Analysis on the Contribution of Water Transport Development to Social Economy in the Middle and Upper Reaches of the Yangtze River

Wei Bai¹, Xue Zheng²

¹Department of road traffic management, Sichuan Police College, Luzhou 646000; China; ²Sichuan Railway Group Co. Ltd, Chengdu 610031, China.

Abstract

The development of inland water transport industry not only promotes the development of the city, the growth of regional economy and the improvement of people’s living standards, but also plays an important role in improving the traffic environment and urban ecological environment. Based on the existing literature research, this paper summarizes and draws lessons from the development experience of water transport industry at home and abroad. Firstly, it expounds the overall development status of waterway transportation in the middle and upper reaches of the Yangtze River, including the construction, development and achievements of waterway. Secondly, the correlation between waterway transportation and basin economy in the middle and upper reaches of the Yangtze River is analyzed. And summarize and analyze the contribution of waterway construction to economic development and social development. Finally, based on the above analysis, this paper puts forward the corresponding development strategies of the middle and upper reaches of the Yangtze River waterway: improving the water transport policy; increasing the construction of waterway and port facilities; accelerating the construction of collection and distribution system; optimizing the structure of ship transport capacity, developing professional transportation; improving the level of inland water transport informatization; vigorously cultivating high-quality shipping talents; building and developing a green water transport system.

Keywords

The Middle and Upper Reaches of the Yangtze River; Waterway; Social Economy; Contribution.

1. Introduction

China’s water transport industry is mainly composed of ocean, coastal and river transport. Among them, the Yangtze River shipping, as the most important part of China’s river transportation industry, is also an early way to rise to a national strategic mode of transportation. It is an important support for the construction of socialism with Chinese characteristics in the new era, and also a necessary condition for promoting the high-quality development of the Yangtze River economic belt. It has the advantages of less land occupation, less pollution, less energy consumption, etc. In 2019, the cargo throughput of the Yangtze River trunk line reached 2.93 billion tons, an increase of 8.9% year on year; the cargo throughput of the trunk port reached 3.16 billion tons, an increase of 11.3% year on year; the container throughput reached 19.4 million TEU, an increase of 10.9% year on year. Maximize the comprehensive transport benefits of the Yangtze River and strongly support the regional economic development.
There are few studies on water transport economy abroad, which mainly focus on the quantitative calculation of the impact of water transport industry on regional economic development, and objectively put forward the role and existing problems of water transport industry on regional economic development. An Fen's optimization of empty container relocation network has important practical significance for improving the service level of inland shipping and promoting the transformation of freight mode from land to waterway [1]. Chen y studied the characteristics of flow composition of inland river basin in arnc area, the characteristics and main control factors of inland river bottom flow, and the changes of hydrological process and water resources in the future, which is helpful to strengthen the ecological, economic and social sustainable development of the study area [2]. Carse Ashley believes that technical standards play an important role in the construction of global transportation and communication infrastructure, but the environmental standardization related to infrastructure is seldom paid attention to [3]. Bart wiegmans introduced the role and conditions of inland water transport as a freight system, and pointed out the economic, logistics, technical and policy issues and challenges related to inland water transport [4]. He et al. Used data envelopment analysis (DEA) and Marquise index (MI) as the model framework to study the water resources transportation efficiency in the Yangtze River Delta region, and proposed that we should consider strengthening the internal competition of ports and improving the mechanism to improve the transportation efficiency [5]. Many provinces in China have carried out research on the development strategy of water transport economy. Tian Hongwei proposed to vigorously build the water transportation access network and extend the water transportation coverage, so as to promote the economic development of Hunan Province [6]. Zhang Haifeng believes that China’s water transport economy is still in a backward state with the developed countries. In order to promote the development of China's water transport economy, we must continue to issue corresponding development strategies to promote the further development of water transport economy [7]. Yang Chunyu believes that the development of the water transport industry must get the attention and investment from the national level, so as to promote the development of regional economy [8]. By establishing VAR model, Xiong Pu proposed that the development of water transportation industry in Shanghai and Jiangsu has played an important role in promoting regional economic development [9]. Xue Shujie summarized the advantages of Ningbo Zhoushan port in developing river sea intermodal transport, concluded that there is a correlation between river sea intermodal transport volume and regional economic growth, and established a production function model to obtain the contribution rate of river sea intermodal transport volume to regional economic growth [10]. Based on the water transport scale of the Yangtze River economic belt, Jing Xueqing proved that water transport has a positive and positive impact on the economic growth of the Yangtze River economic belt [11].

