

A 25-Year Review and Outlook on Macao's Economy Since Its Return: A Perspective on the Marine Economy

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Abstract. This paper reviews the development of Macao's marine economy over the 25 years since its return to China, with a particular focus on its economic structure, industrial layout, future development potential, and possible challenges. Although Macao is a coastal city endowed with relatively abundant marine resources, the development of its marine economy has lagged behind. By analyzing the current state, opportunities, and challenges of Macao's marine economy, this study explores how policy support and technological innovation can be leveraged to promote its sustainable development.

Keywords: Macao, Return, Marine Economy

1. Introduction

Since its return to China in 1999, the Macao Special Administrative Region has experienced remarkable economic growth, primarily driven by the gambling and tourism industries. However, as a coastal city endowed with abundant marine resources, Macao's marine economy remains relatively underdeveloped in both scale and progress. With the ongoing advancement of the Guangdong-Hong Kong-Macao Greater Bay Area, Macao now faces new opportunities for the development of its marine economy. This paper reviews the evolution of Macao's marine economy over the past 25 years since its return and analyzes its current status and future development prospects.

2. Review of the development of Macao's marine economy

2.1. Overall development of the marine economy

Macao's economy is highly dependent on the gaming and tourism industries. As of 2023, gaming revenue accounted for approximately 70% of its GDP[1]. In contrast, the development of Macao's marine economy remains relatively weak. Despite its abundant coastal resources, the contribution of sectors such as fisheries, marine tourism, and marine science and technology remains minimal. In 2023, the marine economy accounted for less than 2% of Macao's GDP, significantly lower than that of neighboring Guangdong Province and the Hong Kong Special Administrative Region[2].

2.2. Development of the fisheries sector

Macao's fisheries are primarily concentrated in nearshore fishing and have a long-standing history, though the sector remains relatively small in scale. The number of fishing vessels in Macao has declined from over 800 prior to the handover to just over 100 today. According to data from the Macao Fisheries Association, the total output value of Macao's fisheries in 2023 was approximately MOP 350 million, representing an increase of less than 15% compared to 2010. Meanwhile, the number of workers in the sector has been steadily decreasing. A survey conducted by the Macao Polytechnic Institute (now renamed Macao Polytechnic University) revealed that 60% of the fishermen interviewed reported that their children were not engaged in fishing, and 74% expressed that they did not wish for their children to enter the fishing industry. With the government's growing emphasis on marine conservation and environmental protection policies, nearshore fishery resources are facing depletion, leading to declining trends in fishery output, employment, and related activities.

2.3. Marine tourism and leisure activities

Marine tourism and leisure entertainment constitute major components of Macao's marine economy. In recent years, the government of Macao Special Administrative Region has actively promoted tourism diversification by launching a variety of marine sightseeing projects and recreational activities. Examples include the "SJM Integrated Maritime Tour," which offers panoramic views of Taipa, the Peninsula, Coloane, and even the coastal scenery of Hengqin; the "MGM Macao Sightseeing Cruise," which connects key points from A-Ma Temple to Coloane; and the "Explore Sky, Land and Sea" tour by Studio City, offering 360-degree views of Macao's stunning landscapes[3]. While these projects have successfully attracted a substantial number of tourists, the revenue they generate does not constitute a major portion of Macao's overall tourism income, and thus their contribution to the broader economy remains limited.

3. Opportunities for Macao's marine economy

3.1. Policy support through regional cooperation

The implementation of the Guangdong-Hong Kong-Macao Greater Bay Area strategy has presented significant opportunities for the development of Macao's marine economy. The Outline Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area, issued by the Central Committee of the Communist Party of China and the State Council in 2019, clearly states that under the principles of fully and accurately implementing "One Country, Two Systems," "Macao people governing Macao," and a high degree of autonomy, and in strict accordance with the Constitution and the Basic Law, China will support Macao's development in the marine economy. The plan emphasizes deepening mutually beneficial cooperation among Guangdong, Hong Kong, and Macao and further establishing a win-win regional cooperation framework—particularly in areas such as marine tourism, technological collaboration, and the integrated utilization of marine resources[4]. In 2022, Macao and Zhuhai signed a cooperation agreement to jointly develop the marine industry in the Hengqin New Area, injecting new vitality into Macao's marine economy.

