

Research on the Influence Factors of the Performance of corporate Mergers and Acquisitions based on the perspective of management innovation

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Abstract. Enterprises will generate mergers and acquisitions to expand their value, which will have far-reaching effects on both parties' current benefits and future development. Moreover, from the perspective of management innovation capability, the study of mergers and acquisitions performance influencing factors is essential for enterprises to improve internal control management and increase value creation. This paper first uses the mixed cross-sectional data of listed companies as the research sample. Then, based on the volatility and conflict perspective of the indicators, we quantified the corporate management innovation capability using information weight, independence weight, and the TOPSIS method. Then, operating cash flow, firm size, and mergers and acquisitions size were used as control variables to investigate the effect of management innovation capability on corporate mergers and acquisitions performance using a robust linear regression model, and a robustness test was conducted. The empirical results show that management innovation capability has a significant positive relationship with mergers and acquisitions performance, which confirms that management innovation capability is a requirement for firms to create practical value. Finally, this paper puts forward relevant suggestions for enterprises to achieve high-quality development and improve mergers and acquisitions performance.

Keywords: Corporate Mergers and Acquisitions; Management Innovation Capability; Performance Evaluation.

1. Introduction

As a major business strategy of enterprises, mergers and acquisitions are an important manifestation of the effectiveness of corporate governance. In order to reveal the influencing factors of corporate mergers and acquisitions performance, some scholars have explored the effects of state-owned equity, social trust level, and factor market development on corporate mergers and acquisitions performance from government and market factors. [1] Some scholars have also focused on the important roles the board of directors and management played in corporate Mergers and Acquisitions and explored the board structure and managerial traits based on agency theory and the executive overconfidence hypothesis. However, there is also little literature focusing on firms' management innovation capabilities on mergers and acquisitions performance. Management innovation enables firms to perform value-creating activities better and thus may be an important factor influencing mergers and acquisitions performance.

With approximately 70% of global mergers and acquisitions cases failing to meet expectations, the risk factors of corporate mergers and acquisitions cannot be ignored, and thus corporate mergers and acquisitions motives have undergone a major shift. The most representative one is the principal-agent theory, and these motivational hypotheses suggest that the pursuit of corporate diversification and self-interested behavior are the main motives for executives to push for Mergers and Acquisitions. As for managerial innovation, Ray Stata (1989) [2] first raised the issue of managerial innovation, and his most outstanding contribution was to further pierce away from technological innovation with innovation as an independent content. Rui Mingjie (1994) [3] believes that management innovation refers to creating a new and more effective paradigm of organizational resource integration. Tang

Houxing (2006) [4] proposed in the study of innovation in private technology enterprises that the innovation evaluation index system of private technology enterprises can include technological innovation and management innovation. Wang X, Zang J, Li Shuai Shuai (2003) [5] based on fully considering the factors influencing the performance of high technology enterprises, it is proposed to evaluate the performance of high technology enterprises from the perspective of input and output. Afework G, Kassa. R, SATYA RAJU (2014) [6] explores the functional relationship between innovation and corporate entrepreneurial performance and argues that the increase in innovation investment promotes the growth level of corporate performance profitability.

The possible contributions of this paper mainly lie in the following: firstly, differing from the existing studies on macro factors affecting mergers and acquisitions performance, this paper explores mergers and acquisitions events in depth from the micro perspective of management innovation capability, which confirms that management innovation enables corporate mergers and acquisitions performance to be improved and further enriches the related literature in the field of mergers and acquisitions performance. Second, previous studies have focused more on the impact of technological innovation capability on mergers and acquisitions performance and less on the impact of management innovation capability on the mergers and acquisitions process. The study provides some reference value for corporate mergers and acquisitions to enhance core competencies' competitive advantage. Finally, it provides theoretical support for predicting future mergers and acquisitions events when they occur. The time span of mergers and acquisitions events is large, and a detailed analysis of company financial data before and when they occur can reasonably predict the performance of mergers and acquisitions.

2. Theory

2.1 Theoretical analysis of influencing factors

Damanpour (1989) [7] earlier proposed that management innovation and technological innovation positively affect firm performance. Tu Yunmi (2012) [8] used multiple linear regression analysis to investigate the relationship between three variables: technological innovation capability, managerial innovation capability, and firm performance, and verified that managerial innovation capability could positively moderate the relationship that technological innovation capability has a significant positive effect on firm performance. Therefore, hypothesis 1 is proposed:

[H1]: there is a positive correlation between management innovation ability and mergers and acquisitions performance.

