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Research and Analysis Report on the Sanya Yazhou Central Fishing Port

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Abstract: This study examines the operational dynamics of Sanya Yazhou Harbor Investment Co., Ltd. (hereafter "Harbor Company"), the entity managing Yazhou Central Fishing Port. Through a comprehensive analysis of the port's historical context, current operational framework, market environment, and future development prospects, this report evaluates the successes and challenges encountered under Harbor Company's stewardship. The port has achieved notable progress in infrastructure development, marine economic growth, employment opportunities for fishermen, and environmental stewardship. However, it faces persistent challenges, including market competition, environmental pressures, and resource allocation constraints. The operational and managerial insights derived from Harbor Company's experience offer a valuable reference for the sustainable development and management of fishing ports nationwide.

Keywords: Yazhou Central Fishing Port; Fishing Port Management; Revenue-Expenditure Balance

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1.Introduction and Research Background

Fishing ports serve as critical interfaces between marine and terrestrial ecosystems within the fisheries industry, underpinning the socio-economic fabric of coastal communities globally (FAO, 2020). Beyond their role in facilitating seafood supply chains, they are vital for providing protein to billions and sustaining livelihoods in fishing-dependent regions.

Located in Yazhou District, Sanya City, Hainan Province, the Yazhou Central Fishing Port stands as Hainan's first centrally designated fishing port, endorsed by the Ministry of Agriculture in 2024. Since its grand opening in 2016, the port has catalyzed significant growth in the regional fisheries sector. By 2024, annual fish unloading reached over 140,000 tons, with approximately 10,000 vessel visits recorded, reflecting a robust upward trajectory. The port is equipped with fishery necessary infrastructure, including cold storage facilities, ice-cube plants, a public trading center, integrated fisherman services, and fishmen shore-based housing, positioning it as a cornerstone of Hainan's marine economy.

To recover the substantial investment in its development, the government granted Harbor Company a 50-year concession. However, the company incurs annual public service expenditures of approximately RMB 18 million, which are not fully subsidized by public funds. This necessitates reliance on commercial revenue streams, compelling Harbor Company to innovate its management practices to ensure financial sustainability and long-term operational viability. This study aims to assess these efforts, identifying both achievements and areas requiring enhancement, while contributing to the broader discourse on fishing port management.

2.Literature Review

Fishing ports worldwide are transitioning from traditional fishery hubs to complex adaptive systems, driven by global pressures such as climate change, resource depletion, and geoeconomic shifts (Holling, 2001; Folke et al., 2005). This evolution demands not only physical upgrades but also sophisticated managerial and institutional adaptations to address multifaceted challenges.

2.1 Accelerated Resource Depletion

The FAO reports that a significant proportion of global fish stocks are overexploited, with species like North Atlantic cod experiencing marked declines (Zeller et al., 2023). As key nodes in resource extraction, fishing ports often exhibit an "Efficiency–Sustainability Paradox," where enhanced operational efficiency correlates with ecological degradation ($r = 0.71$, $p < 0.01$; Costello et al., 2016). This tension underscores the need for balanced management strategies.

2.2 Escalating Climate Risks

Climate vulnerability assessments reveal that nearly half of coastal fishing ports face risks from sea-level rise and extreme weather by 2050, with Southeast Asia and West Africa showing indices above 0.8 (Blasiak et al., 2017). Events like Typhoon In-Fa (2021) in China's Zhoushan region highlight the operational and infrastructural disruptions caused by such phenomena (Tang et al., 2023), necessitating resilient port designs.

2.3 Geoeconomic Fragmentation

Global trade disruptions, exemplified by the Russia–Ukraine conflict, have elevated seafood prices, with EU cod import indices rising 3% annually and Arctic cod quotas projected to drop 25% by 2025 (EUMOFA, 2024). Concurrently, divergent national policies—such as the EU's Green Deal and China's 14th Five-Year Plan—impose conflicting demands on fishing ports, reflecting institutional path dependence (North, 1990).

2.4 Theoretical synthesis in Fishing Port Studies

In recent years, scholarly inquiry into the development and operation of fishing ports has expanded beyond traditional logistical and economic perspectives to incorporate integrated frameworks that address sustainability, technological advancement, and governance. The multidimensionality of modern fishing port systems reflects a growing recognition of their strategic importance in the context of global environmental and economic transitions.

Port–Regional Economic Linkages

Ports function as critical infrastructure nodes that facilitate regional economic growth. The "port regionalization" framework proposed by Notteboom and Rodrigue (2005) emphasizes how enhanced logistics efficiency and hinterland connectivity promote industrial clustering and trade facilitation. In fishing port contexts, this translates to increased employment, value-added processing, and integration with broader supply networks, ultimately reinforcing local and regional development trajectories.

Sustainable Fisheries and Resource Management

The sustainability of marine resources is a cornerstone of fishing port viability. Charles (2001) introduced a triadic model that calls for equilibrium among infrastructure development, ecological conservation, and resource stewardship. The application of innovations such as selective fishing gear exemplifies the integration of technological solutions to reduce ecological impacts and safeguard long-term fish stock productivity.

Supply Chain Optimization and Risk Mitigation

Logistics efficiency remains fundamental to fisheries value chains. Research by Gustavsson et al. (2011) illustrates how cold chain systems reduce post-harvest losses and ensure product quality throughout distribution. Meanwhile, Sodhi and Tang (2012) advocate for a proactive approach to supply chain resilience through comprehensive risk management—identifying and mitigating operational disruptions such as environmental volatility and market fluctuations—thus reinforcing the stability and adaptability of fishing port operations.

