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## Coal Logistics Competency Strategies for Ports in the Tianjin and Hebei Regions around the Bohai Bay in China

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### Abstract

With the formation of the tripartite-confronting coal logistics competitive situation among the ports around the Bohai bay in China, each port is confronted with intensive challenges. This paper firstly identifies a group of factors and some considerations that are required for evaluating the port coal logistics competency. The coal logistics competency of the main ports in the Tianjin and Hebei regions around the Bohai Bay in China are then investigated in detail using the qualitative method by analyzing their comparative advantages and disadvantages in this competitive environment. Competitive strategies are thus proposed for these ports respectively, which may be useful for relative practitioners.

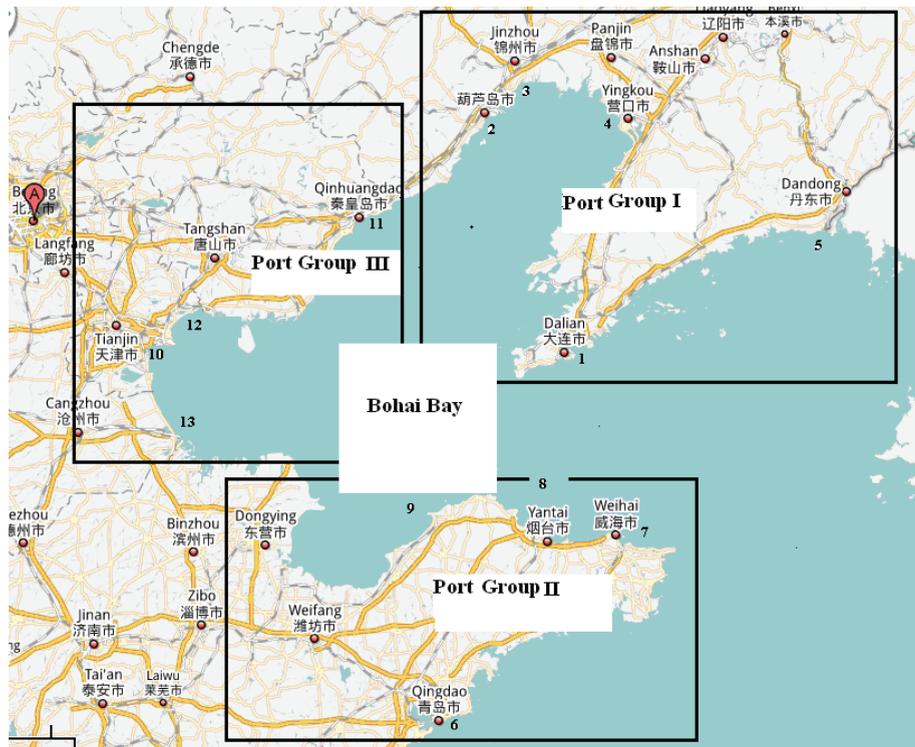
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### 1. Introduction and literature review

Ports around the Bohai Bay in China can be generally divided into three groups (Figure 1), the northeast port-group with Dalian Port as the hub and others such as Hulu port, Jinzhou port, Yinkou port and Dandong port as subordinates, the Shandong port-group with Qingdao Port as the hub and others such as Longkou port, Weihai port, Yantai port as subordinates, as well as the Tianjin and Hebei port-group. Different from port group I and II, port group III has two hubs, i.e., the container terminal hub of Tianjin Port with others such as Qinhuangdao port, Tangshan port, Cangzhou port (Huanghua port zone) as subordinates, and the coal port hub of Qinhuangdao Port with others such as Tianjin port, Tangshan port, Cangzhou port as subordinates.



Port group I: Northeast port-group      II: Shandong port-group      III: Tianjin & Hebei port-group  
 1. Dalian Port   2. Hulu port   3. Jinzhou port   4. Yinkou port   5. Dandong port   6. Qingdao Port   7. Weihai port  
 8. Yantai port   9. Longkou port   10. Tianjin Port   11. Qinhuangdao port   12. Tangshan port   13. Cangzhou port

Figure 1. Three port groups around the Bohai bay

These three groups of ports can be compared to three legs of a tripod, and currently, there exists disordered cooperation and competition among them due to lack of strategic work division and well-assorted functional orientations.

