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The Financial Analysis of Listed Companies in the Communications Equipment Industry Using Factor Analysis

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Abstrak

Penelitian ini bertujuan untuk mengevaluasi kesehatan keuangan perusahaan publik secara komprehensif. Data yang digunakan dalam penelitian ini adalah data sekunder yang diambil dari situs sina.com yang terdiri dari 37 perusahaan yang terdaftar di bidang penyediaan industri komunikasi. Metode analisis data yang digunakan dalam penelitian ini adalah Analisis Faktor yang bertujuan untuk mengekstraksi dari sejumlah indikator atau rasio keuangan dimana sejumlah rasio keuangan yang berbeda dari sistem analisis dapat dibuat dengan menganalisis sejumlah besar indikator keuangan dan mengekstraksi faktor-faktor tersebut. Proses ini dapat menghasilkan suatu sistem penilaian yang terintegrasi terhadap situasi keuangan dan membantu dalam pemilihan strategi bisnis dan keuangan Perusahaan.
Kata Kunci: Analisis Faktor, Indikator Keuangan Peralatan Komunikasi

Abstract

This study aims to evaluate the financial health of public companies comprehensively. The data used in this study are secondary data taken from the sina.com website which consists of 37 companies listed in the field of providing the communications industry. The data analysis method used in this study is Factor Analysis which aims to extract from a number of financial indicators or ratios where a number of different financial ratios from the analysis system can be created by analysing a large number of financial indicators and extracting important factors. This process can produce an integrated assessment system of the financial situation and assist in the selection of the Company's business and financial strategies.
Keywords: Factor Analysis, Financial Indicators Communication Equipment

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INTRODUCTION

China's telecom equipment industry will continue to grow steadily in the coming years, thanks to the telecom restructuring and the issuance of 3G licenses. However, the industry is also facing many challenges due to the global financial crisis, including financial pressure, a decline in consumer spending that affects performance and business plans, and more. Abdullah et al., (2023). Apply a factor analysis. This paper aims to provide guidance on enterprise operations and financial strategy selection by providing a thorough evaluation of the financial situation of listed companies in China's communications equipment industry. The financial analysis method found differs from the analysis system.

Factor analysis is the process of finding a few essential factors among a variety of complexly correlated economic events. Since each component plays a part in the interdependence of economic variables, focusing on these important factors can aid in the study and interpretation of many economic difficulties. Factor analysis's thorough evaluation techniques are extensively employed in the fields of sociology, economics, and management science. When compared to alternative techniques for financial analysis, factor analysis possesses the following qualities: To start, the weight is more objective. In factor analysis, the variance contribution determines the integrated factor weight, allowing for man-made modifications to prevent arbitrary weights and guarantee objective and fair financial results. Chen et al., (2023). Secondly, factor analysis is appropriate for a thorough examination of financial data. A single indicator in financial analysis cannot accurately reflect the entire financial state. Factor analysis allows for the efficient processing and analysis of a wealth of financial data. Third, businesses with varying sizes and operational environments within the same industry can use factor analysis to analyse their integrated financial status effectively

Sample and Variable Selection

Multiple indicators exist to show the overall financial health of a corporation. In order to eliminate result deviation caused by information loss due to a single variable design factor, this paper designs as many variables as possible for each factor influencing the financial performance of the company, taking into account comprehensiveness, comparability, objectivity, and the importance principle Guo Yu et al., (2008). This paper employs an indicator system similar to Table 1 to evaluate the financial health of the communications equipment sector.

