of the marine economy, many countries have formulated policies and measures to support and promote the development of the marine economy and marine industry. These policies include the development and utilization of resources, environmental protection, marine safety and other content, aiming to promote the healthy, orderly and sustainable development of the marine industry. The policy documents of important regions and countries abroad are shown in Table 1.

Table 1. Policy Documents of Important Regions and Countries Abroad.

	Region/Country	Key Policy Names
International Marine industry policy	Europe	Blue Book of EU's Integrated Marine Policy and Road Map of European Marine Energy Strategy
		"Blue Economy" Innovation Plan
	United States of America	Ocean Blueprint for the 21st Century, US Ocean Action Plan
		The Final Proposal on Strengthening U.S. Marine Work
		The National Marine Policy Implementation Plan and the US 10-Year Vision of Marine Science and Technology
		Executive Order on Marine Policies to Promote U.S. Economic, Security, and Environmental Interests
	Britain	Ocean Outlook, Ocean Strategy 2050
	Germany	Ocean Agenda 2025: Germany's Future as a Marine Industry Center

Source: Collation of this study.

Currently, China has issued marine strategic planning and policy documents, which have clearly defined the development objectives and policy direction of the marine economy and related industries. These documents have provided policy support and development direction for the marine economy. In addition, the specific policies to support the marine economy and marine industry vary from region to region. Domestic coastal provinces or regions also formulate corresponding policies and measures according to their development needs and characteristics to promote the healthy development of the marine economy and industrial upgrading. Table 2 presents an overview of major policy documents of marine industry.

Table 2. Major Policy Documents of Marine Industry.

	Time	Key Policy Names
National Marine Industry Policy	2013	The 12th Five-Year Plan for the Development of National Marine Undertakings
	2015	Key Points of National Marine Economy Work in 2015
	2016	The 13th Five-Year Plan for National Science and Technology Innovation and the 13th Five-Year Plan for National Marine Economic Development
	2017	The 13th Five-Year Plan for National Marine Economic Development
		"13th Five-Year Plan" Special Plan for Scientific and Technological Innovation in Marine Field
	2018	"Guidance on Improving and Strengthening Financial Services for Marine Economic Development"
		Implementation Opinions on Promoting High-quality Development of Marine Economy
	2020	"Guidance on Promoting Quality Development in Banking and Insurance Industry"

Cont.

2021	The "14th Five-Year Plan" Implementation Plan for Promoting High-Quality Construction of New Land and Sea Channels in Western China
	The "14th Five-Year" Marine Economic Development Plan
2022	The "14th Five-Year" Marine Ecological Environment Protection Plan

Source: Collation of this study.

To speed up the construction of a strong marine region, Guangxi put forward the "Action Plan to Build Guangxi's Xianghai Economy" in 2017, the "Three-year Action Plan for Guangxi to Accelerate the Development of Xianghai Economy and Promote the Construction of a Strong Marine Region (2020–2022)" and the "Three-year Action Plan for Guangxi to Vigorously Develop Xianghai Economy and Build a Strong Marine Region (2023–2025)" in 2021–2023 respectively. Meanwhile, Guangxi has also put forward policy documents such as "Several Policies for Promoting High-level Open and High-quality Development of Guangxi's Beibu Gulf Economic Zone in the New Era", "Three-year Action Plan for Promoting the Construction of a New Land-Sea Passage in the West" to boost the construction of an all-round open development of "South-to-North Alliance, East-to-East Integration, and West-to-North Cooperation" and the development of the marine economy.

3. Analysis on the Current Situation of Guangxi's Marine Industry Development and Financial Support

Facing the South China Sea, Guangxi is connected with ASEAN countries by land and sea, and "one bay connects seven countries". It has irreplaceable strategic position, advantaged location advantage and abundant resources advantage to develop the sea economy. This paper will analyze Guangxi's resource base, marine industry development and financial support from the following three aspects.

3.1. Guangxi Marine Industry Development Trend

At present, the main development trend of Guangxi's marine primary industry is to protect and rationally utilize marine resources and realize sustainable development. The development trend of marine secondary industry is to strengthen technological innovation and industrial upgrading to improve the efficiency of the development and utilization of marine resources. The marine tertiary industry is mainly to strengthen the improvement of service quality and the cultivation of new formats, and to increase the contribution rate to the local economy. Overall, Guangxi's marine industry has a complete range of industries, including marine fishery, marine transportation, marine oil and gas industry, etc. Among them, the development of marine fishery is particularly prominent. As shown in Table 3, the development trend of Guangxi's marine industry is gradually towards diversification, high-end and intelligence.