Among these three port groups and different from the Northeast port-group and the Shandong port-group, the Tianjin and Hebei port-group suffers much more from service areas overlapping and existence of multiple local administrative governments within the same port region. This greatly impairs the compromise of local government interests. Additionally, it is difficult to realize strategic resource integration, and port businesses tend to homogenize and loss distinctiveness. Therefore, much research has been devoted to analyze the current poor situation and develop adequate strategies for improvement of the port logistics competency either focusing on the whole Bohai coastal region across Beijing, Tianjin and Hebei province, or on some specific port(s). For example, Wang (2002) attempted to find ways to improve the transportation system connecting the ports around Bohai bay to facilitate their cooperation [1]. Shen (2003) discussed the layout issues for the container ports around Bohai bay [2]. Wang and Qu (2008) identified poor coordination among the Jing-Jin-Ji Port group and recommended regional coordination mechanisms to strengthen the complementarity of the ports involved [3]. Du (2008) addressed improvement of the cooperation among different ports around Bohai bay with respect to international trade business [4]. Sun & He (2008) comprehensively evaluated the port logistics capability of main ports around the Bohai bay based on an index system using factor analysis and then proposed a way to rightly positioning themselves and implementing effective strategies based on their individual

strength to promote wide-scope cooperation and harmonious development and thus improve the port logistics of the entire area [5].

This study also concerns improving competitive cooperation and logistics capability of the main ports around the Bohai bay across Beijing, Tianjin and Hebei province. However, the focus is given to the coal logistics aspect. It is noted that almost all ports involved provide coal transportation services for the national coal distribution system, but the competition among them is particularly fierce and disordered. Therefore, even in an exceptional political and human culture environment due to being close to the capital of the country, the Tianjin and Hebei port-group has no special developmental advantages over other port groups. In order to make full use of the port resources to achieve maximum holistic economic profit from the national coal transportation market while maintaining moderate beneficial internal competitions, this group of ports are in need of implementing appropriate strategies for harmonious regional development.

This paper presents some views to contrive such strategies. Qualitative methods are used and the factors which need to be considered are firstly investigated. Corresponding to the factors identified, the strength and weakness of the main ports around the Bohai bay are analyzed to develop coal logistics. The competitive strategies are consequently given based on the analysis.

## 2. Identification of Factors to Evaluate Coal Logistics Competency

Many researchers have proposed sets of taxonomical factors to be considered for evaluating port logistics competency based on some fundamental principles [6-8]. Using the factors identified, they applied either qualitative or quantitative methods to try to provide proper positioning for the port(s), port groups or port-centered regions and then proposed development strategies. This study mainly uses Yin and Gan's[8] index system for reference to identify the appropriate factors to be considered. Since Yin and Gan's index system aims at evaluating general logistics system and this study concerns the coal logistics system, suitable adjustments and further specifications are then made consequently while taking into account the characteristics of a coal logistics system. Additionally, a few new perspectives are proposed and applied in this process.

According to Yin and Gan[8], to evaluate the competency of a logistics system, two types of factors need to be considered, i.e., those from the customers' perspective and those from the enterprise itself perspective (Fig. 2). The first type contains five further aspects, i.e., logistics width, logistics length, time span of the goods flow process, costing of the goods flow process and predictability. The second type contains three further aspects, i.e., service quality, response time and accuracy.

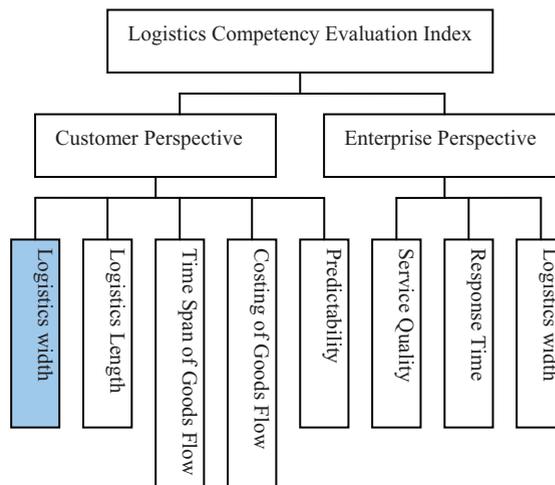


Fig. 2. General logistics evaluation index

When applying the above index to evaluate port coal logistics competency, the “Customer” here refers to coal mining companies, mainly located in western and northern part of China, as well as the companies which consume coal and are mainly located overseas or in the eastern and southern part of China. The “Enterprise” here refers to the ports to be investigated. The following improvements are made. Since only product coal is involved, the item “Logistics Width” is not applicable. Since the coal transportation from the ports to the companies which consume coal is almost the same for all ports, this part of logistics activities will not be taken into account. As for “logistics Length”, it specifically refers to the distance between the ports and coal mining companies. As for timing, costing and predictability, especially costing, not only static value should be estimated, but also the dynamic one should also be considered, according to the dynamic logistics node location theory[9]. That is to say, even if the static value of the port which is currently employed by a consumer may be not better than the other’s, but if a comprehensive comparison is made, the impact of the imaginary activity to make the current one moved to the other should be taken into account. In another word, one port may be more apparently competitive than another for a mining company, but if the company does not employ this port currently, this port may not give up the current one and come to the new one. Only, the new one is far better than the current one, is it possible for the company to do so. The factors at the enterprise perspective side tend to be easier to be improved than the factors at the customer perspective side because unlike the latter they are almost fully controlled by the port enterprise itself with fewer constrains from outside. Therefore, the factors at the enterprise side are less important than the factors at the customer perspective side.

