Research on Strategies for Promoting the Integrated Development of Jiangsu's Coastal Ports and the Shanghai International Shipping Center Hub

Duanduan Sun, Kai Wang
Business School, Jiangsu Ocean University, Lianyungang, Jiangsu, China

Abstract: The integrated development of Jiangsu's coastal ports and the Shanghai International Shipping Center constitutes a vital component of the Yangtze River Delta integration and the Yangtze River Economic Belt initiative. In recent years, with the deepening advancement of the Yangtze River Delta integration strategy, significant progress has been achieved in the integrated development of Jiangsu's coastal ports and the Shanghai International Shipping Center across areas such as infrastructure construction, industrial synergy, and technological innovation. However, challenges persist in the integration process, including regional competition, difficulties in resource consolidation, and insufficient shipping service capabilities. Moving forward, Jiangsu should further deepen regional port collaboration, optimize resource allocation, strengthen port infrastructure development, expand high-end shipping services, and improve multimodal transport systems. Through these measures, Jiangsu's coastal ports and Shanghai's International Shipping Center are poised to achieve higher-level integrated development, providing robust support for economic growth in the Yangtze River Delta region and across the nation.

Keywords: Coastal Ports; Shipping Center; Port Cooperation; Integrated Development; Countermeasure Research

1. Introduction

Jiangsu Province, located in China's eastern coastal region, possesses numerous vital port resources, including major ports such as Lianyungang and Nantong. The implementation of national strategies—including the Jiangsu Coastal Development Plan, the Belt and Road Initiative, and the Yangtze River Economic Belt—has created significant opportunities for port development. Concurrently, Shanghai, as China's international shipping center, boasts globally advanced shipping service resources and capabilities. The integrated development of Jiangsu's coastal ports with Shanghai's international shipping hub is a vital component of the Yangtze River Delta's integrated development. It holds significant importance for enhancing the region's overall strength, serving the new development paradigm, refining the overall layout for building a maritime power, and promoting green and low-carbon development in the eastern coastal region. To strengthen the integrated development between Jiangsu's coastal ports and Shanghai and enhance the overall competitiveness of the Yangtze River Delta region, the Jiangsu Provincial Government has proactively introduced policies to vigorously promote cooperation between coastal ports and the Shanghai International Shipping Center. This initiative accelerates the sharing of port resources, fosters complementary development, and optimizes and integrates the port industry chain.

Against the backdrop of deepening global economic integration and regional coordination, collaborative development among port clusters has become a key pathway to enhancing competitiveness. As one of China's most open and economically dynamic regions, the Yangtze River Delta is poised to seize new opportunities and meet emerging challenges through its shipping system—centered on Shanghai's international shipping center and supported by Jiangsu's coastal ports. The Chinese government places high importance on the development of the Yangtze River Delta region, issuing a series of policy support documents such as the Outline of the Yangtze River Delta Regional Integration Development Plan. These documents clarify the development direction and strategic positioning of the region's ports and shipping industry, providing policy guidance for the deep integration of Jiangsu's coastal ports with the

Shanghai International Shipping Center.

Currently, the linkage between Jiangsu's coastal ports and the Shanghai International Shipping Center still faces prominent issues such as functional homogeneity competition, inefficient resource allocation, and significant disparities in shipping service capabilities. These reflect an asymmetrical development pattern between hub functions and feeder networks. Therefore, researching countermeasures for the integrated development of Jiangsu's coastal ports and the Shanghai International Shipping Center hub holds significant theoretical and practical significance. This study aims to thoroughly examine the importance and necessity of the integrated development between Jiangsu coastal ports and the Shanghai International Shipping Center, analyze existing challenges and obstacles, and propose practical countermeasures. It seeks to provide theoretical guidance for promoting coordinated port development in the Yangtze River Delta region and enhancing the international competitiveness of China's shipping industry.