Taking the analysis of cash flow as the basis of mergers and acquisitions performance evaluation and the mergers and acquisitions transactions of listed companies from 2003 to 2005 as empirical analysis samples, MA Haifeng (2009) confirmed that managerialism, free cash flow hypothesis, and private holding have specific explanatory ability to mergers and acquisitions performance. As a result, hypothesis 2 is proposed

[H2]: the level of cash flow is positively related to corporate mergers and acquisitions performance.

Cui Haiyan (2002) [10] pointed out that the most significant factors affecting mergers and acquisitions performance are "the strength of the merging parties" and "the industrial background of the merging parties"; Wang Yijia (2006) [11] uses a sample of horizontal mergers and acquisitions that occurred in China in 2000, concluded that the significance of the mergers and acquisitions affect was affected by factors such as the small size of the mergers and acquisitions. Therefore, hypothesis 3 is proposed:

[H3]: there is an effect of firm size and mergers and acquisitions size on firm mergers and acquisitions performance.

Apart from that, many factors have an impact on the performance of corporate Mergers and Acquisitions. This paper mainly explores the impact of management innovation capability on corporate mergers and acquisitions performance. For example, Zhao Denghua [12] defined management innovation as various innovations other than technological innovation, such as

institutional innovation, organizational innovation, conceptual innovation, and strategic innovation. Chen Shenglin [13] discussed the basic principles of management innovation. Shi Shixin [14] believed that management innovation is a qualitative leap in the concept and way of enterprise management. Based on the collation of relevant literature, we select representative indicators as a reference, considering expert opinions and our understanding of management innovation capability. Under the principle of following the evaluation indicators in this paper,

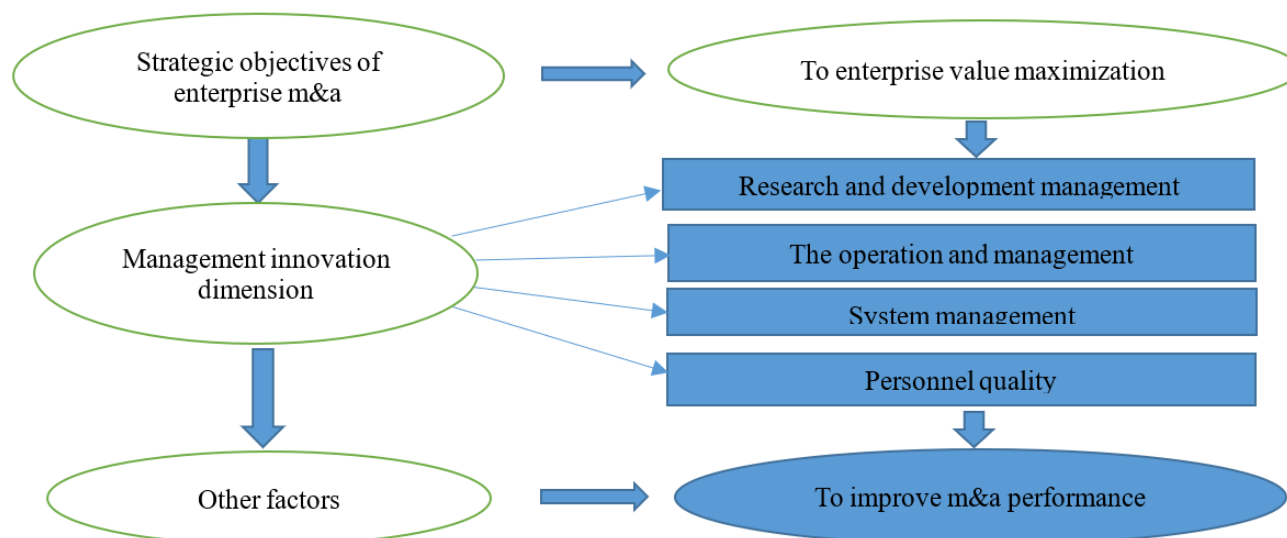


Figure 1 Theoretical framework

initially select four primary indicators of research and index system of management innovation capability is based on two considerations. On the one hand, development management, operation management, system management, and indicators in the evaluation enterprises lack personnel quality and 12 secondary indicators from the evaluation indicators about management innovation capability. This study does not include corporate culture corresponding mechanisms and measurement standards for measuring corporate culture indicators. On the other hand, the core of management innovation is people-oriented, which is integrated into four elements of research and development management, operation management, system management, and personnel quality, that is, all four elements have a certain level of evaluation for corporate culture. On the other hand, the core of management innovation is people-oriented.