2. Development status of water transport industry in the middle and upper reaches of the Yangtze River

Compared with other regions in China, the Yangtze River Basin has certain advantages in geographical location, natural resources, economic base, population density and urban concentration. However, what does not match with these significant advantages is that the Yangtze River Basin, as an important development axis connecting China’s East and West, does not play an important role in the process of China’s national economic growth.

Taking the data of 2019 as an example, the per capita GDP of Qinghai, Sichuan, Chongqing, Yunnan, Hubei, Hunan and Jiangxi along the middle and upper reaches of the Yangtze River is 60530 yuan, which is lower than 70892 yuan of the national per capita GDP. The reason for this result is that the economic development of the region along the middle and upper reaches of
the Yangtze River lags behind, and the overall advantage is not obvious. At the same time, the overall gap between the cities in the middle and upper reaches of the Yangtze River is gradually widening, especially the cities in the middle reaches of the Yangtze River have greater advantages than the cities in the upper reaches of the Yangtze River in terms of per capita gross output value. The main reasons are the separation of enterprise chains, similar industrial structure, and lack of cooperation among enterprises.

3. Contribution of water transport industry to economic development in the middle and upper reaches of the Yangtze River

First of all, the improvement of the network degree and hierarchical structure of inland waterway infrastructure can enhance the openness of the basin economic system and strengthen the economic connection inside and outside the basin economic system. Secondly, it can reduce the freight, improve the regional accessibility, and cause the regional product cost to drop, and the product market to expand. At the same time, the improvement of river channel conditions can strengthen the agglomeration of river basin economy, strengthen the connection between regional economic subsystems, effectively improve the location advantage of river basin economic system, increase the attraction to investment, drive the development of advantageous resources in the region, and form new advantageous industries.

3.1. Contribution form of inland waterway engineering to GDP

The contribution of inland waterway project to GDP mainly includes direct contribution and indirect contribution, which is the embodiment of the impact of inland waterway construction on GDP.

(1) Direct contribution mainly refers to the result of GDP growth caused by the construction of new infrastructure and equipment. It mainly includes the production remuneration of workers, net value-added tax of production, depreciation of fixed assets and business balance of enterprises. According to the survey data,

(2) Indirect contribution, that is, the spillover effect of waterway construction, is composed of three parts: backward spillover effect, forward spillover effect and consumption spillover effect. The backward ripple effect of waterway construction refers to the added value created by the production of the products as the intermediate input of waterway construction; the forward ripple effect of waterway construction refers to the added value created by the production of the products as the intermediate input; the consumption ripple effect of waterway construction refers to the added value, backward ripple effect and forward ripple effect directly created by waterway construction The added value created, the national income formed together, and the national income increment caused by distribution and use.

3.2. The contribution of Waterway Engineering in the middle and upper reaches of the Yangtze River to social development

3.2.1. Promote the improvement of shipping efficiency

With the improvement of waterway quality, shipping efficiency will be directly improved. For example, according to the research and calculation of authoritative departments, if the water depth of Yichang Wuhan section of the middle reaches of the Yangtze River is increased to 3.2 meters, the annual waterway capacity of Yichang Chenglingji and Chenglingji Wuhan sections of the Yangtze River can be increased to more than 3.09 million tons and 3.85 million tons respectively, and the direct economic benefit brought by the increased freight turnover is more than 130 million yuan per year. After the implementation of the regulation project of Luohuzhou waterway, the proportion of large ships in the ship flow increases, the daily average actual carrying capacity is 2.22 times of that before the regulation, the annual load reduction
cost of ships saves 9.2 million yuan, the annual shipping cost saves 12.1 million yuan, and the annual navigation cost saves more than 1 million yuan [12].