With the above observation in mind, the coal logistics competency of the ports involved are then investigated and compared qualitatively.

### **3. Qinhuangdao Port**

#### *3.1 Advantageous factors*

Qinhuangdao Port holds an obvious advantage with respect to hardware. The mechanization of coal handing technology, handing efficiency and handing quality are in a high level, and relevant technology is in a leading position in the world. The operation management system for coal transmission in bulk lays the foundation for company management, business development, information-sharing and intelligent cooperation mechanisms. For history reason, it has formulated the coal logistics supply chain spontaneously, and it is in charge of 50 percentage of coal freight transportation in China. The amount of coal loading has surpassed 200 million tons by the end of 2007. And the brand effect is prominent.

#### *3.2 Disadvantageous factors*

Since the port history is too long, it is a great risk for it to make reform risk and the dispersed innovative impetuses are difficult to be converged. Its rail transportation distance is 140 kilometers and 200 kilometers longer than that of Tianjin Port and Cangzhou Port respectively, which results in higher cost. Since the central government is implementing policies to control energy exporting, construct coal power station in west areas and promote initiatives to “convert coal to petrol”, business shrink cannot be avoided for Qinhuangdao Port. It can not match other coal ports in view of its inadequate capacity of hardware construction. It cannot well adapt to the rapid-developing port logistics market, customers’ demands, and the rapidly-changing competitive environments.

### 3.3 Competitive strategies

The port is suggested to: (1) strengthen the rail trains dispatching and scheduling, improve the capacity of inside dispatching and outside coordination; (2) solidify the affinity with mining, railway, power plant industries; (3) guarantee the transporting line to be smooth, reasonable and adequate; (4) well resolve the stagnant problem due to unsalable coal products; intensify the coal import from Inner Mongolia, unify the product chain more tightly; (5) establish the policy of ‘one base, two centers, three platforms’; (6) implement the resource integration of port coal operation; (7) centralize the scattered operations to avoid the extra management and operation costs; (8) expend the custom service to “three north”, Russia and Mongolia areas while consolidating of traditional custom services; establish the sustainable coal logistics supply chain; (9) Reinforce the IT technology application, construct the customer-oriented high-efficiency production and business information system platform to improve the logistics management level; (10) exploit the cooperative space, such as establishing a type of customer yard mechanism to rent the yard to major electrical coal consumers and coal-oriented enterprises so that the supply and demand are stabilized and win-win corporation is achieved between the port and its customers.

## 4. Tianjin Port

### 4.1 Advantageous factors

Tianjin Port is the second largest transportation hub within the north-to-south coal distribution system in China. Its coal resource and transportation route are similar to Qinhuangdao Port, but the land transportation distance slightly shorter than that of Qinhuangdao Port. The customer service innovation for coal logistics in Tianjin Port successfully realizes the containerization of specified coal type according to the medium-sized customers’ demands, as well as the door-to-door service in this field. This makes Tianjin Port to stand in a leading position. Tianjin Port has expanded the field of coal trade and service, constructed a preliminary well-running supply chain which contains coal resources, port processing services, cargo deputy services and inbound logistics services. Thus, from the perspective of service innovation, Tianjin Port has found the conjunction of the coal and container transportation business in modern port logistics. It is also the largest coal export port in China.

### 4.2 Disadvantageous factors

Coal is the greatest amount of materials handled in Tianjin Port, but the transporting efficiency and throughput is less than that in Qinhuangdao Port. The coal logistics capability is limited.

### 4.3 Competitive strategies

The development strategy for Tianjin port is to make full use of all resources to keep up with Qinhuangdao port. With the coal business goal greater than Qinhuangdao Port, and more innovation being made in services, operations and management, Tianjin Port is a strong competitive adversary of Qinhuangdao Port. The competition is all-dimensional in broad aspects such as roads, mines, customers, management, cost, services, etc. As the completion of its specialized coal yard, the advantage in terms of port equipment is reinforced. Additionally, it incorporates investment with Shenhua group to build exclusive coal yard, which weakens the competitive power of Qinhuangdao Port in hardware. Its high loading efficiency enlarges the gap with Qinhuangdao Port in terms of running cost and operation cost.

