

# Research on Logistics Development Mode of Gwadar Port under the Background of the Belt and Road and China-Pakistan Economic Corridor

Aimin Deng, Siyu Xiang

**Abstract**—Gwadar Port is located near the Persian Gulf of strategic significance, clutching the throat of several important maritime routes, is the end point of the China-Pakistan Economic Corridor, and is also an important hub port along "the Belt and Road ". Therefore, the study of Gwadar Port logistics development mode has strategic significance. After a detailed literature review of port logistics, this paper analyzes the development mode of port logistics in typical ports at home and abroad, and summarizes its enlightenment to the development of port logistics in later developing regions. Then, based on the long-term planning of China-Pakistan Economic Corridor, the logistics development mode of Gwadar Port in 2017-2030 is studied and analyzed. This paper believes that in the first stage (2017-2020), the competent authorities of Gwadar Port should focus on consolidating the infrastructure construction and adopting the logistics development model led by the free trade zone. In the second stage (2021-2025), Gwadar Port should give full play to the development of port-adjacent industries and realize the integrated development of port production and city. In the third stage (2026-2030), it will be important for Gwadar Port to focus on the overall port development, integrate resources and realize the integrated development of the port global supply chain.

**Index Terms**—Gwadar Port, logistics development model; The Belt and Road Initiative, China Pakistan Economic Corridor, Hinterland economy, Supply chain integration.

## I. INTRODUCTION

On February 19, 2014, China and Pakistan issued a statement, noting that the two countries will focus on the development of the China-Pakistan Economic Corridor (CPEC), and the construction of the Gwadar Port and other flagship projects, leading the in-depth cooperation in energy, transportation and logistics infrastructure and promoting the construction of the belt and Road initiative. During President Xi's state visit to Pakistan in April 2015, Chinese and Pakistani leaders agreed to focus on the construction of the CPEC, promote China-Pakistan industrial cooperation and build a "1+4" economic cooperation layout. CPEC Vision Plan was released at the end of 2017. This series of documents and plans pointed out the direction for the development and construction of Gwadar Port and ensured that sufficient human and material resources could be

obtained during the development process. Gwadar was taken over by China after a decade of lackluster operations in Singapore. Since the launch of the CPEC, Gwadar Port has taken on a new look. A number of key projects have made important and positive progress, effectively boosting the local economy. Despite the outbreak of COVID-19, the Prime Minister and government of Pakistan have firmly supported the construction of the corridor at full speed, accelerated the construction of the transportation network in Gwadar and the integrated development of its radiation cities, and provided policy support for the development of transit trade and investment attraction at Gwadar Port. Gwadar port is located in the traffic fort near the Persian Gulf, become "in" all the way with hub ports of CPEC traffic routes, Gwadar to borrow from the domestic and foreign typical port logistics from small to large to strong the development course of seeking success tips, achieve leapfrog development in both countries, and the surrounding area has a crucial strategic significance.

## II. LITERATURE REVIEW

Scholars mainly study port logistics from three aspects: meaning, function, system construction and evaluation analysis.

### A. Port Logistics

#### 1. The meaning of port logistics

Port construction in foreign countries started early, and port logistics has attracted the attention of foreign scholars because of its importance and unique form. In order to adapt to the trend of port development, the concept of port logistics came into being. Hesse M (2006) believes that world-class ports are constantly transforming into integrated logistics service centers and developing into hubs of the world logistics network system. In China, the view of scholar L J Zhang is more recognized. L J Zhang (2005) pointed out that port logistics refers to the construction of an integrated port service system that includes all key features of the logistics supply chain by relying on the conditions of the port, giving full play to the advantages of the port distribution center, and supported by the port infrastructure and wireless communication network. Based on the viewpoints of the above scholars, this paper holds that the port is a logistics base, logistics hub and logistics node, and a cluster of all logistics enterprises within the port scope and radiation area.

#### 2. Functions of port logistics

With the development of global economy and the

Aimin Deng, the School of Economics and Trade, Hunan University, Changsha, China

Siyu Xiang\*, the School of Economics and Trade, Hunan University, Changsha, China

promotion of economic globalization, the function of port is also changing and developing. The first-generation port is a traditional transportation and logistics center. The second-generation port evolved into a transportation center and a service center; The third-generation port undertakes the function of international logistics center. The third-generation port will evolve into a global supply chain center. The evolution of port functions from the first generation to the third generation is characterized by non-active natural formation. The fourth-generation ports take cities as the main body, combined with relying on the free trade zone policy, have formed an active dispatching base station, industrial integration development base and service integration platform for global economy and trade.

