

Logistics Competitiveness of Jiangsu Province: Analysis Using the Diamond Model

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Abstract. The logistics industry plays an indispensable part in the national economy, and it can promote economic growth and urban development. This paper uses the diamond model to analyze the opportunities and challenges of the logistics industry in Jiangsu Province from 6 aspects. It illustrates the possible factors and conditions affecting the development of the logistics industry. In the end, it uses the analysis above to propose corresponding countermeasures and suggestions to boost the logistic industry in Jiangsu Province.

Keywords: Jiangsu Province; Diamond model; Competitiveness of logistics industry.

1. Introduction

With the boom in trade, logistics has become an essential part of our lives. In recent years, with the development of Internet technology, more and more people are using the Internet for shopping. The development of online shopping also requires the logistics industry to keep up with the pace. However, according to the logistics situation of various e-commerce platform shopping festivals, they all face problems such as burst warehouses, logistics delays and long delivery times. Therefore, the logistics industry still needs further technical development and system improvement. Focusing on improving the current development can contribute to the future logistic sector.

The development of a region's logistics industry is influenced by its economic growth. Jiangsu's GDP in 2020 was 10,271.898 billion, ranking second in the country, and the province's total social logistics reached 32.88 trillion yuan, ranking first in the country. However, because of a lack of modernization and internationalization of logistics enterprises in Jiangsu Province, cargo operation efficiency is low; simultaneously, the high cost of international logistics impedes the rapid development of international trade. To boost the competitiveness and influence of Jiangsu Province's logistics industry, the Jiangsu government has made significant efforts to accelerate the construction of comprehensive urban logistics hubs, improve logistics transportation efficiency, and ensure safety. Simultaneously, we will strongly support the development of logistics parks in the province, encourage logistics firms to combine traditional logistics with modern technologies such as big data and the Internet of Things, and transition to green logistics and digital logistics while improving logistics competitiveness. Furthermore, Jiangsu Province has actively responded to the 'Belt and Road Initiative policy', increasing the number of trains between China and Europe and promoting international trade.

2. Literature review

Pearson (1998) thought it is impossible to overlook the importance of the logistics business, whose weight is continuously rising, and the integrated building of logistics is essential to the growth of the whole industry. [1] Jose (2007) proposed eight factors affecting the competitiveness of logistics. He illustrates his concept with the example of Singapore. He found that enterprises are more inclined to

choose the integrated supply chain outsourcing model. Besides, policymakers and operators consider operation efficiency a vital factor in obtaining a competitive edge. [2] Huang A, Ji S, and Shen J (2008) illustrate that the basic construction of cities along the NELB should also abundantly consider the modern logistic development requirement of the whole area, and reasonably arrange the layout of the logistic function park. [3] Levans (2012) recognized the degree of automation of society or logistics firms as the primary element impacting the growth of the logistics sector, claiming that automation modifies the course of logistics development. [4] Kwasnicki (2013) provides logistics development possibilities for the United States, Japan, China, and other nations based on the growth curve of logistics competitiveness in terms of both population and economic level. [5] Stankovic and his partners (2016) mentioned that if a region wants further development in logistics, it needs to find its competitive edge in its geographical position and infrastructure. Only by doing so, can the potential be dug out to boost the logistic and manufacturing industry. [6] Liu and Wei (2021) analyzed the development status of postal enterprises. They pointed out that the development of the logistics industry should tend to be intelligent, and enterprises should reduce transportation costs. [7] Lv (2022) used the structural model to analyze the logistics competitiveness of the western region. Taking the current situation of the logistics industry in Shaanxi Province as an example, he obtained the ISM influencing factor model. [8] He and Tang (2022) analyzed that e-commerce platform integrity significantly impacts the entire supply chain. [9] Yingfei and Mengze (2022) explained a strong correlation between logistics performance and infrastructure construction. [10] Cui analyzed the impact of the pandemic on logistics transportation between cities, focusing on the Belt and Road Initiative. [11]

To sum up, domestic and foreign research on logistics competitiveness mainly focuses on theoretical analysis, impact factor measurement and empirical research. Scholars primarily define the concept in the logistics industry and research its development to determine the direction of logistics development. There are fewer studies on the competition of the logistics industry in specific regions, making the selection of evaluation indicators, and the establishment of models and research methods relatively limited. In recent years, domestic scholars have conducted more relevant studies on the evaluation of the competitiveness of the logistics industry. They have made suitable suggestions for the development of logistics in some regions. However, obtaining statistical data in logistics has made it challenging to operate data sorting, producing many studies that may choose another analytic method. Therefore, this paper uses data readily available in Jiangsu Province to elaborate the analysis of indicators better to explain the impact of each hand on logistics competitiveness and to propose corresponding countermeasures, which can provide a reference for the development of the logistics industry in other provinces in China.

