

# Research on the Development Trend of China's Port and Shipping Modernization Under the Background of "the Belt and Road" Initiative

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**Abstract**—The development of port and shipping industry is a strategic requirement under the background of "the Belt and Road" initiative. This these analyzes the necessity of the development of China's port and shipping industry from the strategic level of the port and shipping industry in serving the country, the global resources allocation of shipping center and the level up of port and shipping industry, and discusses the current situation of port development from the aspects of supportability, competitiveness and influence, and the shortcomings in the development course of port and shipping industry in our country at present, thus puts forward the development trend of the modernization of port and shipping industry in our country.

**Keywords**—*the Belt and Road; port and shipping industry; development trend*

## I. INTRODUCTION

The development of port and shipping industry is a strategic requirement under the background of "the Belt and Road" in China, which is embodies in the following aspects:

### A. *Requirements for Improving the National Strategic Level of China's Port and Shipping Service*

Along with the implementation of the major national strategies of "the Belt and Road", the free trade zone, the Yangtze River economic belt and the integration of Beijing-Tianjin-Hebei Region and the Guangdong-HongKong-Macau Greater Bay Area, it has put forward higher requirements for the coordinated development of the port and shipping industry, the collecting and distributing system, shipping services and resource allocation. The vigorous promotion of our regional integration strategy will further lift shipping demand, integrate and optimize port and shipping resources and bring new opportunities to the development of shipping business in China. The supply-side reform injects new impetus into the integration of port and shipping resources, requiring the integration of port and shipping resources, improving and strengthening the supply quality of port and shipping services, and becoming a new impetus for the development of port and shipping enterprises.

### B. *Requirements for Enhancing the Global Resource Allocation Capability of China's Shipping Centers*

Singapore and Hong Kong, as relatively mature international shipping centers, have taken the lead in maritime services, legal environment and other soft shipping environment. In the future, the construction of China's major shipping centers will face challenges from Hong Kong and Singapore. They need to be placed in Northeast Asia and even in the global port and shipping system to participate in competition. Substantially, form the coordination development model of port and shipping industry, and thus build a world-class port group and shipping enterprises.

Through the integration of port and shipping supply chain resources, we can avoid the problems of fragmentation of port and shipping lines and shipping service resources, and low utilization efficiency, and realize the overall planning, rational layout, complementary advantages and coordinated development of regional port and shipping industry, and make every effort to promote the gathering of logistics, business flow, information flow and capital flow in the supply chain, so as to form a smooth, safe and convenient port and shipping supply chain system, to form synergies, and constantly enhance the global recycling of China's major shipping business.

### C. *Adapting to the Requirements of Scientific and Technological Innovation for the Improvement of Ability Level of China's Port and Navigation Industry*

New technologies such as data, cloud computing, Internet of things, automation and intellectualization have been innovatively applied in the field of port and shipping industry. They can facilitate collecting and distributing transportation, intellectualize control, refine service and intensify operation, and provide a technical basis for the integration of port and shipping supply chain resources, and be conducive to the coordination and consistency in standards, policies, techniques and other aspects.

Under the "Internet +" mode of thinking, the port and shipping industry will make use of big data and Internet of things, automation, intelligence and information technology

industry chain to extend upstream and downstream, make horizontal cooperation, improve efficiency and reduce costs systematically. It will be conducive to truly realizing division of labor and complementary advantages in the integrated system of port and shipping industry. New technologies will be widely used in port and shipping management decision-making, assist port and shipping operation management, facilitate to build a visual, efficient, safe and convenient e-commerce trading platform for port and shipping logistics, with one-step service function, which will make port and shipping logistics faster and easier to operate, and is conducive to the realization of coordinated operation between ports and shipping.

## II. THE DEVELOPMENT STATUS OF PORTS IN CHINA

Ports are an important part of the shipping industry. They play an important role in supporting and leading economic and social development, opening to the outside world in an all-round way and maintaining national economic security. Ports bear more than 90% of China's foreign trade volume, and ports are irreplaceable in all-round opening up. Moreover, China's coastal areas and inland river areas gather 75% of the country's permanent population, 78% of GDP, 91% of foreign trade, 78% of crude oil consumption, 85% of steel production, 72% of electricity consumption, so it plays a leading role in "going out, going far and going safely".