### *3. Port logistics system construction and evaluation analysis*

Cao L H (2019) believes that the construction level of port logistics should be measured from multiple angles, and puts forward that to develop China's port logistics related industries, we must strengthen the construction of logistics service supply chain. J Y Gu (2018) analyzed the construction of military civilian integration system of port logistics from five perspectives: legal standard system, command and management system and information construction system. X L Shen (2017), C Y Ji (2017) and G Li (2010) respectively evaluated and analyzed the competitiveness of port logistics industry cluster, the performance of port logistics informatization and the development of logistics system of advanced ports at home and abroad by building an index system. Moona A (2003) and H Xing (2011) respectively used input-output model, entropy theory and fuzzy matter-element theory to empirically evaluate the development level of Korean port construction and domestic port logistics system in China. H L Cao (2007) introduced the system engineering theory and creatively constructed the comprehensive evaluation index system.

Verdouw (2011) and others put forward the green index system of port logistics for the first time; Cer'sar (2007) pointed out that port logistics can promote the development of regional economy; Rodrigue (2005) pointed out the core development mode, driving force and influencing factors of port logistics industry.

#### *B. Development Model of Port Logistics*

Generally speaking, the current representative port logistics development models include the following:

##### *1. International shipping center model*

W Cao (2014) and L X Chen (2014) pointed out that the international shipping center refers to the hub port located at the convergence of dense and busy routes. With developed transportation network, complete deep-water channels and advanced hardware and software foundation, it is a world-wide trade and logistics center. Its main features are as follows:

- 1) A strong hinterland economy. J Wang et al. (2020) believe that developing hinterland economy plays a vital role in promoting regional economic development.
- 2) The port has complete software and hardware facilities. P Luo (2004) and others believe that the international shipping

center is equipped with modern and competitive complete software and hardware facilities, including but not limited to sufficient wharf berths, deep-water channels and information management platforms.

3) Equipped with complete rear collection and distribution system. P C Song (2014) shipping center not only has the characteristics of shipping system, but also must build an integrated collection and distribution network system including railway, road, inland river and Aviation.

4) Government policies vigorously support and a complete system of laws and regulations. D Q Sun (2014) and others pointed out that the development of international shipping center needs shipping industry support policies and regulations in line with global regulations. Port development model.

There are three main port logistics modes of international shipping center. One is to provide market trading places and shipping services. The typical representative is London international shipping center. The second is mainly the distribution service of goods in the hinterland. Generally speaking, the hinterland type international shipping center is rich in resources and broad market, and the direct foreign trade transportation in and out of the country is very large. Under this logistics mode, the port is usually the "gateway" of domestic foreign trade transportation. Such as Rotterdam international shipping center and New York international shipping center. The last port logistics mode focuses on providing transit services, that is, the international shipping center in transition. Such as Singapore international shipping center. In addition to the superior geographical conditions, the international shipping center in transition also has developed entrepot trade and free port policies.

##### *2. Regional port logistics system model*

F Hai (2004) believed that the logistics organizations and activities in the port and its hinterland constitute the port regional logistics system. It is applicable to the operation mode of taking the logistics center as the core of the system and connecting the whole logistics park and distribution center. There are three main types of port regional logistics modes. H Yang (2018) believed that the logistics park should give full play to the role of connecting hub ports and other transportation modes to promote the integrated development of logistics system. X J Bai et al. (2000) believed that when planning the logistics center, the priority areas should be the import and export of the main traffic routes near the industrial and commercial enterprise cluster and the urban logistics network. Y Fang (2003) believed that the distribution center mainly plays the distribution and distribution functions of goods inside and outside the region in the regional logistics system.

##### *3. Virtual supply-chain alliance model*

Zeng J (2003) believed that the horizontal alliance of ports is reflected in the coordinated development of multiple ports in the world. There are three types of vertical alliances of ports. Y Z Gu (2008) believed that from the perspective of shippers, in order to improve efficiency, the Hong Kong Cargo Alliance focused on core business and outsourced non-core business. L Zhou (2006) pointed out that the ports

and shipping companies of the port and shipping alliance carry out joint operation through joint investment. L J Zhang (2005) believe that the Port Alliance port is the distribution center of logistics, which can give play to the industrial cluster effect and promote port industry with logistics.

### C. Comparison of Port Logistics Development Modes

It is difficult to fundamentally judge the advantages and disadvantages of international shipping center model, port regional logistics system model and virtual supply chain alliance model. Because it can be compared only when it is implemented in a specific port. But generally speaking, there are some characteristics and differences between these models.

Firstly, the mode of international shipping center is far greater than that of port regional logistics system, and the mode of port regional logistics system is greater than that of virtual supply chain alliance. Surely, this comparative relationship is only relative. There is no absolute substitution relationship between them. On the contrary, they can complement each other. Therefore, it can often appear in a cross form.

Secondly, the formation conditions. Virtual supply chain model and port regional logistics system model have relatively loose requirements for formation conditions. For example, a port with sufficient hinterland economy and natural port conditions can easily meet the requirements of the virtual supply chain model. As long as the government departments formulate reasonable policies and the management departments implement reasonable means, it is easier to upgrade it to the port regional logistics system model. However, the conditions for the formation of the international shipping center model are extremely harsh. It must have favorable natural conditions and a broad hinterland economy. Only after a series of conditions such as high-quality management means, complete infrastructure and perfect rear collection and distribution system can it be formed.

