



Comprehensive Evaluation of the Operating Performance of Chinese Tourism Listed Companies Based on Factor Analysis

*Youcheng Long

Chengdu University of Information Technology, Chengdu, Sichuan, 610100, China

*1824034205@qq.com

Abstract. The operating performance of tourism listed companies reflects the development trend of the tourism industry. It is of great significance to conduct a scientific evaluation of the operating performance of tourism listed companies. Taking the data of some financial indicators of 27 Chinese tourism listed companies from 2019 to 2023 as samples, an empirical study on the operating performance of Chinese tourism listed companies is conducted using the factor analysis method. It is found that the COVID-19 pandemic has severely impacted the operating performance of tourism listed companies, and as of now, it has still not returned to the pre-COVID-19 level. Moreover, the development of various capabilities of tourism listed companies is unbalanced. Finally, some suggestions are put forward, expecting to contribute to the improvement of the operating performance of tourism listed companies and facilitate the high-quality development of the Chinese tourism industry.

Keywords: Tourism Listed Companies; Operating Performance; COVID-19 Pandemic; Factor Analysis

1 INTRODUCTION

As outstanding representatives of the tourism industry, tourism listed companies' operating performance reflects the operating conditions and development level of the entire industry. A scientific and accurate evaluation of the operating performance of tourism listed companies is of great significance for their future operation and development.

Regarding the operating performance of tourism listed companies, different scholars have conducted relevant research on the operating performance of tourism listed companies based on different perspectives and using different methods. Shi Liang et al. empirically explored the impact and mechanism of the light asset strategy on the operating performance of tourism listed companies by using the two-way fixed effect model [1]. Nagendrakumar, N et al. analyzed the financial performance related to sustainable development practices from the three dimensions of environment, economy and society by adopting the Altman Z-score model [2]. Chen, T.-A took 12 listed

companies in Taiwan as the empirical research object and analyzed the operating performance before and after the COVID-19 epidemic from both overall and individual aspects based on the DEA method and the Delphi method [3]. Mercedes Rodríguez-Fernández et al. studied the impact of environmental, social, governance and controversy (ESGC) indicators on financial performance based on parametric and non-parametric statistical tests [4]. Jin, S et al. took the COVID-19 pandemic in public health emergencies as the research object and constructed a quasi-natural experiment by adopting PSM-DID (Propensity Score Matching Difference-in-Differences Model), and found that the impact of the COVID-19 pandemic on the operating performance of tourism enterprises was more severe than that of other industries [5]. Geng S.T et al. introduced the obstacle degree model to explore the main obstacle factors affecting the operating performance of tourism listed companies [6].

Most of the current research related to the operating performance of tourism listed companies explores the influence on the operating performance from a certain aspect, and most of the research data end during the COVID-19 pandemic. There are relatively few comprehensive studies on the recovery situation of tourism listed companies after being affected by the COVID-19 pandemic and the entire process before and after the COVID-19 pandemic. This study selects the data of some financial indicators of 27 listed companies in the Chinese tourism industry from 2019 to 2023 as the research sample and uses the factor analysis method to conduct a comprehensive evaluation of the operating performance before (2019), during (from 2020 to 2022), and after (2023) the COVID-19 pandemic. It is expected to put forward some suggestions for improving the operating performance of Chinese tourism listed companies and facilitating the high-quality development of the Chinese tourism industry.

2 MATERIALS AND METHODS

2.1 Data Source

The research data is sourced from the RESSET Financial Research Database. 27 tourism listed companies are selected. Each tourism listed company in the article is expressed by its stock code. Based on the various financial indicators of tourism listed companies and referring to the research of relevant scholars, a total of 10 financial indicators, namely return on assets, net return on assets, return on invested capital, current ratio, quick ratio, growth rate of earnings per share, growth rate of net profit, inventory turnover ratio, fixed asset turnover ratio, and total asset turnover ratio, are ultimately selected for the study.

2.2 Factor Analysis

Validity Analysis. The KMO and Bartlett tests were conducted to confirm whether the variables were suitable for factor analysis. It is generally considered that K should be greater than 0.5 and the significance should be less than 0.05. In this study, $K = 0.67$ and the significance = $0.000 < 0.05$, indicating that factor analysis could be conducted.

Extraction and Naming of Common Factors. According to the principle that the initial eigenvalue was greater than or equal to 1, 4 factors were selected, and their cumulative variance contribution rate reached 92.473%, that is, it was considered that the 10 selected financial indicators could be comprehensively explained by these 4 selected common factors.