2. Literature Review

2.1 Current Research on Port Cooperation and Port Integration

Domestically, Zhao Pengtao et al. [1] examined the interactive relationship between port investment and horizontal cooperation by establishing an infinite-round repeated game model. The study found that cooperation does not emerge in single-round games, with the possibility of cooperation limited to repeated games. Feng Can et al. [2] observed that as competition among ports intensifies, cooperation between neighboring ports exhibits a strengthening trend. The effective integration, unified planning, rational division of labor, and flexible cooperation models among these ports offer valuable insights for China to further consolidate port resources and build world-class port clusters. Shen Lei [3] analyzed the cooperation between Shanghai Port and the Yangtze River Delta port cluster, concluding that future efforts should focus on enhancing infrastructure connectivity, strengthening regional port market collaboration, and promoting administrative cooperation among ports. Bi Chengcheng [4] examined the current state of port cooperation between Tianjin and Hebei, proposing corresponding strategies and recommendations for Tianjin Port's future cooperative development pathways and the quality of inter-port linkage. Lu Bo et al. [5] Employing the TEI@I methodology as the theoretical framework and guiding principle, this study analyzes and forecasts strategic choices for ports in the Bohai Rim region amid competition and cooperation. Zhang Zhifan [6] Research reveals that as development progresses, existing cooperation mechanisms among South China Sea ports have exposed deficiencies. Addressing these shortcomings requires establishing a unified regional cooperation mechanism.

Internationally, Feng L et al. [7] proposed that China's Belt and Road Initiative, with ports serving as nodes, holds significant practical importance for enhancing interregional connectivity and driving economic, financial, and trade development in port cities and their hinterlands. Zhou Y et al. [8] employed a multi-period difference-in-differences model based on panel data from China's nine coastal provinces (2004-2019) to empirically examine the impact of provincial port integration on port efficiency from a provincial perspective. Xu L et al. [9] employed a game theory model to analyze capacity-sharing cooperation and competition between two ports. The study comprehensively examined how differences in port operating costs and potential capacity demands between two terminals influence optimal strategy selection, presenting a series of broad decision outcomes that offer new insights into port cooperative competition. Luo M et al. [10] propose identifying the intrinsic linkages among port competition, port cooperation, and port competitive capacity—a necessity for both port management and public interest. Extensive domestic and international research on the relationship between port competitiveness and competitive capacity generally concludes that internal port competition enhances competitiveness. However, research indicates that both competition and cooperation between two ports yield positive and negative impacts, with these effects varying based on research perspectives and port locations. Stamatović K et al. [11] expanded the existing framework for analyzing adjacent port cooperation cases by examining the relevance of national borders, thereby proposing an upgraded version of the port cooperation case classification matrix.

2.2 Literature Review

Scholars worldwide have produced extensive research on port integration, covering various aspects such as port competition and cooperation strategies, regional port cooperation mechanisms, port-city collaboration, and the economic effects of port cooperation. However, existing studies still exhibit certain limitations. While research has delved deeply into theoretical models and strategic evaluations, studies examining the adaptability of port cooperation remain relatively scarce. Moreover, with the rapid advancement of digital and intelligent technologies, port integration research must further integrate emerging technologies to explore novel models and pathways for port cooperation. Future studies can deepen in the following directions: enhancing the economic impact assessment of port cooperation by developing more precise benefit analysis models using big data and artificial intelligence; and exploring digital transformation pathways for port integration, examining the influence of smart port development on port collaboration.

3. Current Status of Integrated Development Between Jiangsu Coastal Ports and the Shanghai International Shipping Center Hub

3.1 Current Development Status of Jiangsu Coastal Ports

Located along the Yellow Sea coast of the Pacific Ocean, Jiangsu's coastal region has developed over the years into a coastal port cluster centered around the three port cities of Lianyungang, Yancheng, and Nantong. Lianyungang Port stands as a major deep-water port along Jiangsu's coastline and serves as the eastern bridgehead of the New Eurasian Continental Bridge. In recent years, Lianyungang Port has continuously expanded its shipping routes. For instance, the successful maiden voyage of COSCO Shipping's CPV Northwest US Route filled a market gap. Nantong Port is another significant port along Jiangsu's coastline. Its Tongzhouwan Port Area is planned as a large port zone, encompassing multiple operational areas such as Yangkou, Lvsi, and Haimen. In 2024, Nantong Port achieved significant cargo throughput growth, with coastal port cargo handling increasing by 22.2% year-on-year. Additionally, Nantong Port actively promotes “door-to-door” waterway transportation connecting inland rivers directly to ports, enhancing logistics efficiency. Yancheng Port, a regionally important port along Jiangsu's coast, has optimized customs clearance efficiency through smart supervision models in recent years, ensuring efficient exports of goods like automobiles. Its port construction is also progressing steadily, providing robust support for port-adjacent industries. Overall, Jiangsu's coastal ports play a vital role in regional economic development, logistics transportation, and industrial layout. Moving forward, they will continue to enhance their national and global standing through infrastructure development, technological innovation, and green development.