3. Analysis of the diamond model

Porter's diamond model consists primarily of six factors: demand, factors of production, related industries and corporate strategies, structure, competitors, government behavior, and opportunities. A diamond model is essential for determining whether a drive in a country or region possesses competitive advantages.

3.1 Factors of production

Human resources, capital, and infrastructure are the three components of products that comprise the most vital aspect of firm production. These three perspectives will examine the logistics sector in Jiangsu Province below.

The first, is the population count. In 2019, the total population of Jiangsu Province was estimated to be 80.7 million. After analyzing the population in China's population provinces and cities over the last 20 years, it was determined that the number of populations in Jiangsu Province had increased year by year. This helps to improve the competitiveness of logistics in Jiangsu Province. In 2019, the population with a bachelor's degree or above in Jiangsu province was 53.551 million, representing a

small share of the province's total population, which is terrible for logistics growth. This also indicates that there is space for improvement in the labor force quality and that it is vital to increase the level of education for employees to encourage regional industries' growth effectively.

The second, is the aspect of capital. According to the 'Jiangsu Provincial Bureau of Statistics Yearbook', Jiangsu Province's annual fixed asset investment totaled 5,300,000,21 billion yuan in 2017. The share of tertiary industry investment is 2,624,438 billion, indicating that the tertiary industry occupies a more significant proportion of the total investment share. Since 2000, both the annual fixed asset investment amount and the tertiary industry investment in Jiangsu Province have risen rapidly, which enhances Jiangsu Province's logistics industry's competitiveness.

Finally, infrastructure. In Jiangsu Province, investments in the transportation, storage, and postal industries have expanded over the previous five years, reaching 288.321 billion in 2017. Among these, the railroad mileage in 2020 will reach 3,998 kilometers, putting Jiangsu Province in the lead among China's provinces; from 2000 to the present, Jiangsu Province's transportation, warehousing, and postal sector investment have led to a rapid increase in railroad mileage. In 2020, port cargo traffic will be almost 47% more than in 2019 and nearly seven times greater than in 2000. And the circumstances mentioned above may increase the competitiveness of Jiangsu Province's logistics industry.

3.2 Demand ailment

According to Porter's diamond theory, the demand situation contributes significantly to the economic development of regional sectors. At the same time, the ability of regional goods and services reflects their demand condition; if regional demand is more significant, regional industries are better able to supply products and services. According to the 'Jiangsu Provincial Bureau of Statistics Yearbook', the freight turnover in Jiangsu Province in 2020 was as high as 115,388,000,000 tons. The whole business of the postal industry was 169.95 billion, up nearly 19% from 2019, and rising faster over the past 20 years, reflecting the more rapid development of the province's logistics sector. The volume of express delivery reached 6.977 billion items, an increase of approximately 21% compared to 2019, while the volume of packages reached 13.308 billion items, an increase of roughly 9% compared to 2019, representing an exponential growth pattern since 2000. In 2020, the overall retail sales of social consumer goods will be valued at 370,860,600,000,000, accounting for about 9% of the total value of national retail sales of social consumption, indicating a more significant demand for retail consumers goods in Jiangsu Province. In addition, the growth rate of total retail sales of consumer products in Jiangsu Province has reached 15% over the previous five years, demonstrating the tremendous demand potential of the regional sector. Expanding these demands has enhanced the province of Jiangsu's logistical competitiveness.

