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Evaluation Study on the Level of Industrial Development of Logistics Industry in Jilin Province in the Era of Big Data

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Abstract: The era of big data is an era dominated by information technology, and the development of various industries should be fully integrated into the context of the development of the era of big data. The logistics industry has become an important service industry supporting the development of the national economy, and how to develop the logistics industry in the era of big data has become an issue of the times. In the analysis of the input-output efficiency of logistics industry development with other provinces and regions in China in recent years, it is found that the comprehensive industrial efficiency of logistics industry in Jilin Province ranks at the back of the list, with a large gap with other provinces and regions, and is only ahead of some underdeveloped provinces and regions in the west, southwest and northwest regions.

1. Introduction

The era of big data requires the development of regional logistics industry to focus on the construction of information technology and the development of modern logistics industry. The logistics industry in Jilin Province started late and there is a gap compared with domestic and foreign regions. This study uses the hierarchical analysis method to evaluate the efficiency of the logistics industry in Jilin Province, analyze the position of the development of the logistics industry in Jilin Province, the deficiencies that exist, and provide reference for further improvement of the development of the logistics industry.

2. Literature Review

2.1. Research on Regional Logistics

As the logistics industry is highly interrelated and has a linkage with the development of the regional economy, many countries are currently conducting research on regional logistics.

As logistics has received more and more attention from experts in the theoretical and practical fields, many scholars have started to explore the relationship between regional logistics and regional economic development. Some representative studies include Mirjam Iding, Remmelt Thijs and Bart Kuipers from the University of Rotterdam and Tilburg University in the Netherlands, who conducted a study on the regional logistics industry and regional economic development in 2002. The aim of the study was to find out the correlation between the success of economic zones and the development of the logistics industry in the region by summarising the experiences of the logistics development in economic zones in Trinidad, Tobago and Singapore, and to provide theoretical guidance for the construction of economic zones in the Netherlands.

With the development of the logistics market, foreign scholars' research on regional logistics began to shift to the study of regional logistics demand forecasting. They believe that inventory strategy is an important part of regional logistics strategy, while demand forecasting is a key to inventory management, therefore, regional logistics demand forecasting plays an important role in the development of regional logistics).

In the research on regional logistics, foreign scholars represented by Australian scholars Oiev.Fisher,W, Lemoineand Lars Dagnns, etc. have also conducted research on the planning of regional logistics development, considering various factors affecting the planning, putting forward the planning methods, schemes, design paths and other research results.

In addition, some other scholars have conducted research on the role of government in regional logistics development.

It can be seen that although the field of regional logistics research by foreign scholars has been broadening, there is still much room for development.

Along with the introduction and development of the idea of logistics in China, the domestic research on regional logistics has also been gradually developed. At the initial stage, some scholars interpreted and analysed the concept of regional logistics, but a unified definition has not yet been formed. Broadly speaking, the definition is based on several elements, such as region, logistics activities, purpose, system and influencing factors. For example, Xue Hui and Ou Guo believe that regional logistics refers to the transportation, storage, loading and unloading, packaging, circulation processing, distribution and related information transfer activities of goods within a specific region and into and out of that region. This definition is a very simple primary definition that combines region and logistics together. While Zhang Lili, Haifeng and others believe that regional logistics is in a certain regional geographical environment, centered on large and medium-sized cities, and based on the scale and scope of the regional economy, the effective physical flow of all kinds of goods from the supply place to the receiving place within and outside the region. This definition clearly defines the geographical environment, takes into account the influence of the regional economy and emphasises the objective of efficient physical mobility.

In the 1980s, some domestic scholars began to conduct research on the relationship between regional logistics and regional economy. Scholars represented by Zhang Ping and Jin Zhen put forward the conclusion that regional logistics is a factor of regional economic development; scholars represented by Zhou Junying and Cheng Guoping further studied the relationship between

regional logistics development and regional economic growth, and put forward the cycle theory for the development law of regional logistics and The scholars, represented by Zhou Junying and Cheng Guoping, further studied the relationship between regional logistics development and regional economic growth, and proposed the cycle theory and related influencing factors for the development law of regional logistics.

The study of regional demand forecasting is still a relatively new and hot research topic in China, with scholars such as Wang Xiaoyuan, Tang Weihong and Wu Snap, etc. using different demand forecasting models to conduct research, and the research results are relatively fruitful.