Finally, combining with previous studies, we construct a multi-dimensional index system for measuring mergers and acquisitions performance from four aspects: operation management, corporate governance, research and development management, and personnel quality, specifically: research and development management (F1) includes research and development expenditure intensity (x1) and research and development personnel investment intensity (x2); operation management (F2) includes management expense contribution ratio (x3), total asset turnover ratio (x4) and sales expense contribution ratio (x5); corporate governance (F3) includes equity concentration CR index (x6), equity system Z index (x7) and corporate governance structure (x8); personnel quality (F4) includes the percentage of skilled labor (x9) and the percentage of bachelor degree and above (x10).

2.2 Model Principle

2.2.1 Management Innovation Capability Measure

Many methods are used to calculate weights: principal component analysis, expert rating method, hierarchical analysis, entropy method, etc. In addition to these, there are some practical, comprehensive evaluation methods, such as gray correlation and fuzzy comprehensive evaluation. This paper uses a combination of independence weights and information weights to calculate the weights. The advantage of this combination method is that the two methods themselves have natural complementarity, which can measure the volatility of indicators while reflecting the conflict between

indicators so that the importance degree of indicators can be calculated more objectively. After assigning weights, the TOPSIS method calculates the management innovation capability index. Specifically, the TOPSIS method is used to study the sequential selection technique of similarity with the ideal solution, which is commonly understood. It means that the data size has a superior and inferior relationship. There larger the dating superior and the smaller the dating inferior, so the optimal and inferior solutions are identified by combining the sizes of the data, and then the weights are calculated. The final judgment of the superiority of the data is made.

Step 1: Prepare and homogenize the data. All data need to be homo-trended, i.e., let all data be expressed as the larger the number, the better (if, the larger the number of an indicator item, the worse it is).

Step 2: The data normalization process solves the magnitude problem.

Step 3: Find the optimal and inferior matrix vectors.

Step 4: Calculate the distance D^+ or the distance D^- between the evaluation object and the optimal solution, respectively. By the formula

$$d_i^* = \sqrt{\sum_{j=1}^n (x_{ij} - x_j^*)^2} \quad i=1,2,\dots,m. \quad (1)$$

$$d_i^0 = \sqrt{\sum_{j=1}^n (x_{ij} - x_j^0)^2} \quad ,i=1,2,\dots,m \quad (2)$$

can be obtained.

Step 5: From the formula

$$C_i^* = d_i^0 / (d_i^0 + d_i^*) \quad i=1,2,\dots,m \quad (3)$$

we can get the management innovation capability.

2.2.2 Regression model design

In exploring the role of management innovation capability on firm Mergers and Acquisitions performance, in addition to management innovation capability (GB), existing studies suggest that operating cash flow (operating cash flow/total assets; (OCF)), firm size (natural logarithm of a firm's total asset size; (ESIZE)), and Mergers and Acquisitions size (Mergers and Acquisitions transaction value/total assets at the end of the year; (TSIZE)) also and there are interactions between the control variables. Then, a robust linear regression equation model was constructed using mixed cross-section data, and model parameters were estimated, as shown in EQ4-7. In addition, we control both the individual and the time.

$$PMA1 = \beta_0 + \beta_1 MIA + \beta_2 OCF + \beta_3 ESIZE + \beta_4 TSIZE + \beta_5 OCF * ESIZE + \beta_6 OCF * TSIZE + \beta_7 ESIZE * TSIZE + \varepsilon; \quad (4)$$

$$PMA2 = \beta_0 + \beta_1 MIA + \beta_2 OCF + \beta_3 ESIZE + \beta_4 TSIZE + \beta_5 OCF * ESIZE + \beta_6 OCF * TSIZE + \beta_7 ESIZE * TSIZE + \varepsilon; \quad (5)$$

$$PMA3 = \beta_0 + \beta_1 MIA + \beta_2 OCF + \beta_3 ESIZE + \beta_4 TSIZE + \beta_5 OCF * ESIZE + \beta_6 OCF * TSIZE + \beta_7 ESIZE * TSIZE + \varepsilon; \quad (6)$$

$$PMA4 = \beta_0 + \beta_1 MIA + \beta_2 OCF + \beta_3 ESIZE + \beta_4 TSIZE + \beta_5 OCF * ESIZE + \beta_6 OCF * TSIZE + \beta_7 ESIZE * TSIZE + \varepsilon, \quad (7)$$