Finally, from the final impact, the establishment of the international shipping center model will often drive the rapid development of urban economy. The city that has the first mock exam has already been or will soon become an international metropolis, and its surrounding city will also become a regional metropolis. So its influence ability and radiation level are the highest, and the influence ability and radiation level of the port regional logistics system mode are not as good as the international shipping center mode. But it can still greatly drive the development of local economy. So the first mock exam city that the first mock exam is basically a regional metropolitan city, the lowest level of influence and radiation level between the three models.

## III. DEVELOPMENT MODEL AND ENLIGHTENMENT OF TYPICAL PORT LOGISTICS AT HOME AND ABROAD

### A. Development Model of Typical Port Logistics at Home and Abroad

This article mainly selects three ports, which are Rotterdam port, Shenzhen port and Hong Kong port.

The similarity of the three ports logistics development is that they all pay great attention to the interactive development

of port logistics and hinterland port industry. Rotterdam port has built an efficient collection and distribution system and perfect service system, and vigorously developed the port industrial zone to build itself into an important entrance and exit for goods from European countries to and from all over the world; Singapore port builds a complete logistics chain of the port by leasing the port's parking place to multinational enterprises and other ways to achieve greater development benefits; The urban port linkage development model is the key to the rapid progress of Shenzhen port construction. Shenzhen port has broken through the institutional obstacles of the separation of China's bonded zone and port. By building three bonded zones as the carrier of "zone port linkage" and realizing the interaction of "complementary advantages and policy superposition" between zones and ports, Shenzhen port has become an important hub for international transit, distribution, procurement and trade activities. At the same time, the policy environment support provided by the government has laid a solid foundation for the development of the three major ports. The management mode of Rotterdam port is the direct management mode of government agencies, which carries out unified planning, construction and management of Rotterdam port. At the same time, the Dutch government also continues to optimize the port management function and let the market mechanism play a greater role; In order to build Singapore port into a hub port, Singapore port management department has systematically developed a unique container transfer system around the world, and introduced foreign advanced gate management system to improve the efficiency of container gate passing. In order to enhance the international competitiveness of Shenzhen Port physical Park, Shenzhen municipal government has also increased the construction of port supporting infrastructure, planned and integrated resources, regulated the development of logistics distribution base and surrounding manufacturing industries, and improved the coordination among various departments and units. In addition, the three major ports also pay attention to the training and introduction of logistics professionals, the construction of port logistics infrastructure, and constantly expand the value-added business of the port.

The differences of the three ports logistics development are mainly reflected in the three aspects of port logistics management mode, operation mode and development driving force. The construction of Singapore port is jointly invested by the government, state-owned and private enterprises as the main body to jointly provide port logistics services. This model can not only realize the rapid development of the port in the short term, but also will not damage its long-term interests, and realize the rapid development of Singapore port. The logistics operation mode of Rotterdam port more reflects the characteristics of "host port"; The logistics operation system of Singapore port mainly shows the advantages of supply chain and joint development. Relying on the advanced information technology and superior geographical location of Shenzhen Special Zone, Shenzhen port has built a logistics system with local characteristics and become an advanced container hub in South China and even the world. As a transportation hub, Singapore port has become a hub port for

## Research on Logistics Development Mode of Gwadar Port under the Background of the Belt and Road and China-Pakistan Economic Corridor

international routes by relying on its unique advantages and policy support. Shenzhen port has been developing with preferential policies and the increase of business and trade demand.

### *B. Enlightenment of Typical Port Logistics Development at Home and Abroad*

#### *1. Relying on the economic development of hinterland, reasonably plan the port logistics operation mode*

Port and hinterland economy can promote regional economic development, increase employment and employees' wages, and promote the development of regional integration. The port logistics operation mode is the core of port logistics development. The software and hardware facilities and supporting services of the logistics park jointly determine the realization of port economic benefits.

#### *2. Strengthening the construction of information system and promote the integrated development of logistics services*

Through modern information and communication technology, build an open information network management system covering the storage, distribution and other links of the whole port and its hinterland, realize the information sharing between the upstream and downstream of the logistics supply chain of the whole port, greatly improve the operation efficiency of port logistics and increase the benefits of Port Logistics.

#### *3. Paying attention to the training of professional logistics talents*

For the ports in the coastal late developing areas, strengthening the communication with major universities, building logistics specialty, cultivating professional port logistics talents and other ways to cultivate and introduce talents play an important role in the development of port logistics. At the same time, the port should actively improve the professional quality of existing management and technical personnel, so that talents with professional skills and knowledge can play the greatest role in the development of port logistics.

Increasing the investment of the port in port scale, logistics machinery, logistics system engineering, channel water depth, wharf infrastructure construction, etc. At the same time, strengthen the level and capacity of port logistics services. According to the concept of sustainable development, realize the harmony between man and economy, man and nature, so as to achieve the high unity of economic and social benefits of port logistics development.