Domestic scholars have been exploring the countermeasures of domestic regional logistics development, mainly focusing on two aspects of regional logistics development model and regional logistics development planning. For example, Sun Shusheng, Li Ya and others have proposed a comprehensive development model based on industry clusters; Lin Rongqing, Li Chunhai and others have proposed ideas and solutions for logistics park planning in regional logistics planning, etc.

In addition, while studying the development of regional logistics, China has also introduced and developed new concepts and ideas of logistics development such as green logistics, agile logistics, supply chain management, etc.

2.2. Research on the Development of Logistics in the Era of Big Data

Following the publication of a report entitled "Big Data: The Next Frontier of Innovation, Competition and Productivity" by the world-renowned consulting firm McKinsey in 2011, British economist Victor Mayer-Schönberg published "The Age of Big Data", which has been sold worldwide and has had a wide impact. Since then, research has been carried out on various aspects of economic behaviour in the "big data era". There are many foreign research studies on logistics in the era of big data. Patrick, editor-in-chief of the Journal of Logistics Management and Supply Chain Management Review, who has studied logistics and supply chains for many years in San Francisco, believes that in this era of big data, all big data will become the key to competition. Oracle's marketing director Vaminathan believes that the massive amount of data in the era of big data will have a greater impact on the logistics industry, and that companies are collecting all kinds of real-time data through various channels, including sensors and smartphones. IT companies are also providing customers with all kinds of new data through logistics, and companies need to have a strategy to face the massive amount of data, such as hardware infrastructure, collecting and analysing information, providing customers with operational and cooperation networks, etc.

Foreign research on logistics in the era of big data is mostly focused on the enterprise and industry level, and the research is mostly conducted in terms of impact, changes and strategies.

At the beginning of 2013, the Ministry of Industry and Information Technology (MIIT) issued the "Guiding Opinions on Promoting Logistics Informatization". The Opinions proposed that by the end of the 12th Five-Year Plan, a logistics informatization system that is compatible with the national modern logistics system and develops in a coordinated manner should be initially established, laying the foundation for informatization-driven logistics development. Since then, China's enterprises, industries and research institutes have been conducting research on logistics in the era of big data. Ding Junfa, executive vice president of the China Federation of Logistics and Purchasing, believes as: "In terms of the modern logistics industry, we have grasped two major data analysis, one is the purchasing managers' index, namely PMI, and the other is the statistical analysis of logistics. We use data to speak, but it should be admitted that we are not high level of the whole

process of data operation, many problems are not analyzed thoroughly, the value of data is not fully explored." This also shows that China's logistics industry in the era of big data is a mixture of opportunities and challenges.

Scholars represented by Gao Lianzhou and Liang Hongbo believe that in the era of big data, the logistics industry can improve the level of informationization in logistics-related fields as a whole, drive the development of the entire logistics industry, and achieve great changes to the logistics industry and the regional economy, which can improve logistics efficiency and control logistics costs through informationization and integrated logistics management and process monitoring, and spontaneously organize and regulate a number of production enterprises according to the needs of the market production, thus forming an economic consortium to face the market directly and organise the use of resources fully, rationally and effectively to ensure both its own economic benefits and those of the producing enterprises, thus avoiding various problems.

Scholars represented by Li Yongfei and Gao Hua have conducted research on the synergistic development of logistics and regional economy in the era of big data.

In addition, most scholars conduct research oriented towards the changes of specific logistics business modules in the era of big data, such as express delivery, warehousing, transportation and information systems in the era of big data.

In summary, although China's research on regional logistics started late, it has developed faster, and the research on logistics in the era of big data has gradually converged with international standards.

3. Research Method

In analyzing the industrial efficiency of Jilin Province, this topic selected Jilin Province, Liaoning Province, Guangdong Province, Zhejiang Province, Shanxi Province, Sichuan Province, Shandong Province, Beijing Municipality and Shanghai Municipality in 2019, which are representative and effective, according to the distribution of research indicators, as the sample analysis and comparison objects, and applied the hierarchical analysis method to compare the efficiency of logistics industry in different provinces, regions and municipalities. The study uses two aspects of factor input and output volume as the comparison of industrial efficiency, and the hierarchical analysis model constructed and the arithmetic results are shown in Figure 1.