In 2016, China's ports completed cargo throughput of 13.2 billion tons, foreign trade cargo throughput of 3.85 billion tons, and container throughput of 0.22 TEU, with 231 berths for production bearing 10,000 tons of cargos or above, ranking first in the world. China occupies 7 of the top 10 ports in the world in terms of cargo and container throughputs. Ningbo Zhoushan Port ranks first in cargo throughput in the world for many years, and Shanghai Port ranks first in container throughput in the world for seven consecutive years. China's port container throughput accounts for nearly one-half of Asia's total and more than one-quarter of the world's total. China's marine volume accounts for one-third of the world's total, and these indicators are still rising in recent years.

But China's port development is generally "big but not strong". It is manifested in:

- Poor supportability. Ports and shipping are not matched. Shipping strength marks China's economic and trade status, and it is not matched with our port status. Soft infrastructure and hard facilities mismatch. The shipping service industry chain develops slowly, and cannot fully adapt to the current and future needs of upgrading. The internal and the external are mismatching. Port shipping has a small external radiation range, weak international control power, and a small influence on overseas supporting points and important maritime transport channels.
- Poor competitiveness. The construction of international shipping center has a long way to go. The export of maritime service trade is growing rapidly, but the deficit is expanding constantly; and the competitiveness of brand is weak.

- Small influence. The formulation of the world's important maritime rules and technical rules is still dominated by Western countries. We have little international voice right and small influence in the field of port and shipping development.

## III. THE DEVELOPMENT TREND OF PORT AND SHIPPING MODERNIZATION IN CHINA

### A. The Development Trend of China's Shipping Industry

1) *Presenting the integrative development trend of "four flows in one" in the port and shipping industry:* Resource integration is closely related to supply chain globalization, integration and collaboration. Only when we realize the integration and collaboration of organizations, process and information, the whole supply chain can respond faster, be more forward-looking, better resist various risks together and provide customers with the best products and services at minimum cost. In organization: from "cooperation and game" to a more clear division of labor and responsibility in the supply chain, namely "cooperation and integration"; in process: breaking the enterprise boundaries at the supply chain level, focusing on the core of meeting the needs of end-users and recombining process integration; in information: realize the information system integration among supply chain members by Internet Technology, realize real-time sharing and exchange of operational data and market data, so as to achieve faster and better collaborative response between members to the needs of end-users.

Promote the development and innovation of the port and shipping supply chain system, implement the extension strategy, lay out the network horizontally, integrate the superior resources in the port and shipping logistics service industry chain vertically, construct the port and shipping service supply chain, extend the port and shipping service industry chain and expand the port and shipping service value chain. Realize the competitive advantage of integrated operation, develop "port and shipping + logistics", "port and shipping + business flow", "port and shipping + information flow", "port and shipping + capital flow", four flows in one. Unite the upstream and downstream enterprises of supply chain, port and shipping, road, railway and air transport enterprises, build the whole-course logistics network, extend the service chain and expand the value chain. Enlarge linkages with regional industry, free trade parks and logistics part, play the scale effect of production, circulation and market, promote the development of domestic trade, and form a shipping supply chain service network. Cooperate with the Customs, entry-exit inspection and quarantine and other port supervisory departments, dock the policy of international trade facilitation, strengthen the global network layout and realize the competitive advantage of differentiated services.

2) *Showing an integrative and reorganized development trend of port and shipping industry alliance:* With the development of port and shipping alliance, DNV merged

with GL, Herbert merged with CSAV, French CMA purchased Neptune Orient Lines, COSCO merged OOCL. Super operators are more concentrated. The trend of shipping alliance and port alliance puts forward new requirements for the comprehensive service level of port and shipping logistics industry.

The global liner industry has formed three major alliances (OCEAN, 2M and THE), which require higher service for shipping companies and more urgent innovation for shipping industry. COSCO and China Sea merged and set up the China Ocean Shipping Group to further strengthen the trend of shipping alliance. The market concentration of main routes is higher and the competition in shipping market will be more intense. China and Malaysia are planning to establish a port alliance of the Belt and Road and create a vast interconnection network between the two sides and even the entire ASEAN region, promote the trades, investment and logistics and transportation facilitation among the countries along the Marine Silk Road. The port and shipping industry will face new opportunities. 10 Chinese ports (Dalian, Shanghai, Ningbo, Qinzhou, Guangzhou, Fuzhou, Xiamen, Shenzhen, Hainan and Taicang) will cooperate with 6 Malaysian ports (Klang, Malacca, Penang, Johore, Kuantan and Bintulu). The Malaysian and Chinese governments will set eyes on the establishment of port alliance of the countries along "the Belt and Road" to reduce barriers of each side and promote trade development.