#### IV. FACTORS AFFECTING THE CHOICE OF PORT LOGISTICS DEVELOPMENT MODE

Through the comparative analysis of several port logistics development modes, it can be concluded that , The choice of port logistics model does not only depend on the quality of these models. Instead, it should be selected in combination with the characteristics of the port itself. It is neither blindly copying nor making cars behind closed doors, but learning from several logistics development modes and choosing the mode in line with its own characteristics according to local

conditions. Specifically, the factors affecting the choice of port logistics development mode mainly include the following aspects

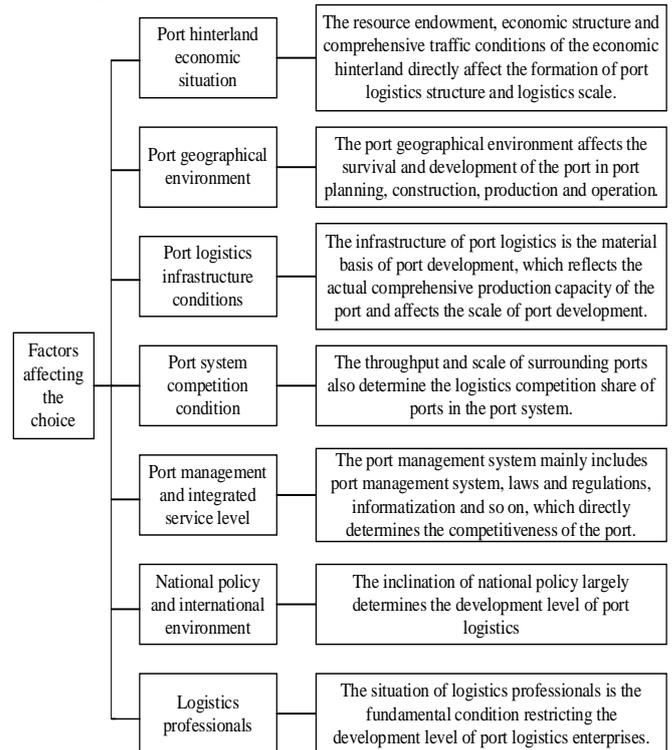


Figure 1 Factors affecting the choices of port logistics development mode.

#### V. GWADAR PORT LOGISTICS DEVELOPMENT MODEL UNDER THE BACKGROUND OF THE BELT AND ROAD AND CHINA-PAKISTAN ECONOMIC CORRIDOR

According to the long-term planning of CPEC, this paper divides the time dimension into short-term, medium-term and long-term. The first period is 2017-2020, the second period is 2021-2025 and the last period is 2026-2030. The logistics development mode of Gwadar Port in 2017-2030 is studied and analyzed.

##### *A. The First Stage (2017-2020): Strengthening Infrastructure Construction and Form a Free Trade Zone Leading Development Model*

Gwadar is a key hub for the sea lanes of central Asian countries and the best route to the Indian Ocean for China, Russia and Europe. Since the opening of China-Pakistan Economic Corridor, the trade volume between China and Pakistan has increased year by year, reaching 20.1 billion US dollars in 2017, and the development potential of logistics cannot be underestimated.

Therefore, in the near term, Gwadar port should focus on consolidating logistics infrastructure, building a free trade zone in Gwadar Port, and achieving mutual and win-win cooperation based on the policies of the free trade zone. Table 1 shows the statistics of Trade volume between China and Pakistan from 2013 to 2017.

Table 1 Total import and export volume (unit:100 million US dollars) of China to Pakistan from 2013 to 2017

Years	Total import and export	Import	Export	Surplus
2013	142.2	110.2	32.0	78.2
2014	160.1	132.5	27.6	104.9
2015	189.3	164.5	24.8	139.7
2016	191.4	172.3	19.1	153.2
2017	200.8	182.5	18.3	164.2
2018	221.2	195.6	25.6	170.0

It can be seen from Table 1 that the trade volume between China and Pakistan is increasing year by year. For Pakistan, to seek a broad market of China, the world's second largest economy, it is necessary to fully stimulate the competitive potential of Gwadar Port. In the initial stage of Gwadar Port construction, improving hardware and software infrastructure is the most basic and crucial link in the development of port logistics. Gwadar Port should build corresponding logistics parks based on the logistics and location characteristics of each port area, promote the transformation of port ecology from logistics supply to production and supply chain services, and enhance the added value of port industry. After the completion of modern infrastructure, Gwadar Port needs to realize the basic functions of modern port logistics in the near future, and build a clear division of labor and intensive logistics distribution system.

For Gwadar Port, in the first stage of construction, it is very important to strive for policy support for the joint construction of China-Pakistan Free Trade Zone, form a major opportunity of logistics development model dominated by free trade zone, highlight the key points and accelerate the economic cooperation in China-Pakistan Free Trade Zone. Firstly, by making full use of CPEC, Gwadar Port can strengthen cooperation with China's tourism industry and build Gwadar Port into the first stop for Chinese tourists to travel to Pakistan. Secondly, Gwadar has been selected as the key development area of the China Pakistan Economic Corridor. The cooperation between China and Pakistan will certainly accelerate the passenger transportation of Gwadar Port and drive the development of other transportation industries of Gwadar Port. Instead, we should make use of the location advantages of Gwadar Port and the role of infrastructure construction to build a manufacturing and sales hub for Pakistani goods and build a distribution center for Chinese goods to Pakistan. Thirdly, we can promote the deep integration of Gwadar Port service industry with other industries and expand the market radiation scope through the policy support of the free trade zone.