3.2.2. Meet the needs of "two oriented" society construction

With the acceleration of China's industrialization and urbanization, land and energy are increasingly tense, and environmental pressure continues to increase, which will have a great impact on the sustainable development of economy and society and the construction of transportation infrastructure. The Yangtze River water transport has the advantages of large transport capacity, less land occupation, low energy consumption and less pollution, which meets the basic requirements of building a "two oriented" society. Strengthening the construction of the Yangtze River waterway, speeding up the development of the Yangtze River water transport, and giving full play to the advantages and functions of the golden waterway of the Yangtze River play an important role in alleviating the pressure of land, resources and environment, and promoting the sound and rapid economic and social development of the Yangtze River Basin.

3.2.3. Guide the upgrading of industrial structure in the areas along the Yangtze River

As one of the basic elements supporting the economic growth of the river basin, shipping has an important impact on the upgrading of industrial structure. Shipping provides necessary energy and raw materials for river basin enterprises, which can flow in large-scale and low-cost. When selling products, it can transport large-scale, providing low-cost and convenient transportation, reducing enterprise costs and creating profits for enterprises. Waterway can also play the role of connecting large and medium-sized port cities, industrial centers and transportation hubs along the river, and become the carrier of the development of enterprises in the river basin. The direction of waterway construction is the direction of enterprise group layout. The construction of waterway will help to break through the regional barriers, promote the integration of different industries and regions, promote the regional economic integration, industrial development scale, and enterprise intensive management, so as to improve the modernization and advanced degree of industrial product structure along the Yangtze River, and promote the development of the tertiary industry and high-tech industry.

3.2.4. Promoting the process of Urbanization

Channel construction is conducive to promoting the development of cities. Channel construction can improve the interaction of people flow, logistics flow and information flow between river basin cities, speed up the process of regional urbanization, and is conducive to the healthy and rapid development of large cities in the region. Through the construction of high-level channel network and the development of urban agglomeration, big cities can obtain new development in a broader environment and obtain higher benefits. At the same time, the waterway construction can promote the economy and traffic of small towns along the river, and also connect big cities and small towns to form a complementary, reflecting the efficiency of regional economic cooperation and development.

3.2.5. Protect the natural environment

Since the implementation of waterway system regulation in the middle and upper reaches of the Yangtze River, it has effectively protected the natural environment, reduced soil erosion, improved the water environment, and promoted the survival and reproduction of aquatic animals and plants in the Yangtze River. At the same time, in the process of governance, the application of new materials, new energy and new technology also plays an important role in protecting the natural environment. Through the corresponding transformation of the boat facilities, the pollution caused by the boat itself is reduced.
3.2.6. Improve safe navigation conditions

Before the construction of the Yangtze River waterway, the hidden dangers of navigation accidents were relatively serious. Through years of systematic management and vigorous maintenance, the safety conditions of the waterway were significantly improved, and the accident rate decreased significantly. In addition, the bridge construction not only promotes the economy on both sides of the inland river and accelerates the speed of logistics, but also has a certain impact on the safety of ship navigation. By using digital channel, electronic channel map, navigation mark telemetry and remote report, channel visual supervision system, the intelligent level of channel service is greatly improved, and the need of safe navigation of ships in bridge area is guaranteed.

4. Countermeasures to promote the development of water transport industry in the middle and upper reaches of the Yangtze River

4.1. Improve local water transport policy and work coordination mechanism

In the aspect of water transport management, we should adopt the management mode of combination of sections and sections, improve and straighten out the main functions of various water transport management departments as soon as possible, strengthen personnel exchanges between maritime, ship inspection and other relevant departments, strengthen coordination and cooperation, and strengthen comprehensive law enforcement. At the same time, water transport management involves a wide range. When formulating relevant water transport planning and management policies, we should strengthen communication and coordination with development and reform, land, environmental protection, water conservancy and other departments, and further improve the work coordination mechanism.

