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Analysis of Influence Factors on Corporate Financial Strategy

A Case Study of a Public Energy Company

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Abstract—Strategic Financial Management determines the strategic goals in long term view. The analysis of Energy business is always important under the contemporary conception of "Low Carbon and Green Growth". However, most energy enterprise' understanding and application of Business strategy only stays on the level of operation management with the lack of attention to important influence factors of strategic financial management. This paper selects a representative company for finding out some specific influence factors of determine the strategic financial management of Energy business. A factor load matrix is established for the primary financial indicators .The final result discovers some important influence factors of this business's financial strategy, such as capital flow and value-cash financing, except for operational capacity.

Keywords—Strategic financial management; Influence factors; Factor analysis

I. INTRODUCTION

Energy resource plays an important role in the economic development of China. China government is focusing on the development of energy business. Elasticity index of energy consumption in China has constantly decreased to the lowest level in the past decade. China is experiencing a new transformation from a high energy-consuming industry to major green industry, which has effectively promoted the implementation of energy conservation and "green" environmental protection development strategies hence accelerated China's industrial reform. Total size of energy-saving and environmental protection industries will be expected to reach CNY10 trillion (USD1.59 trillion). However, the strategic financial management is always one of important problems facing most energy business in China.

In the last century, the world's largest energy companies narrow their focus to the traditional energy resources such as oil, gas, and chemicals. The primary financial strategies of these businesses consist of restructuring assets, reducing liability ratio and increasing return of capital. In the new century, the structure of the global energy industry has changed significantly. Traditional fossil fuel is supplanted by the use of renewable technologies. Some low carbon conceptions such as solar photovoltaic, wind, battery storage, concentrated solar power, CHP and anaerobic digestion technologies have become a main theme among the energy companies. The question on "How to determine an efficient and effective financial strategy management" is worth researching. This paper chooses a representative new energy business to analyze by applying factor analysis and exploring possible influence factors to establish financial management strategy.

II. REVIEW OF LITERATURE

There is a veritable flood of research on financial management and financial strategy. David (1997) defines strategic financial management as "Managers design and plan a future financial strategic project for prospective enterprise goals."

A. Analysis of Strategic Financial Management

Gabriel (2000) initially presented "Financial Strategy Matrix" for predicting the business future financial situations. J.H.vH. de Wet & P. de Jager (2007) added two new dimensions into "Financial Strategy Matrix" and claimed the indicator of cash flow should be added to the analysis of "Financial Strategy Matrix" for satisfying enterprise sustainable development. And also, financial strategy matrix can be combined with Balance Scorecard for analyzing [1]. Höglund, Caicedo, Mårtensson and Svärdsten (2018) did some research on strategic management tools and how to apply strategic management by analyzing a case of government agency, Swedish Transport Administration (STA) [2].

B. Application of Factor Analysis

Since 1920s, DuPont Corporation has developed a method called DuPont Analysis to evaluate the business performance measurement. Holzinger and Harman (1939) used a factor analysis to analyze and evaluate the Wisdom testing result. This method is frequently used for Big Data and persuasive result is always from an analysis of more data [3]. Bandyopadhyay and Chakraborty (2011) selected 10 years of financial data of an Indian cement companies to perform a factor analysis. They classified 44 variables into 7 common factors by utilizing Principal Component Analysis (PCA) in order to verify objective validity [4]. Arunkumar and Radharamanan (2013) introduced the use of factor analysis to analyze Indian manufacturing industry's operating cash. They divided 9 variables into 4 factors of the complicated operating cash and total assets, therefore making the analysis process easier [5]. Shao and Yu (2013) filtered 12 financial samples and applied factor analysis to evaluate operating performance of 25 real estate businesses based on those characteristics [6].