Jiangsu's coastal ports also play a significant role in China's shipping landscape. Located in eastern Jiangsu, Nantong Port stands as one of the major ports along the lower reaches of the Yangtze River. Its strategic position makes it a vital logistics hub within the Yangtze River Economic Belt, handling the transshipment and distribution of import and export goods. Zhangjiagang Port, situated on the southern bank of the Yangtze River estuary, ranks among China's key foreign trade ports. Its efficient logistics operations and advantageous geographical location have made it the preferred choice for numerous large international enterprises and traders. As a major port city on China's eastern coast, Lianyungang Port serves the import-export trade of northern Jiangsu and southern Shandong, and also functions as a key departure point for the China-Europe Railway Express. These ports not only provide robust support for Jiangsu's internal economic development but also play vital roles in national and international trade. Their advantageous geographic locations, well-developed infrastructure, and advanced logistics management make them crucial nodes in the global supply chain, contributing significantly to China's stable economic growth and the smooth operation of international trade.

3.2 Current Development Status of Shanghai International Shipping Center

Since its establishment in 1992, the Shanghai International Shipping Center has achieved remarkable progress through over three decades of rapid development. The official opening of Phase I of the Luojing Container Port Area has further enhanced Shanghai Port's regional influence. Shanghai has attracted leading enterprises including COSCO Shipping—the

world's largest integrated shipping operator—China State Shipbuilding Corporation (CSSC)—the world's largest shipbuilding enterprise—and ZPMC (Zhenhua Heavy Industries)—the world's largest port machinery manufacturer. Shanghai Port has also made significant strides in green shipping and digitalization of shipping trade. LNG bunkering services for international vessels have expanded from Yangshan to the entire port, and large container ships now achieve simultaneous ship-to-ship bunkering of green methanol fuel. Concurrently, Shanghai Port actively advances digitalization in shipping trade, with the application scope of electronic bills of lading and electronic cargo release continuously expanding.

As a vital shipping hub for China and the world, Shanghai Port plays an indispensable role in the global shipping landscape. Long ranked among the world's busiest container ports, it consistently handles one of the highest volumes of containerized cargo annually. Its efficient container handling capacity and advanced logistics infrastructure position Shanghai Port as a critical hub within the global supply chain. As China's economic and financial center, Shanghai's port not only serves the local economy but also functions as a vital gateway for numerous international companies entering the Chinese market. Shanghai also boasts comprehensive ship service and repair facilities, providing high-quality maintenance, retrofitting, and logistics services to global shipowners. These capabilities have attracted a significant number of international shipping companies to establish branches in Shanghai, further elevating the port's standing within the global shipping service industry chain. In summary, leveraging its strategic geographic location, comprehensive infrastructure, and advanced service capabilities, the Shanghai International Shipping Center has emerged as a major global hub in the shipping industry. Its development not only accelerates the internationalization of China's economy but also enhances the convenience and efficiency of global trade and logistics.