The common factor F1 has relatively large factor loadings of return on assets, net return on assets, and return on invested capital, and is named the profitability factor. The common factor F2 has relatively large factor loadings of inventory turnover ratio, fixed asset turnover ratio, and total asset turnover ratio, and is named the operational capability factor. The common factor F3 has relatively large factor loadings of quick ratio and current ratio, and is named the debt-paying ability factor. The common factor F4 has relatively large factor loadings of growth rate of net profit and growth rate of earnings per share, and is named the growth ability factor.

Calculation of Factor Scores. Based on the component score coefficient matrix, the calculation models of the 4 common factors are obtained as follows:

$$F1 = 0.322x1 + 0.315x2... + 0.66x10 \quad (1)$$

$$F2 = -0.18x1 - 0.18x2... + 0.321x10 \quad (2)$$

$$F3 = -0.26x1 - 0.01x2... - 0.38x10 \quad (3)$$

$$F4 = -0.80x1 - 0.67x2... - 0.59x10 \quad (4)$$

The weights of the common factors are determined by the contribution rate of each factor. To calculate the comprehensive performance score F of each tourism listed company, the calculation model is as follows:

$$F = (32.815F1 + 24.548F2 + 20.128F3 + 14.947F4) / 92.437 \quad (5)$$

3 RESULTS

3.1 Comprehensive Score

From the perspective of the comprehensive score (Table 1), the number of tourism listed companies with negative comprehensive scores from 2019 to 2023 was 8, 16, 17, 20, and 8 respectively. By comparing the highest score each year, the highest scores from 2019 to 2023 were 2.48, 0.66, 0.5, 0.57, and 1.78 respectively. From the perspective of the highest and lowest scores each year, the difference in the comprehensive score was significant, and there was a considerable difference in the operating performance among tourism listed companies. These data reflect the development status of China's tourism industry in recent years: that is, the tourism industry reached a new height in 2019. Since 2020, it has been in a sluggish state affected by the COVID-19 pandemic. Although there was a recovery in 2023, it still has not returned to the pre-COVID-19 level. The operating performance of tourism listed companies

was poor during the COVID-19 pandemic (from 2020 to 2022), and the COVID-19 pandemic had a huge impact on the tourism industry.

Table 1. Comprehensive Scores and Rankings

| stock code | 2019 | rankings | 2020 | rankings | 2021 | rankings | 2022 | rankings | 2023 | rankings |
|------------|-------|----------|-------|----------|-------|----------|-------|----------|-------|----------|
| 600054 | 0.81 | 4 | 0.39 | 5 | 0.4 | 3 | 0.05 | 5 | 0.53 | 4 |
| 600138 | 0.25 | 12 | -0.17 | 16 | -0.09 | 15 | -0.37 | 18 | 0 | 19 |
| 600749 | 0.04 | 17 | -0.08 | 14 | -0.07 | 12 | -0.13 | 11 | 0.02 | 18 |
| 002707 | 2.48 | 1 | -1.37 | 27 | -0.7 | 26 | -0.34 | 17 | 1.14 | 2 |
| 000978 | -0.18 | 23 | -0.57 | 24 | -0.49 | 24 | -0.63 | 24 | -0.17 | 21 |
| 000721 | -0.32 | 26 | -0.12 | 15 | -0.74 | 27 | -0.65 | 25 | -0.37 | 24 |
| 600576 | -1.94 | 27 | 0.55 | 4 | 0.5 | 1 | 0.57 | 1 | 0.18 | 13 |
| 002059 | -0.03 | 20 | 0.01 | 10 | -0.36 | 20 | -0.42 | 19 | -0.59 | 27 |
| 000524 | 0.81 | 4 | -0.2 | 19 | -0.07 | 12 | -0.26 | 14 | 0.35 | 8 |
| 600258 | 0.09 | 15 | -0.27 | 20 | -0.09 | 15 | -0.33 | 15 | 0.04 | 17 |
| 000888 | 0.53 | 8 | 0.03 | 8 | 0.17 | 7 | -0.13 | 11 | 0.48 | 6 |
| 600754 | 0.03 | 18 | -0.07 | 12 | -0.12 | 17 | -0.11 | 10 | 0.09 | 15 |
| 002159 | -0.13 | 21 | -0.07 | 12 | -0.41 | 22 | -0.33 | 15 | 0.2 | 12 |
| 300144 | 0.65 | 7 | -0.51 | 23 | 0.14 | 8 | 0.01 | 7 | 0.3 | 10 |
| 301073 | 1.12 | 2 | 0.65 | 2 | 0.44 | 2 | 0.56 | 2 | 0.31 | 9 |
| 600593 | -0.13 | 21 | -0.44 | 21 | -0.67 | 25 | -0.46 | 20 | -0.11 | 20 |
| 603199 | 0.37 | 9 | 0.25 | 6 | 0.26 | 5 | -0.05 | 9 | 0.43 | 7 |
| 601007 | 0.07 | 16 | 0.03 | 8 | 0.01 | 10 | -0.01 | 8 | 0.09 | 15 |
| 603099 | 0.28 | 11 | -0.17 | 16 | -0.04 | 11 | -0.25 | 13 | 0.55 | 3 |
| 605108 | 0.74 | 6 | 0.66 | 1 | 0.31 | 4 | 0.13 | 4 | 0.25 | 11 |
| 002033 | 0.91 | 3 | 0.59 | 3 | 0.25 | 6 | 0.15 | 3 | 1.78 | 1 |
| 600706 | 0 | 19 | -0.17 | 16 | -0.07 | 12 | -0.75 | 27 | -0.31 | 22 |
| 603136 | 0.33 | 10 | 0.12 | 7 | 0.07 | 9 | 0.02 | 6 | 0.53 | 4 |
| 000428 | -0.21 | 25 | -0.72 | 26 | -0.23 | 18 | -0.54 | 22 | -0.33 | 23 |
| 000610 | 0.14 | 14 | 0 | 11 | -0.3 | 19 | -0.47 | 21 | -0.43 | 25 |
| 002186 | 0.22 | 13 | -0.58 | 25 | -0.36 | 20 | -0.74 | 26 | 0.15 | 14 |
| 000430 | -0.18 | 23 | -0.46 | 22 | -0.44 | 23 | -0.57 | 23 | -0.44 | 26 |