In the model, the efficiency of the logistics industry is set as the decision-making objective, and the intermediate factors of the first level are input and output factors; the intermediate factors of the second level corresponding to the input factors are: fixed asset investment in the logistics industry (taken from the data of fixed asset investment in the transportation, storage and postal industry in 2019 in each region, employees (taken from the data of employees in the transportation, storage and postal industry in 2019 in each region), information industry fixed asset investment (taken from the 2019 data of fixed asset investment in information transmission, software and information technology service industry in each region); the second-level intermediate factors corresponding to the output factors are: business revenue (taken from the 2019 data of business revenue of transportation, storage and postal industry in each region), freight volume (taken from the 2019 data of freight volume in each region), cargo turnover (taken from the 2019 data of cargo (from each region's annual freight volume data for 2019) and cargo turnover (from each region's annual cargo turnover data for 2019). The regions studied are used as "options". Based on the sample data from the 2017 China Tertiary Industry Statistical Yearbook, the model was iterated and the calculation process was as follows.

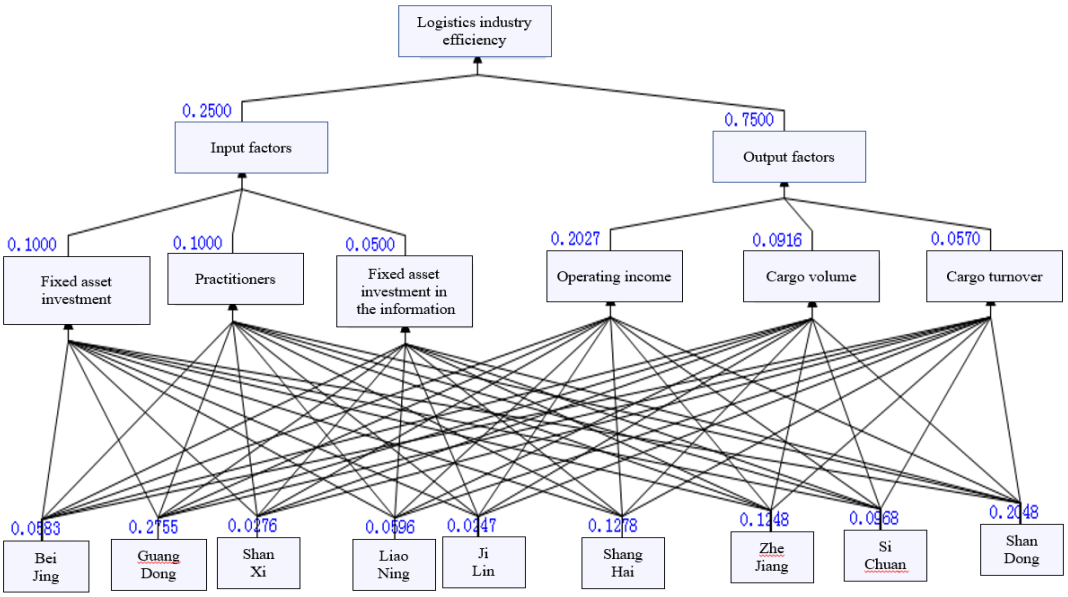

Figure 1. Analysis of logistics industry efficiency of representative provinces, autonomous regions and municipalities directly under the central government in 2019

Table 1. Calculation process for the cross-sectional comparison of industrial efficiency of logistics industry in Jilin Province

1. Efficiency of the logistics industry Consistency ratio: 0.0000; the weighting of "efficiency of the logistics industry": 1.0000; λmax:2.0000

Logistics industry Efficiency	Input factors	Output factors	Wi
Input factor	1.0000	0.3333	0.2500
Output factor	3.0000	1.0000	0.7500

2. Input factors Consistency ratio: 0.0000; the weighting of "efficiency of the logistics industry": 0.2500; λmax:3.0000

Input factor	Investment in fixed assets	Practitioners	Fixed asset investment in information	Wi
Investment in fixed assets	1.0000	1.0000	2.0000	0.4000
Practitioners	1.0000	1.0000	2.0000	0.4000
Fixed asset investment in information	0.5000	0.5000	1.0000	0.2000