Table 1 Variables Definition

Name	Meaning	Name	Meaning
$\boldsymbol{X_1}$	Liquidity ratio	X_7	Earnings per share
$\boldsymbol{X_2}$	Asset-liability ratio	X_8	Asset Margin
$\boldsymbol{X_3}$	Equity ratio	X_9	Return on Net assets
$\boldsymbol{X_4}$	Debt to equity ratio	X_{10}	Return on assets
$\boldsymbol{X_5}$	Account receivable turnover ratio	X_{11}	Main revenue growth
$\boldsymbol{X_6}$	Total assets turnover ratio	X_{12}	Growth rate of total assets

METHODOLOGY

37 listed companies have received communications equipment industry data from sina.com financial plate. Using data from the 2022 annual report as samples, we randomly chose 25 of these 37 organizations to be the research subjects. We then performed factor analysis in SPSS to thoroughly assess each company's financial status. Using factor analysis requires that the observable variables have a high degree of correlation as the goal of factor analysis is to simplify the data or uncover the fundamental data structure. This indicates that the assumption was rejected Zhang Hong-bin et al., (2006). The correlation coefficient matrix and matrix units have significant differences, making the original variables suitable for factor analysis. The KMO and Bartlett test (such as Table 2) show that the Bartlett's test probability is 0.000, less than significant level of 0.001. Furthermore, according on the criterion provided by statisticians Kasier, the observation variable's KMO value of 0.646 makes it appropriate for factor analysis.

Table 2 KMO and Bartlett's Test

KMO Measure of Sampling Adequacy		.646
Bartlett's test of Sphericity Approx.	Chi-Square	364.423
	df	66
	Sig.	.000

RESULT AND DISCUSSION

Extract the Common Factor

We can obtain an explanation of the total variance table (e.g., Table 3) by using the principal component analysis method in SPSS. The paper extracts four main factors based on the principle of cumulative variance contribution rate greater than or equal to 85% . This is because the first four indicators' cumulative variance contribution rate has reached 89.84%, which means they can reflect sufficient information about the original data provided (Bako et al., 2022)

Table 3 Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.35	36.24	36.24	4.3	36.24		3.6	30.36	30.36
2	3.19	26.56	62.80	3.2	26.56	62.80	3.4	28.41	58.77
3	1.85	15.37	78.17	1.9	15.37	78.17	1.9	16.34	75.11
4	1.40	11.67	89.84	1.4	11.67	89.84	1.8	14.73	89.84
5	.510	4.250	94.09						
.....	...	.....	...						
12	.002	.018	100.0						

Rotating the component matrix is required to express influencing factors in each factor's component and reflect the representative meanings of various factors of the representatives of various factors in order to employ principal component interpretation and analysis in practical problems. Rotate the entire component matrix; table 4 shows the outcome.

Table 4 Rotated Component Matrix

	Component			
	1	2	3	4
x_{10}	.951	-.197	.113	-.005
x_9	.948	.032	.039	-.044
x_8	.947	-.254	.062	-.038
x_7	.923	.023	.085	.073
x_2	-.142	.948	.043	.143
x_3	.145	-.947	-.102	-.186
x_4	-.100	.823	.438	.255
x_1	.014	-.756	.403	.138
x_{12}	.150	-.158	.921	-.112
x_{11}	.123	.450	.805	-.051
x_5	.032	.136	.108	.920
x_6	-.024	.111	-.247	.871

The factor is more significant to comprehend when its absolute value is higher due to higher factor and variable overlap. If the loading value is greater than 0.71, it is generally regarded as excellent. In this study, the named factor and segmentation point of 0.71 are used to explain the factor. As the table illustrates, factor 1 significantly influences asset profitability, return on net assets, return on assets, and earnings per share, all of which are referred to as profitability. In the asset-liability, equity, debt-to-equity, and liquidity ratios—collectively, the solvency ratios—factor 2 bears a disproportionate weight. Factor 3, also known as growth capacity, has a large weight in the growth rate of total assets and primary revenue growth. Factor 4, or operational efficiency, has a large burden in the ratios of accounts receivable turnover and total asset turnover.

Factor Scored

According to statistical theory and regression algorithm can get component score coefficient matrix such as shown in table 5.

