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Research on the Collection and Distribution System of Container Port Group in Shandong Province

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Abstract. Shandong province is of great strategic significance to China. Shandong is not only China's third largest economy, but also the second most populous province. The GDP of Shandong province ranks among the top three in China all year round, and its total GDP is up to one-eleventh of China's total GDP. Shandong province has occupied the most competitive province in China for many years. Firstly, the hinterland of container port cluster in Shandong province is analyzed. The railway network of container port group in Shandong province is analyzed from four vertical channels and four horizontal channels. The container port group highway network in Shandong province is studied. Finally, the waterway network of container ports group in Shandong province is analyzed.

1. Introduction

Shandong province has outstanding advantages in geographical location. As an open peninsula among provinces and cities, Shandong province naturally becomes one of the windows of foreign trade. Especially in the face of Korea, Japan, Korea and other countries, the appropriate distance allows Shandong province to obtain extremely close economic, cultural and trade links with these countries and regions through high-quality maritime shipping. In terms of industrial transfer and other aspects of a perfect connection, collection and distribution capacity on container port group needs to be further improved in Shandong. If the cooperation in finance and technology of container port group construction can be further strengthened while developing economy and trade, the development potential of Shandong province in container gathering and distribution system cannot be ignored. Shandong province, as an important part of two key areas in China, namely, the cooperation area along the Yellow River and the Bohai sea economic circle, plays an important role in the development of these two economic areas, whether it is the construction of container port group, container gathering and distribution system or the development degree of multimodal transport.

2. Analysis of hinterland of container port group in Shandong province

2.1 City Group on Shandong Peninsula

The urban agglomeration of peninsula is the key region of Shandong province. The urban agglomeration covers 16 districts and cities in Shandong province. The urban agglomeration is an important urban concentration area in north China and east China, and it is also the most important outlet of the vast hinterland of the middle and lower reaches of the Yellow River in China. The urban agglomeration is one of the eleven state-level urban agglomerations. At the same time, Shandong is the province closest to Korea, Korea and Japan, which is of great significance. Shandong province is



located in China's Bohai rim region and is the pioneer of China's participation in northeast Asia regional cooperation. Shandong province has a high level of economic development, strong industrial foundation, perfect urban system and developed transportation network. A comprehensive planning of Shandong peninsula city cluster led by Qingdao is ready to come out.

2.2 Jinan metropolitan region

The urban agglomeration area of Jinan is called "Jinan metropolitan circle", which is the economic zone of Jinan. Jinan metropolitan circle is located in the west of Shandong province. It plays an important role in the economic structure of Shandong province. The metropolitan area of Jinan covers Jinan, Zibo, Tai'an, Dezhou, Liaocheng and Zouping county of Binzhou. The total area is about 53,000 square kilometers with a population of over 3,219.40 thousand, also radiation Puyang city in Henan province, Hebei province, Handan city, Xingtai city. The metropolitan area has developed regional traffic, superior conditions, complex and rich urban types, and has formed the "one-hour economic circle" with a high degree of collaboration efficiency. The export volume statistics of each city in Shandong province are shown in table 1.

Table.1 Statistics of export volume in Shandong

Unit: \$100 million

Region/year	2005	2009	2010	2011	2012	2013	2014	2015	2016
Total	4625113	7956530	10424695	12578809	12873171	13450998	14474545	14406069	13715826
Jinan	177843	304706	405065	604702	571423	548093	606119	599604	734449
Qingdao	1942323	2729865	3388997	4058082	4079090	4195962	4577696	4532685	4246549
Zibo	201683	306267	403077	532422	531938	524998	559843	578724	523697
Zaozhuang	31357	48925	74567	84410	93923	94656	115373	140271	121770
Dongying	85448	195539	275753	435919	498199	580290	609488	496787	455879
Yantai	648308	1983380	2547962	2669482	2835914	2947468	2940357	2804476	2484594
Weifang	295085	615288	869581	1036386	1096820	1160420	1232904	1298380	1234913
Jining	116360	156771	229866	307012	319613	333417	326913	343461	336635
Taian	54476	70540	92614	118548	122221	136696	173108	174881	161578
Weihai	473400	681808	891721	1074178	1065926	1070238	1137218	1262087	1167064
Rizhao	132341	162672	221080	390635	387622	387918	478865	413386	422266
Linyi	127688	218801	282591	362193	389726	463548	569408	605650	592273
Dezhou	55209	95504	133596	174642	186760	202646	222717	220674	224347
Liaocheng	46001	83701	128938	187526	184919	200303	238553	253684	292520
Binzhou	124096	176567	254980	284489	282876	354250	378169	363203	376194
Heze	47465	87050	121105	144051	152819	175000	215759	219703	243491