3.3 Enterprises development and challenges

In general, logistics enterprises in Jiangsu Province have developed enormously. In 2020, 10 enterprises entered China's top 50 logistics enterprises, such as Jiangsu Suning Logistics Co., Ltd., Linsen Logistics Group Co., Ltd., and Jiulong steel Logistics Co., Ltd. At the same time, companies in Jiangsu province are also vigorously seeking to transform themselves from traditional logistics businesses to an integrated online and offline operation model. In this way, more comprehensive services can be provided to customers. Many Jiangsu logistics enterprises are constantly promoting intelligent logistics to achieve the whole enterprise logistics intelligent services. For example, Jiangsu Wuyuntong logistics company utilizes the intelligent logistics system platform to optimize the vehicle-cargo matching mode, increasing 70%. And reduce 35% of the original time spent. Therefore, a large number of costs were saved. However, the transformation of logistics enterprises in Jiangsu Province has a long way to go, and there is still a large gap between their business capacity and the demands of the modern logistical market. Many enterprises' vehicle idling rate is around 30%, which increases transport costs. Meanwhile, there is a significant economic disparity between the southern and northern regions of Jiangsu, causing the development of the northern parts far behind the southern

ones. Consequently, developing logistics enterprises in north Jiangsu must face many restrictions. In addition, the growth of the logistics and transport industry has been remarkably hindered by the high cost in the water transport industry and the monopoly behavior. Hence, functioning competitions are challenging in Jiangsu's logistical market. Due to the impact of COVID-19, goods cannot be delivered on time every time, and detained situations often happen. These increased the transport costs of logistics enterprises, putting them in crisis and losing their competitive edge in the inter-industry.

3.4 Relevant and supporting industries

The development of the logistics industry cannot be promoted without the support of its upstream and downstream industries. The upstream industries mainly include grain, agricultural products, and industrial raw materials. Downstream demands essentially come from the trade industry, manufacturing industry and e-commerce. Upstream and downstream industries are interdependent, either can exist separately. Due to e-commerce, due to the impact of COVID-19, numerous customers choose to shop online at home to shift consumption mode from offline to online, promoting the deep integration of digital technology and the traditional real economy. Jiangsu boosts e-commerce in rural areas, making lots of villages can enjoy online shopping, which effectively revitalizes the countryside and promotes the improvement of the last mile of rural logistics in transportation. What's more, as a major manufacturing province, Jiangsu Province ranked first in China in its secondary industry in 2021. The strong production and manufacturing capacity has spawned a wave of logistics demands, which has promoted the development of the logistics industry. In addition, Jiangsu owns the second largest number of logistics parks in China, which provides convenient facilities for logistic enterprises. According to the chart below, it is clear that most parks are in places where the economy is strong, like Wuxi, Nanjing and Suzhou. Therefore, Jiangsu can take the opportunity to develop more logistic parks in northern areas.

Table 1. The number of logistic parks in some regions. (Data sources: People's Government of Jiangsu Province)

Region	Number
Wuxi	10
Xuzhou	2
Changzhou	2
Yancheng	4
Zhenjiang	4
Nanjing	4
Suzhou	4

3.5 Development opportunity

Jiangsu Province is located at the crossroads of the Silk Road Economic Belt and the 21st Century Maritime Silk Road, actively participating in the construction of "the belt and road initiative," amplifying the benefits of opening to the east, doing well in opening to the west, and expanding new space for opening to the outside world. Jiangsu Province and countries along the 'belt and road initiative' strategy have been developing economic and trade cooperation, accelerating foreign investment, actively responding to economic globalization, and constantly accelerating the global strategic layout with the continuous construction of the 'belt and road initiative' strategy. By 2021, Jiangsu will have completed 137 sister city agreements with countries along the 'Belt and Road Initiative', with over 2,200 investment projects in countries and regions along the route, 56 investment countries, and 73 investment industry categories. Furthermore, Jiangsu enterprises follow the principle of 'going out' to open up the market further and obtain resources. Jiangsu logistics enterprises are committed to promoting economic and trade development by utilizing e-commerce and international trade as trading vehicles, constantly strengthening foreign economic exchanges,

developing the cross-border logistics industry, creating a brand-new logistics ecosystem, and laying a solid foundation for developing the province's logistics industry. Jiangsu Province, as the meeting point of the 'belt and road initiative', has gradually become an essential new node connecting the Yangtze River Delta with Eurasia through the advantages of 'highway, railway, and waterway'. Jiangsu can seize the unique opportunity of global supply chain reconstruction and actively integrate into the global industrial chain network thanks to the China-Europe train. The intelligence of logistics information is constantly improving due to the rapid development of electronic technology and the economy. Jiangsu Province seizes this opportunity, fully integrating the Internet of Things with logistics information technology and accelerating the result of an online public logistics transportation information platform. It realizes informatization and visualization in the logistics transportation process through software and mobile phone applications, guarantees transportation safety, improves transportation efficiency, and realizes overall supervision and control in logistics transportation. Jiangsu Province's unique geographical advantage and developed economy make it highly competitive in logistics.