The result has high explanatory power in compliance with business practice, which provides persuasive evidences for scientific research. Liu (2014) indicated that the traditional model is highly subjective, and factor analysis is more objective. He improved the analysis and evaluation by using factor analysis in public banks [7]. Wang, Ni and Yang（2015）proved the main influence factor of all financial indicators is the solvency ratio by analyzing the financial performance of 22 high technology public corporations [8]. Alves, Mendonça, Benedicto and Carvalho (2017) identified the most relevant economic and financial indicators for evaluating the performance of banking financial institutions by using the factor analysis [9].

This paper focuses on 4 primary financial indicators and 16 sub-level financial indicators of an energy company by using factor analysis.

III. DESCRIPTION OF RESEARCH CASE

A. *Introduction of the Corporation*

This research selects a famous energy public corporation, ENN Energy Holding Limited Company (2688.HK). It is one of the largest-scale clean energy distributors in the Greater China. The business headquarter is located in Hong Kong. The core business includes sales of natural gas, integrated energy service, energy trade, and energy transmission and distribution. The company provides energy service of 300 cities in China and stretches its operation over Southeast Asia, Europe, North America and Oceania. The company has a total asset of 60 billion RMB and more than 400 wholly-owned and holding companies and branches, with more than 32,000 employees in the end of 2017. Therefore, this case should be a good representative in Energy Business discussed in this research.

B. *Relevant Financial Information of the Corporation*

The financial strategy system of ENN Energy is designed depending upon market changes. The company constantly adjust next annual budget by comparing the current budget and actual result. ENN energy uses a sustainable and systematic method to cyclically design, resolves and performs the financial strategy assessment. At the same time, management also consider market development trend to redesign the next development and future financial strategy. The company is conducting and resolving Three-One projects based on the internal and external changes of the current market, which could promote business performance. Hence, this research also considers the influences of the Three-One projects over future periods in the financial strategy.

IV. THEORETICAL FRAMEWORK AND RESEARCH METHOD

A. *Establishment of Factor Analysis Regression Model*

The degree of impact on the company's financial strategy is determined by calculating total scores of factor variables. Then, we use the regression analysis to analyze the financial strategy factor evaluation scores as the following (1):

$$F = a_{p1}F_1 + a_{p2}F_2 + a_{p3}F_3 + ... + a_{pm}F_n \quad (1)$$

F_i presents different common factors of financial strategy.

B. *Sample Data Collection and Definition of Variablesl*

A set of financial data of ENN energy from 2001 to 2017 were selected from GTA (Guo Tai An) database and Bloomberg database, which including 4 primary financial indicators and 16 sub-level financial indicators.

The four primary financial indicators include F1 Operational Ability, F2 Debt Repayment Ability, F3 Development capacity and F4 Profitability. Moreover, the four primary financial indicators are classified into 16 sub-level financial indicators shown in Table I below:

TABLE I. DEFINITION OF VARIABLES

Common Factor	Code	Index name
Operational capability（F_1）	X_{10}	Earnings per share
	X_{15}	Net assets per share
	X_6	Total asset turnover
	X_5	Account receivable turnover rate
	X_7	Liquidity turnover rate
	X_{11}	Net profit rate
Solvency（F_2）	X_4	Cash flow debt ratio
	X_2	Current ratio
	X_1	Current ratio
	X_{12}	Total asset growth ratio
	X_8	Operating profit ratio
	X14	Main business income growth rate
Development Ability（F_3）	X_{15}	Net profit growth rate
	X_{13}	Pre-tax profit growth ratio
Profitability（F_4）	X_3	assets and liabilities ratio
	X_9	Asset profit rate

C. *Correlation Test*

The correlation between KMO test and Bartlett's sphere test to verify the indicators are used to determine whether the sample data is suitable for factor analysis. The analysis results are shown in Table II:

TABLE II. KMO TEST AND BARTLETT'S SPHERE TEST RESULT

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.657
Bartlett Test of Sphericity	Approx. Chi-Square	424.148
	df	120.000
	Sig.	0.000

The KMO value is 0.657, which is significantly higher than 0.5. It indicates that the selected data is very suitable for factor analysis. Bartlett's sphere test has an x2 value of 424.148, a degree of freedom of 120.000, and a test P value of 0.000, which is less than 0.05. This refuses the null hypothesis that the correlation coefficient matrix can't be an identity matrix and the correlation between variables is high. Therefore, it is highly reliable and efficient to study the financial strategy of ENN Energy.