3. Analysis of railway network of container ports in Shandong province

National railway mainly has the Beijing-shanghai railway, Beijing-kowloon railway and Biaoji railway, the railway, Xintai Longdong railway, new Yanshi railway, success, railway, Longyan, railways (including railway result, Longyan railways big drain railway), Leni LAN railway, the railway, Taoyuan ZaoLin railway and Zhangdong railway and Jiaoji railway, goodness, railway, Xinchang railway, to form the "been horizontal" in Shandong province. These railways support each other and share the same hinterland resources, while there is a very subtle competition and cooperation relationship between railways. They complement and restrict each other, forming a port pattern characterized by Shared hinterland. The Shandong railway network is shown in **figure 1**.

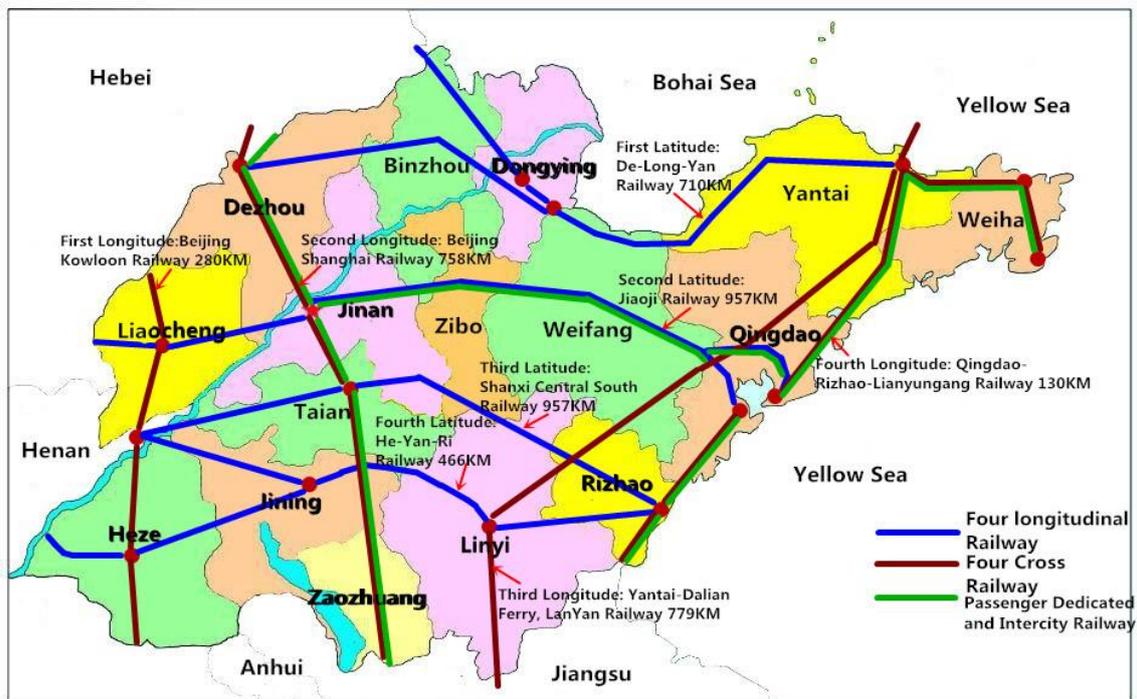


Figure 1. Railway Network in Shandong Province

3.1 Four-longitudinal channel

(1) Beijing-kowloon corridor. The importance of the Beijing-kowloon railway corridor is self-evident. He undertook the task of materials and personnel exchange between the whole western Shandong region and the whole province, namely the important north-south coal transport corridor and the important inter-provincial corridor.

(2) Beijing-shanghai corridor. It is composed of the Beijing-shanghai railway and the Beijing-shanghai high-speed railway, which runs through the north and south.

(3) New channel of Lanyanjiao. It is composed of Yantai ferry, Lanyan line, Jiaoxin line and Qingrong intercity railway.