Smart Port Technologies

Digital transformation is reshaping the operational logic of fishing ports. As highlighted by Crainic, Perboli, and Rosano (2018), emergent technologies including the Internet of Things (IoT), big data analytics, and artificial intelligence are

enabling ports to optimize workflows, monitor logistics in real time, and allocate resources more efficiently. These technological integrations are pivotal in ensuring competitiveness amid rapid changes in global trade and environmental conditions.

Policy and Institutional Support

Public policy continues to play a pivotal role in the structural and functional evolution of fishing ports. Drawing from the Porter Hypothesis (Porter & van der Linde, 1995), effective regulatory frameworks and fiscal incentives can catalyze both infrastructural investment and innovation. For fishing ports, well-articulated policies create an enabling environment that enhances governance, fosters long-term stakeholder commitment, and aligns local development goals with broader sustainability agendas.

Conclusion

The literature collectively underscores that fishing port development transcends logistical concerns, engaging complex dimensions of environmental governance, technological modernization, and socio-economic strategy. Under the compounded pressures of natural resource depletion, climate change, and economic volatility, future-oriented management of fishing ports necessitates localized, adaptable strategies. These strategies must be responsive to unique regional conditions and aligned with medium- and long-term development objectives. Ultimately, by harmonizing ecological integrity, operational efficiency, and institutional coherence, fishing ports can evolve into sustainable hubs that contribute to both coastal resilience and global food security.

3.Research Methodology

This study employs a mixed-methods approach, integrating quantitative and qualitative techniques to ensure robust data collection and analysis:

Literature Review: Analysis of industry reports, policy documents, and scholarly articles to delineate trends, market positioning, and growth potential.

Field Investigation: On-site observations at Yazhou Central Fishing Port to assess operations, infrastructure, and workflows, yielding primary data.

Interviews: In-depth discussions with Harbor Company's management, frontline staff, and port stakeholders to capture operational and market insights.

Data Analysis: Quantitative evaluation of collected data, synthesized with management theories, to derive evidence-based conclusions and recommendations.

This methodology ensures a comprehensive examination of the port's performance and challenges, grounded in empirical and theoretical perspectives.

4.Results

As a non-listed entity, Harbor Company lacks public financial statements, necessitating data collection via media, field studies, and interviews. The findings highlight three areas of exceptional performance alongside notable challenges.

4.1 Achievements

Effective Port Management: Designed for 800 vessels, the port now routinely handles over 1,000, peaking at 1,582 during typhoon periods in 2024. Despite spatial constraints, operations remain orderly, bolstered by Hainan's most comprehensive port facilities, attracting vessels to designate Yazhou as their home port.

Proactive Management Team: Since December 2022, the new team has shifted from traditional models to a market-driven approach, boosting revenue from RMB 30 million (pre-2022, negative EBITDA) to RMB 46 million (2023, EBITDA RMB 17 million) and RMB 53 million (2024, EBITDA RMB 8 million). Fish landings rose from 111,000 tons (2023) to 140,500 tons (2024), enabling self-sufficiency in public service funding—a rarity among Chinese fishing ports.

Policy and Funding Success: Key milestones include the 2023 approval of Hainan's first National-Level Coastal Fishing Port Economic Zone pilot, 2024 recognition as a provincial industrial park, the launch of Hainan's inaugural Fishing Port Charter, and designation as a National Central Fishing Port by the Ministry of Agriculture.

4.2 Challenges

Infrastructure Lag: The harbor basin, planned in 2011 for 800 vessels, is overcrowded with over 1,000 daily and 1,500 during typhoons, straining environmental capacity. An incomplete industrial chain further hampers growth potential.

Low Digitalization: Limited resources restrict smart technology adoption to basic systems (e.g., surveillance, OA approval), lacking advanced tools like vessel dispatch or pollution monitoring, trailing domestic commercial ports.

Talent Shortages: With over 15% of staff lacking higher education by 2024, the niche industry and Sanya's location impede talent recruitment, limiting scalability and model export.

5.Recommendations

Expand Harbor Capacity: Secure funding and leverage Hainan Free Trade Port policies to enlarge the basin, enhance anchorage, and improve safety, while targeting fisheries-related investments to bolster the industrial ecosystem and revenue.

Advance Digitalization: Adopt cutting-edge terminal management systems, integrating smart hardware and algorithms to optimize vessel operations and compliance monitoring, aligning with national port standards.

Enhance Talent Pipeline: Recruit skilled professionals and develop a succession framework to support expansion and disseminate the port's management model regionally.

6.Conclusion

This investigation reveals a typical Fishing port management situation, the Harbor Company's pivotal role in driving local economic growth and elevating fishing port management standards. Despite significant achievements, sustained progress hinges on addressing infrastructure deficits, talent gaps, and technological lags. Standardizing Yazhou Central Fishing Port's practices could inform national strategies, enabling ports to achieve self-sustainability and alleviate governmental fiscal pressures. Moreover, its "leading effect" promises to uplift surrounding fishing communities, fostering employment and tax revenue through industrial expansion. Future research might explore scalable digital solutions and cross-regional management transfers to amplify these impacts.

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no

Conflict of Interests

The author(s)declare(s) that there is no conflict of interest regarding the publication of this paper.

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