D. Variance Analysis of Variables

Table III shows the common changes in the various indicators of the financial strategy analysis. The initial variances are the common factor variance of each original pointer variable. The normal variable is settled with a standard deviation of 1 and the average value of 0. Therefore, the common variance is 1. After the common factor is extracted, the variance can be used as the common variance of each indicator variable.

TABLE III. FACTOR VARIANCE EXTRACTION

code	variance after extracted	code	variance after extracted
X1	0.910	X9	0.938
X2	0.951	X10	0.921
X3	0.929	X11	0.625
X4	0.750	X12	0.810
X5	0.942	X13	0.823
X6	0.897	X14	0.753
X7	0.933	X15	0.681
X8	0.876	X16	0.940

Based on the use of SPSS, the variance contribution rate and cumulative contribution rate are shown in Table IV (Appendix). The principal component analysis was used to extract common factors. The results are shown in Table IV. Four common factors were extracted, in F1, F2, F3, and F4. The eigenvalues of F1, F2, and F3 are more than 1, and the eigenvalue of F4 is 0.77 near to 1. The reason why F4 is selected as the common factor is as follows: firstly, the characteristic value 0.77 of F4 is near to 1, or it can be intuitively obtained based on the factor crushed stone extraction diagram in Table V-1. The cumulative contribution rate has increased to 90.28%, which is more comprehensive than the selection of only three common factors explaining the financial strategy of the ENN Energy. Secondly, based on the common factor classification and naming of Table V-5. F4 represents the group's profitability. It specifies asset-liability ratio and asset profit rate respectively. As shown in Table V-2, the rear differentials between the asset-liability ratio and the asset profit margin are 0.929 and 0.938, respectively, both close to 1, indicating that F4 can better describe the original data. Thirdly, F4 Profitability is one of the factors that measure the financial strategy and is in line with reality. The eigenvalue of F1 is 9.44. The variance contribution rate is 58.97%. The cumulative contribution rate is 58.97%. The eigenvalue of F2 is 2.80. The variance contribution rate is 17.49%. The cumulative contribution rate is 76.46%. The eigenvalue of F3 is 1.45. Variance The contribution rate is 9.03%. The cumulative contribution rate is 85.49%. The characteristic value of F4 is 0.77. The variance contribution rate is 4.79%, the cumulative contribution rate is 90.28%, and the high rate is 85%. The combination of these results can accurately explain ENN Energy Group for nearly 17 years. The standard deviation of the financial status is 90.28%. Therefore, it is considered that the four common factors extracted can well reflect the original data, and at the same time the 90.28% financial strategy status of ENN Group can be explained by these four common factors. The selected variance contribution rate is the weight of the comprehensive factor score of the calculation factor. The weight of F1 is the largest of the four common factors, which shows that the common factor F1 has the greatest impact on the group's financial strategy in the past 17 years, and the impact degree reaches approximately 58.97%. To further verify the rationality of the four common factors, a factorized stone extraction diagram is used.

According to the following figure, the overall graph is convex with a steep slope on the left and a steeper slope on the right. In summary, F1, F2, F3, and F4 are the common factors to be extracted in this paper.

A factor load matrix is established for the primary financial indicators F1, F2, F3, and F4, and further simplified components are formed to form a maximum variance orthogonal rotation matrix.

V. THEORETICAL FRAMEWORK AND RESEARCH METHOD

A. Factor Loading Matrix Analysis

A factor load matrix is established for the primary financial indicators F1, F2, F3, and F4, and further simplified components are formed to form a maximum variance orthogonal rotation matrix. The result is shown in Table V (Appendix).