*B. The Second Stage (2021-2025): Develop Port Industry and Integrate the Development Mode of Port Industry City Integration*

After the initial construction of Gwadar Port, a logistics development model dominated by free trade zone has been formed. However, after the construction of Gwadar Port enters the second stage, we must constantly adapt to the trend of world economic development and change the logistics development model. On the basis of the first stage of development, give play to the role of infrastructure construction and policy support, attract industries and people to live together, and finally form industrial clusters and cities around Gwadar Port; After the industrial development, it will gradually replace the previous port position and become the leading factor to promote the economic construction of ports and hinterland cities; When the hinterland city develops and prospers, the city will become a supporting platform to support the development of coastal port logistics and other industries, play a leading role, and finally form a logistics development model of port industry city integration.

*1. Promoting the development of port industry*

According to the industrial and urban layout of Gwadar City, the West Bay coastline is suitable for development activities combining urban planning and human activities, while the East Bay coastline should be developed in combination with industrial layout. Gwadar Port can be divided into four port areas: leisure and tourism port area, comprehensive port area, supporting service port area and industrial port area. Firstly, the leisure tourism port area can meet the functional needs of tourism and citizens' leisure and entertainment life. Secondly, build a "Y" shaped park by integrating the waters of the port area, and develop port loading and unloading, warehousing, business services, port industry, international transit, transshipment, bonded warehousing and processing. Thirdly, the supporting service port area is located in the northeast of the bay. The port area can be developed in combination with the rear industrial situation to meet the transportation needs of enterprise shippers and carry out port loading and unloading and commercial logistics business. Finally, the industrial port area can develop port loading and unloading, warehousing business, port trade and transit business, and undertake the business transfer caused by the contradiction between the port and the city in the comprehensive port area.

*2. Promoting integrated development of port, industry and city*

In order to cope with the regional port competition situation and promote the development of Gwadar Port, it is necessary to speed up the development of port industry and the construction of free port, improve the construction of collection and distribution system with the hinterland, speed up the construction of large deep-water berths and improve the overall competitiveness of the port. The hinterland potential study is shown in Table 2.

## Research on Logistics Development Mode of Gwadar Port under the Background of the Belt and Road and China-Pakistan Economic Corridor

Table 2 Hinterland development objectives and competitive advantages

Hinterland	Development objectives	Market environment	Competitive advantages
Gwadar	Economic development hub in western Pakistan	Gwadar's only seaport	
Pakistan and India	Major ports in western Pakistan	Karachi Port	1.The infrastructure on construction and maintenance cost of Gwadar Port is low. 2.There are few restrictions on the development of the port area.
Western China	One of the sea routes in Western China	Port Qasim	
Five Central Asian countries and Afghanistan	The sea port of Five Central Asian countries and Afghanistan		There is no obvious competitive advantage in infrastructure construction.
South Asia region	South Asia and its adjacent Trade Center in the Middle East	Port of Sohar, Oman, Colombo Port, Mumbai Port and Dubai Port	There are no obvious advantages in location and construction, and there is not enough route density to support the service of container transit business

Gwadar Port obtains preferential policies in customs, taxation, finance and other aspects through the construction of a free port, and forms effective interaction with the free zone through the integration of district and port, so as to improve the overall competitiveness of the port and strive for more international freight business. Gwadar Port should reasonably allocate the functions of each port area on the basis of fully understanding and mastering the port resources. The comprehensive port can be built in the sea area with complete channel, smooth anchorage, good wind shelter conditions and perfect port infrastructure; The transportation transit base can build sea areas with natural deep-water channels and other advantages. Through the all-round interaction between port distribution centers, a port system with complete logistics services and integration will be formed.

With the development of regional integration, the development of Gwadar Port, industry and city needs to break through the boundary and be endowed with new development connotation. With the help of shipping lines, roads and other transportation modes, the port can form sea channels and land channels, expand the actual hinterland area, make a

breakthrough in the space and economic scope of the port, and promote the establishment of regional logistics network.

Port economy consists of three subsystems (Fig. 2). In the development period and mature period, we can vigorously develop port industry, import and export, bonded and processing trade, and promote the integration of logistics services in the port area. Promote the construction of port processing and manufacturing industrial park on the basis of the original logistics park; Comprehensive industries can be integrated and developed in combination with bulk commodity manufacturing industries related to petrochemical industry. Then, the city's direct dependence on ports decreased and ushered in a period of stagnation. However, Gwadar Port can take this opportunity to carry out the transformation of economic development mode, develop the tertiary industry, and realize the long-term development of the port through the continuous introduction of advanced technology, equipment and management concepts.