4.2. Increase investment in water transport infrastructure

We should strive for capital investment in water transport construction projects, seize the opportunities brought about by the national strategy and regional economic development in the new era, actively strive for the government’s capital investment in the key water transport construction projects in the middle and upper reaches of the Yangtze River, and strive for the state’s financial subsidies for the construction of high-grade waterway and port terminals. We should speed up the construction of high-level channels, strengthen channel maintenance and management, and promote the construction of large-scale and specialized port areas.

4.3. Speed up the construction of collection and distribution system and actively develop multimodal transport

The water transport structure in the middle and upper reaches of the Yangtze River is not perfect, which needs industrial adjustment and transformation. It also needs to develop the tertiary industry logistics service industry, strengthen the integration of ports and transport enterprises, further enrich the main and branch network of water transport, and enhance the inland container transport capacity. In addition, we should continue to strengthen the infrastructure construction and build a number of stations with multimodal transport capacity, so as to improve the multimodal transport capacity, improve the port collection and distribution system, realize the connection between important port areas and expressways, freight enterprises and logistics parks, and vigorously develop multimodal transport.

4.4. Promote the structural adjustment of ship transport capacity and develop specialized transport

We should promote the standardization of inland river ships, build ships according to the national and provincial inland river ships as far as possible, and improve the ship
standardization rate. The old transport ships with small tonnage and non-standard ship types should be disassembled to actively guide the adjustment of ship capacity structure.

4.5. Training high quality shipping talents
The development of water transport industry is closely related to the cost of human resources. Labor resources are needed for management, driving, handling and so on. With the growth of employees, the quality requirements of employees will be higher and higher. To cultivate high-quality shipping talents is an important way to improve the efficiency of water transport industry.

4.6. Improve the level of inland water transportation informatization
Informatization and networking are the important guarantee for the development of modern water transport industry. We should make use of modern information technology to improve the ability of water transport management, effectively improve the level of water transport information service, and improve the economic benefits of water transport. In response to one belt, one road and the Yangtze River Economic Belt national strategy, the development of multimodal transport in the upper and middle reaches of the Yangtze River will be promoted, providing water transportation goods flow, information flow, price information, meteorological and waterway safety information, etc., to facilitate data exchange and sharing, laying the foundation for the "single system" of the whole process and all transparent intermodal transport, and providing multimodal transport information services for the related enterprises.

4.7. Strengthen the awareness of environmental protection and build a green water transport system
In order to ensure the sustainable and healthy development of the water transport industry in the middle and upper reaches of the Yangtze River and promote the development of regional economy, we must enhance the awareness of environmental protection, focus on the low-carbon green development of water transport, strive to build a green water transport system for the development of the Yangtze River, and accelerate the development of green logistics in the field of water transport. Encourage and support enterprises to eliminate old transport ships with high energy consumption and high pollution ahead of time, strengthen the transformation of domestic sewage pollution prevention facilities of transport ships, and urge enterprises and ship owners to build or purchase ships in strict accordance with the national standardized ship types, so as to improve the rate of meeting the discharge standard of ships.

Acknowledgments
Fund projects: Key research base of Humanities and Social Sciences in Colleges and universities of Sichuan Province. Water transport Economic Research Center. “Economic contribution and utility prediction of Waterway Construction: a case study of the middle and upper reaches of the Yangtze River (SYJJ2020C03)”.

References


[12] Li Zhihong, Li Lei, Zhao Liping. Research on the contribution of waterway construction in the middle reaches of the Yangtze River trunk line to the economy along the river [J]. Hunan Transportation Science and technology, 2010.12 (36): 111-113 + 125.