

# Evaluation of Shanghai's Logistics Level from the Perspective of High-quality Development

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## ABSTRACT

The thesis evaluates the logistics level of Shanghai by constructing the evaluation indexes of Shanghai logistics level under the perspective of high-quality development, setting up five first-level indexes and corresponding nine second-level indexes, adopting the data of Shanghai Municipal Bureau of Statistics from 2005 to 2022, and evaluating the logistics level of Shanghai by utilizing the factor analysis method to find out the factors that have the most influence on the high-quality development of the logistics level of Shanghai, i.e., the factor of logistics infrastructure and the factor of logistics innovation ability. factor, focusing on these two factors to make countermeasures and suggestions for Shanghai's logistics industry, pointing out the shortcomings of the thesis and the future outlook.

## KEYWORDS

High Quality; Logistics Level; Shanghai; Factor Analysis.

## 1. INTRODUCTION

With the rapid development of the economy and the continuous improvement of people's living standards, the logistics industry has gradually become a pillar industry of the national economy. However, the logistics industry still exists problems such as uneven development, high cost, insufficient innovation power, irrational resource allocation, and high environmental pressure, which seriously impede the high-quality development of the logistics industry [1]. Therefore it is particularly important to enhance the level of logistics development in China. To enhance the level of logistics development, it is first necessary to evaluate the logistics development and find out the problems. This paper takes Shanghai as an example, adopts the data of Shanghai Municipal Bureau of Statistics from 2005 to 2022, and further analyzes the problems and challenges of Shanghai's logistics development based on the evaluation of Shanghai's high-quality development, according to the factor analysis method, and puts forward some development countermeasures suggestions.

## 2. CONSTRUCTION OF EVALUATION INDICATORS AND DATA SOURCES

### 2.1. Construction of Evaluation Indicators

In order to facilitate the research of this paper, the indicator system is now divided into two categories. According to the existing information and development level of Shanghai, the first-level indicators are set up as the level of economic development, logistics infrastructure, logistics innovation ability, logistics development potential [2], and the second-level indicators are divided, in which the indicators of the level of economic development include the gross domestic product of Shanghai, the

turnover of goods and the total retail sales of consumer goods; the indicators of the logistics infrastructure indicators include coastal berths of port terminals, port throughput; logistics innovation capacity indicators include scientific and technological achievements; logistics development potential indicators include cargo transportation volume, total import and export. The development of Shanghai's logistics industry is evaluated in a relatively comprehensive way, and the specific evaluation index system is shown in Table 1.

**Table 1.** Evaluation indicator system

<b>Level 1 indicators</b>	<b>Secondary indicators</b>
<b>Level of economic development</b>	<b>Shanghai GDP, cargo turnover, total retail sales of social consumption</b>
<b>Logistics infrastructure</b>	<b>Port Terminal Coastal Berths, Port Throughput</b>
<b>Logistics innovation capacity</b>	<b>scientific and technological achievements</b>
<b>Logistics development potential</b>	<b>Volume of cargo transportation, total exports and imports</b>

## **2.2. Data Sources**

The data of this empirical paper comes from Shanghai Statistics Bureau, and these authoritative data can make this paper more reliable.

## **3. EVALUATION OF SHANGHAI'S LOGISTICS DEVELOPMENT LEVEL**

This paper adopts the method of factor analysis, combining the data of Shanghai Municipal Bureau of Statistics and the evaluation indexes established in this paper to analyze the data, find out the determining influencing factors of the high-quality development of logistics in Shanghai, and evaluate the level of high-quality development of logistics in Shanghai.

### **3.1. Factor Analysis**

Factor analysis tries to find a set of factors that explain the correlation between observed variables. Each observed variable is a linear combination of these factors, and these linear relationships can be quantified through factor loadings (loadings). In this way, factor analysis can reveal the essential structure of the data by reducing multiple variables to a smaller number of factors, which helps us to understand the complex relationships in the data or to downscale the data for further analysis [3].

### **3.2. Factor Analysis of Shanghai's Logistics Development Level**

Using SPSS26.0 software to carry out KMO test, the test obtained the KMO value between the indicators is 0.746, and Sig.=0.000<0.05, the results of this test shows that there is a need to strengthen the correlation between the indicators written only, and you can continue to carry out factor analysis. As shown in Table 2.