3.2 Scores of Each Factor

Due to the large volume of panel data composed of each factor, year, and company, in order to reflect the change trend more intuitively and clearly, this study selects the average score of each factor of each company in the past five years for analysis (Table 2).

Table 2. Mean Scores and Rankings of Each Factor

| stock code | F1 | rankings | F2 | rankings | F3 | rankings | F4 | rankings |
|------------|-------|----------|-------|----------|-------|----------|-------|----------|
| 600054 | 0.28 | 8 | -0.26 | 17 | 1.93 | 3 | -0.10 | 17 |
| 600138 | 0.33 | 6 | 0.00 | 6 | -0.67 | 20 | -0.27 | 24 |
| 600749 | 0.04 | 14 | -0.42 | 26 | 0.28 | 9 | -0.04 | 13 |
| 002707 | -1.63 | 27 | 3.18 | 1 | -0.34 | 14 | 0.30 | 2 |
| 000978 | -0.42 | 23 | -0.39 | 24 | -0.78 | 23 | 0.09 | 3 |
| 000721 | -0.58 | 24 | -0.12 | 9 | -0.85 | 24 | -0.11 | 18 |
| 600576 | -1.08 | 26 | -0.14 | 12 | 2.12 | 1 | -0.43 | 27 |
| 002059 | -0.33 | 21 | -0.26 | 18 | -0.48 | 17 | 0.06 | 4 |
| 000524 | -0.11 | 17 | 0.68 | 3 | -0.07 | 11 | -0.01 | 11 |
| 600258 | 0.27 | 9 | -0.09 | 8 | -0.74 | 22 | -0.16 | 21 |
| 000888 | 0.04 | 13 | -0.27 | 19 | 1.32 | 4 | -0.09 | 16 |
| 600754 | 0.32 | 7 | -0.13 | 11 | -0.53 | 18 | 0.01 | 9 |
| 002159 | 0.26 | 10 | -0.33 | 22 | -0.67 | 21 | -0.06 | 15 |
| 300144 | -0.07 | 15 | -0.28 | 20 | 1.01 | 5 | -0.01 | 10 |
| 301073 | 0.78 | 3 | 0.99 | 2 | 0.47 | 6 | -0.17 | 22 |
| 600593 | -0.14 | 19 | -0.41 | 25 | -0.99 | 27 | 0.06 | 5 |
| 603199 | 0.70 | 4 | -0.21 | 14 | 0.29 | 8 | -0.05 | 14 |
| 601007 | 0.52 | 5 | -0.19 | 13 | -0.33 | 13 | -0.14 | 19 |
| 603099 | 0.15 | 11 | -0.25 | 16 | 0.42 | 7 | -0.02 | 12 |
| 605108 | 1.24 | 1 | 0.25 | 4 | -0.13 | 12 | -0.36 | 25 |
| 002033 | 0.09 | 12 | -0.28 | 21 | 2.01 | 2 | 2.10 | 1 |
| 600706 | -0.13 | 18 | -0.13 | 10 | -0.53 | 19 | -0.37 | 26 |
| 603136 | 0.82 | 2 | -0.23 | 15 | 0.03 | 10 | -0.15 | 20 |
| 000428 | -0.08 | 16 | -0.49 | 27 | -0.95 | 26 | -0.23 | 23 |
| 000610 | -0.29 | 20 | -0.05 | 7 | -0.46 | 16 | 0.06 | 7 |
| 002186 | -0.62 | 25 | 0.16 | 5 | -0.44 | 15 | 0.06 | 6 |
| 000430 | -0.38 | 22 | -0.36 | 23 | -0.88 | 25 | 0.04 | 8 |