B. Ranking Impact Factor Scores and Analyzing the Result

Each common factor among F1, F2, F3, and F4 can only reflect the ability of a certain aspect of the enterprise. To understand the overall status of a company and its capabilities, four common factors need to be considered. The weighted average calculation is based on variance contribution rate by comprehensive evaluation. The formula of factor analysis is rebuilt as the following (2):

$$F = (58.97F_1 + 17.49F_2 + 9.03F_3 + 4.79F_4)/90.28 \quad (2)$$

Table VI shows ranking result of factor scores of ENN financial strategy from 2001 to 2017.

In Table VI (Appendix), the scores for the four common factors F1, F2, F3, and F4 are obtained by using the average value. The score coefficients corresponding to the factors in the factor score table are not selected to calculate the results of F1, F2, F3, and F4. The reason for choosing this treatment method is that in the past, the results of the common factor obtained from the factor score coefficient table can only represent the degree of influence of the factor variable on the common factor. The higher the influence degree, the higher the ranking is, and they don't represent the specific financial significance. The data in this paper come from different years of the same company. The overall operating environment is relative. This is also an important prerequisite for choosing F1, F2, F3, and F4 as the average value of the factor variables.

The average value can satisfy the purpose of the ranking and the specific score represents a certain financial significance, such as 2015 F2 score of 0.29, ranked 17th, sort of the final, indicating that F2's influence on financial strategy is relatively small compared to other years, at the same time, it can indicate that the overall solvency of the group in 2015 is about 29%. It should be equal to 2 while it is the best. So the debt-repaying ability was insufficient.

From the result of ranking comprehensive scores from 2001-2017, the overall trend has been upward, and the ranking of F1 operational capabilities is kept in the same direction. Once again, F1's operational capabilities have become more and more important to ENN Energy Group's financial strategy for the past 17 years. Both F1's operational capabilities and comprehensive scores have peaked in 2017. F2's solvency, F3 development capabilities, and F4's profitability peaked in 2002, 2001, and 2005, respectively. The scores of these four common factors are different over different years. There are also differences between the peak years. This result indicates that the factors affecting the financial strategy of ENN Energy Group are different sensitive over different periods.

The solvency of F2 from 2015 to 2017 is poor, and the rankings are 17th, 16th, and 15th respectively. This indicators is further categorized as X1 current ratio, X2 quick ratio, X4 cash flow liability ratio, X12 total asset growth rate, and X8 operating margin. The X14's main business income growth rate are the impact factors of F2's operating capacity. This result shows that ENN Energy Group is lack of relative capital flow and growth slowdown during the past three years from 2015 to 2017. F3 development ability score also explains this result. As a result, ENN was in a shortage of value-added cash during 2010-2014. The rapid increasing in total asset stress cash financing. The increase of asset-liability ratio meets the requirements of a large amount cash. F2 solvency rankings are relatively backward from 2015-2017. One of the reasons is that, even if the amount of group financing increases rapidly during the three years, the funds that can be used for financing are not only used for the development of enterprises, but also need to repay the principal and interest of the early years loan. On the other hand, part of the financing amount is advance receipts. Credit financing, which is usually a current liability, also reduces the solvency of the group.

VI. CONCLUSIONS, DISCUSSION, AND LIMITATION

The ranking of the comprehensive scores shows the performance of the financial strategy of ENN energy Group for the past 17 years. The overall performance of the Group's financial strategy has risen, which is similar to that of the group's value state curve. ENN energy has faced the effects and challenges of multiple factors such as declining macroeconomic environment, adjustment of traditional industrial structure, and intensified market competition. At the same time, , business risk factors should integrate the analysis of these factors based on the status of value and capital. Also, Energy business should actively take advantage of China's policies and keepup with the trend of international development in the future for devising the financial management strategy.