3.3 History and Current Status of Jiangsu-Shanghai Cooperation in Shipping

The collaboration between Jiangsu and Shanghai in the shipping sector initially focused on early infrastructure development and division of labor. Leveraging its advantageous geographical location and economic foundation, Shanghai gradually evolved into a major shipping hub. As a vital component of the Yangtze River Economic Belt, Jiangsu's riverside and coastal ports established a division of labor and cooperative relationship with Shanghai Port from the outset, jointly driving regional shipping development. Subsequently, policy initiatives accelerated integration. With the advancement of the Yangtze River Delta integration strategy, cooperation between Jiangsu and Shanghai in shipping has deepened continuously. In 2020, maritime authorities from Shanghai and Jiangsu signed the “Shanghai-Jiangsu Maritime Regulatory Service Integration Cooperation Agreement”, establishing comprehensive collaboration in maritime supervision, traffic organization, and information data sharing. Second, Jiangsu and Shanghai have progressively advanced port cooperation and resource integration in shipping. In 2017, Shanghai International Port Group, Jiangsu Port Group, and COSCO Shipping Group signed a “Memorandum of Understanding on Strategic Cooperation” to strengthen collaboration, reduce regional logistics costs, and advance the development of Shanghai as an international shipping center.

Currently, Jiangsu and Shanghai have established a pattern of deep synergistic development in shipping. Through measures such as jointly building the northern hub of the Shanghai International Shipping Center, cooperatively operating the deep-water channel at the Yangtze River estuary, and promoting the integration of ports in Shanghai and Nantong, they have achieved complementary advantages in container transshipment, river-sea combined transport, and shipping services, jointly enhancing the competitiveness of the Yangtze River Delta's world-class port cluster. In January 2025, Shanghai's inland electronic navigation charts achieved interoperability with the Yangtze River water system and Jiangsu's inland waterways. Through the “Yangtze e+” platform and Shanghai's Big Data Center “One Map” platform, the region's intelligent shipping management capabilities have been enhanced. Shanghai and Jiangsu maritime authorities deepened cooperation to jointly build a new landscape of integrated maritime development. Through joint escort operations, integrated traffic organization, and technological innovation, they ensured smooth passage and

navigation safety for large vessels. In January 2025, the 2025 Green Shipping Innovation and Development Conference convened in Nanjing. Shanghai Maritime University partnered with relevant Jiangsu institutions to establish the "Hydrogen-Powered Vessel Safety Inspection Technology Research Laboratory", advancing green shipping technologies. The deepening collaboration between Jiangsu and Shanghai in shipping has provided robust support for the integrated development of the Yangtze River Delta and the construction of the Yangtze River Economic Belt.

3.4 Analysis of Factors Influencing the Integrated Development of Jiangsu Coastal Ports and Shanghai International Shipping Center

From a regional economics perspective, the integrated development of Jiangsu coastal ports and Shanghai International Shipping Center constitutes a complex systemic interaction involving multi-level, multi-dimensional factors. Its evolutionary mechanism is synergistically influenced by institutional environments, market demands, spatial structures, technological innovations, and other multifaceted elements. Delving into the dynamic mechanisms of these influencing factors not only enhances the theoretical framework for coordinated port cluster development but also provides scientific grounds for formulating differentiated regional policies. Systematic research reveals that the integrated development of Jiangsu's coastal ports and Shanghai's international shipping center is primarily influenced by the following factors.

At the geographic and infrastructure level, geographical location and infrastructure serve as foundational factors shaping the integration of Jiangsu's coastal ports with Shanghai's international shipping center. The Jiangsu port cluster (Lianyungang, Yancheng, and Nantong ports) sits at the intersection of China's coastal economic belt and the Yangtze River Economic Belt, fulfilling a vital role in connecting the Bohai Rim and Yangtze River Delta logistics corridors. However, constrained by natural conditions, Jiangsu's coastal ports generally suffer from insufficient channel depths and a shortage of large specialized berths. This makes it difficult for them to directly accommodate the berthing demands of ultra-large container vessels, resulting in some deep-sea cargo still relying on Shanghai Port for transshipment. Simultaneously, the limited capacity of cross-river transportation networks (such as Yangtze River bridges and tunnels) between the two regions hampers the efficient collection and distribution of goods.

In terms of economic and industrial synergy, Shanghai Port and Jiangsu's coastal ports possess significant complementary development potential. As a global shipping hub, Shanghai Port's core competitiveness lies in international transshipment operations and high-end shipping services, including ship brokerage and shipping finance. Meanwhile, the Jiangsu port cluster can leverage its vast hinterland to focus on domestic cargo distribution, bulk commodity transportation, and supporting services for port-adjacent industries. However, ports in Jiangsu currently face pronounced issues of homogeneous competition, lacking distinctive functional positioning, business models, and development directions. This not only reduces resource allocation efficiency but also constrains the overall competitiveness of the regional port cluster. Concurrently, significant structural differences exist in trade patterns between the two regions: Shanghai emphasizes foreign trade, while Jiangsu focuses on domestic trade. This structural divergence provides a foundation for synergistic development but also necessitates policy guidance for optimization and integration.