(4) Huangdao Rizhao Lianyungang passage. From the northernmost Huangdao district of Qingdao city to the southern terminus in Rizhao city, which is connected with Jiangsu province, it connects Qingdao and Rizhao, two important port cities in the east China sea.

3.2 Four-horizontal channels

(1) Delongyan passage. The passage is composed of the Deda railway, the Huangda railway and the Longyan railway, as well as the simple construction of the Dalailong railway.

(2) Hangji Jiaoji channel. It connects Liaocheng, Dezhou, Jinan, Zibo, Weifang, Qingdao and so on a multitudinous, is my province connects the central area container channel.

(3) South central railway access. It connects Tai'an, Jining, Laiwu, Linfen and Rizhao.

(4) Heranri lane. At the present stage, only Heze-Ranzhou-Rizhao railway line is formed. The passage plays an important role in southwest Shandong.

4. Analysis of highway network of container ports in Shandong province

Highway construction in Shandong province started earlier, although the growth has slowed down in recent years, but it is still a big province of highways, miles ranking top in the country. Since the 13th five-year plan, Shandong province has opened a new highway construction, put forward the layout of

"nine vertical, five horizontal, one ring and seven links" for short, "9517 network", the total mileage is expected to be as high as 8,300 km. The highway distribution network is locked as the highway network, and the construction cost per kilometer of the highway in Shandong province is shown in figure 2. The growth rate of expressway mileage in Shandong province is shown in figure 3. The growth rate of mileage in Shandong province and the whole country is shown in figure 4.

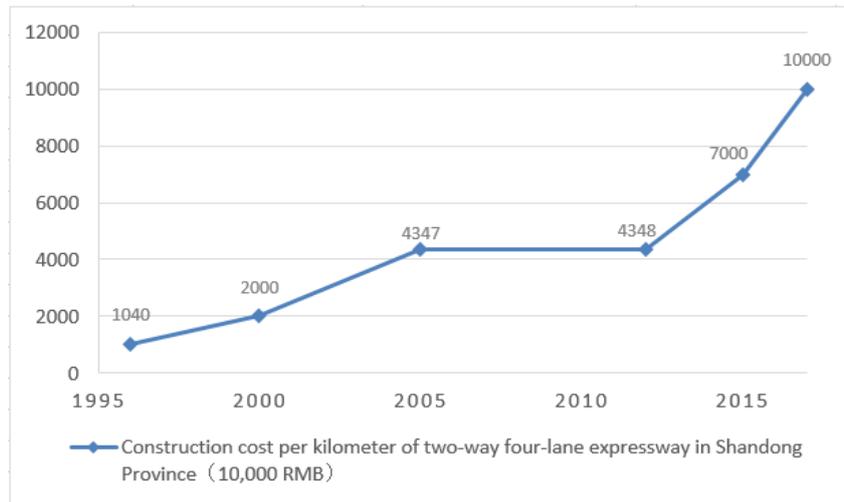


Figure 2. Construction cost per kilometer of Expressway in Shandong province



Figure 3. Speedup of expressway mileage in Shandong province



Figure 4. Mileage growth in Shandong and national

5. Analysis of waterway network of container ports in Shandong province

Shandong province's main seaports consist of Qingdao port, Rizhao port, Yantai port, Weihai port, Dongying port, Weifang port, Binzhou port and so on. Inland river consist of Beijing-hangzhou grand canal, Xiaoqing river, Wei river and Nansihu tributaries. The Beijing-hangzhou grand canal's main inland ports are Jining port, Linqing port and Weishan port. Shandong province is an economic and port province, port throughput, port construction, especially Qingdao port as the world's largest port container throughput continuous growth. However, compared with the water transport capacity, the shipping industry in Shandong province is relatively weak in ports, railways and highways. Except for the inland river transportation in the Shandong section of the Beijing-hangzhou grand canal, the rest of the waterway transportation system has a low contribution to the national economic development of Shandong province, which greatly restricts the social and economic development of Shandong province. Especially with the upgrading of container gathering and distribution system and the development of multimodal container transportation, the pressure of road and railway transportation is huge.

6. Conclusion

The construction of container port group, the establishment of container port system, the optimization of the combination of multimodal transport are not only unique to our province, but also need to be faced by many container ports in the world to some extent. The development direction of these important issues decided by the upper management can determine a reasonable transportation route, a reasonable distribution mode, and choose an appropriate multimodal transport mode, so as to ultimately improve the transportation efficiency and reduce the transportation cost.

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