This condition will also give its coal logistics business a strategic shock-absorber phase until 2015. In this period, it can launch actions to integrate the port resources, improve the logistics supply chain and enhance its management and service level.

## **5. Caofeidian port zone in Tangshan Port**

### *5.1 Advantageous factors*

Construction of Caofeidian port zone in Tangshan Port is one of the biggest projects in Heibei Province. It combines the deep water ore port, which is under construction, with the Caoqian sub-railway line branched from the Datong-Qinhuangdao railway line, to expand the north-to-south transportation capacity. The third biggest aisle of north-to-south coal transportation will come into being. Construction of the dedicated coal terminal is accelerating. The construction capacity of the dedicated coal terminal has reached approximate 50 million tons in a short term, will be about 10 billion tons in a long term and ultimately 20 billion tons, equal to or even more than that of Qinhuangdao Port.

### *5.2 Disadvantageous factors*

Coal terminal in Caofeidian Port zone is still under construction. It has to take time to deal with a great amount of initialization and development of business management, customer service and logistics supply chain. There are also maybe numerous unexpected market difficulties.

### *5.3 Competitive strategies*

With its preponderance in the business operation level, Tangshan Port (Caifeidian port zone) will compete directly against Qinhuangdao Port in terms of cargo resources and customers. This further provides broad market game space for customers. However, from the view point of the overall enterprise strategy, vicious competition between these two ports could be alleviated and even avoided considering their tight strategic relationship and the restrictive administration by national policies. Caofeidian zone should, on the basis of improving logistics comprehensive service capacity, establish stable logistics supply chain and develop new competition power through innovation of management, operation, and services. With respect to software environments, it should exploit its advantage of its modernized enterprise system to the full, build its own brand, and reduce the competitive gap with Qinghuangdao Port.

## **6. Jing-Jin-JI port zone in Tangshan Port**

### *6.1 Advantageous factors*

Kailuan coal mine is the important hinterland for the JJT port zone and the way from Kailuan coal mine to the JJT port zone is a coal transportation branch away from Datong-Qinhuangdao railway line. It guarantees the coal loading amount. Tangsha steel industry is in the local hinterland of the JJT port zone. Shougang group's moving west gives the JJT port zone very large developmental space. The coal logistics operation cost owns prominent advantages over others. The 20-million-ton coal berth project coordinately invested has been put into production.

### 6.2 Disadvantageous factors

The JJT port zone possesses limited throughput capacity and operation capacity. It mainly targets at medium-size customers' demand, lags far behind the Qinhuangdao Port. It is inevitable for the JJT port zone to disadvantageously compete with Caofeidian port zone.

### 6.3 Competitive strategies

The JJT port zone in Tangshan port is oriented as a local branch port. Facing the current competitive situation, it has to practice a lower operation cost policy compared with Qinhuangdao Port. It emphasizes on refined services and pays much attention to management of customers' relationship so as to successfully attract part of the customers away from other ports. The JJT Port zone will see a large coal logistics developmental space in the future if it adopts flexible business operation mechanism and modern management and service conception. Limited by its business scale, it mainly target at the medium-size customers nearby and a few large-size customers. The regional advantage is relatively obvious, and the advantageous competition situation will last for a long period of time.

## 7. Conclusions

The competitive situation of coal logistics around Bohai Bay has reached a new stage. Fierce competition among them is inevitable. The competitive focus is located at a number of aspects such as production scale, internal management system and operational mechanisms.

Having an advantage in scale, Qinhuangdao Port is suggested to continue to be oriented as national coal transportation hub, fully exploit the beneficial policies from the local government, actively carry out the construction of port industrial district, speed up the space to reform its internal enterprise mechanisms, and improve the enterprise efficiency.

On the other hand, Tianjin Port is suggested to relay on its scale effect, actively innovate in service, establish various kinds of coal terminals, break the district division limitation, chose the approach of coordination and win-win strategy, do the proper while abandon the improper, enthusiastically participate in the strategic coordination led by the local governments, grasp the opportunity of constructing new coastal areas in Tianjin and boost the increase of efficiency along with improvements of operation scale and service.

Finally, Tangshan Port is confronted with the challenge from Qinhuangdao Port and Tianjin Port in coal logistics. It is suggested to rely on the Number 1 construction program of Hebei Province and the branch railway construction of Datong-Qinhuangdao railway, and undertake the responsibility of north-to-south coal transportation. The key point is to break through current competition pattern, take advantage of its own new management system and make a firm stand in the coal logistics competition among the ports around Bohai Bay.

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