Table 3. Classification of Marine Economy Industries.

Industry Category	Main Components
primary industry	Marine fishery, aquaculture
secondary industry	Aquatic products processing industry, marine pharmaceutical industry, seawater comprehensive utilization industry, seawater salt industry, marine chemical industry, marine oil and gas industry, marine mining industry, marine shipbuilding industry, marine energy utilization industry, marine construction industry, etc.
service sector	Marine transportation, marine tourism and other marine service industries

Source: Collation of this study.

3.2. The resource Base of Guangxi's Marine Economy

3.2.1. Coastline and Island Resources

Guangxi is the only coastal area in the west and has an important strategic position. As can be seen from Table 4, its coastline has a total length of 1, 628.6 kilometers, which accounts for 9.05% of the national continental coastline. The sea area available for development is 62, 800 square kilometers, indicating it has abundant marine resources to be developed.

Table 4. Statistics of Coastlines and Islands.

Region	Length of Coastline (km)	Number of Sea Islands (s)	Island Shoreline Length (km)	Percentage of Coastline to Mainland Coastline (%)
Tianjin	153.67	12	6.8	0.85
Hebei	487	75	138.4	2.71
Liaoning (Province)	2292.4	506	700.2	12.74
Shanghai	172.31	five	5.8	0.96
Jiangsu (Province)	954	296	688.6	5.30
Zhejiang (Province)	2200	2161	4068.2	12.22
Fujian (Province)	3752	1404	2119.8	20.80
Shandong (Province)	3345	296	688.6	18.58
Guangdong	4114.3	1431	2414.4	22.80
Guangxi	1628.6	697	513.2	9.05
Hainan	1823	600	1618.0	10.13
Taiwan Province of China	1139	222	1823.5	6.33

Source: National Island Protection Plan, Ministry of Natural Resources of People's Republic of China (PRC).

3.2.2. Coastal Wetland Resources

lt can be seen from the data in Table 5 that Guangxi has an area of 126,300 hectares of wetlands, spanning from north to south three climatic zones, namely, the mid-subtropical zone, the southern subtropical zone and the northern tropical zone. It is a global biodiversity hotspot with abundant wetland resources. At the same time, Guangxi is also an important distribution area of mangrove forests in China, with a mangrove land of 96,000 hectares, which supports a large number of fishing activities, provides rich fishing products for local residents, and has high potential for marine tourism.

Table 5. Statistics of Wetland Area in Coastal Areas.

Region	Total Wetland Area (Ten Thousand Hectares)	Coastal Mudflats (Ten Thousand Hectares)	Mangrove Land (Ten Thousand Hectares)
National total	2360.96	150.28	2.27
Tianjin	3.28	1.70	0.00
Hebei	14.05	6.30	0.00
Liaoning (Province)	29.56	13.63	0.00
Shanghai	7.21	3.05	0.00
Jiangsu (Province)	40.89	38.24	0.00
Zhejiang (Province)	16.14	15.11	0.01

Cont.

Region	Total Wetland Area (Ten Thousand Hectares)	Coastal Mudflats (Ten Thousand Hectares)	Mangrove Land (Ten Thousand Hectares)
Fujian (Province)	18.72	17.35	0.13
Shandong (Province)	24.68	19.89	0.00
Guangdong	17.84	14.89	1.06
Guangxi	12.63	9.54	0.96
Hainan	12.12	10.59	0.57

Source: China Marine Economic Statistics Yearbook 2022.

3.3. Guangxi Marine Industry Development Status Analysis

3.3.1. Guangxi's Marine Economic Scale and Industrial Structure

After preliminary calculation, Guangxi's marine GDP in 2022 reached 229.69 billion yuan, up 4.2% year-on-year, accounting for 8.7% of the region's GDP. Guangxi's marine primary industry added 23.65 billion yuan, marine secondary industry added 69.06 billion yuan and marine tertiary industry added 136.98 billion yuan, accounting for 10.3%, 30.1% and 59.6% of Guangxi's marine GDP, respectively. As shown in Figure 1, the added value of the three industries showed an upward trend.