There are some limitations to this study that is worth mentioning. Firstly, it is difficult to accurately measure non-financial indicators with subjective judgment, such as policies, financial staff's capabilities, and technical standards. They have to be ignored during the process of factor analysis. Therefore, it is necessary to take appropriate measures to solve the problem. Secondly, the factor analysis model itself is flawed. It is based on the analysis of specific financial conditions. The effect of the factor analysis model depends on the rotation results of the factor. At the same time, there are some special factors that are not calculated. Our study serves, in some degree, as a test bed. We would leave all those topics for more thorough studies in the future. Thirdly, this case may not be representative of China new energy industry. We leave these aspects to future research.

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APPENDIX

TABLE IV. FACTOR EXTRACTION TABLE

code	Initial feature value			Before rotation			After rotation		
	Eigenvalues	*Variance contribution rate*	*Cumulative contribution rate*	*Eigenvalues*	*Variance contribution rate*	*Cumulative contribution rate*	*Eigenvalues*	*Variance contribution rate*	*Cumulative contribution rate*
F1	9.44	58.97	58.97	9.44	58.97	58.97	5.31	33.18	33.18
F2	2.80	17.49	76.46	2.80	17.49	76.46	4.63	28.92	62.10
F3	1.45	9.03	85.49	1.45	9.03	85.49	2.56	16.03	78.13
F4	0.77	4.79	90.28	0.77	4.79	90.28	1.94	12.15	90.28

TABLE V. ROTATED FACTOR MATRIX

Index	Common factors				Index	Common factors			
	F_1	F_2	F_3	F_4		F_1	F_2	F_3	F_4
X_{10}	0.93	-0.24	0.06	-0.09	X_1	-0.41	0.82	0.27	0.00
X_{16}	0.90	-0.30	-0.19	-0.05	X_{12}	-0.45	0.76	0.08	0.29
X_6	0.87	-0.39	-0.11	0.16	X_8	-0.51	0.56	0.38	0.41
X_7	0.86	-0.34	-0.19	-0.07	X_{14}	-0.51	0.55	0.27	0.38
X_{11}	0.79	-0.53	-0.08	0.20	X_{15}	-0.01	0.24	0.94	0.15
X_4	-0.55	-0.30	0.19	0.47	X_{13}	-0.27	0.24	0.85	0.31
X_2	-0.21	0.91	0.22	0.08	X_3	-0.25	-0.21	-0.29	-0.8
X_3	-0.30	0.88	0.27	0.13	X_9	-0.17	0.48	0.56	0.61

TABLE VI. FACTOR COMPOSITE SCORE RANKING TABLE

Year	F_1	Sorting	F_2	Sorting	F_3	Sorting	F_4	Sorting	score	Sorting
2001	1.52	17	0.95	2	1.16	1	0.15	17	1.30	17
2002	1.92	14	1.30	1	0.59	3	0.18	15	1.57	13
2003	1.80	16	0.61	5	0.35	7	0.22	6	1.34	16
2004	1.90	15	0.73	4	0.47	4	0.22	4	1.44	15
2005	2.09	13	0.84	3	0.18	13	0.26	1	1.56	14
2006	2.69	12	0.60	6	0.37	6	0.22	5	1.92	12
2007	3.30	11	0.50	8	0.43	5	0.22	3	2.31	11
2008	3.90	10	0.38	13	0.32	8	0.21	7	2.67	10
2009	3.97	9	0.39	12	0.25	12	0.20	10	2.71	9
2010	5.34	8	0.36	14	0.28	11	0.19	13	3.60	8
2011	5.87	7	0.43	10	0.29	10	0.23	2	3.96	7
2012	5.99	6	0.41	11	0.17	14	0.21	8	4.02	6
2013	6.31	5	0.49	9	-0.09	16	0.19	11	4.22	5
2014	7.36	3	0.56	7	1.04	2	0.21	9	5.03	2
2015	7.43	2	0.29	17	-0.22	17	0.19	12	4.90	3
2016	7.07	4	0.32	16	0.13	15	0.19	14	4.70	4
2017	7.91	1	0.35	15	0.30	9	0.18	16	5.27	1