3. Output factors Consistency ratio: 0.0428; the weighting of "efficiency of the logistics industry": 0.7500; λmax:4.1142

Output factor	Operating income	Cargo volume	Cargo Turnover	Value addedValue added	Wi
Operating income	1.0000	3.0000	4.0000	0.3333	0.2702
Cargo volume	0.3333	1.0000	2.0000	0.2500	0.1221
Cargo Turnover	0.2500	0.5000	1.0000	0.2000	0.0760
Value addedValue added	3.0000	4.0000	5.0000	1.0000	0.5318

4. Fixed asset investment Consistency ratio: 0.0696; the weighting of "efficiency of the logistics industry": 0.1000; λmax:9.8125

Fixed asset investment	Guang Dong	Shan Xi	Liao Ning	Ji Lin	Zhe Jiang	Shan Dong	Si Chuan	Bei Jing	Shang Hai	Wi
Guang Dong	1.0000	7.0000	9.0000	5.0000	4.0000	3.0000	0.3333	8.0000	6.0000	0.2473
Shan Xi	0.1429	1.0000	3.0000	0.2500	0.2000	0.1667	0.1429	2.0000	0.3333	0.0300
Liao Ning	0.1111	0.3333	1.0000	0.1667	0.1429	0.1250	0.1111	0.3333	0.2500	0.0157
Ji Lin	0.2000	4.0000	6.0000	1.0000	0.3333	0.2500	0.2000	3.0000	2.0000	0.0671
Zhe Jiang	0.2500	5.0000	7.0000	3.0000	1.0000	0.2500	0.3333	4.0000	2.0000	0.1000
Shan Dong	0.3333	6.0000	8.0000	4.0000	4.0000	1.0000	0.3333	5.0000	3.0000	0.1611
Si Chuan	3.0000	7.0000	9.0000	5.0000	3.0000	3.0000	1.0000	7.0000	5.0000	0.2952
Bei Jing	0.1250	0.5000	3.0000	0.3333	0.2500	0.2000	0.1429	1.0000	0.3333	0.0273
Shang Hai	0.1667	3.0000	4.0000	0.5000	0.5000	0.3333	0.2000	3.0000	1.0000	0.0563

5. Practitioners Consistency ratio: 0.0753; the weighting of "efficiency of the logistics industry": 0.1000; λmax:9.8795

Practitioners	Guang Dong	Shan Xi	Liao Ning	Ji Lin	Zhe Jiang	Shan Dong	Si Chuan	Bei Jing	Shang Hai	Wi
Guang Dong	1.0000	7.0000	5.0000	8.0000	4.0000	2.0000	6.0000	3.0000	2.5000	0.2750
Shan Xi	0.1429	1.0000	0.2500	2.0000	0.2000	0.1250	0.3333	0.1667	0.1429	0.0221
Liao Ning	0.2000	4.0000	1.0000	3.0000	0.3333	0.2500	2.0000	0.1667	0.1429	0.0456
Ji Lin	0.1250	0.5000	0.3333	1.0000	0.2500	0.1429	0.3333	0.2000	0.2500	0.0218
Zhe Jiang	0.2500	5.0000	3.0000	4.0000	1.0000	0.2000	2.0000	0.2500	0.3333	0.0708
Shan Dong	0.5000	8.0000	4.0000	7.0000	5.0000	1.0000	4.0000	3.0000	2.0000	0.2198
Si Chuan	0.1667	3.0000	0.5000	3.0000	0.5000	0.2500	1.0000	0.2000	0.2500	0.0421
Bei Jing	0.3333	6.0000	6.0000	5.0000	4.0000	0.3333	5.0000	1.0000	0.3333	0.1317
Shang Hai	0.4000	7.0000	7.0000	4.0000	3.0000	0.5000	4.0000	3.0000	1.0000	0.1711

6. Fixed asset investment in the information Consistency ratio: 0.0583; the weighting of "efficiency of the logistics industry": 0.0500; λmax:9.6805