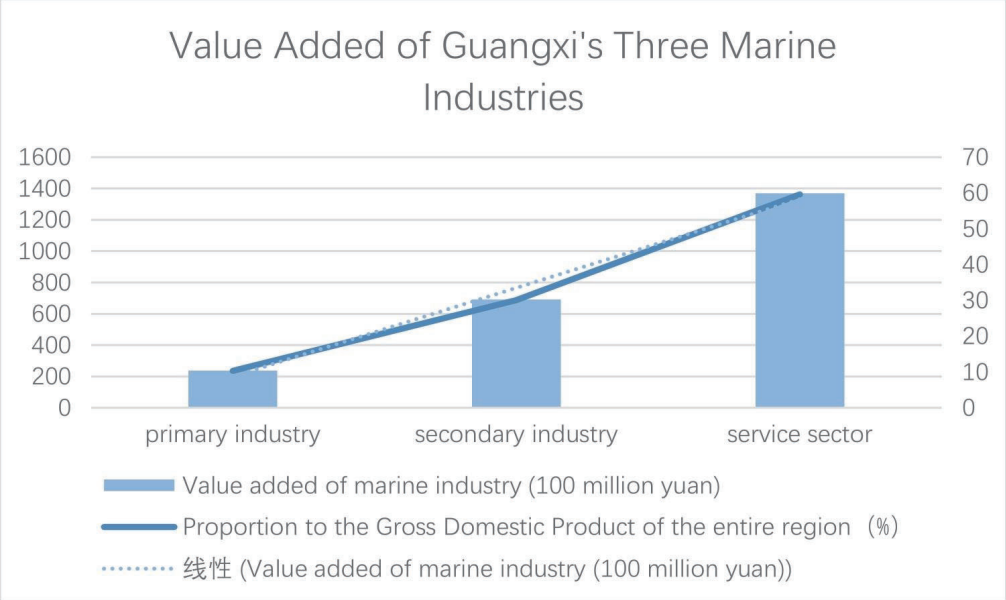

Figure 1. Value Added of Guangxi's Three Marine Industries.

Source: China Marine Economic Statistics Yearbook 2022.

3.3.2. Comparison of the Development of Guangxi's Marine Industry with that of the Whole Country

From Table 6 and Figure 2 we can see that the country's marine GDP was 9462.8 billion yuan, and Guangxi's marine GDP accounted for only 2.42% of the country's marine GDP in 2022. Among the three industrial structures, Guangxi accounted for 5.58%, 2.05% and 2.46% of the country's marine primary, secondary and tertiary industries. Overall, the scale of Guangxi's marine economic development and the scale of industrial development are relatively low in the whole country, with the overall development lagging behind.

Table 6. Statistical Table of National and Guangxi Marine GDP and Three Industries Development.

Age	Whole Country				Guangxi			
	Gross Marine Product (Billion yuan)	Primary Industry	Secondary Industry	Service Sector	Guangxi's Gross Marine Product (RMB100 million)	Primar Industry	Secondary Industry	Service Sector
2010	39619.2	2008.0	18919.6	18691.6	548.7	100.4	223.1	225.2
2011	45580.4	2381.9	21667.6	21530.8	613.8	126.8	230.6	256.4
2012	50172.9	2670.6	23450.2	24052.1	761.0	142.7	301.8	316.5
2013	54718.3	3037.7	24608.9	27071.7	899.4	154.0	376.9	368.6
2014	60699.1	3109.5	26660.0	30929.6	1021.2	175.9	373.5	471.7
2015	65534.4	3327.7	27671.9	34534.8	1130.2	183.1	404.6	542.6
2016	69693.7	3570.9	27666.6	38456.2	1251.0	203.5	434.4	613.1
2017	76749.0	3628.1	28951.9	44169.0	1377.0	219.4	462.0	695.6
2018	78077.8	3842.7	26854.0	47381.1	1501.7	230.2	486.1	785.5
2019	84191.3	3833.1	28020.1	52338.1	1612.5	241.3	481.8	889.4
2020	79549.8	4133.5	26226.4	49190.0	1579.7	218.3	500.3	879.1
2021	89521.3	4119.0	30960.5	54441.7	2204.6	230.1	634.7	1339.8

Source: China Marine Economic Statistics Yearbook 2011–2022.