Secondly, the evaluation index system to extract the common factor, the total variance interpretation table illustrates the cumulative contribution rate of the factor and the selection of the number of factors, because the number of the common factor extraction by default is to extract the eigenvalue is greater than 1, according to Table 3 can be seen, only the first two common factor is greater than 1, so the extraction of two common factor according to the Fig. 1 crushed stone map can be seen, the slope of

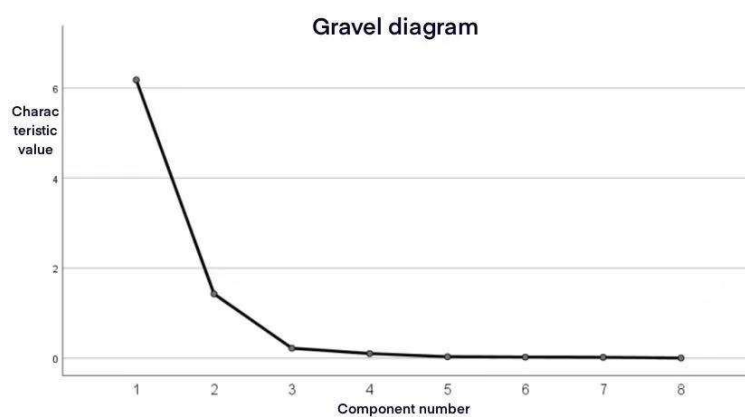
the 1-2 is larger, and the slope of the 3-8 is flat, which indicates that the former extracted common factor is not in it, verifying the correctness of the conclusion of extracting 2 common factors.

**Table 2.** KMO and Bartlett's test

<b>KMO Sampling Suitability Quantity.</b>		.746
<b>Bartlett's test of sphericity</b>	<b>approximate chi-square (math.)</b>	261.852
	<b>(number of) degrees of freedom (physics)</b>	28
	<b>significance</b>	.000

**Table 3.** Total Variance Explained

Initial eigenvalue			Extracting the sum of squared loads			
ingredient	(grand) total	Percentage of initial eigenvalue variance	Cumulative %	(grand) total	Extracting load squares and percent of variance	Cumulative %
<b>1</b>	6.182	77.275	77.275	6.182	77.275	77.275
<b>2</b>	1.427	17.837	95.112	1.427	17.837	95.112
<b>3</b>	.220	2.745	97.857			
<b>4</b>	.101	1.259	99.115			
<b>5</b>	.030	.374	99.489			
<b>6</b>	.022	.277	99.766			
<b>7</b>	.017	.212	99.979			
<b>8</b>	.002	.021	100.000			



**Figure 1.** Gravel diagram

Finally, the method of maximum variance orthogonal rotation is used for rotational analysis, and the rotated component matrix is shown in Table 4, according to the rotated component matrix, the first factor has a larger loading coefficient in the four indicators of Shanghai city's gross domestic product, cargo turnover, total retail sales of consumer goods, and it is considered that the first factor can be

named as the factor of the level of economic development, and the second factor has a larger loading coefficient in the four indicators of the port terminals' coastal berths, port throughput, scientific and technological achievements in the three indicators, the loading coefficient is larger, so it is considered that the second factor can be named as the logistics infrastructure and logistics innovation ability factor [4].

**Table 4.** Component matrixa

	ingredient	
	1	2
<b>Shanghai GDP</b>	.984	.088
<b>Cargo turnover</b>	.986	-.063
<b>Total retail sales of consumer goods</b>	.967	.159
<b>Port Terminal Coastal Berths</b>	-.670	.663
<b>port throughput</b>	.718	.677
<b>scientific and technological achievements</b>	-.750	.607
<b>Volume of cargo transported</b>	.958	-.085
<b>Total exports and imports</b>	.929	.342

#### **4. PROBLEMS IN THE LEVEL OF HIGH-QUALITY DEVELOPMENT OF LOGISTICS IN SHANGHAI**

From the above analysis, it can be concluded that the salient factors for the high-quality development of logistics in Shanghai can be categorized into three aspects, one is the aspect of logistics infrastructure, and the other is the aspect of logistics science and technology innovation.

##### **4.1. Inadequate Logistics Infrastructure**

As the economic center of China, the logistics infrastructure of Shanghai is generally very developed, with a comprehensive network of roads, railroads, airways and waterways, as well as numerous logistics distribution centers and warehousing facilities. However, with the acceleration of urbanization and the rapid development of e-commerce, some challenges and deficiencies have emerged [5].

First of all, tight land resources lead to limited space for warehousing. In Shanghai, where land is scarce, there is less and less land available for the construction of large-scale logistics warehouses, which limits the space for the development of the logistics industry. Secondly, traffic congestion affects distribution efficiency. Despite the well-developed transportation network, traffic congestion is serious during peak hours, especially in the central city, which affects the rapid circulation of goods. In addition, the strengthening of environmental protection policies has put forward higher requirements for the emission standards of logistics vehicles, and the elimination of old vehicles has accelerated, but the promotion of new energy logistics vehicles and supporting facilities still need to be improved.