3.2. Coastal characteristics of Macao’s maritime zone

As of the baseline date of July 1, 2017, Macao’s total coastline measured 76.7 kilometers, including 18.4 kilometers on the Macao Peninsula, 49.9 kilometers on the outlying islands, 5.7 kilometers in the New Urban Zone Area A, and 2.7 kilometers within the Macao Port Management Zone on the artificial island of the Hong Kong-Zhuhai-Macao Bridge (see Table 1). The majority of Macao’s coastline is artificial, totaling 62.5 kilometers (see Table 2)[5], and consists primarily of artificial sloping shorelines and vertical seawalls. These artificial coastal structures offer several advantages conducive to the development of the marine economy. Sloping and vertical artificial shorelines provide stable support for the construction of ports, piers, and other critical infrastructure, thereby promoting the growth of maritime transportation and logistics industries. Furthermore, the extensive use of artificial coastlines has improved land-use efficiency and created favorable conditions for the development of large-scale projects such as the New Urban Zone Area A and the artificial island of the Hong Kong-Zhuhai-Macao Bridge.

Table 1: Coastal length statistics for Macao’s various regions

Region	Coastal Length (km)	Proportion (%)
Macao Peninsula	18.4	24.0
Outlying Islands	49.9	65.1
New Urban Zone Area A	5.7	7.4
Macao Port Management Zone, Hong Kong-Zhuhai-Macao Bridge Artificial Island	2.7	3.5
Total	76.7	100

Table 2: Distribution of coastal line types across Macao’s regions

Coastline Type	Total Length(km)	Proportion(%)	Macao Peninsula(km)	Outlying Islands(km)	New Urban Zone Area A(km)	Hong Kong-Zhuhai-Macao Bridge Artificial Island – Macao Port Management Zone (km)
Artificial Coastline	62.5	81.5	18.3	35.8	5.7	2.7
Sandy Coastline	2.2	2.9	0.1	2.1	0.0	0.0
Bedrock Coastline	5.2	6.8	0.0	5.2	0.0	0.0
Naturally Restored Coastline	1.7	2.2	0.0	1.7	0.0	0.0
Rehabilitated Coastline	5.1	6.6	0.0	5.1	0.0	0.0

4. Challenges in the development of Macao's marine economy

4.1. A monostructural industrial composition

The industrial structure of Macao's marine economy is relatively limited, relying primarily on low-value-added traditional sectors, particularly fisheries and basic forms of marine tourism. According to data from the Economic and Technological Development Bureau, in 2023, professional and technical personnel accounted for less than 5% of the total workforce in Macao's marine economy. This indicates a serious lack of investment and technological capacity in high-tech marine industries. As a result, despite Macao's abundant marine resources and strategic geographic location, these advantages have not been fully leveraged to develop high-value-added sectors such as marine science and technology, marine biopharmaceuticals, and ocean engineering. Compared to cities in the Pearl River Delta region—such as Shenzhen and Guangzhou—Macao's investment in marine technological research and innovation remains notably insufficient.

Regions with a scale comparable to Macao often rely on industrial upgrading to enhance economic vitality. For example, in 2022, Shenzhen's marine economy achieved a total output value exceeding 300 billion RMB, with high value-added industries such as marine electronic equipment manufacturing and marine communication technologies contributing significantly. In contrast, Macao has not yet developed similar high-tech industrial clusters, which severely limits the diversification and modernization of its marine economy.

4.2. Environmental pressure and resource conservation

Macao's marine resources face significant environmental pressures, particularly due to the limited size of its maritime area and nearshore resources, which exacerbate the risks of overexploitation. Over the long term, Macao's nearshore fisheries have experienced a decline in fish stocks caused by overfishing, further intensifying the strain on the marine environment's carrying capacity. According to data from the DSPA, in 2022, less than 40% of Macao's coastal waters met the Class I standards of the environmental quality standards for surface water[6]. This underscores the severity of marine pollution issues, particularly due to the discharge of industrial wastewater and domestic sewage, which have adversely affected water quality.

As Macao's population density increases and economic activities expand, the deterioration of nearshore water quality has become an urgent issue that needs to be addressed. In contrast, the 2022 Marine Environmental Quality Annual Report of Guangdong Province indicated that approximately 65% of the marine areas near the Pearl River Estuary met high water quality standards. This suggests that environmental protection measures in other cities within the region have yielded positive results, whereas Macao still needs to strengthen its efforts in this regard.

At the same time, Macao's marine biodiversity faces significant threats, particularly due to coastal development, land reclamation projects, and water pollution. Many critical ecological habitats are being eroded and damaged. Macao's ecologically sensitive areas, such as coastal wetlands and mangroves, are essential for the reproduction and protection of marine species. However, due to a long-standing lack of effective environmental protection policies and ecological restoration programs, the protection of these habitats remains insufficient. According to statistics from the DSPA, in 2022, the area of mangroves in Macao decreased by approximately 10%, putting several endangered marine species that depend on these habitats at risk of extinction.