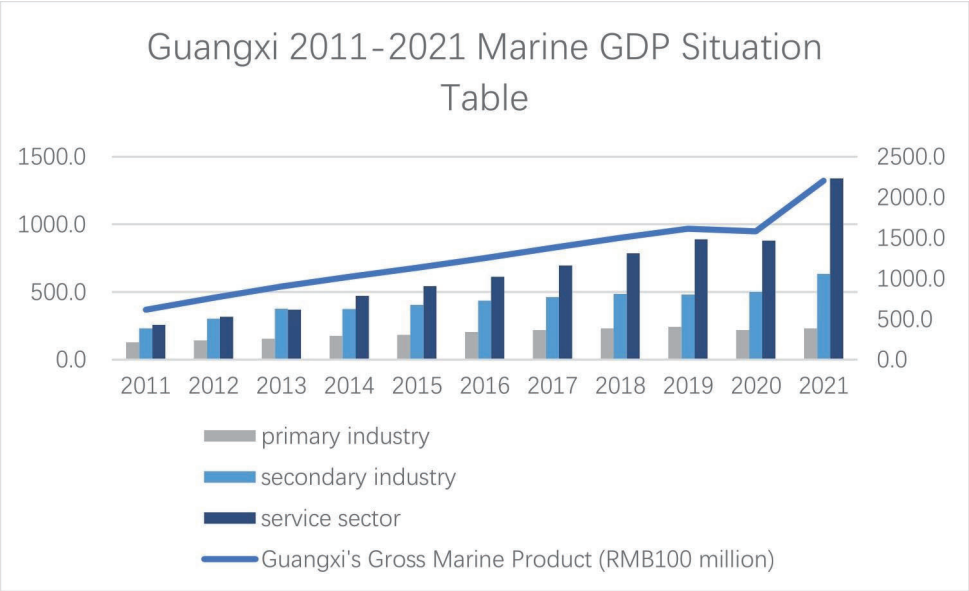

Figure 2. Guangxi 2011–2021 Marine GDP Situation Table.

Source: China Marine Economic Statistics Yearbook 2011–2022.

3.3.3. Comparison of Guangxi's Marine Industry Development with other Provinces

Among the 11 coastal cities in the country, the GDP of Guangxi's tertiary industry is lower than that of other coastal cities, and Hainan is similar. One of the fastest growing is Guangdong. Guangxi ranks last in the marine tertiary industry. The statistical table of comparison of regional marine GDP and three industries' development are presented in Table 7. The comparison of gross domestic product of three marine industries in different

regions can be seen in Figure 3.

Table 7. Statistical Table of Comparison of Regional Marine GDP and Three Industries Development (2021).

Region	Gross Marine product (Billion yuan)	Primary Industry	Primary Industry (%)	Secondary Industry	Secondary Industry (%)	Service Sector	Tertiary Industry (%)
total	89521.3	89521.3	4.6	30960.5	34.6	54441.7	60.8
Tianjin	5174.9	9.1	0.2	2145.2	41.5	3020.7	58.4
Hebei	2743.8	152.7	5.6	1071.7	39.1	1519.5	55.4
Liaoning	4450.6	365.8	8.2	1583.9	35.6	2500.9	56.2
Shanghai	9621.3	8.2	0.1	2612.9	27.2	7000.3	72.8
Jiangsu	8422.7	281.6	3.3	3500.1	41.6	4641.1	55.1
Zhejiang	9841.2	523.8	5.3	3741.3	38.0	5576.1	56.7
Fujian	10841.5	796.6	7.3	3822.2	35.3	6222.8	57.4
Shandong	15154.4	898.4	5.9	6613.4	43.6	7644.5	50.4
Guangdong	17114.5	533.1	3.1	5019.2	29.3	11562.2	67.6
Guangxi	2204.6	230.1	10.4	634.7	28.8	1339.8	60.8
Hainan	1989.5	288.9	14.5	131.1	6.6	1569.4	78.9

Source: China Marine Economic Statistics Yearbook 2022.