Secondly, the level of port automation needs to be further improved; the connection between ports and inland collection and transportation systems needs to be strengthened; port environmental governance needs to be continuously improved; the capacity of comprehensive port services needs to be strengthened, especially in the provision of personalized and differentiated value-added services;

and the mechanism of synergistic development of the port region needs to be further improved in response to the challenges posed by the changes in the international trade environment [6].

Finally, the end distribution is facing challenges. With consumers' increasing demand for distribution speed, the last-kilometer distribution has become the focus of competition among logistics enterprises. Shanghai's end distribution has problems such as uneven distribution network coverage, insufficient community distribution points, high cost, etc., and the cold-chain logistics system is still not perfect, especially in the field of pharmaceuticals, fresh produce and other high-demand areas, which lacks sufficient cold-chain facilities and technical support; in addition, the last-kilometer distribution's In addition, the level of greening and intelligitization of the last-mile distribution also needs to be improved.

#### **4.2. Inadequate Logistics Innovation Capacity**

Shanghai's logistics industry has made remarkable progress in terms of innovation, but there are still some shortcomings. First of all, the speed of application of technological innovation is relatively slow, especially in the popularization of automation and intelligent equipment, compared with the international leading level there is still a certain gap. Although some enterprises have begun to try to use advanced technologies such as automated three-dimensional warehouses and unmanned handling vehicles, on the whole, the acceptance and application rate of new technologies in the industry is still not high [7].

Secondly, the ability of logistics science and technology achievements to be transformed into actual production capacity needs to be improved. The cooperation between scientific research institutions and logistics enterprises is not close enough, which makes it difficult for many research results to be put into practice; the investment in logistics science and technology innovation is relatively decentralized, and there is a lack of mechanism to focus on key technologies. In addition, there is still room for improvement in the level of intelligence and automation of logistics equipment compared with that of developed countries, especially in the large-scale application of unmanned vehicles and robots in sorting, etc., which are not widely used.

Finally, the integration and utilization of logistics data is insufficient. Although information technology has been widely used in the logistics industry, there are still barriers to data interconnection and interoperability between different enterprises and different systems, and the lack of unified standards and platforms has led to the serious phenomenon of logistics information silos, which makes it difficult to realize comprehensive data analysis and optimized decision-making [8].

### **5. COUNTERMEASURES AND SUGGESTIONS FOR THE HIGH-QUALITY DEVELOPMENT OF SHANGHAI LOGISTICS**

#### **5.1. Improvement of Logistics Infrastructure**

In order to improve the city's infrastructure, it is recommended that the Shanghai Municipal Government optimize the layout of logistics parks, enhance the automation level of warehousing facilities, strengthen the construction of information platforms, improve the automation level of ports, introduce advanced automated equipment and technology, improve loading and unloading efficiency and accuracy, and enhance the overall operational efficiency and service quality of the Shanghai port, in addition to promoting green logistics and developing intelligent logistics with a view to solving these problems and enhance the overall service level of the logistics industry.

## 5.2. Improvement of Logistics Innovation Capacity

In order to enhance the innovation ability of logistics, it is suggested that the Shanghai Municipal Government and logistics enterprises should be committed to promoting the cooperation among industries, universities and research institutes, establishing more cooperation platforms, promoting the exchanges and cooperation between scientific research institutes, universities and logistics enterprises, accelerating the transformation of scientific and technological achievements, increasing the investment in research and development, fostering the innovative talents, learning from the advanced foreign logistics technology and management experience, and enhancing the international vision and competitiveness of Shanghai's logistics industry, and Promote logistics informatization and intelligence [9]: use modern information technology such as big data, cloud computing, and Internet of Things to improve the transparency of logistics operations and decision-making efficiency, and achieve optimal allocation of resources, as well as exploring more green and intelligent logistics solutions to adapt to the development needs of the logistics industry in the future.

## 6. SUMMARY

This topic evaluates the level of high-quality development of Shanghai's logistics from the first-level indicators of four dimensions: economic development level, logistics infrastructure, logistics innovation ability, and logistics development potential, and examines the degree of influence of these indicators through factor analysis to find out the part with clear influence and the shortcomings of high-quality development of this part, and to put forward suggestions and countermeasures for the next stage of logistics development. However, due to the incomplete acquisition of data and the small selection of indicators, this thesis does not comprehensively represent the dimensions of high-quality development of logistics in Shanghai.

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