Research on M&A Performance of Listed Companies in Internet Industry Based on Engineering Management

Ning Cui

1School of economics and management, Beijing Jiaotong University, Haidian district, Beijing, 100044, China

*Corresponding author’s email: cnlh0823@163.com

Abstract. In recent years, the in-depth application of the Internet and other new generation of information technology in the engineering construction industry has given birth to the intelligent construction platform mode in the Internet era. Under this new model, the organization mode, operation mode and management mode of the existing project construction have undergone profound changes. Therefore, exploring the development of Internet industry is of great significance to project management. This paper selects 36 independent companies in Internet industry during the M&A announcement period in 2014 as research samples. Then it uses accounting research method and constructs the financial index system in order to compare the comprehensive performance of companies in the short term. The empirical research draws the following conclusions: First, M&A activity has not significantly promoted the performance of Internet industry companies. Second, different types of M&A produce different effects. Mixed M&A are more beneficial to the improvement of the performance of companies in the Internet industry. Finally, combined with the empirical results, this paper proposes suggestions for M&A activities of listed companies in the Internet industry from the government and enterprise levels.

1. Introduction

Mergers and acquisitions (M&A) are a major strategic measure for enterprises to expand their scale and achieve long-term development. In China, with the concept of the supply-side reform and economic transformation and upgrading proposed in recent years, the development of the domestic M&A transaction market has gradually accelerated. The transaction scale has generally shown an overall growth trend, which has greatly promoted the rapid development of China's social economy.

Among numerous industries, the number of enterprises in the Internet industry has also shown an obvious growth trend, and the competition is becoming increasingly fierce. Therefore, integration and M&A have become the key words for the development of this industry in recent years, so as to optimize the company's corporate structure and social resource allocation, and increase the core competitive advantage. According to the consolidation and statistics of China's 2013-2017 M&A data, there were 3,313 M&A in the Internet industry, second only to those in the industrial sector. And the amount involved is 12,955,873 yuan, accounting for a large proportion of the total amount of M&A. Therefore, this paper focus on the listed companies in the Internet industry as the research object and analyzes the impact of M&A events on the comprehensive performance of listed companies.

The next article is divided into four parts. Section 2 is to summarize and comment on the research status at home and abroad. Section 3 is the empirical process, including hypothesis, data collection, sample selection and research design. Section 4 is mainly to analyze the empirical results. Section 5 is the conclusion of the study and related recommendations.
2. Literature review
The research on M&A performance at home and abroad is mainly divided into short-term performance research and long-term performance research. Most of the research shows that there is no obvious promotion of the performance of M&A entities in the short term due to the need for more time or other unstable factors after M&A integration. However, in the long term, M&A activity has a significant effect on corporate performance improvement. In 2016, Rekha and Julie studied M&A activities in ASEAN countries and collected financial indicators from 2001 to 2012 to observe changes in performance before and after mergers and acquisitions. As a result, in the three years after the merger, the adjusted operating results of M&A activities generally showed a downward trend [1].

In terms of research methods, the scholars at home and abroad mainly adopt event research method and accounting research method. But the conclusions obtained by the two methods may not be consistent. Arvanitis and Stucki (2012) used accounting research method to analyze the post-merger performance changes and the impact on various economic performance indicators. Three of the five key performance indicators used in the empirical study reflect that M&A has a significant positive impact on firm performance [2]. Zhang Benzha and Sheng Qianwen (2017) selected 55 Internet finance companies as research samples and They used the event research method to calculate the average return rate and cumulative abnormal return rate of the sample enterprises. The results showed that the overall performance of the sample company is fully improved in the short term [3]. The event research method is based on the assumption of effective capital market. But China's capital market has not yet matured. There are many uncertain factors and the effectiveness has not yet reached the standard. Therefore, this paper chooses the accounting research method for empirical research.

3. Hypothesis, data, sample selection and research design

3.1. Primary hypothesis
According to the M&A performance theory, M&A transactions can improve the market share, reduce transaction costs and agency problems between management and owners. It is beneficial to achieve partial or overall improvement in terms of operation, management and finance. But the conceited hypothesis (Roll, 1986) argues that management may have misunderstandings about M&A activity because of overconfidence, and then make wrong decisions [4]. In addition, domestic scholars' understanding of M&A performance is not consistent. Pang Qi and Zhang Jianping (2015) believe that corporate performance will be improved in the short term due to M&A activities [5], while Li Siyong and Zhang Jing (2017) believe that the merger of Chinese bosses in the short term did not reach the expected state [6]. Therefore, this paper propose a competitive hypothesis:

H1a: M&A activities have contributed to the improvement of short-term performance of listed companies in the Internet industry.

H1b: M&A activities have no significant effect on the short-term performance improvement of listed companies in the Internet industry.