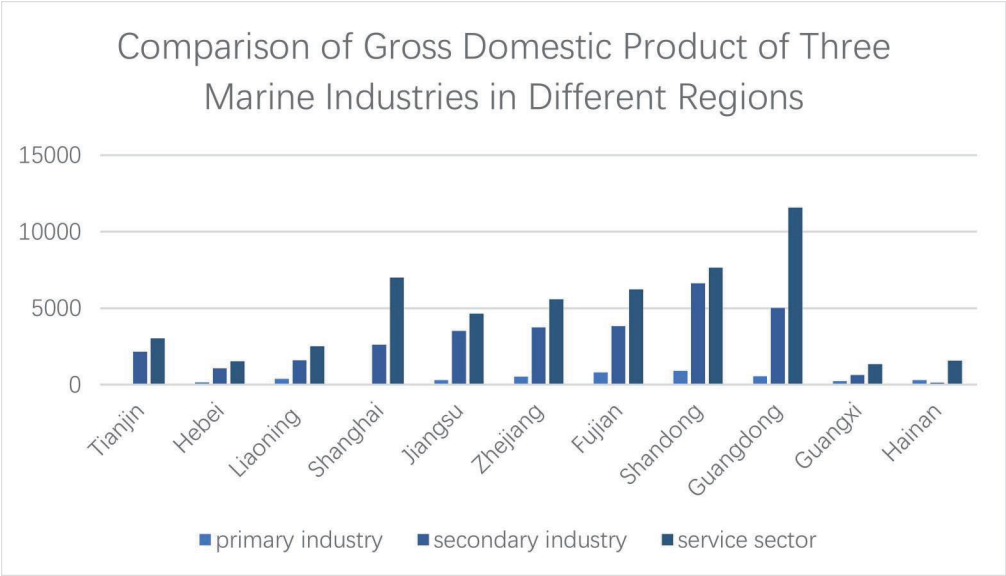

Figure 3. Comparison of Gross Domestic Product of Three Marine Industries in Different Regions

Source: China Marine Economic Statistics Yearbook 2022.

3.3.4. Current Situation of Marine Scientific Research Education and Service Level in Guangxi

In terms of the growth value of marine and related industries, the growth value of Guangxi's marine industry was 108.2 billion yuan, ranking lower than that of the coastal cities in the country, and the proportion of marine industry was as high as 49.1%. As can be seen from Table 8, Guangxi has invested 10.94 billion yuan in marine scientific research and education, ranking tenth among the coastal cities in the country and lagging behind.

Table 8. Value Added of Marine and Related Industries in Coastal Areas (2021).

Region	Total (Billion yuan)	Marine Industry (Billion Yuan)	Marine Industry (%)	Marine Scientific Research Education (100 million yuan)	Marine scientific Research Education (%)	Marine Public Management Services	Marine Public Management Services (%)
total	89521.3	36761.3	41.1	5579.4	6.2	15240.4	17.0
Tianjin	5174.9	2691.5	51.0	135.2	2.6	181.4	3.5
Hebei	2743.8	1337.0	48.7	137.8	5.0	328.2	12.0
Liaoning	4450.6	2291.4	51.5	149.9	3.4	718.1	16.1
Shanghai	9621.3	2745.6	28.5	361.5	3.8	2360.1	24.5
Jiangsu	8422.7	3262.8	38.7	511.5	6.1	1336.1	15.9
Zhejiang	9841.2	4610.4	46.8	286.7	2.9	1468.6	14.9
Fujian	10841.5	4860.7	44.8	240.7	2.2	1356.0	12.5
Shandong	15154.4	6634.0	43.8	827.3	5.5	1896.2	12.5
Guangdong	17114.5	6060.1	35.4	934.6	5.5	5126.1	30.0
Guangxi	2204.6	1082.0	49.1	109.4	5.0	199.7	9.1
Hainan	1989.5	1068.1	53.7	40.3	2.0	269.9	13.6

Source: China Marine Economic Statistics Yearbook 2022.

In the aspect of the expected number of graduates from marine majors, Guangxi has an expected number of 996 graduates. As to the estimated number of graduates from marine master's degree programs, Guangxi has an estimated number of graduates of 55. Judging from the expected number of graduates from the doctoral program in marine science, Guangxi has only 2 expected graduates. Therefore, it can be seen from the data in Table 9 that the level of marine professional education in Guangxi is relatively backward and the supply of talents is insufficient.

Table 9. Higher Education of Marine Specialty (2021).

Region	Expected Number of Graduates of Marine major (Person)	Estimated number of graduates from master's degree program in marine specialty (Person)	Estimated Number of Doctoral Students Majoring in Ocean (Persons)
total	38490	7576	3777
Beijing	1138	652	574
Tianjin	1186	176	11
Hebei	1083	18	0
Liaoning	3521	517	201
Shanghai	1688	964	297
Jiangsu	3641	642	354
Zhejiang	1670	522	197
Fujian	2368	256	180
Shandong	4045	881	468

Cont.

Region	Expected Number of Graduates of Marine major (Person)	Estimated number of graduates from master's degree program in marine specialty (Person)	Estimated Number of Doctoral Students Majoring in Ocean (Persons)
Guangdong	2964	313	128
Guangxi	996	55	2
Hainan	664	eighty-five	12

Source: China Marine Economic Statistics Yearbook 2022.

