

Competitiveness Evaluation of Listed Logistics Companies Based on Factor Analysis Method

Yufei Qiu

Southwest Petroleum University School of Economics and Management, Chengdu, China

Email: qyf050106@163.com

How to cite this paper: Qiu, Y. (2025). Competitiveness evaluation of listed logistics companies based on factor analysis method. *Economics & Business Management*, 1(1), 97-106. ISSN Print: 3079-5214; ISSN Online: 3079-5222.

<https://doi.org/10.63313/EBM.9009>

Published: 2025-03-12

Copyright © 2025 by author(s) and Erytis Publishing Limited.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Abstract

With the rapid development of the times, the logistics industry, as an important link connecting production and consumption and promoting the economic cycle, is thriving at an unprecedented speed and scale. This research constructs a competitiveness evaluation system covering profitability, operations, debt repayment, and research and development capabilities. We deeply analyzes 74 listed logistics companies using factor analysis to accurately rank their competitiveness. This approach aims to provide scientific evidence for strategic adjustments, assist companies in formulating precise strategies, strengthen their advantages, and effectively respond to market challenges. Through continuous optimization and innovation, the study contributes to the steady advancement of logistics companies, enabling them to distinguish themselves in the highly competitive market and achieve sustainable growth.

Keywords

Factor Analysis Method; Listed Logistics Companies; Competitiveness Evaluation

1. Introduction

As global economic integration deepens and international trade becomes increasingly interconnected, the logistics industry, serving as a bridge between production and consumption, is playing an increasingly prominent role and emerging as a key driver of global economic prosperity. Logistics demand is evolving towards personalization, diversification, and efficiency, with customer expectations for logistics services rising accordingly. This has prompted logistics companies to continuously optimize service quality to precisely face the market demand.

Against this backdrop, the government's support for the logistics industry has significantly increased, with a series of favorable policies introduced to foster its healthy and rapid development. These measures aim to create a conducive growth environment and generate vast opportunities for publicly listed logistics companies. However, the logistics market remains a fiercely competitive opportunity. As industry leaders, listed logistics companies must contend with intense competition from both

domestic and international rivals. To solidify their market position and sustain growth, these companies must urgently focus on enhancing their competitiveness, driving development through innovation, and leading the industry to new heights.

By analyzing the competitiveness of listed logistics companies, a solid data foundation can be established for strategic formulation and adjustment. Companies can tailor their strategies based on competitiveness rankings and strength/weakness assessments, allowing for precise policy implementation and enhanced competitiveness. This approach not only fosters healthy competition and collaboration among listed logistics companies but also contributes to the overall positive development of the logistics industry. As a key pillar of the national economy, the growth of the logistics sector is closely linked to national competitiveness. By conducting in-depth analyses of the competitiveness of listed logistics companies, we can stimulate innovation within the industry, thereby enhancing the nation overall competitiveness in the global market and fueling sustained economic growth.

Based on the above considerations, this study first develops a comprehensive and scientific competitiveness evaluation index system, which includes multiple dimensional indicators that collectively reflect the overall competitive strength of listed logistics companies. Next, a large dataset from these companies is collected, aligned with the indicator criteria, for subsequent analysis and calculation. Third, factor analysis is employed to process the collected data, extracting the key factors that influence the competitiveness of logistics companies. This method reduces dimensionality by consolidating multiple variables into a few common factors, thereby providing a clearer understanding of the competitiveness differences among companies. Finally, based on the results of the factor analysis, the competitiveness of each listed logistics company is ranked, and the underlying reasons for these rankings are analyzed. Using these insights, targeted strategic recommendations and development directions are proposed for listed logistics companies. The aim of this research is to help companies optimize resource allocation, improve operational efficiency, and enhance innovation capabilities, thus maintaining a leading position in future market competition.