5. Looking ahead: development strategies for Macao's marine economy

5.1. Promoting diversification of the marine economy

In the future, Macao should accelerate the diversification of the marine economy, with a focus on developing emerging sectors such as marine tourism and marine science and technology.

5.1.1. Marine tourism industry

Macao's unique geographical location and rich cultural background provide it with distinct advantages for developing high-end marine tourism. To this end, Macao can draw on Hong Kong's successful experiences by building ocean-themed tourism facilities such as marine theme parks and marine museums. Hong Kong's Ocean Park is a renowned tourist attraction in the Asia-Pacific region, which not only draws a significant number of international visitors but also enhances the city's marine cultural atmosphere. Macao can develop similar projects to attract tourists from around the world while promoting marine environmental awareness.

5.1.2. Yacht tourism industry

Macao can vigorously develop a high-end yacht tourism industry, leveraging its international reputation in the gaming and entertainment sectors. By integrating these with yacht tourism, Macao can create a maritime tourism project that combines travel, business, and leisure, attracting high-end tourists from around the world while also driving the growth of related service industries. Furthermore, according to the China Yacht Industry Association's forecasts, the yacht market in the Asia-Pacific region is expected to experience rapid growth in the coming years. Macao can seize this opportunity to become a key yacht tourism hub in the region.

5.1.3. Marine technology industry

Macao should actively promote the development of the marine technology industry, particularly by collaborating with the Hengqin New Area through policy alignment. By guiding policies and advancing technological research and development, Macao can drive innovation in marine science and technology. Hengqin, designated as a key development zone for deep cooperation between Guangdong, Hong Kong, and Macao, provides an ideal backdrop for Macao to enhance its collaboration with Hengqin. This could involve developing high-tech industries such as marine biopharmaceuticals and marine engineering equipment. Moreover, leveraging its partnerships with Portuguese-speaking countries, Macao can advance the development and utilization of marine biological resources, thereby expanding its presence in international markets.

5.2. Strengthening marine environmental protection and resource conservation

While developing its marine economy, Macao must also prioritize ecological and environmental protection. This can be achieved through increased investment in environmental protection and the strict implementation of marine conservation policies to ensure the sustainable use of resources.

5.2.1. Increasing investment in environmental protection

The the government of Macao Special Administrative Region should increase its financial investment in marine environmental protection, particularly by introducing advanced marine pollution control technologies. For example, by strengthening the construction of facilities for industrial emissions and domestic wastewater treatment, Macao can reduce the impact of pollutants on the marine environment. Additionally, Macao can draw on the experiences of Hong Kong and Shenzhen by establishing a comprehensive marine environmental monitoring system. This system would enable real-time monitoring of marine water quality, pollution sources, and biodiversity, allowing for the timely detection and resolution of environmental issues.

5.2.2. Establishing marine protected areas

To better protect marine biodiversity, Macao should establish more marine protected areas, especially in ecologically sensitive regions such as mangroves and coastal wetlands. By implementing strict conservation measures, human interference with the ecological environment can be minimized, ensuring that vital habitats for important species are not destroyed, and appropriate penalties for violations can be put in place. Based on Macao's medium- and long-term plans for the utilization and development of its maritime areas, it is essential to scientifically assess the carrying capacity of resources and the suitability of marine spatial development. This will ensure effective integration with Guangdong's territorial spatial planning and its specialized coastal zone plans, aligning Macao's maritime areas with the national marine development strategy[7].

5.2.3. Strengthening marine ecosystem monitoring

Macao can enhance the monitoring of its marine ecosystem through technological means. For example, by utilizing advanced technologies such as drones and remote sensing satellites, Macao can conduct real-time monitoring of coastal ecosystems, track environmental changes, and predict potential ecological crises. Additionally, Macao should strengthen its collaboration with international environmental organizations and research institutions to learn from global advancements in marine ecological protection technologies and management practices, ensuring that Macao's marine environment is effectively protected and managed.

6. Conclusion

After 25 years of its return to China, Macao's marine economy faces immense development potential and challenges. Under the impetus of the Guangdong-Hong Kong-Macao Greater Bay Area strategy, Macao has the opportunity to create a distinctive marine economy through regional cooperation, technological innovation, and industrial upgrading. In the future, Macao needs to continue its efforts in policy support, industrial diversification, and environmental governance to achieve the sustainable development of its marine economy.

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