3.4. The Status Quo of Financial Support for the Transformation and Upgrading of Guangxi's Marine Industry

3.4.1. Basic Overview of Financial Infrastructure

At present, the government has issued a series of policy documents to support the construction of offshore financial infrastructure, specifying the development objectives and policy measures, which provide a strong guarantee for the construction of offshore financial infrastructure. Financial institutions actively explore and develop in offshore finance, and promote the innovation and enhancement of offshore financial business. These institutions include but are not limited to Guangxi Beibu Gulf Bank and Guilin Bank. At the same time, they also actively promote the construction of the offshore financial market, and continuously improve the function and efficiency of the market by enhancing the market supervision mechanism, optimizing the market structure, improving market liquidity, etc. However, Guangxi has not established a blue financial franchise institution to support and promote economic activities related to marine resources, marine technology and marine industry.

3.4.2. Basic Overview of Credit Support Capabilities

In 2022, Guangxi's banking financial institutions had a total of 6,646 outlets, the region's loan balance reached 446,879 million yuan, an increase of 12.14% year-on-year, and 65 projects supported by policy-based development financial instruments, with a total investment of 23 billion yuan. "Guihui Loan" added 330 billion yuan to reduce the financing cost of enterprises by 6.3 billion yuan; Guangxi Credit Information Financing Service Platform has provided credit information support over 800,000 times and service financing over 800 billion yuan. Among them, Beihai City in Guangxi has set up a Beihai City Association, which has provided 123 million yuan in loans for sea water fishing, mariculture, aquatic product processing and South Pearl industries, and 7.5 billion yuan in loans for marine industries to support the development of marine economy.

3.4.3. Basic Overview of the Insurance Service Guarantee Ability

Currently, the sea-related insurance in Guangxi only includes the wind index insurance for prawn, oyster and pearl oyster farming, fishery mutual insurance and "golden pomfret weather index insurance" marine farming loan products, etc. In 2021, the Qinzhou Branch of China Fishery Mutual Insurance successfully issued the first form of employer's liability mutual insurance for fishing-related enterprises and individual farmers in Qinzhou, which covered 34 employers' liability insurance, providing farming enterprises (households) with about 10 million yuan of farming risk protection.

4. Problems in Transformation and Upgrading of Guangxi's Marine Industry and Financial Support

4.1. Guangxi Marine Industry Transformation and Upgrading Problems

4.1.1. Guangxi's Marine Economic Production scale is Relatively Small

Compared with other coastal provinces, the development scale of Guangxi's marine economy needs to be improved. In 2022, Guangxi's total marine production was 229.69 billion yuan, only one-tenth of that of Guangdong Province, where marine industry is relatively developed. Among the three national marine industry GDP, Guangxi's marine tertiary industry has an added value of 136.98 billion yuan. Compared with other

provinces, Guangxi's marine tertiary industry is relatively low in scale and efficiency due to the lack of advanced technology and industrial production lines.

4.1.2. Guangxi's Marine Industrial Structure needs to be Optimized

Regrading from the three industrial structures in Guangxi, traditional industries such as fishing and seafood processing account for a relatively high proportion, while the development of modern and high-tech marine industries lags behind, which results in an unreasonable industrial structure and can not give full play to the potential of modern marine industries. Most of the products are low value-added marine products, such as simple fishery products and traditional aquatic product processing, which makes it difficult for enterprises to obtain higher profit margins in the market competition, and also hinders the transformation and upgrading of marine industry to high value-added fields. At the same time, the diversified development of Guangxi's marine industry is relatively insufficient, and the development of other fields such as marine new energy and marine tourism is relatively limited, lacking the comprehensive utilization of marine resources and the expansion of the industrial chain.

4.1.3. Weak Capability of Marine Science and Technology and Innovation

Guangxi's marine industry lags behind in terms of technological innovation, introduction and application of new technologies. Some enterprises are still stuck in the traditional industrial chain and lack core competitiveness. From the perspective of sea-related enterprises, Guangxi has fewer scientific and technological innovation-oriented marine enterprises, fewer research and development platforms, and the existing enterprises have low scientific and technological content, which results in a relatively low proportion of Guangxi's marine high-tech technologies in the marine economy. When it comes to marine research, Guangxi has cooperated with ministries and commissions to jointly build the 4th Marine Research Institute of the Ministry of Natural Resources, and promoted the construction of a number of marine-related scientific and educational institutions such as Guangxi University, Beibu Gulf University, Guangxi Marine Research Institute and Guangxi Academy of Marine Sciences. A total of 21 provincial and ministerial-level marine-related scientific and technological innovation platforms have been approved throughout the region. However, the investment in education, research and development is relatively small, the number of high-level talents in the marine specialty is relatively small, and the "blue think tank" platform for gathering high-level talents in the marine industry has not yet been established. Guangxi's development level is relatively low when compared with Guangdong, which is in the leading position. At present, Guangdong has more than 500 marine industries. It is breaking through the four major emerging marine industries, namely, high-end marine equipment, marine life, marine new energy and comprehensive utilization of seawater. Therefore, Guangxi's scientific and technological level in the ocean still needs to be further developed.