For Gwadar Port, to realize the integrated development strategy of port, industry and city, it is inseparable from the system design led by the Chinese and Pakistani governments. It is inseparable from the attention and support of the government and the integration and connection at the planning level. To realize the integrated development strategy of port, industry and city, it is necessary to build a complete information sharing platform, centralized control and management of port logistics and external services. Overall and in the long run, Gwadar Port has the potential to develop into a world-class diversified cluster port area of trade and industrial industries. Gwadar region also has vast undeveloped land and heavy industry with great investment and development potential. With the increasingly busy economic activities of ports and terminals, it provides development opportunities for service-related industries in the future, and provides the possibility to drive the development of shipping and related industries.

### *C. The Third Stage (2026-2030): Based on the Whole, Integrate Resources and Form an Integrated Development Model of Global Supply Chain*

Under the background of Belt and Road and the CPEC, the third stage of logistics development in Gwadar Port can take advantage of the Internet and base on the whole to achieve the interaction of resources that can produce benefits, and form a global supply chain integrated development mode, and promote the extension of port logistics supply to manufacturing services and supply chain services. Ports need to attract relevant industrial agglomeration through the construction of supply chain system to realize low-cost operation and efficient development of ports, industries and cities.

The cross-border logistics supply chain of Gwadar Port includes production end, logistics end and consumption end. The function of the production end is to provide the supplier with physical products from raw materials to rough and finished products. After the supplier receives the order application from the customers, it will transfer the information to the logistics end, pay corresponding fees and initiate the demand for supply chain services. The role of the logistics side is to confirm the demand and carry out

corresponding transportation, packaging, warehousing, processing and other services. At the same time, there are customs declaration, customs clearance and other cross-border logistics services. The involved products are allocated separately according to the differences of product category, destination and transportation conditions. Finally, the goods are often transported to the consumer side in the form of multi-modal transport. The consumer, that is, the customer, can track and finally confirm the ordered products after initiating order application and payment. If the product meets the demand, it means that the cross-border logistics supply chain service has been reached; If there is any objection, follow-up communication shall be made with the supplier at the production end. The operation mode of cross-border logistics supply chain of Gwadar Port can show the coordination of many different transportation modes. Under the guidance of reasonable transportation thought, multi-modal transportation has been developed.

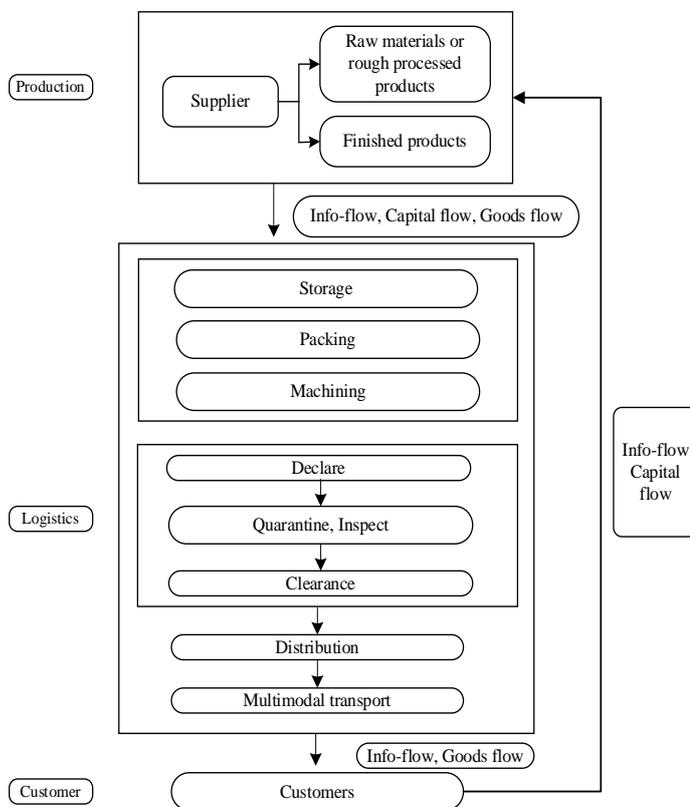


Figure 2 The operation mechanism of port logistics supply chain.

Logistics supply chain has high requirements for cooperation, information sharing and integration among all constituent enterprises. Therefore, improving the operation flexibility and competitiveness of logistics supply chain should become a core task of Gwadar Port Logistics Supply Chain System. Adhering to this concept, Gwadar Port logistics supply chain system should improve the ability of logistics supply chain members to dynamically participate, cooperate and share logistics information, and strive to break through the limitations of ownership and time and space, so as to realize complementary advantages. However, the logistics supply chain system of Gwadar Port still has defects in the following four aspects.

1) Imperfect infrastructural facilities

Firstly, the transportation system is imperfect. The economic development of Gwadar Port needs the support of the comprehensive transportation system. The imperfect problem of the whole system from the supply end to the consumer end is still prominent. Especially under the new economic environment, the increase of the total amount of cross-border economic trade should keep the transformation and development of the logistics industry in sync. However, this is not the case. The potential functions of public rail inter-modal transport, sea rail inter-modal transport and other resources have not been effectively brought into play, and the collection and distribution port also has many deficiencies.