3.6 Policy analysis

Jiangsu Province issued the Work Points of the Belt and Road Initiative Interchange Construction in Jiangsu Province 2021 document 2021, which defined four parts, eight landmark work items, and five effective plans, and made ongoing efforts in silk road trade and international exchanges. Jiangsu Province adheres to the five basic principles of market-leading, overall consideration, key breakthrough, openness and sharing, and wisdom and green in the 14th Five-Year Plan of Modern Logistics Development in Jiangsu Province, focusing on 'one direction, two systems, and three highlands' to realize higher quality, more efficient, fairer, more sustainable, and safer development of modern logistics in Jiangsu Province. Furthermore, as part of the 'Yangtze River Delta integration' development strategy, all prefecture-level cities in Jiangsu Province have introduced a series of railway trains and shipping trains, continuously expanding the level and market demand of the regional consumer market. The Jiangsu Provincial Government has also successively launched the Special Action Work Plan for High-quality Development of Trade and Logistics in Jiangsu Province (2021-2025), the Implementation Plan for Promoting the Adjustment of Transportation Structure in Jiangsu Province, and some policies and measures issued by the General Office of Jiangsu Provincial People's Government to promulgate to solve the problems that exist in the development of logistics in our province. Focus on the logistics industry's cost reduction, efficiency increase, and quality improvement, increase the international competitiveness of logistics entities, improve the level of intellectualization, greening, and internationalization of logistics, build a comprehensive modern logistics system, increase Jiangsu Province's logistics competitiveness, and promote the new development of Jiangsu logistics industry. Introducing a series of logistics policies, whether for intra-provincial logistics and transport in Jiangsu Province, out-of-province competition, or even international transactions, has made Jiangsu Province significantly more competitive in the logistics industry.

4. Suggestions

4.1 Improve the quality of talents and logistics technology

For the current situation that the quality of skills in Jiangsu Province is generally not high, the Jiangsu government should firstly introduce a series of talent introduction policies, aiming to promote the input of relevant skills, improve the quality of skills and create a good talent market environment. Secondly, it should also aggressively introduce the appropriate modern logistics technology to promote the advancement of logistics technology in Jiangsu Province. Intelligent logistics under 'Internet +' is the future growth direction of the logistics sector. Intelligent logistics refers to the use of cutting-edge logistics network technology, which may accomplish autonomous operation and efficient management of cargo transportation. Therefore, in the context of the fast expansion of the

e-commerce trade environment such as the necessity to create cross-border e-commerce logistics in Jiangsu, should train and introduce professional staff and relevant information technology. At the same time, the current on-the-job professional and technical workers should establish and improve a variety of training mechanisms, to improve the overall technical level and ability of employees in the logistics industry, to open to meet the relevant professional skills learning courses, to promote the healthy and stable sustainable development of the logistics industry in Jiangsu Province.

4.2 Expand market demand

The urban and rural logistics distribution system significantly influences the growth of the logistics sector. In rural urbanization, the improvement of different e-commerce distribution networks and procedures should be enhanced to build and improve. Jiangsu Province, as one of the cities with a high level of e-commerce development in China, wants to expand the demand for the logistics industry and must expand e-commerce consumption in rural areas because the development of urban electronic consumption has entered a bottleneck, the space and potential for growth are smaller than in rural areas, which would be bad for the development of the logistics of Jiangsu Province, it should introduce related policies and regulations, strengthen the construction of transportation facilities for the logistics industry such as highways and high-speed railways, further improve the urban and rural logistics distribution system, promote the rapid development of the logistics industry in Jiangsu Province, and improve the speed and efficiency of rural logistics distribution. At the same time, logistics-related departments and companies should also combine diverse resources, such as finance, government, etc., to effectively support the entire growth of the logistics sector in Jiangsu Province.

4.3 Enhance the transport facilities

Only with a sound economy, can Jiangsu Province build a solid logistical network. If Jiangsu's logistics industry wants to move forward steadily, the supply capacity of its downstream manufacturing industry cannot be ignored. Therefore, Jiangsu should enhance the manufacturing industry's production and supply capacity. To achieve this goal, enterprises must improve their innovation capability and invest in independent brands to gain a long-term, sustainable advantage over suppliers. By doing so they can optimize the logistics industry and enhance the competitiveness of Jiangsu's logistics industry in the country. Meanwhile, Jiangsu Province, as a coastal city, can fully use its ports to shorten the time for customs clearance and packing of goods. Clients will be pleased to place more orders due to its fast delivery. Also, more high-speed ways should be built to alleviate traffic jams during delivery. Besides, the government must coordinate the conflicts between different regions, such as resource and fund allocation. Then enterprises need to follow the guide to work together to achieve win-win results. More logistic parks should be built in those high-speed ways or bridge nodes to accelerate their operating time. Thus, we can see a boom in the logistics industry.