4.2. Problems in Financial Support for Transformation and Upgrading of Marine Industry

4.2.1. The Construction of Financial Infrastructure is Inadequate and Lacks Personalized and Professional Services

Most of Guangxi's financial institutions are still stuck in the traditional loan model, lack understanding in emerging industries, which led to a lack of personalized and professional services. However, the transformation and upgrading of the marine industry have put forward higher requirements for the service capabilities of financial institutions, more personalized and professional financial services according to the risk characteristics and rules of the marine industry are needed. However, at present, most financial lack professionalism and cannot provide better services. In terms of the internal structure of Guangxi's financial industry, there is no marine financial exclusive institution, such as Blue Bank, was established in Guangxi.

4.2.2. Diversified Financing Channels are Difficult to Achieve

At present, the transformation and upgrading of Guangxi's marine industry mainly rely on bank credit to

obtain financial support, and there are relatively few channels such as equity financing and bond financing. According to the actual measurement and short-term forecast of the financial gap, the existing scale of financial investment cannot meet the needs of the transformation and upgrading of the marine industry. Due to the insufficient development of capital market and small scale of direct financing in Guangxi, the securitization rate is lower than the national average. In addition, the marine industry itself has great technical and market risks, while financial institutions usually pay more attention to the preservation of creditor's rights and have a strong risk awareness, which makes it difficult to meet the diversified financing needs of enterprises.

4.2.3. Inadequate Innovation and Development of Marine Financial Products

Firstly, the development of insurance management products is insufficient. The marine industry has high risk characteristics, including the influence of weather, natural disasters, other factors. However, the marine finance field lacks corresponding risk management products, such as marine environmental liability insurance, ship pollution damage liability insurance, and blue carbon sequestration insurance. This not only limits the risk management ability of marine enterprises, but also increases the uncertainty and investment risk of the marine industry. Secondly, financial products are not well-adapted. For example, there are few innovative financial products such as offshore technology research, development loans and offshore equipment financing, which cannot meet the financing needs of offshore enterprises. Thirdly, there is a lack of financial innovation and cross-border cooperation, and there is a lack of effective cooperation mechanism between the marine industry and financial institutions. Hence, financial institutions do not have sufficient understanding and attention on the marine industry and cannot carry out cross-border cooperation to promote financial innovation and product development.

5. Guangxi Marine Industry Transformation and Upgrading and Financial Support Countermeasures and Suggestions

5.1. Government Policy Support

5.1.1. Develop Guiding Policies and Clarify Support Priorities

We should fully consider Guangxi's actual situation and resource endowments, formulate local guiding policies and set up government-led funds in combination with the stage of industrial development and market demand. Firstly, it is possible to set up a special research institution or entrust a professional institution to conduct a comprehensive investigation and analysis of Guangxi's marine industry. Based on the results of the investigation, it is possible to determine the development objectives and policy framework for the transformation and upgrading of Guangxi's marine industry and to identify key areas and tasks. Secondly, formulating specific local guidance policies based on the development goals and policy framework, which may include financial support, tax incentives, land use and other aspects of the policy measures. Thirdly, exploreing the establishment of a government-led fund to support projects and enterprises in the transformation and upgrading of the marine industry, and supporting emerging marine industries. The fund can be raised by means of government grants, introduction of social capital, etc. It can be managed and invested by specialized agencies with a clear focus.

5.1.2. Improve the Financial Support Mechanism for the Marine Industry and Strengthen Supervision and Evaluation

Firstly, the government can guide financial institutions to strengthen financial services for the marine industry and provide customized financial products and services to meet the different needs of the marine industry. At the same time, financial institutions are encouraged to innovate financial products and services, such as marine industry equity investment funds, marine industry bonds, etc., to provide diversified financing channels for the marine industry. Secondly, the government should strengthen the supervision of financial institutions to ensure the safe and compliant operation of financial funds supporting the marine industry. At the same time, they can also establish a sound risk prevention and control mechanism, strengthen the risk

assessment and monitoring of marine industrial projects, and detect and respond to risks promptly. Thirdly, they can actively promote the deep integration of finance and industry, promote the deep cooperation between financial institutions and marine industry, enterprises and promote the deep integration of finance and industry. We will provide all-round financial support and services to the marine industry through financial institutions setting up special funds for the marine industry and establishing incubators for marine industries. In addition, the government should strengthen the information sharing and exchange with financial institutions, marine industry enterprises and research institutions, understand the financial needs and problems promptly, and make policy adjustments and optimization according to the actual situation. By improving the system and mechanism of financial support for the marine industry, Guangxi local governments can improve the financing and innovation capabilities of the marine industry, and promote the healthy development of the transformation and upgrading of the marine industry.