From the perspective of policy and institutional factors, the national strategy of Yangtze River Delta integration provides top-level policy support for the coordinated development of Jiangsu's coastal ports and Shanghai's international shipping center. However, multiple challenges persist at the implementation level. On one hand, the territorial management system resulting from administrative divisions creates administrative barriers in port planning, construction, and operational management across regions. Cross-regional port resource integration and interest coordination mechanisms remain incomplete. On the other hand, at the operational coordination level, issues such as insufficient customs clearance facilitation, lack of shipping data sharing mechanisms, and inconsistent port fee standards continue to constrain the deep integration process between the two ports.

4. Research on Obstacles and Causes Hindering the Integrated Development of Jiangsu Coastal Ports and the Shanghai

International Shipping Center

4.1 Obstacles to the Integrated Development of Jiangsu Coastal Ports and the Shanghai International Shipping Center

The integrated development of Jiangsu coastal ports and the Shanghai International Shipping Center faces significant infrastructure bottlenecks. First, natural conditions impose notable constraints. Jiangsu's coastline is predominantly sedimentary, with port channel depths generally maintained between 12 and 15 meters. This depth is insufficient to accommodate large container vessels, forcing cargo from ocean-going routes to rely on Shanghai Port for transshipment. This limitation hampers the international competitiveness of Jiangsu ports. Second, cross-river passage bottlenecks are increasingly evident. Existing cross-river routes in the lower Yangtze River are nearing capacity saturation, with critical transportation nodes like the Sutong Bridge experiencing chronic congestion. This severely impedes cargo collection and distribution efficiency between Jiangsu ports and Shanghai Port. Third, the multimodal transport system exhibits significant shortcomings. Rail freight accounts for an insufficient share, inland waterway grades vary widely, and the "last mile" connection between ports and their hinterlands remains inefficient, collectively resulting in low overall logistics efficiency. These infrastructure bottlenecks not only limit the service capacity enhancement of Jiangsu ports but also constitute key obstacles to the coordinated development of the Yangtze River Delta port cluster.

Regional differences in administrative management systems and legal frameworks between Jiangsu Province and Shanghai objectively create institutional barriers to cross-border port cooperation and the implementation of unified standards. At the administrative level, belonging to different provincial administrative units leads to policy implementation disparities in areas like planning approvals and market supervision. This administrative fragmentation often results in inefficient resource allocation and redundant construction. Regarding legal and regulatory application, specific provisions such as cargo inspection and quarantine standards, customs clearance procedures, and hazardous materials transportation management remain inconsistent between the two regions. Taking imported cold-chain food inspection as an example, Shanghai ports have implemented a "pre-inspection" model, while some ports in Jiangsu still follow traditional inspection procedures. This disparity significantly increases compliance costs for cross-regional logistics enterprises.

Regarding market coordination, the competitive landscape reveals high homogeneity in port business structures, with excessive overlap in traditional services like container and bulk cargo handling. This homogeneous development model triggers disorderly price competition, leading to fragmented allocation of regional port resources and directly undermining the cultivation of overall competitive advantages. From a supply-demand perspective, current port services exhibit pronounced structural imbalances: traditional bulk cargo transport capacity utilization rates continue to decline, indicating oversupply; conversely, high-end logistics services like cold-chain logistics and cross-border e-commerce—emerging alongside regional industrial upgrades—suffer from insufficient supply, with mismatches growing increasingly evident. From an industrial linkage perspective, ports and adjacent industries have yet to establish a robust collaborative development mechanism. This prevents ports from effectively driving industrial agglomeration and deprives them of stable cargo sources supported by industrial clusters. This "port-industry disconnect" hinders the full realization of port economic value. These deep-seated contradictions in market coordination have become major obstacles to the Yangtze River Delta's efforts to build a globally competitive port cluster.