Secondly, other infrastructure construction can't be ignored. The cross-border logistics supply chain of Gwadar Port faces a large number of international trade information resources. Therefore, in the process of operation and development, it will face various management difficulties. In addition, its own investment cost is high. At the same time, it is limited by the unbalanced development of information area and the backward function of logistics center, It is difficult to ensure that the functions of logistics agglomeration and logistics radiation can be effectively brought into play.

In addition, affected by the factors that the policy guidance is not in place, the importance of each node in the supply chain is not noticed, and the problem of unreasonable node layout is prominent, resulting in the problem of imperfect infrastructure becoming more and more serious.

2) Weakness of public services

Gwadar Port has not been able to keep up with the needs of the times in terms of public services. An important requirement of cross-border economic and trade is that the logistics supply chain can provide relevant services for it, so that the subjects of economic and trade activities can be in a relatively complete platform and practice base, making trade activities more convenient. However, due to the limitations of marketing methods, distribution technology and means of competition, the development of Gwadar Port in this regard is obviously backward. Many local government departments have failed to realize the innovation of supervision and management according to the actual needs, resulting in low customs clearance efficiency and backward port and shipping service level.

3) Low level of customer service

Although Gwadar Port can drive the upgrading of logistics supply chain due to cross-border economic trade, it often fails to keep pace with the times because it ignores customer service demand, which will also lead to significant weak supporting capacity and low customer service level, which limits the goal of optimizing the development of global supply chain. As shown in Table 3, there are many potential uncertain factors caused by customer demand, and the neglect of these factors is a common problem in the local area.

Table 3 Potential uncertain impact of customer demand

Demand	Potential uncertainties
Increasing demand	The increase of customer requirements leads to the increase of demand change
Shortening the supply period	Order response time reduced
Increasing product variety	The types of products supplied are scattered
Increasing the speed of innovation	Uncertainty of new product development
Improving service level	Responding to occasional service demand peaks

In order to make the cross-border logistics supply in the West Bank of the Strait problems has been effectively solved. It is suggested to pay attention to the following points.

Firstly, multi-point infrastructure should be constructed. Node layout is a special link to build a Gwadar cross-border logistics supply chain. Because of the differences in positioning and functions of different cities, the effect intensity and corresponding radiation range caused by logistics nodes are also different. If the layout of logistics nodes is unbalanced or the number is insufficient, it may have an adverse impact on the normal operation of the logistics supply chain, and even lead to the bad consequences of the rupture of the logistics supply chain. At this time, we need to pay attention to the rationality of the urban layout of logistics nodes to make it more in line with the principle of node aggregation and diffusion. With reference to the urban functions in the hinterland of Gwadar Port and the objectives of cross-border logistics development planning, we should mainly rely on the international channel of the port, select the surrounding cities as the alternative nodes, and analyze the geographical location, urban positioning, economic development, logistics facilities and other factors of the corresponding cities and relevant countries and regions, so as to determine the final node layout scheme.

Secondly, Gwadar Port managers should lay emphasis on customer service. Gwadar Port should strive to improve the public service level in the region, so as to help expand the cross-border logistics supply chain. The free trade zone should be taken as the traction. Gwadar Port should let the optimization of public service functions become the premise guarantee for the effect of logistics services. Through a variety of possible first try means, it is possible to ensure that cross-border logistics is in line with the international standardized logistics supply chain system and avoid the trade disharmony caused by the backward cross-border logistics service mode. Secondly, all enterprises, customs, inspection and quarantine bureaus and cargo owners in the region need to make early communication and exchange, jointly contribute to the deepening construction in the region, and strive to promote win-win from the perspective of cross-border logistics supply chain.

Finally, the radiation capacity of regional economy should be improved. Within the scope of Gwadar Port, we should give full play to our own advantages, realize the transformation of cross-border logistics supply chain mode, highlight the key direction of external logistics demand, and make the possibility of derivation and radiation of regional economy, so as to form multiple logistics and supply chain centers in the region. In addition, considering the in-depth cooperation between Gwadar Port and China, we should pay more attention to give full play to the local advantages, make more efforts to integrate logistics enterprises with internationalization, and form a characteristic supply chain conducive to the exertion of regional radiation function.

#### ACKNOWLEDGMENT

This research was financially supported by the project of National Social Science Fund of China: "Research on Logistics Development in Gwadar Port Based on the Belt and Road" and the Sino Pakistani Economic Corridor (No. 18BJY168).