Fixed asset investment in the information	Guang Dong	Shan Xi	Liao Ning	Ji Lin	Zhe Jiang	Shan Dong	Si Chuan	Bei Jing	Shang Hai	Wi
Guang Dong	1.0000	7.0000	8.0000	4.0000	2.0000	2.5000	3.0000	5.0000	6.0000	0.2697
Shan Xi	0.1429	1.0000	2.0000	0.2000	0.1250	0.1429	0.1667	0.2500	0.3333	0.0217
Liao Ning	0.1250	0.5000	1.0000	0.1667	0.1111	0.1250	0.1429	0.2000	0.2500	0.0162
Ji Lin	0.2500	5.0000	6.0000	1.0000	0.1667	0.2000	0.2500	2.0000	3.0000	0.0672
Zhe Jiang	0.5000	8.0000	9.0000	6.0000	1.0000	2.0000	3.0000	4.0000	5.0000	0.2320
Shan Dong	0.4000	7.0000	8.0000	5.0000	0.5000	1.0000	2.0000	3.0000	4.0000	0.1670
Si Chuan	0.3333	6.0000	7.0000	4.0000	0.3333	0.5000	1.0000	3.0000	4.0000	0.1267
Bei Jing	0.2000	4.0000	5.0000	0.5000	0.2500	0.3333	0.3333	1.0000	2.0000	0.0587
Shang Hai	0.1667	3.0000	4.0000	0.3333	0.2000	0.2500	0.2500	0.5000	1.0000	0.0408

7. Operating income Consistency ratio: 0.0810; the weighting of "efficiency of the logistics industry": 0.2027; λmax:9.9459

Operating income	Guang Dong	Shan Xi	Liao Ning	Ji Lin	Zhe Jiang	Shan Dong	Si Chuan	Bei Jing	Shang Hai	Wi
Guang Dong	1.0000	8.0000	6.0000	9.0000	5.0000	3.0000	7.0000	4.0000	0.3333	0.2364
Shan Xi	0.1250	1.0000	0.2500	2.0000	0.2000	0.1429	0.3333	0.1667	0.1250	0.0198
Liao Ning	0.1667	4.0000	1.0000	3.0000	0.2500	0.1667	2.0000	0.2000	0.1429	0.0384
Ji Lin	0.1111	0.5000	0.3333	1.0000	0.1667	0.1250	0.2500	0.1429	0.1111	0.0157
Zhe Jiang	0.2000	5.0000	4.0000	6.0000	1.0000	0.2500	3.0000	0.3333	0.2000	0.0710
Shan Dong	0.3333	7.0000	6.0000	8.0000	4.0000	1.0000	5.0000	2.0000	0.2500	0.1518
Si Chuan	0.1429	3.0000	0.5000	4.0000	0.3333	0.2000	1.0000	0.2000	0.1429	0.0341
Bei Jing	0.2500	6.0000	5.0000	7.0000	3.0000	0.5000	5.0000	1.0000	0.2500	0.1158
Shang Hai	3.0000	8.0000	7.0000	9.0000	5.0000	4.0000	7.0000	4.0000	1.0000	0.3170

8. Cargo volume Consistency ratio: 0.0753; the weighting of "efficiency of the logistics industry": 0.0916; λmax:9.8798

Cargo volume	Guang Dong	Shan Xi	Liao Ning	Ji Lin	Zhe Jiang	Shan Dong	Si Chuan	Bei Jing	Shang Hai	Wi
Guang Dong	1.0000	5.0000	4.0000	8.0000	3.0000	2.0000	6.0000	9.0000	7.0000	0.2969
Shan Xi	0.2000	1.0000	0.3333	5.0000	0.2500	0.2000	3.0000	6.0000	4.0000	0.0731
Liao Ning	0.2500	3.0000	1.0000	6.0000	0.3333	0.2500	4.0000	7.0000	5.0000	0.1112
Ji Lin	0.1250	0.2000	0.1667	1.0000	0.1429	0.1250	0.2500	2.0000	0.3333	0.0204
Zhe Jiang	0.3333	4.0000	3.0000	7.0000	1.0000	0.3333	4.0000	7.0000	5.0000	0.1589
Shan Dong	0.5000	5.0000	4.0000	8.0000	3.0000	1.0000	5.0000	8.0000	6.0000	0.2420
Si Chuan	0.1667	0.3333	0.2500	4.0000	0.2500	0.2000	1.0000	4.0000	2.0000	0.0469
Bei Jing	0.1111	0.1667	0.1429	0.5000	0.1429	0.1250	0.2500	1.0000	0.2500	0.0161
Shang Hai	0.1429	0.2500	0.2000	3.0000	0.2000	0.1667	0.5000	4.0000	1.0000	0.0346