The common factor F1 is the profitability factor. The company with the highest profitability score is 605801, which is 1.24, and the company with the lowest profitability score is 002707, which is -1.63, indicating a significant difference in the profitability of tourism listed companies. The common factor F2 is the operational capability factor. The operational capability score of 002707 is the highest, which is 3.176. However, only 6 companies have positive operational capability scores, reflecting that the operational capability of tourism listed companies is generally poor. The common factor F3 is the debt-paying ability factor. The debt-paying ability score of 600576 is the highest, which is 2.119, and the debt-paying ability score of 600593 is the lowest, which is -0.998. Similar to the profitability, the debt-paying ability of tourism listed companies varies greatly. The common factor F4 is the growth ability factor. The growth ability score of 002033 is the highest, which is 2.102. The growth ability scores of most tourism listed companies are around 0. This is because after experiencing the COVID-19 pandemic, a series of measures taken by the Chinese govern-

ment have injected new vitality into the tourism industry, and tourism listed companies have shown great growth and development potential. Overall, the development of various tourism listed companies is unbalanced in terms of profitability, operational capability, debt-paying ability, and growth ability.

4 CONCLUSIONS

Through the factor analysis method to conduct a comprehensive evaluation of the partial financial indicator data of 27 Chinese tourism listed companies from 2019 to 2023 on the operating performance, it was found that the operating performance of tourism listed companies was poor during the COVID-19 pandemic, and there was a significant difference in the operating performance among various tourism listed companies, indicating that the COVID-19 pandemic had a severe impact on the tourism industry. Although there was a recovery in 2023, it still has not returned to the pre-COVID-19 level. The profitability of tourism listed companies varies greatly, the operational capability is generally poor, the debt-paying ability is severely affected, the growth ability has great development potential, the profitability and growth ability recover the fastest, while the operational capability and debt-paying ability recover slowly. The development of various tourism listed companies is unbalanced in terms of profitability, operational capability, debt-paying ability, and growth ability. Overall, there is no tourism listed company with balanced development of all capabilities. Based on this, some suggestions are put forward for tourism listed companies: First, it is necessary to strengthen the company's strategic research and highlight the core competitive advantages; Second, it is necessary to improve its own comprehensive ability to achieve sustainable development; Third, it is necessary to closely follow national policies and contribute to the high-quality development of the tourism industry. This study has certain limitations, such as a single research method and a small sample size. In the future, multiple methods will be used and a large sample size will be selected for further research on the operating performance of tourism listed companies.

REFERENCES

1. S. Liang, R. Yu, Z. Liu, W. Wang, L. Wu, X. Hu, An empirical study on the asset-light operation and corporate performance of China's tourism listed companies, *Heliyon* 9 (2) (Feb. 2023), e13391, <https://doi.org/10.1016/j.heliyon.2023.e13391>
2. Nagendrakumar, N.; Alwis, K.N.N.; Eshani, U.A.K.; Kaushalya, S.B.U. The Impact of Sustainability Practices on the Going Concern of the Travel and Tourism Industry: Evidence from Developed and Developing Countries. *Sustainability* 2022, 14, 17046. <https://doi.org/10.3390/su142417046>
3. Chen, T.-A. Business Performance Evaluation for Tourism Factory: Using DEA Approach and Delphi Method. *Sustainability* 2022, 14, 9209. <https://doi.org/10.3390/su14159209>
4. Rodríguez-Fernández, M.; Sánchez-Teba, E.M.; López-Toro, A.A.; Borrego-Domínguez, S. Influence of ESGC Indicators on Financial Performance of Listed Travel and Leisure Companies. *Sustainability* 2019, 11, 5529. <https://doi.org/10.3390/su11195529>

5. Jin, S.; Gao, Y.; Xiao, S. Corporate Governance Structure and Performance in the Tourism Industry in the COVID-19 Pandemic: An Empirical Study of Chinese Listed Companies in China. *Sustainability* 2021, 13, 11722. <https://doi.org/10.3390/su132111722>
6. Geng, S.T, Yang, J.J, Liao, X.L. Research on the Performance Evaluation of Chinese Tourism Listed Companies Based on the Diagnosis and Analysis of Obstacle Factors [J]. *Journal of Southeast University (Philosophy and Social Science Edition)*, 2020, 22(03): 90-98 + 153. DOI: 10.13916/j.cnki.issn1671-511x.2020.03.010.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