4.4 More investment and cooperate

Technology is a crucial element in the market. Advanced technology can improve the competitiveness of Jiangsu logistics enterprises themselves, which can be of help to occupy more market share. Jiangsu logistics enterprises can work with local universities and research institutes to develop new technologies in logistics to reduce the rate of empty vehicles and logistics costs. For example, Southeast University and Jiangsu jointly build the 'Jiangsu Logistics and Supply Chain Research Institute', creating a support platform for the high-quality development of the logistics industry, which better serves the local economy. At the same time, some small and medium-sized logistics enterprises can learn from some large enterprises about their advanced management methods and apply them to their daily business activities, such as using standardized operating procedures to improve the efficiency of all aspects of logistics. Also, Enterprises in the northern part of Jiangsu can use its geographic position to change their routes to cross the new NELB to finish the delivery, which can save much cost due to the latest regulations.

4.5 Increase foreign exchange and cooperation

The government should strengthen collaboration between Jiangsu Province enterprises and countries along the 'Belt and Road Initiative', vigorously develop modern logistics and international logistics, raise logistics internationalization awareness, encourage more enterprises to set up exchanges and cooperation with multinational enterprises, accelerate the pace of 'going global' in industrial investment and significant engineering projects, and construct an international logistics network. Furthermore, Jiangsu Province can concentrate on developing a mode of transportation that combines diverse logistics transportation. It can promote the development of sea-rail intermodal transport and air-rail intermodal transportation based on vigorously developing the methods of shipping, rail transportation, and air transportation, realize the scale, standardization, and information sharing of logistics enterprises, promote the diversification of logistics enterprises in Jiangsu Province, further improve the efficiency of logistics transportation, and provide supporting international logistics. To enhance the competitiveness of Jiangsu Province in the global logistics industry, expanding the range of international logistics services is essential.

4.6 Improve strategic planning and policy

Jiangsu province should strengthen its logistics strategic planning, increase support for relevant policies to stabilize Jiangsu Province's strong competitiveness in terms of policy and strategy, make it more detailed, and put it into action. As a result, the unbalanced distribution of logistics infrastructure resources among provincial cities can be reduced, making the development strategy feasible and efficient. Simultaneously, it should encourage the innovative development of logistics hub economies and the coordinated development of regional logistics, as well as strengthen logistics coordination with the Yangtze River Delta urban agglomeration, establish an efficient communication channel between cities, and form a cooperative partnership between cities, to promote the overall improvement of Jiangsu Province's logistics competitiveness. This includes strengthening logistics land support, improving logistics facility land planning, and ensuring the construction of a national logistics hub and backbone cold chain logistics base. The government should also strengthen financial and tax support, consolidate tax and fee reduction achievements, and strictly implement preferential tax and fee policies for the logistics industry to effectively control logistics costs.

5. Conclusion

In terms of production factors, Jiangsu Province has a relatively significant competitive advantage in terms of population, capital and infrastructure, which makes its logistics competitive. Still, due to the relatively low percentage of a highly educated population, improving the introduction of a talent policy and improving the population's quality needs to be done as soon as possible. In terms of demand, Jiangsu Province has enormous demand potential, so it can further promote the expansion of market demand and promote the rapid and comprehensive development of the logistics industry. In terms of enterprises, there is still a long way to transform logistics enterprises in Jiangsu Province due to the large gap between their business capacity and the demands of the modern logistical market. They need to develop advanced technology to be more competitive. With the development of logistics, people in rural areas have gained plenty of benefits from modern facilities and products, so it is wise to build more logistics parks in its northern and rural areas. Also, the unique geographical position, the solid economic advantage and the constant updating of policies have given Jiangsu province a place in the logistics industry. The Jiangsu government needs to strengthen its position by increasing international logistics cooperation, expanding the market it serves and accelerating policy reforms to ensure strong competition. This will enable Jiangsu's logistics industry to reach a new level.

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