4.2 Causes of Integration Barriers Between Jiangsu Coastal Ports and Shanghai International Shipping Center

The disparity in service capabilities between Jiangsu coastal ports and Shanghai International Shipping Center stems from multiple structural factors. At the industrial development level, Shanghai leverages its international financial hub advantage to form a "port-finance" dual-engine model, while Jiangsu ports remain dominated by traditional loading/unloading operations, lagging significantly in cultivating modern shipping services. Regarding digital transformation, Jiangsu ports allocate a

significantly lower proportion of R&D investment compared to Shanghai Port, with severe underinvestment in smart upgrades. Technical barriers persist, including inconsistent data standards and poor system interoperability. In talent development, influenced by salary disparities and industrial ecosystems, the local employment rate of shipping graduates in Jiangsu is markedly lower than in Shanghai, leading to a continuous outflow of high-end talent. In the policy environment, Jiangsu lags significantly behind Shanghai in institutional innovation and foreign investment participation. Regarding market ecosystems, Jiangsu lacks influential shipping service industry clusters and has a limited number of specialized intermediary institutions. The combined effect of these factors creates systemic obstacles that constrain the enhancement of service capabilities at Jiangsu's coastal ports.

The institutional differences between Jiangsu Province and Shanghai Municipality in their policy and regulatory frameworks and administrative management mechanisms impose multiple constraints on cross-regional port cooperation. At the policy and regulatory level, regional disparities exist in legislation across key areas such as port operation licensing, vessel registration, and hazardous materials transportation management. Jiangsu and Shanghai exhibit numerous specific differences in licensing requirements, approval procedures, and other aspects. Regarding administrative approvals, Jiangsu implements a “three-tier approval” system with an average processing time of 20 working days, while Shanghai operates a “one-stop online service” model that reduces approval times to 7 working days. This efficiency gap hinders cross-regional business coordination. Disparities in market supervision standards are even more pronounced: in environmental regulation, Shanghai has enforced a “zero-emission” standard mandating shore power use for berthing vessels, whereas Jiangsu remains in a phased implementation period. Regarding customs clearance facilitation, Shanghai ports have achieved full electronic processing with “advance declaration and arrival release”, while some Jiangsu ports still retain paper-based document circulation.

As a vital hub in the global shipping system, the Yangtze River Delta region is undergoing structural transformation and diversification in market demand, posing unprecedented challenges to port service capabilities. From the market demand perspective, three dimensions show particularly pronounced changes: First, the rapid annual growth of cross-border e-commerce has created an urgent need for specialized cross-border e-commerce logistics hubs. Second, the increasing proportion of high-end manufacturing products being transported has led to a surge in demand for premium logistics services such as temperature-controlled warehousing and precision time-sensitive delivery. Third, the demand for “door-to-door” end-to-end logistics solutions has surpassed that for traditional port loading and unloading services. However, Jiangsu's coastal ports and the Shanghai International Shipping Center face significant supply-side mismatches. This imbalance causes threefold efficiency losses: First, high-value-added goods are forced to transit through overseas ports. Second, port facility utilization rates show extreme polarization, with some traditional bulk cargo terminals operating at high idle rates while modern container terminals run at overcapacity. Third, customer satisfaction continues to decline.

5. Strategies for Jiangsu to Promote the Integrated Development of Coastal Ports and the Shanghai International Shipping Center

5.1 Case Studies of Regional Shipping Center Integration from an International Perspective

Currently, interconnected development among port clusters is a common phenomenon internationally, with extensive cooperation encompassing jointly establishing service standards, strengthening equity partnerships, and co-investing in port infrastructure. A prime example is the integration between the Port of Rotterdam and other European ports. As one of Europe's largest ports, the Port of Rotterdam in the Netherlands has successfully enhanced the overall competitiveness of regional shipping through integrated development with other European ports. By embracing digital transformation, green sustainable development, regional cooperation, and policy support, Rotterdam has achieved seamless integration with its European counterparts. This model not only boosts port competitiveness but also provides crucial support for the coordinated development of Europe's regional economy.