Where β_0 is the model constant, β_1 is the coefficient of the explanatory variable, $\beta_2 \sim \beta_4$ is the coefficient of the control variable, and $\beta_5 \sim \beta_7$ is the coefficient of the interaction term of the control variable; ε is the residual term. It is set the corporate Mergers and Acquisitions performance PMA1, and this paper uses the average of the acquirer's return on assets (three-year average ROA) in the three years in which the Mergers and Acquisitions occur minus the difference of the previous year's return on assets (ROA), ΔROA , as the corporate Mergers and Acquisitions performance. To truly

reflect the correctness of the model's assumptions, we also construct three other sets of models for consistency testing. Specifically, PMA1 represents the average of the acquirer's return on assets (three-year average ROA) minus the difference between the previous year's ROA Δ ROA. PMA2 represents the average of the acquirer's return on assets (three-year average ROA) minus the relative difference of the previous year's ROA Δ ROA. PMA3 represents the difference between the acquirer's return on assets in the first year of the acquisition minus the previous year's return on assets Δ ROA. PMA4 represents the relative number of the acquirer's return on assets in the first year of the acquisition minus the difference between the previous year's return on assets Δ ROA.

3. Empirical Analysis

3.1 Data sources and pre-processing

The variable data are mainly obtained from CSMAR, WIND database, and relevant annual reports. This paper uses 75 listed companies in which mergers and acquisitions occurred in 2017 as the initial sample. Enterprises listed for less than 3 years, ST enterprises with abnormal operating performance losses, and samples with abnormal financial data or financial reports were excluded. While financial and real estate enterprises with evident industry specificity and samples with missing key data were excluded, missing value processing using the interpolation fill method and outlier analysis were conducted, resulting in the remaining 75 research samples.

3.2 Enterprise management innovation capability measurement based on the combined weight topsis method

From Table 1, it can be obtained that in the management innovation capability measure of the company, the largest weight is given to operation management, which is 0.2953. followed by research and development management, then personnel quality and the one with the smallest weight is corporate governance. Therefore, to improve enterprises' management innovation capability, we can mainly start by improving the company's contribution ratio of management expenses, total asset turnover ratio, and contribution ratio of sales expenses. Where: W is the criterion layer factor weight; W1 is the weight of information amount; W2 is independent weight; W3 is the combined weight.

Table 1 measurement weights

index	W	item	W1	W2	W3
F1	0.2953	X1	10.90%	8.22%	0.0878
		X2	11.23%	18.86%	0.2075
		X3	14.38%	8.68%	0.1223
F2	0.4122	X4	6.39%	13.23%	0.2070
		X5	20.87%	10.12%	0.0829
		X6	5.45%	8.30%	0.0443
F3	0.1366	X7	9.79%	8.26%	0.0793
		X8	1.69%	7.83%	0.0130
F4	0.1558	X9	9.43%	8.45%	0.0781
		X10	9.86%	8.04%	0.0777

3.3 Analysis of factors influencing corporate mergers and acquisitions performance

3.3.1 Descriptive statistics

Using SPSS for the experiments shows the results of the descriptive statistics in Table 2, where OCF and TSIZE are the results after scaling the data outline. After statistical analysis of the minimum, the maximum, mean and standard deviation of the control variables, it was found that the standard deviations of both firm size and mergers and acquisitions size were small, indicating the similarity of

the selected firms and making the analysis results generalizable. In addition, the standard deviation of the post-merger performance of enterprises (average return on assets three years after mergers and acquisitions - return on assets one year before mergers and acquisitions) is large, which indicates that the overall volatility of the enterprises' effectiveness in the period after mergers and acquisitions is high, with the possibility of both upward or downward movement and a larger magnitude. Since OCF, TSIZE, and other indicators have large differences in magnitudes. We use the magnitudes here to treat them in the appropriate proportions.