9. Cargo turnover Consistency ratio: 0.0753; the weighting of "efficiency of the logistics industry": 0.0916; λmax:9.8798

Cargo turnover	Guang Dong	Shan Xi	Liao Ning	Ji Lin	Zhe Jiang	Shan Dong	Si Chuan	Bei Jing	Shang Hai	Wi
Guang Dong	1.0000	6.0000	3.0000	8.0000	4.0000	5.0000	7.0000	9.0000	2.0000	0.2966
Shan Xi	0.1667	1.0000	0.2000	3.0000	0.2500	0.3333	2.0000	4.0000	0.1667	0.0434
Liao Ning	0.3333	5.0000	1.0000	6.0000	2.0000	3.0000	5.0000	7.0000	0.3333	0.1481
Ji Lin	0.1250	0.3333	0.1667	1.0000	0.1667	0.2000	0.3333	2.0000	0.1250	0.0214
Zhe Jiang	0.2500	4.0000	0.5000	6.0000	1.0000	2.0000	4.0000	6.0000	0.2500	0.1065
Shan Dong	0.2000	3.0000	0.3333	5.0000	0.5000	1.0000	4.0000	6.0000	0.2000	0.0788
Si Chuan	0.1429	0.5000	0.2000	3.0000	0.2500	0.2500	1.0000	4.0000	0.1429	0.0348
Bei Jing	0.1111	0.2500	0.1429	0.5000	0.1667	0.1667	0.2500	1.0000	0.1111	0.0162
Shang Hai	0.5000	6.0000	3.0000	8.0000	4.0000	5.0000	7.0000	9.0000	1.0000	0.2543

10. Value added Consistency ratio: 0.0620; the weighting of "efficiency of the logistics industry": 0.3988; λmax:9.7242

Value added	Guang Dong	Shan Xi	Liao Ning	Ji Lin	Zhe Jiang	Shan Dong	Si Chuan	Bei Jing	Shang Hai	Wi
Guang Dong	1.0000	8.0000	5.0000	9.0000	3.0000	2.0000	4.0000	7.0000	6.0000	0.2953
Shan Xi	0.1250	1.0000	0.2000	2.0000	0.1429	0.1250	0.1667	0.3333	0.2500	0.0203
Liao Ning	0.2000	5.0000	1.0000	5.0000	0.2500	0.2000	0.3333	3.0000	2.0000	0.0659
Ji Lin	0.1111	0.5000	0.2000	1.0000	0.1250	0.1111	0.1429	0.2500	0.2000	0.0155
Zhe Jiang	0.3333	7.0000	4.0000	8.0000	1.0000	0.3333	2.0000	5.0000	4.0000	0.1533
Shan Dong	0.5000	8.0000	5.0000	9.0000	3.0000	1.0000	4.0000	7.0000	6.0000	0.2532
Si Chuan	0.2500	6.0000	3.0000	7.0000	0.5000	0.2500	1.0000	4.0000	3.0000	0.1093
Bei Jing	0.1429	3.0000	0.3333	4.0000	0.2000	0.1429	0.2500	1.0000	0.3333	0.0342
Shang Hai	0.1667	4.0000	0.5000	5.0000	0.2500	0.1667	0.3333	3.0000	1.0000	0.0529

4. Calculation Results and Conclusions

Based on the results of the analysis of the sample data, the comprehensive ranking of the efficiency of the logistics industry in each region was obtained as shown in Table 2.

Table 2. Comprehensive ranking of the efficiency of the logistics industry in representative regions of the country in 2019

Rank	Region	Logistics industry efficiency
1	Guangdong	0.2755
2	Shandong	0.2048
3	Shanghai	0.1278
4	Zhejiang	0.1248
5	Sichuan	0.0968
6	Liaoning	0.0596
7	Beijing	0.0583
8	Shanxi	0.0276
9	Jilin	0.0247

The results of the analysis show that Jilin Province is at the back of the list in the overall ranking of the efficiency of the logistics industry in the country, and there are still some gaps compared to other provinces, especially in the output level of the logistics industry.