#### *B. The Development Trend of Ports in China*

In the development of port modernization, we should change the existing status, change the role from a follower to a leader, change from scale expansion to brand promotion and innovation, arrange strategic support in global, and strengthen the control and voice rights of the main efficient transport corridors.

*1) Reasonable layout, adequate guarantee, green and sustainable facilities supply:* Form the land and sea two-way logistics network layout with port as hub. The main port hub are complete in functions, outstanding in subjective role, and smoothly linked with the integrated transportation system, which plays an important strategic support role in "the Belt and Road" strategy. Containers, coal, crude oil, iron ore, cruise ships and other major transport systems are well-laid out and fully supplied. Resources allocation is intensive and efficient, multimodal transport is developed, logistics services are efficient and economic, and port efficiency is world-class. The three major port groups of Tianjin-Hebei, Yangtze River Delta and Pearl River Delta have achieved coordinated development and strong international influence. Other regional ports have basically formed port groups with clear division of labor and orderly competition. The spatial system of port group — comprehensive channel — inland hinterland is improved, and the green spatial pattern and development mode are formed. Space development is agglomerated, resources utilization is efficient. The effective protection mechanisms

of core port resources are formed, coordinative with urban development. A green and ecological port system is formed.

*2) Guiding intelligent ports with scientific and technological innovation:* Automated wharfs are widely used. Achieve intelligent scheduling of production operations and efficient information management of the whole process, one-step service mode, innovative port logistics operation mode of paperless operations, perfect port logistics information system based on cloud architecture and prevailing application of big data analysis, an open information platform for sharing and interconnection (deepening the application of EDI technology; completing the public information platform for the whole port logistics chain; linking up with ministerial information system and information system of relevant port administrative departments).

*3) The whole-process logistics tracking and monitoring system:* Use big data and Beidou satellite to monitor ships, port operations, vehicles and so on. Integrate transportation modes such as waterways, highways and railways. Form an integrated management platform of seamless connection between land and water by integrating data resources of ports, cargo, vehicles and ships, so as to realize dynamic tracking and supervision of the whole logistics chain.

*4) International shipping services with global influence:* The agglomeration effect of shipping factors is obvious, the level of shipping service is constantly improving, and the global influence of shipping is significantly increasing. Shipping finance, ship trading, ship management, shipping brokerage, shipping consulting, ship technology, maritime legal arbitration and other shipping services require a high degree of concentration. The scale of international ship flow, information flow and capital flow is at the forefront of the world. Have a number of internationally competitive brand shipping enterprises, port construction and operation enterprises, global logistics enterprises and cultivate a number of maritime services enterprises.

*5) Perfect overseas strategic support layout:* Have a batch of overseas supporting ports among the Marine Silk Road and form a smooth, safe and efficient logistics channels for connecting our domestic ports, main maritime passages and the countries and regions along "the Belt and Road". Fully protect the transport needs of the country's expansion and opening up to the outside world, and better support the national strategy of "the Belt and Road". Actively participate in the formulation and revision of the relevant standards and rules of the international shipping service industry, and increase the international voice right and influence.

*6) Modern shipping management system:* Externally, international shipping governance wireless communications should be formed to meet the requirements of globalization. Have a voice and influence in the global maritime organization and related service agencies, and improve the competitive water transport financing and tax policies.

Internally, we should make full use of modern information technologies such as big data, cloud computing, Internet of Things, remote sensing and so on to establish a dynamic monitoring and control system for port resources, provide all elements and full-cycle monitoring for port construction, branch and management, and realize the effect evaluation and in-process and after-event supervision of the whole process of port planning and related traffic planning implementation.

#### IV. CONCLUSION

Under the background of the "Belt and Road", development of smart ports becomes a tendency and is required for improving business capabilities and changing the shipping quality and capacity. China has invested much in aspect of smart ports. However at present, there are still many aspects of shortcomings. If an integrated logistics, data movement, full-process shared smart logistics platform can be realized, it will be available to change the traditional operation mode and method, improve work efficiency and reduce error rate as well as get shipping agencies, off-port yard, logistics enterprises, registered vehicles, and registered drivers integrated to improve work efficiency. In aspects of integration, innovation and comprehensive service, the construction of smart port shall realize technical innovation, platform integration and transformation upgrading and realize integrated port information, full-process online check and approval, government collaborated supervision and regulation, convenient services in free trade zone, smart sluice gate at port, smart dispatching of vehicles, smart tallying operation, automatic loading/unloading at wharf, uniform management on customers, smart dispatching of ships, automatic performance evaluation and all-round safeguards.

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