2. Literature Review and Theoretical Analysis

In recent years, the rapid growth of e-commerce has led to a surge in logistics business volume, while consumer demand has become increasingly diversified. The competitive landscape in the logistics industry is intensifying, with companies focusing on improving service quality and operational efficiency. To stand out in this fiercely competitive market, logistics companies must continually optimize the service experience, accelerate efficiency upgrades, and ensure high service quality to enhance customer satisfaction, thereby solidifying and expanding their market share. Brammer et al. (2006) used data from large UK companies to explore the impact of stock returns of listed companies on corporate competitiveness, thus initiating active

research on the need to consider indicators such as corporate capital utilization efficiency under stable external conditions. In their empirical research on listed companies, Homburg et al. (2013) proposed development indicators related to innovative technologies and risk resistance, which play an important role in measuring corporate competitiveness. Garriga et al. (2004) found in their research on corporate competitiveness dimensions such as profit, performance, social demand, and value are crucial, and that increasing the effort to transform the company in the direction of profit enhancement will lead to the most significant results. Lu Kejiang et al. (2024) selected relevant indicator data from the 2021 financial reports of the top 20 listed logistics companies in the A-share market. Using principal component analysis, they extracted four main factors—scale, growth, assets, and sales—from nine indicators. The results show that there is a significant gap in corporate competitiveness among China's listed logistics companies, with a clear tiered distribution. From the above research, it is evident that scholars commonly use factor analysis or principal component analysis to examine the factors affecting competitiveness based on financial data, which offers the advantage of high data availability. This study, while analyzing financial data, also incorporates indicators related to research and development capabilities and development potential, providing a more objective and comprehensive understanding of the company and broadening the approach to enhancing its competitiveness.

3. Model Specification and Data Description

3.1. Construction of the Competitiveness Evaluation Index System for Logistics Companies

Enterprise competitiveness refers to a company's ability to create unique value that surpasses its peers through the deep cultivation of internal resources and effective integration of external resources in a highly competitive market environment. This ability allows a company to deliver outstanding experiences to customers while enhancing its own value. It not only reflects the company's leading position and overall strength in the market but also indicates its potential for sustainable development. Among the various dimensions for measuring enterprise competitiveness, financial indicators directly or indirectly reflect the strength or weakness of a company's competitiveness in the market. Additionally, the company's research and innovation capabilities have become key drivers of competitiveness improvement. To this end, we construct a comprehensive evaluation system that thoroughly examines the company's financial status and operational performance, with a focus on four key areas: profitability, operational efficiency, debt repayment ability, and research and development capabilities. The competitiveness evaluation index system for logistics companies is presented in Table 1.

Table 1.Competitiveness Evaluation Index System for Logistics Companies

Functional layer	Indicator layer	
Profitability	Return on Assets	X1
	Return on Total Assets	X2
	Return on Equity	X3
	Net Profit	X4
	Operating Profit Margin	X5
Operational Capacity	Accounts Receivable Turnover	X6
	Total Asset Turnover	X7
Debt Repayment Capacity	Current Ratio	X8
	Quick Ratio	X9
	Debt-to-Asset Ratio	X10
R&D Development Capacity	Revenue Growth Rate	X11
	R&D Investment-to-Revenue Ratio	X12

In Table 1, X1 represents Return on Assets, X2 represents Return on Total Assets, X3 represents Return on Equity, X4 represents Net Profit, X5 represents Operating Profit Margin, X6 represents Accounts Receivable Turnover, X7 represents Total Asset Turnover, X8 represents Current Ratio, X9 represents Quick Ratio, X10 represents Debt-to-Asset Ratio, X11 represents Revenue Growth Rate, and X12 represents R&D Investment-to-Revenue Ratio.

3.2. Data Description

1) Data Sources

Data used in this study were selected from logistics companies listed on the A-share market and not classified as ST (Special Treatment) companies in China. After screening, companies with incomplete data were excluded. The final sample for analysis consists of data from 74 listed logistics companies for the year 2021. The financial data primarily comes from the Guotaian database.

2) Feasibility Analysis

Considering the potential interference caused by unit differences between variables, SPSS software was used to standardize the raw data. Subsequently, the KMO test was performed for feasibility evaluation. According to the KMO test results presented in Table 2, the KMO value obtained is 0.710, which significantly exceeds the generally accepted threshold of 0.6, indicating a moderate partial correlation between the data. The P-value is 0.000, which is less than 0.001, confirming that the data from the 74 listed logistics companies meets the requirements for factor analysis.