5. Suggestions for Improvement

The evaluation of industrial efficiency is the result of comprehensive evaluation. From the perspective of factor input-output analysis, the talent element is the key to improve industrial efficiency, therefore, in the era of big data, Jilin Province should pay special attention to the cultivation of talents in developing modern logistics industry.

5.1. Optimize the training mechanism of enterprise talents

According to the current situation of the lack of logistics talents in Jilin Province, make use of the advantageous educational resources in Jilin Province. Vigorously cultivate the specialized talents needed by the logistics market.

5.1.1. The importance of training logistics professionals should be raised

The scale and quality of training of logistics professionals is a key factor in the development of the logistics industry. Logistics industry on the comprehensive quality of talent and ability requirements are relatively high, it needs talents to know the economy, management, technology, commodities, warehousing, transportation, distribution, financial accounting, computer networks, statistics and operations research and other disciplines and fields of knowledge, senior logistics personnel but also on international trade, international logistics, policies and regulations, language and other knowledge to use freely. Therefore, logistics talents are comprehensive talents rather than specialists who only master one kind of discipline knowledge. Therefore, the Jilin Provincial Government should promote the formation of a multi-level and diversified logistics education system and cultivate comprehensive logistics professionals in all aspects.

5.1.2. Logistics professionals should be trained to cover multiple levels and meet the needs of different levels

As the positions set up during the operation of the logistics industry cover different layers of functions from the operational level to the business level to the decision-making level, the logistics industry in Jilin Province should design a talent training system and strategy that can meet the needs of different levels in terms of talent training planning. Logistics management-related majors should be set up in key undergraduate, general undergraduate, private undergraduate, high-ranking high school and vocational and technical schools, and equipped with resources such as teachers, facilities and equipment that meet the needs of talent training, with a plan to expand the scale of enrollment and increase the ways and levels of logistics management professional talent output.

5.1.3. To expand the international exchange of talents

With the development of foreign trade and border trade in Jilin Province, the demand for international logistics talents is also increasing, and at the same time, the modern logistics industry has put forward higher requirements for the international vision of talents. Therefore, Jilin Province should apply the training method of combining domestic and foreign education in line with the concept of open talent training, encourage going out and inviting in, expand the international exchange of talents, and cultivate professional talents to meet the needs of the international logistics field. Especially for large manufacturing, commercial chain and trade enterprises with distribution

centres, logistics centres or logistics bases, they should be fully aware of the importance of international exchange of logistics talents, and should join with universities to provide professional training and orientation training for middle-level and above management personnel of the enterprises, or the competent departments can come forward to organise and host higher-level international exchange conferences and exhibitions, and so on, with foreign experts and logistics enterprises Conduct exchanges. Promote cooperation with internationally renowned logistics enterprises and encourage joint training of international logistics professionals with foreign logistics enterprises or educational institutions. Increase the number of international students sent abroad in order to expand international exchanges, optimise the competitive environment and respect and reasonably employ international logistics talents.

5.1.4. To build a talent competition mechanism and encourage the free flow of talents

The logistics industry in Jilin Province should establish a talent management database and use it to guide the competitive induction and employment of practitioners in conjunction with the needs of enterprises. Link talents and employers effectively, promote competitive two-way selection and guide the free flow of talents. At the same time, guide logistics enterprises to increase investment in human resource management, deepen human resource reform within the enterprise, attract talent, motivate talent, and optimise the reasonable allocation of human resources. Really use the characteristics of the big data era for effective talent management.

5.2. Strengthen the training of logistics professionals

First of all, strengthen the training of existing employees of logistics enterprises in Jilin Province, and improve the ability and quality of front-line staff. Logistics enterprises existing business staff have many years of front-line work, very familiar with the traditional logistics business, but do not understand the new business requirements, through training, can update knowledge, master modern logistics technology and service capabilities. Secondly, recruit talents from the society who master new business knowledge. With the rapid development of the logistics industry, new technologies, new methods and new ideas are constantly emerging, therefore, logistics enterprises should pay attention to the introduction of talents who master new knowledge and adapt to new market competition needs, and strengthen the continuing education and on-the-job training of employees. In short, logistics enterprises in Jilin Province need to effectively improve the quality and ability of their employees through a variety of ways.