From the perspective of different industries, the role of different M&A types varies from one to another depending on the path of action. According to the development characteristics of the Internet industry, horizontal M&A and vertical M&A may cause employees to stick to the rules and poor work enthusiasm for innovation. As a result, investment in technology research and development has increased, and performance has decreased. By contrast, mixed M&A can expand the scope of business, thereby popularizing the application of Internet technology in many business areas, or gaining more flexible funds and benefits in other business areas. Therefore, mixed M&A can promote the development of enterprises to a certain extent. Therefore, this paper proposes hypothesis 2:

H2: Compared with horizontal M&A and vertical M&A, hybrid M&A are more beneficial to the short-term performance improvement of Internet industry companies.
3.2. Data and sample selection
This paper takes listed companies in the Internet industry with M&A transactions in 2014 of Shenzhen stock exchange and Shanghai stock exchange as the original research samples, and the research window is from 2013 to 2016. The sample screening conditions are as follows: a. The company that has completed the merger and acquisition, and the amount of the merger is more than 10 million yuan. b. The control of the target company has changed. c. The financial data of the sample company during the study period is complete and available. d. Excluding ST and *ST companies. e. Excluding companies that frequently make multiple M&A transactions during the study period. f. A company that has had multiple M&As in the same year, taking the largest M&A event.

Finally, a total of 36 listed companies in the Internet industry were identified as research samples. According to the type of M&A, 23 horizontal M&A, 6 vertical M&A, and 7 M&A. All data comes from the Wind database and is collected manually.

3.3. Research design
Table 1. Comprehensive financial index system

| Types          | Financial index       | Financial index   | Financial index |
|----------------|-----------------------|-------------------|-----------------|
| Profitability  | ROA                   | Periodic Cost Ratio| X1              |
|                | ROE                   | Management ability | X2              |
|                | Net Profit Margin on Sales | Debit- paying | X3              |
|                | EPS                   | Quick Ratio       | X4              |
|                | Cash Flow per Share   | Debt Asset Ratio  | X5              |
| Operating      | Receivables Turnover Ratio | Development | X11             |
| ability        | Inventory Turnover Ratio | Operating Income Growth Rate | X12             |
|                | Total Assets Turnover Ratio | Equity Capital Growth Rate | X13             |

Based on the “Detailed Operational Rules for Enterprise Performance Evaluation” issued by the National Ministry of Foreign Affairs in 2017 and the method which was applied by Li Shanmin and Li Heng (2003) [7], this paper selects 16 financial indicators to build an evaluation system for M&A performance, as shown in Table 1.

In this paper, SPSS 22.0 is used to reduce the dimension of 16 original variables into a few common factors by factor analysis, so as to reduce the correlation between independent variables. First, the feasibility test of factor analysis is carried out. The test results showed that the KMO in each year is greater than 0.5, and the sig. value in Bartlett sphericity test is all 0, proving that the data come from the normally distributed population and meet the necessary conditions of factor analysis.

And by testing the commonality of the variables, the results show that the commonalities of all variables are above 55.2%, and 56.25% of the variables have a commonality close to or exceed 90%. This proves that the common factor to be extracted can explain the variables to a large extent.

Table 2. Statistical table of total variance interpretation (rotate the sum of squares to load)

| Year | 2014 | 2015 | 2016 | 2017 |
|------|------|------|------|------|
|      | total | var % | total | var % | total | var % | total | var % |
| 1    | 3.847 | 24.044 | 3.569 | 22.309 | 3.951 | 24.694 | 3.327 | 20.791 |
| 2    | 3.306 | 20.661 | 3.149 | 19.680 | 3.376 | 21.100 | 3.268 | 20.424 |
| 3    | 2.047 | 12.794 | 2.663 | 16.642 | 2.758 | 17.239 | 2.641 | 16.505 |
| 4    | 1.546 | 9.665  | 2.043 | 12.768 | 1.850 | 11.564 | 1.403 | 8.768  |
| 5    | 1.379 | 8.618  | 1.682 | 10.513 | 1.165 | 7.282  | 1.261 | 7.881  |
| cum var % | 75.781 | 81.911 | 81.879 | 74.369 |

And table 2 shows that the cumulative variance contribution rate of the first five components in each period are all greater than 70%. This indicates that these five components have a higher degree of interpretation of the original data, so the first five components are extracted as common factors.
Financial performance may decline. There summary, the financial situation of the year of merger and acquisition may not be improved, and even proportion has not reached the expected level. Moreover, the number of companies with improved performance is less than the number of companies with deteriorating performance.