5.2. Financial Institutions

5.2.1. The Establishment of Marine Financial Franchise Institutions

Guangxi can set up special financial institutions, such as the Marine Industry Development Fund and the Marine Industry Investment Company, to finance and invest in the marine industry. The institution can be established by the government or involve social capital, and should has professional investment and financing capabilities and risk management capabilities. At the same time, we will explore the establishment of franchised institutions such as Blue Bank, use synergies to promote the development of the marine economy, and actively encourage the sea-related enterprises to conduct direct and indirect financing to solve the "financing difficulty" problem of the sea-related enterprises. Securities companies should actively participate in the issuance of securities by sea-related enterprises, provide them with consulting services and counseling services, and expand the financing scale of sea-related enterprises. Guangxi Beibu Gulf Bank, Liuzhou Bank and other local commercial banks should actively learn from other commercial banks to set up special service branches. For example, Pudong Development Bank has set up a blue economic and financial service center in Qingdao, and Hengfeng Bank has set up a special branch of Yantai Ocean Industry.

5.2.2. Innovative Blue (or Marine) Financial Products

Banking financial institutions have launched innovative financial products with marine characteristics to meet diversified financing needs in marine areas. Guangxi local commercial banks and joint-stock banks should actively launch innovative financial products in Guangxi branches, such as the China Agricultural Development Bank's loan for marine resources development and protection, and the China Industrial and Commercial Bank's local branch's loan for beach resources utilization and "fishing boat loan". Innovative financial products will boost the development of marine industry. We can also learn from foreign experience，which International experience shows that marine industry investment fund is an important force to support marine economy. Therefore, Guangxi’s local financial institutions should set up a number of special marine investment funds and marine trust funds to attract social investors to invest, which can not only obtain investment returns but also spread risks.

5.2.3. Enhance the Marine Insurance Protection Capability

Firstly, financial institutions can set up a risk fund to support the innovation and development of the marine industry by developing and providing customized marine industry insurance products to meet the specific needs of different departments, including marine insurance, coastal tourism featured insurance, marine environmental liability insurance, loan guarantee insurance for marine-related enterprises and other marine featured insurance. Secondly, financial institutions regularly assess the risks of sea-related enterprises to ensure that the risk assessment is based on the latest data and trends to control corporate risks. Thirdly, they can introduce a guarantee mechanism and policy-based finance as a financing guarantee institution to share the risks in the financing process of marine emerging industries, to solve the fundamental problem that banks are unwilling to

lend to enterprises, and to provide market participants with credit enhancement and external guarantee for financing to obtain the funds needed for industrial development.

5.3. Sea-Related Enterprise Level

5.3.1. Large listed Companies Actively Carry out Industry-University-Research Cooperation and Scientific and Technological Innovation

Beibu Gulf Port and other sea-related enterprises need to increase the introduction and training of marine professionals, increase the construction of marine innovative talents, and provide professional training, additionally, strengthen the training of compound marine financial talents. Moreover, use a variety of recruitment channels, including online recruitment platforms, campus job fairs, talent agencies, etc. to find suitable employees. Guangxi's sea-related enterprises have developed joint research projects through school-enterprise cooperation with Beibu Gulf University to attract young researchers and interns. International recruitment will be carried out to attract experienced professionals from abroad, especially for technical and management positions related to the marine field. Using its own economic level, Guangxi’s sea-related enterprises invest in the construction of modern marine scientific and technological research facilities, such as marine laboratories, deep-sea exploration equipment and marine data centers, to support marine scientific research.

5.3.2. Small and Medium-sized Sea-related Enterprises Actively Carry out Industrial Transformation and Upgrading and Seek Financial Support

For Guangxi sea-related enterprises in terms of industrial transformation and upgrading, they should clarify their development direction and objectives, formulate specific industrial transformation and upgrading plans, including technological upgrading, product innovation, market expansion and other aspects, actively cooperate with local governments, strengthen technological innovation and research and development capabilities. They can find financial partners to, improve corporate governance and broaden market channels. Regarding financial support, they should actively establish good cooperative relations with financial institutions, and strive for government policy support and financial capital investment, such as preferential tax policies and exceptional fund support.

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