Located at the confluence of the Rhine and

Meuse rivers, Rotterdam serves as a vital European hub for sea, land, and air transportation. Its extensive economic hinterland enables seamless connectivity to every corner of the European continent. Together with the Antwerp-Bruges port, Rotterdam has called on the European Commission for substantial investment in European industrial competitiveness and the implementation of the Clean Industry Pact. The two ports are viewed as an integrated logistics and industrial complex linked to the industrial clusters of the Ruhr region, accounting for 40% of Europe's petrochemical production. Through this collaboration, the ports not only enhance their own competitiveness but also advance the integration of Europe's regional economy. By working closely with other European ports, the Port of Rotterdam has established an efficient regional logistics network. The port's logistics operations service system is mature and well-developed, enhancing cargo value-added through storage, transportation, and reprocessing via bonded warehouses and cargo distribution centers. Additionally, the Port of Rotterdam promotes regional economic integration by optimizing transport connectivity.

5.2 Strategies for Jiangsu to Promote the Integrated Development of Coastal Ports and the Shanghai International Shipping Center

To further refine the modern integrated transportation system, it is imperative to continuously optimize the layout of transportation infrastructure networks, with a focus on strengthening multimodal transport corridors between port clusters. Under the strategic framework of the Yangtze River Delta integration, the following initiatives should be systematically advanced: First, accelerate the expansion and upgrading of cross-river corridors by implementing smart upgrades and capacity enhancement projects at key nodes such as the Sutong Bridge. Measures including optimized traffic management, installation of intelligent monitoring systems, and expansion of emergency lanes will improve existing cross-river passage efficiency. Second, establish an efficient “water-water transfer” network by deepening the integration between the Yangtze River deep-water channel and Jiangsu's coastal ports. Simultaneously advance the standardized renovation of canal waterways to create golden waterways enabling river-sea combined transport and direct river-sea access. Third, enhance the port collection and distribution railway network by prioritizing the construction of dedicated railway lines for port areas like the Tongzhouwan New Sea Outlet. This will increase the railway access rate for major coastal ports and establish a “road-to-rail” demonstration corridor. These measures will more efficiently connect Jiangsu's coastal ports with Shanghai's international shipping center and significantly enhance the overall competitiveness of the Yangtze River Delta's world-class port cluster.

The Jiangsu Provincial and Shanghai Municipal Governments should establish a regular policy coordination mechanism to build a unified and standardized regional cooperation policy system through the following measures: First, establish a “Shanghai-Jiangsu Port Integration Development Joint Conference” led by the deputy mayors in charge from both regions and comprising relevant functional departments. This conference will convene quarterly meetings to coordinate and resolve key issues such as planning alignment, standard unification, and benefit distribution. Second, jointly formulate regulations for the coordinated development of the Yangtze River Delta port cluster, establishing unified technical standards and management norms in areas such as port construction standards, operational specifications, data sharing, and environmental oversight. Third, establish a dynamic policy adjustment mechanism to conduct regular assessments of policy consistency in areas like free trade zone policies, port supervision, and shipping services, thereby enhancing policy coordination between the two regions. Fourth, jointly build the “Shanghai-Jiangsu Port Policy Service Cloud Platform” to enable online sharing and intelligent matching of policy documents among port management, customs, and immigration authorities in both regions, providing integrated policy consultation services for enterprises. Through these institutional innovations, policy disparities between the two regions will be further narrowed, enhancing operational synergy between Jiangsu's coastal ports and Shanghai's international shipping center, thereby providing institutional safeguards for building a world-class port cluster.

To comprehensively enhance digital collaboration, Jiangsu Province and Shanghai Municipality should jointly advance smart port