Table 2.KMO and Bartlett's

Table Column Head		
Kaiser-Meyer-Olkin		0.710
Bartlett's test of sphericity	R ²	790.462
	df	66
	Sig.	0.000

4. Empirical Analysis

4.1. Extraction of Common Factors

Factor analysis was performed using SPSS with principal component extraction, resulting in Table 3. The table shows that the cumulative contribution rate of variance is 75.358%, indicating that the 4 extracted common factors can explain 75.358% of the information of the original variables, with a relatively high degree of explanation for the 4 common factors.

By rotating the factor loading matrix, further analysis of the 4 common factors was conducted, resulting in Table 4.

Table 3.Total Variance Explained

Initial Eigenvalue				Extraction of Sum of Squares Loadings			Extraction of Sum of Squares Loadings		
Total	Variance Percentage	Cumulative Percentage		Total	Variance Percentage	Cumulative Percentage	Total	Variance Percentage	Cumulative Percentage
1	4.212	35.104	35.104	4.212	35.104	35.104	3.645	30.378	30.378
2	2.198	18.321	53.424	2.198	18.321	53.424	2.711	22.595	52.973
3	1.593	13.271	66.696	1.593	13.271	66.696	1.368	11.401	64.374
4	1.040	8.663	75.358	1.040	8.663	75.358	1.318	10.984	75.358

The higher the factor loading of an indicator, the better the common factor explains that indicator. In the rotated matrix, common factor F1 exhibits the highest loadings on five indicators: Return on Equity, Return on Assets, Return on Total Assets, Net Profit, and Operating Profit Margin. Based on the characteristics of these indicators, common factor F1 is labeled the Profitability Factor. F2 has the highest loadings on the indicators of Current Ratio, Quick Ratio, and Debt-to-Asset Ratio, and is designated as the Debt Repayment Factor. F3 exhibits the highest loading on the Total Asset Turnover indicator, thus being named the Operational Capacity Factor. Finally, F4 has the highest loadings on the Revenue Growth Rate and R&D Investment-to-Revenue Ratio indicators, and is referred to as the R&D Development Factor.

Table 4.Rotated Component Matrix

	Ingredients			
	1	2	3	4
Zscore X1	0.937	0.199		
Zscore X2	0.936	0.223		
Zscore X3	0.941			
Zscore X4	0.752			-0.114
Zscore X5	0.583	0.183	-0.554	0.200
Zscore X6	-0.135	0.456	-0.154	-0.534
Zscore X7		0.112	0.908	
Zscore X8	0.141	0.941	0.109	
Zscore X9	0.161	0.943		
Zscore X10	-0.140	-0.745	0.133	-0.215
Zscore X11				0.715
Zscore X12		0.142	-0.417	0.636

4.2. Calculation and Ranking

According to the component score coefficient matrix, the calculation formulas for the 4 common factors are obtained. Then, based on the overall score formula, the competitiveness rankings of listed companies in the logistics industry are calculated.

$F = F1 \times 0.30378 + F2 \times 0.22595 + F3 \times 0.11401 + F4 \times 0.10984$

The competitiveness ranking of listed logistics companies is shown in Table 5.

Table 5.Competitiveness Ranking of Listed Logistics Companies Five Listed Logistics Companies.