Component Score Coefficient Matrix

	Component			
	1	2	3	4
x_1	-.088	-.308	.290	.197
x_2	.022	.292	-.038	-.026
x_3	-.015	-.281	.003	-.004
x_4	-.010	.205	.190	.076
x_5	-.002	-.074	.087	.550
x_6	.011	-.051	-.102	.508
x_7	.270	.060	-.031	.034
x_8	.260	-.017	-.028	-.001
x_9	.283	.083	-.065	-.041
x_{10}	.261	-.006	-.003	.014
x_{11}	.002	.101	.390	-.051
x_{12}	-.044	-.107	.500	-.008

Then according to factor score function and integrated score function (which based on the four factor scores, then take variance contribution in their respective weights for the linear weighted average) each company's factor score and integrated scoring can be obtained, and then analysed its financial situation.

$$Factor\ Scor\ Function: \begin{Bmatrix} F_1 = -0.088X_1 + 0.022X_2 - \cdots - 0.044X_{12} \\ \dots \\ F_4 = 0.197X_1 - 0.026X_2 + \cdots - 0.008X_{12} \end{Bmatrix}$$

Integrating Scoring Function:
F = 30.361%F1 + 28.409%F2 + 16.339%F3 + 14.728%F4
By calculating， table 6 lists the top three and the last three Companie's integrated scoring.

Table 6 Enterprise Comprehensive Scoring Position

	Jinsma	*Aerospace*	*ZTE*	*Putian*	*Yangtze*	*Latitude*	*Average*
Profitability	-6.032	33.402	2.229	0.49	1.521	-1.671	3.028
Rank	23	1	13	17	15	22	
Solvency	109.715	62.864	54.883	8.219	1.470	-54.951	19.231
Rank	1	3	5	14	20	25	
Growth capacity	325.887	47.885	84.116	-10.195	1.195	91.099	53.94
Rank	1	10	6	25	23	5	
Operating capacity	15.848	19.817	15.178	8.218	6.289	9.400	9.63
Rank	12	15	1	9	21	23	
Composite Score	78.9	38.474	30.087	2.028	2.001	-0.103	16.614
Rank	1	2	3	23	24	25	

CONCLUSION

Analyze the financial situation

ZTE, Jinma Group, and Aerospace Communications are in the top three according to the comprehensive scoring rank. This demonstrates that they have a strong financial position and advantages in the communications equipment sector. Meanwhile, we discover that these businesses consistently rank in the top three for one or more categories, indicating that they are leaders in a number of industries and possess great all-around capabilities. It is noteworthy that, despite the uneven expansion of listed businesses in China's communications equipment market, no single enterprise has achieved a top-tier score on any of the four factor assessments. Businesses must constantly contend with different aspects of capacity in order to emerge as the market leader, even in the face of ongoing telecom restructuring, the issuing of 3G licenses, and the global financial crisis.

With the exception of one extremely individual factor score that is higher than the industry norm, the following three companies have scores that are noticeably below average. To strengthen their own financial position, these businesses should take the necessary actions.

Financial Strategy Selection

Utilize factor analysis to determine factor scores and integrated scoring. Each business should assess its place in the industry, compare its scores to those of other businesses, and conduct thorough study to develop plans that will best address its financial circumstances. For example, Jinma Group has the best integrated scores, but its profitability is not very promising. As such, the enterprise's next operation should concentrate on increasing profitability.

The Merits of Using FactorAanalysis to Conduct Financial Aanalysis

The rights and interests of margin, which are the foundation of the DuPont Financial Analysis System, are calculated using the following formula: rights and interests of margin = sales net profit rate × total assets turnover ratio X rights and interests multiplier. This formula accounts for profitability, operating capabilities, and solvency. Only three ratios, however, are unable to adequately capture various capacities. Moreover, this system does not account for variables like capacity growth. However, by using factor analysis, a variety of financial indicators may be fully considered, making the appraisal of financial status more Thorough and impartial. Second, factor analysis makes it simple to learn about the industry's overall financial status, your competitors, and your place within it. By utilizing those data, corporate financial strategy may be strengthened, which will ultimately increase competitive advantage.

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