development, focusing on the following initiatives: First, jointly develop a port information platform integrating IoT, blockchain, and AI technologies to enable real-time sharing of core data such as vessel movements, cargo tracking, and berth scheduling, thereby improving inter-port information exchange efficiency; Second, uniformly deploy intelligent gate systems to implement an “single declaration, seamless passage” electronic clearance model between Jiangsu coastal ports (e.g., Taicang Port, Nantong Port) and Shanghai's Yangshan Port. Utilize OCR recognition and smart weighing technologies to reduce vehicle clearance times. Third, construct a 5G+ BeiDou high-precision positioning network to provide centimeter-level navigation services for container vessels and trucks traveling between Shanghai and Jiangsu ports. Develop intelligent loading algorithms to optimize route planning, thereby reducing empty container transfers; Fourth, establish a digital twin system for port operations. Utilize big data simulation to predict cargo throughput fluctuations, enabling dynamic allocation of resources such as berths and yards across Shanghai and Jiangsu ports. These measures will shorten cross-port cargo turnaround times, lower logistics costs, and significantly enhance the international competitiveness of the Yangtze River Delta port cluster.

6. Conclusion and Outlook

Ports are currently undergoing a critical period of strategic transformation and deep integration. For Jiangsu's coastal ports, leveraging the integration with Shanghai's shipping hub presents an opportunity to refine their capabilities and achieve sustainable development. However, they must avoid excessive investment in port construction beyond their scale. Instead, they should focus on gradually developing their own core competitiveness through deliberate guidance within market operations. In response to the growing trend of cooperation, they should progressively refine management and operational mechanisms for regional collaboration to secure greater initiative in future partnerships.

Future efforts to integrate Jiangsu's coastal ports with the Shanghai International Shipping Center should prioritize the following areas: deepening regional coordination and policy alignment; enhancing port functions and services while strengthening infrastructure; improve multimodal transport systems to enhance coordination between inland waterway shipping and coastal ports; and cultivate international shipping hubs to expand coverage of international shipping routes. Through policy support, technological innovation, and industrial synergy, Jiangsu's coastal ports and the Shanghai International Shipping Center are poised to achieve higher-level integrated development, providing robust support for economic growth in the Yangtze River Delta region and across the nation.

Acknowledgments

This paper is supported by Jiangsu Ocean University Graduate Research and Practical Innovation Program (No. KYCX2024-51).

References

[1] Zhao Pengtao, Wang Chuanxu. Research on the Transmission Mechanism of Port Investment in Inland Transportation Systems for Horizontal Cooperation. China Maritime, 2024, 47 (04): 51-59.

[2] Feng Can, Chen Xiaobo. Experiences and Insights from International Neighboring Port Cooperation. Macroeconomic Management, 2024, (11): 86-92.

[3] Shen Lei. Strengthening Collaborative Partnerships Between Shanghai Port and Yangtze River Delta Regional Ports. China Ports, 2024, (10): 9-13.

[4] Bi Chengcheng. Exploring Cooperation Pathways for Tianjin and Hebei Ports Against the Background of Port Resource Integration in Hebei. Industrial Innovation Research, 2023, (14): 7-10.

[5] Lu Bo, Wen Yijing, Xing Jian, Song Dongping. Research on Competitive Cooperation Strategies for Bohai Rim Ports Based on the TEI@I Methodology. Management Review, 2020, 32 (07): 246-257.

[6] Zhang Zhifan. Building and Improving Regional Cooperation Mechanisms for South China Sea Ports: A Perspective of the “Maritime Community of Shared Future”. Journal of Hainan University (Humanities and Social Sciences Edition), 2020, 38 (04): 28-36.

[7] Feng L, Li X, Ng A K Y, et al. Can port systems be enhanced by government promotion? The case of port cooperation along the maritime silk road. Ocean &

Coastal Management, 2023, 242: 106669.
[8] Zhou Y, Li Z, Duan W, et al. The impact of provincial port integration on port efficiency: Empirical evidence from China's Coastal Provinces. Journal of Transport Geography, 2023, 108: 103574.
[9] Xu L, Xie F, Wang C. Passive or proactive capacity sharing? A perspective of cooperation and competition between two regional ports. Maritime Policy & Management, 2022, 49(4): 492-509.
[10] Luo M, Chen F, Zhang J. Relationships among port competition, cooperation and competitiveness: A literature review. Transport Policy, 2022, 118: 1-9.
[11] Stamatović K, De Langen P, Groznik A. Revisiting the Cooperation Matrix for Classifying Cases of Port Cooperation—Case Study: Northern Adriatic Ports. Economic and Business Review, 2020, 22(3): 5.