Name	F	Ranking
COSCO SHIPPING	1.68	1
Eastern Air Logistics	1.58	2
Ningxia Western Venture Industrial	0.89	3
Shanghai Zhonggu Logistics	0.82	4
Huamao Logistics	0.76	5
Zhongchuang Logistics	0.71	6
Daqin Railway	0.67	7
CITIC OFFSHORE HELICOPTER	0.66	8
Guangdong Provincial Expressway Development	0.63	9
China Railway Tielong Container Logistics	0.58	10
Tangshan Port	0.53	11
CMST Development	0.52	12
Jiayou International Logistics	0.49	13
Guangdong Jushen Logistics	0.46	14
Nanjing Inform Storage Equipment	0.46	15
Zhuhai Winbase International Chemical Tank Terminal	0.35	16
YTO Express	0.33	17
Zhangjiagang Freetrade Science & Technology Group	0.31	18
Friend	0.29	19
China Merchants Energy Shipping	0.29	20
Shanghai International Port	0.23	21
Xinjiang Tianshun Supply Chain	0.2	22
Sinotrans	0.2	23
Milkyway Intelligent Supply Chain Service Group	0.19	24
Nanjing Sheng Hang Shipping	0.19	25
Guangzhou Jiacheng International Logistics	0.18	26
Ningbo Marine Company Limited	0.11	27
Jilin Expressway	0.1	28
Shanghai Jinjiang Online Network Service	0.09	29
Qingdao Port	0.09	30
San Yang Ma	0.06	31
China Merchants Expressway Network and Technology Holdings	0.06	32
SF Holdings	0.04	33
YUNDA Holding Group	0.04	34
Yantian Port	0	35
Huaihe Energy Group	-0.03	36
Jiangxi Ganyue Expressway	-0.05	37
Shanghai Jiao Yun Group	-0.05	38
Liaoning Port	-0.05	39

Name	F	Ranking
Shenzhen Expressway	-0.05	40
Deppon Logistics	-0.06	41
Tianjin Port	-0.07	42
Guangdong Great River Smarter Logistics	-0.1	43
Ningbo Port	-0.1	44
GuangDong GenSho Logistics	-0.1	45
Beijing Changjiu Logistics Corp	-0.1	46
Shandong Hi-Speed Group	-0.13	47
Henan Ancai Hi-tech	-0.14	48
Beibu Gulf Port	-0.16	49
China Merchants Port Group	-0.17	50
Port of Nanjing	-0.21	51
COSCO SHIPPING Development	-0.22	52
XD	-0.23	53
Hainan Airlines Holding	-0.25	54
Hubei Chutian Smart Communication	-0.25	55
Port of Zhuhai	-0.25	56
Dazhong Transportation Group	-0.33	57
Rizhao Port	-0.36	58
COSCO Shipping Specialized Carriers	-0.36	59
Guangzhou Port	-0.39	60
Sichuan Fulin Transportation Group	-0.41	61
Beijing-Shanghai High-speed Railway	-0.42	62
STO	-0.45	63
Henan Zhongyuan Expressway	-0.45	64
Guangzhou Baiyun International Airport	-0.47	65
Spring Airlines	-0.66	66
China Express Airlines	-0.69	67
Modern Portfolio Theory	-0.71	68
Juneyao Airlines	-0.82	69
Cosco Shipping Energy Transportation	-0.98	70
China Southern Airlines	-0.99	71
Y. U.D. Yangtze River Investment Industry	-1.01	72
China Eastern Airlines	-1.24	73
Air China Limited	-1.28	74

4.3. Result Analysis

From the overall scores of the companies, COSCO SHIPPING and Eastern Air Logistics have scores greater than 1, ranking first and second, while Ningxia Western Venture Industrial, Shanghai Zhonggu Logistics, and Huamao Logistics rank third, fourth, and fifth. The variance proportions indicate that the primary factors influencing the competitiveness of the 74 listed logistics companies are profitability and operational

capacity. Therefore, companies that perform well in these two indicators are ranked higher. The variance proportions for the Debt Repayment Factor and the R&D Development Factor are only 11.401% and 10.984%, respectively, which are relatively low compared to the variance proportions for the Profitability Factor and Operational Capacity Factor. This suggests that these two factors have a limited direct impact on the overall competitiveness of the companies, and their influence is relatively similar, not forming dominant factors in the competitiveness of the companies.