5.3. Cultivating mid- and high-end logistics talents

The logistics industry in Jilin Province is still in the primary stage of development, and the overall level of logistics industry employees is relatively low. Due to the limitations of the employment mechanism of the logistics industry in Jilin Province and the province's economic development environment, the number and quality of logistics industry employees are far lower than those in economically developed provinces. The Jilin Province Medium and Long-term Talent Development Plan (2009-2020) puts forward the following guidelines: adhere to the development of services, talent priority, use-based, innovative mechanisms, high-end leading, overall development, and promote the construction of various types of specialized personnel. The logistics industry in Jilin Province should seize the new opportunity of development, optimise the institutional mechanism of talent work, innovate the talent management assessment and evaluation mechanism,

create a policy environment and social environment that attracts and retains middle and high-end talents, and provide a variety of platforms and paths for the growth of talents. It is important to explore ways to introduce mid- and high-end logistics talents, but also to focus on the cultivation strategy for mid- and high-end logistics talents. The school and enterprise collaborate to educate people, jointly innovate on the way of training logistics talents, and promote the logistics industry-university-research combination mode, with a view to obtaining an overall improvement in the quality and quantity of talents in the logistics industry in Jilin Province.

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Conflict of Interest

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References

[1] National Bureau of Statistics of the People's Republic of China. China Statistical Yearbook. Beijing: China Statistics Press, 2012-2017.

[2] Jilin Provincial Bureau of Statistics, National Bureau of Statistics Jilin Survey General Team. Beijing: China Statistics Publishing House, 2012-2017.

[3] Zhejiang Provincial Bureau of Statistics, Jilin General Survey Team of National Bureau of Statistics. Beijing: China Statistics Publishing House, 2017.

[4] National Bureau of Statistics of the People's Republic of China. China tertiary industry statistical yearbook. Beijing: China Statistics Publishing House, 2017.

[5] China Federation of Logistics and Purchasing. China Logistics Yearbook. Beijing: China Fortune Publishing House, 2012-2017.

[6] China Federation of Logistics and Purchasing, Foresight Industry Research Institute. 2016 China Logistics Industry Research Report. sohu.com.http: //mt.sohu.com/20160501/n447197007.shtml.

[7] He Liming. Review of the development of China's logistics industry in 2014 and outlook for 2015. China circulation economy, 2015.(02).

[8] Wang Baiyi, Yang Fan. A study on the efficiency of logistics industry in Jilin Province based on DEA. Journal of Beihua University (Social Science Edition)2016.17(02).

[9] Li X. Analysis of the potential of linkage development between logistics industry and manufacturing industry in Jilin Province Journal of Jilin Provincial College of Education, 2014.30(05)

[10] Xu Guo. Exploring the development of logistics in Japan and its inspiration. Science and wealth, 2013(07).

[11] Fan Zhixia, Du Yuyang, Yang Liyue. Characteristics and trends of logistics development in Japan. Business, 2014(48).

[12] The post Pengfei. Research on international multimodal transport and logistics development in Europe. China Business, 2015(18).

[13] Gan Qiuping. The development of modern logistics industry in China from the logistics industry in the United States. Modern Business, 2012(14).

[14] Fu Yuanyuan. Experience analysis and reference of logistics cost control in the United States and Germany. Foreign Economic and Trade Practice, 2016(04).

[15] Chen Daifen. Theory and practice of logistics park development in the Pearl River Delta. Beijing: People's Transport Publishing House, 2007.

[16] Lin H-B, Xu M-P, Zhou Y. An introduction to logistics in the Pearl River Delta Logistics. Science and Technology, 2007 (08).

[17] Liu Yuhong, Zhao Hongyun. An empirical analysis of the role of logistics industry on economic growth in Beijing, Tianjin and Hebei. Modern Economic Information, 2016(08).

[18] Sun Zhaolong. Research on countermeasures for the development of modern logistics industry in Jilin Province. Changchun: Changchun University of Technology, 2010.

[19] Liu DY, Cheng Z. Research on the upgrading path and countermeasures of logistics industry in Beijing, Tianjin and Hebei. Economy and Management, 2015(04).