#### REFERENCES

- [1] Hesse M. Guest editorial: Transportation and global product networks[J]. *Growth and Change*, 2006,37:599-609.
- [2] L J Zhang. *Modern port logistics*[M]. Beijing: China Economic Publishing House, 2005.
- [3] Y F Zhu, Z D Huang. Discussion on logistics function of modern port [J]. *Enterprise economy*, 2006, 000 (005): 120-121.
- [4] Q Liang. Research on comprehensive evaluation of port logistics function [D]. Dalian Maritime University, 2008.
- [5] T Cheng. Thoughts on the development of port logistics in China [J]. *Port loading and unloading*, 2005(2): 34-37.
- [6] L L Zhang. Function setting and construction content of port logistics center [J]. *Port engineering technology*, 2001, 000 (01):24-26.
- [7] L H Cao. Discussion on the construction of service supply chain system of port logistics [J]. *China business theory*, 2019,000 (014): 12-13.
- [8] J Y Gu, Z Q Li, R Q Wang. Research on the construction of military civilian integration system of port logistics [J]. *China storage and transportation*, 2018,000 (010):105-107.
- [9] C Y Ji, Y P Li. Research on the construction of port logistics informatization performance evaluation index system [J]. *Logistics engineering and management*, 2017,39 (04): 51-54.
- [10] G Li. Research on Evaluation System of modern port logistics system [D]. Beijing Transportation University, 2010.1-61.
- [11] Moona B. Economic Contribution of Ports to the Local Economies in Korea[J]. *The Asian Journal of Shipping and Logistics*,2011 (1).
- [12] H L Cao. Research on construction and evaluation of port logistics system [D]. Dalian Maritime University, 2007.
- [13] Verdouw D M. The changing role of ports in supply-chain management: an empirical analysis[J]. *Maritime Policy & Management*,2003 (4).
- [14] César D, S.W Lee. Front-line soldiers of globalization: Port-city evolution and regional competition[J]. *Geo Journal*, 2007 (2).
- [15] Rodrigue J P. Port regionalization: towards a new phase in port development[J]. *Maritime Policy & Management*,2005 (3).
- [16] W Cao. Analysis on the development strategy of port logistics enterprises from the perspective of international trade in services [J]. *Business economic research*, 2014, (29): 43-44.
- [17] L X Chen, L J Cao. Research on Influencing Factors of Port Logistics Competitiveness -Taking Shanghai port as an example [J]. *Logistics engineering and management*, 2014, (5): 118-122.
- [18] J Wang, Y Deng. Study on the coupling and coordination between port logistics and direct hinterland economy -- taking nine seaport national logistics hubs such as Tianjin and Yingkou as an example [J]. *Industrial technology and economy*, 2020, 39 (11): 62-68.
- [19] P Luo, Z Yin. Construction of China's international shipping center [J]. *Comprehensive transportation*, 2004 (6).
- [20] P C Song. Shandong Port Logistics Development and countermeasures [J]. *Business information*, 2014, (44): 52-53.
- [21] D Q Sun, Y Yang. Research on port logistics mode and selection method [J]. *Logistics technology*, 2014, 33 (9): 187-190.
- [22] J H Zhou, F Xi, Y Li. Study on development and layout of Gwadar Port [J]. *Water transportation engineering*, 2019(09):125-128 .

- [23] R H Xu, L H Tong. Foreign port logistics development model and Enlightenment [J]. International business accounting, 2018 (05): 45-49.
- [24] X M Yang, Z G Gao. Construction concept of China Pakistan Economic Corridor free trade port (Gwadar Port) [J]. Macroeconomic management, 2019 (09): 76-83.
- [25] Z J Li. Analysis on the role of port in promoting the economic development of the city and hinterland [J]. Port economy, 2002 (02): 38-39.
- [26] J G Ding, C B Zhong. Study on the economic relationship between port and hinterland -- Taking Ningbo port as an example [J]. Economic geography, 2010,30(007):1133-1137.
- [27] G Q Xia. Discussion on China's port logistics development model from the development of Shenzhen port [J]. China water transportation, 2018 (09): 8-11.
- [28] B J Gu. Construction of Ningbo Zhoushan port logistics supply chain under the background of integration [J]. Water transportation management, 2011, 33 (6): 32-33.
- [29] B Zhang. Analysis of typical port logistics development model and Its Enlightenment to China's port logistics development [J]. Logistics technology, 2015, 34 (12): 52-54.
- [30] J J Sun, J Hu. Comparison and Enlightenment of logistics development models of three major ports in Europe and Asia - Taking Rotterdam port, Singapore port and Hong Kong port as an example [J]. Journal of East China Transportation University, 2014,31 (03): 35-41.
- [31] S Q Wei, D D Wang, T J Yao. Challenges and opportunities of "Internet plus port logistics"[J]. port handling, 2016 (03): 52-54.



**Aimin Deng**, Ph.D., Professor of School of Economics and Trade, Hunan University, Ph.D. Supervisor, Director of the Institute of Transportation and Logistics, Hunan University; the first batch of scholars of the Hundred Talents Project of Hunan Province, Director of the Expert Committee/Vice President of Hunan Modern Logistics Society, Expert in the evaluation of master's

and doctoral dissertations in the degree center of the Ministry of Education, and Expert in reviewing the National Social Science Fund.



**Siyu Xiang**, Master's degree from Hunan University; Major in International Business. The research is supply chain management and logistics.