This study focuses on analyzing the top five ranked listed logistics companies, with the aim of helping these industry leaders comprehensively assess their performance across various dimensions and enhance their core competitiveness. By improving their services, these companies can better meet the growing logistics demands, thereby increasing convenience and efficiency in everyday life. As shown in Table 6, COSCO SHIPPING ranks highest, securing the top position with the highest profitability. Although its performance in other areas is not particularly exceptional, its overall competitiveness leads the rankings due to the significant variance explained by profitability. Eastern Air Logistics exhibits strong profitability and solid capabilities in other areas, earning second place in the overall competitiveness ranking. Ningxia Western Venture Industrial ranks third, with slightly lower profitability but exceptional operational capacity, which significantly boosts its competitiveness ranking. Shanghai Zhonggu Logistics and Huamao Logistics demonstrate relatively balanced development across profitability, operational capacity, debt repayment ability, and R&D capabilities, resulting in higher overall competitiveness.

Table 6. Top Five Listed Logistics Companies.

	F1	Ran king	F2	Ran king	F3	Ran king	F4	Ran king	F	Ran king
COSCO SHIPPING	5.24	1	-0.97	65	0.32	25	-1.32	71	1.68	1
Eastern Air Logistics	2.58	2	0.85	12	1.35	8	0.52	14	1.58	2
Ningxia Western Venture Industrial	-0.49	61	3.14	2	0.08	28	0.92	9	0.89	3
Shanghai Zhonggu Logistics	1.44	3	0.66	13	0.43	20	-0.17	46	0.82	4
Huamao Logistics	0.69	7	0.25	20	2.38	3	0.33	19	0.76	5

5. Conclusion and Recommendations

5.1. Conclusion

This study employs factor analysis to evaluate the competitiveness of 74 listed logistics companies, offering a clear and intuitive overview of their overall competitiveness. The ranking results reveal that most companies face the challenge of uneven development, with considerable room for enhancing their competitiveness. Each company should accurately identify its weaknesses, actively implement targeted measures, and capitalize on its existing strengths to achieve comprehensive improvements in competitiveness, thereby securing a favorable position in the intense market competition.

5.2. Recommendations

Eastern Air Logistics, Shanghai Zhonggu Logistics, and Huamao Logistics demonstrate balanced growth trends, and in the future, they should deepen their diversification strategies. These companies need to strengthen their core business, expand market share, and simultaneously optimize service quality, reduce costs, and improve operational efficiency to ensure stable growth. By driving the company forward with a dual strategy—focusing on both business expansion and service optimization—they can foster healthy, rapid, and comprehensive development.

COSCO Shipping should prioritize comprehensively enhancing its core competitiveness while consolidating and maintaining its profitability. This involves strengthening operational capacity, optimizing resource allocation and operational efficiency, enhancing debt repayment capacity, preserving financial health and liquidity, and increasing R&D investment to drive technological innovation and business model upgrades. These measures will allow COSCO Shipping to continuously improve its overall development capacity and maintain its leadership in a complex and ever-changing market environment.

In its business advancement, Ningxia Western Venture Industrial should ensure steady progress in areas such as infrastructure development, talent recruitment, technological innovation, and industrial upgrading, while focusing on improving profitability as a central goal. By optimizing resource allocation, expanding market channels, strengthening internal management, reducing costs, and increasing the added value of products and services, Ningxia Western Venture Industrial can significantly enhance its economic performance and inject strong momentum into the sustainable development of the western region.

Acknowledgements

This study was supported by the “National Social Science Foundation of China (Grant No. 23CGL050)” and “Ministry of Education of the People’s Republic of China (Grant No. 20XJC630009)”

References

- [1] Brammer S, Pavellin S. Voluntary Environmental Disclosures by Large UK Companies [J]. *Business Ethics: A European Review*, 2006, (33).
- [2] Homburg C, Stierl M, Bomemann T. Corporate social responsibility in business-to-business markets: How organizational customers account for supplier corporate social responsibility engagement[J]. *Journal of Marketing*, 2013, 77(6):54-72.
- [3] Garriga E, Melé D. Corporate Social Responsibility Theories: Mapping the Territory [J]. *Journal of Business Ethics*, 2004, (53).
- [4] Lu Kejiang, Xie Xiaobin, Ma Jiawei, et al. A Study on the Competitiveness of A-share Listed Logistics Enterprises Based on Principal Component Analysis. *China Storage and Transportation*, 2024, (01): 152-154.