Table 2 Descriptive statistics results

index	N	Min	Max	Mean	std
Δ ROA	75	-46.76	18.546	-5.913	12.383
OCF	75	-4.709	8.075	3.900	1.517
ESIZE	75	8.634	11.52	9.772	0.567
TSIZE	75	4.526	8.195	1.413	1.720

3.3.2 Regression analysis results

The results are shown in Table 3. According to the overall regression results, it can be seen that management innovation ability has a significant positive correlation with the performance of Mergers and Acquisitions, which indicates that management efficiency and the degree of integration of resources have the most fundamental and direct impact on the improvement of enterprise performance. Innovation ability is the core competitiveness of enterprises, and management innovation is paramount. High-efficiency management can better reduce costs, increase efficiency, and improve the operating efficiency of enterprises. From the local analysis, the coefficient of the interaction term between enterprise size and mergers and acquisitions scale is positive, which indicates that enterprise size has a positive moderating effect on mergers and acquisitions scale, and a larger enterprise size is conducive to expanding mergers and acquisitions scale. In addition, operating cash flow is positively correlated with corporate mergers and acquisitions performance, while corporate size and mergers and acquisitions scale are significantly negatively correlated, which challenges corporate mergers and acquisitions decisions and motivates management to make prudent decisions and allocate resources rationally.

Table 3 Regression results

Variables	PMA1	PMA2
GB	0.0839*** (20.684)	0.1747*** (15.616)
OCF	2.3667*** (18.503)	5.3345*** (13.047)
ESIZE	-0.3460*** (-18.234)	-1.1010*** (-16.844)
TSIZE	-4.8585*** (-13.547)	-10.3544*** (-14.102)
OCF*ESIZE	-0.0411*** (-8.896)	-0.0924*** (-7.252)
ESIZE*TSIZE	4.9125*** (13.631)	10.7982*** (13.855)
OCF*TSIZE	-2.0503*** (-18.191)	-4.6481*** (-13.369)
firm	control	control
Year	control	control

Variables	PMA3	PMA4
GB	0.0104** (2.438)	0.1061*** (2.467)
OCF	2.3704*** (26.953)	1.8333*** (4.488)
ESIZE	-0.4880*** (-120.716)	-0.5484*** (-7.311)
TSIZE	-5.7516*** (-40.034)	-13.5584*** (-16.249)
OCF*ESIZE	-0.0462*** (-23.355)	-0.0417*** (-2.548)
ESIZE*TSIZE	5.8186** (39.940)	13.8825*** (15.977)
OCF*TSIZE	-2.0912*** (-23.908)	-1.6281*** (-4.552)
firm	control	control
Year	control	control

Generally, enterprises face integration work after Mergers and Acquisitions, and the financial data in the year of mergers and acquisitions are volatile. Usually, the operation is relatively stable in the first year after Mergers and Acquisitions, and the effect of mergers and acquisitions gradually appears. Therefore, the difference between ROA in the first year after mergers acquisitions, ROA in the year before mergers and acquisitions are used as PMA, and the variables in the previous model are replaced, and regression analysis is conducted. The results are shown in Table 3, showing that the management innovation ability still has a significant positive correlation with the performance of mergers and acquisitions. The correlation between the control variables and interaction terms and the mergers and acquisitions performance remains unchanged, proving the model's robustness. It also proves that the results of the previous argument are reliable.

4. Conclusion and Discussion

mergers and acquisitions are effective ways for companies to expand their scale and improve their industry competitiveness rapidly. From a capital perspective, the factors influencing mergers and acquisitions performance are not limited to short-term financial benefits. The market is constantly changing, and the factors that affect mergers and acquisitions performance vary at each stage. For this reason, there is a strong need to conduct a comprehensive assessment of corporate mergers and acquisitions performance. In this paper, we combine previous related studies to comprehensively evaluate and analyze the degree of influence of management innovation capability on mergers and acquisitions performance based on the TOPSIS portfolio weighting method with the help of empirical studies. The study results show that management innovation capability is significantly and positively related to mergers and acquisitions performance. Management innovation capability is an inevitable requirement for enterprise development, which can be carried out in the following five aspects: management thinking, organizational structure, management methods and approaches, management mode, and institutional innovation, through which resources can be integrated more effectively, and the effect of improving mergers and acquisitions performance can also be achieved.

According to the research made in this paper, a few suggestions are made to improve corporate performance. (1) attention should be paid to the financial situation of the mergers and acquisitions companies, and effective risk control strategies and appropriate financial management models should be adopted to lay a solid foundation for the mergers and acquisitions process while enhancing the competitive advantage of the companies. (2) We should pay attention to innovation investment after Mergers and Acquisitions, whether technological innovation capability or management innovation

capability and not pursue enterprise scale expansion too much to improve enterprise performance positively. Admittedly, there are still shortcomings in this paper. The external market environment faced by enterprises is always in the process of continuous change, and the selection of evaluation indexes and the determination of weights need to be updated and adjusted in the light of the actual situation in the development process in order to establish a perfect scientific evaluation system, which deserves further research and discussion.

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