As can be seen from the above table:

| Comp1 | Comp 2 | Comp 3 | Comp 4 | Comp 5 |
|-------|--------|--------|--------|--------|
| X1    | 0.881  | 0.290  | -0.022 | -0.171 | 0.088  |
| X2    | 0.919  | 0.053  | -0.124 | -0.094 | 0.116  |
| X3    | 0.549  | 0.594  | -0.360 | -0.093 | 0.157  |
| X4    | 0.924  | 0.173  | -0.013 | 0.114  | 0.119  |
| X5    | 0.719  | -0.001 | 0.174  | 0.177  | -0.182 |
| X6    | 0.006  | 0.093  | -0.937 | 0.113  | -0.123 |
| X7    | 0.273  | -0.340 | 0.858  | -0.043 | -0.027 |
| X8    | 0.156  | 0.942  | -0.141 | 0.012  | -0.059 |

After the maximum variance method is used for rotation, ROA, ROE, net profit margin on sales, EPS and cash flow per share have a large proportion in component 1. Current ratio, quick ratio and debt-asset ratio have a large proportion in component 2. Periodic cost ratio and operating profit ratio have a large proportion in component 3. Receivable turnover ratio, inventory turnover ratio and total assets turnover ratio have a large proportion in component 4. Operating income growth rate, equity capital growth rate and net profit growth rate have a large proportion in component 5. Therefore, component 1 is defined as profit factor, component 2 as debt-paying factor, component 3 as management factor, component 4 as operation factor, and component 5 as development factor.

Then, according to the component score coefficient matrix, $X_i$ is represented by a linear combination of factor scores $f_i$, thereby obtaining a score of the factor variable $F_i$. Finally, the formula of the comprehensive performance score function is obtained by taking the ratio of the variance of the factor after rotation to the total variance as the weight.

$$F_{(2013)}=(24.044f_1+20.661f_2+12.794f_3+9.665f_4+8.618f_5)/75.781$$

$$F_{(2014)}=(22.309f_1+19.680f_2+16.642f_3+12.768f_4+10.512f_5)/81.911$$

$$F_{(2015)}=(24.694f_1+21.100f_2+17.239f_3+11.564f_4+7.282f_5)/81.879$$

$$F_{(2016)}=(20.791f_1+20.424f_2+16.505f_3+8.768f_4+7.881f_5)/74.369$$

### 4.1. Corporate performance analysis of the sample as a whole

#### 4.1.1. Statistical analysis of the differences in company performance scores for each year \((t=2014)\)

| $\delta>0$ | $\delta<0$ | mean     |
|------------|------------|----------|
| $F_{(t)}$ | $F_{(t+1)}$ | $F_{(t)}$ | $F_{(t+1)}$ | $F_{(t+1)}$ | $F_{(t+1)}$ | $F_{(t+2)}$ | $F_{(t+2)}$ | $F_{(t+2)}$ | $F_{(t+2)}$ |
| \delta>0 | 41.67      | 55.56    | 47.22    | 44.44    | 55.56    | 52.78    |
| \delta<0 | 58.33      | 44.44    | 52.78    | 55.56    | 44.44    | 47.22    |
| mean      | -1.15E-07  | 5.92E-08 | -5.58E-08 | -4.76E-07 | -4.17E-07 | -5.32E-07 |

As can be seen from the above table: First, the number of companies with improved performance in the year of mergers and acquisitions is less than the number of companies with deteriorating performance. Second, the number of companies whose performance has improved in the first year after M&A. However, compared with the year before the merger, the number of companies with improved performance is only 17, indicating that the first year of M&A has only a slight promotion effect on the company’s performance. Third, compared with the year of M&A and the year before the merger, more than half of the companies in the second year after the merger have improved their performance, but the proportion has not reached the expected level. Moreover, the number of companies with reduced performance exceeds those with improved performance compared to the first year after the merger. In summary, the financial situation of the year of merger and acquisition may not be improved, and even financial performance may decline. Therefore, $H_{1b}$ is verified.
4.2. Corporate performance analysis under different types of M&A

| Type     | Index | $F_{0(t)}-F_{0(t)}$ | $F_{0(t)}-F_{0(t)}$ | $F_{0(t)}-F_{0(t)}$ | $F_{0(t)}-F_{0(t)}$ | $F_{0(t)}-F_{0(t)}$ |
|----------|-------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Horizontal | mean  | 0.00187             | 0.00599             | 0.00785             | -0.07233            | -0.06634            | -0.06448            |
|           | $\delta>0(\%)$ | 47.83% | 60.87% | 47.83% | 47.83% | 56.52% | 47.83% |
| Vertical  | mean  | -0.09779            | -0.13656            | -0.23434            | 0.09787             | -0.03869            | -0.13647            |
|           | $\delta>0(\%)$ | 66.67% | 66.67% | 66.67% | 83.33% | 66.67% | 66.67% |
| Mixed     | Mean  | 0.07769             | 0.09737             | 0.17506             | 0.15376             | 0.25113             | 0.32882             |
|           | $\delta>0(\%)$ | 28.57% | 57.14% | 57.14% | 57.14% | 71.43% | 85.71% |

It can be seen from the sign of the mean of the difference that the average performance of the listed company rises and then falls in the horizontal M&A, and then rises and in the vertical M&A it first drops and rises. Both are in an unstable change. However, the performance of listed companies under the mixed M&A method has been greatly improved after the M&A event, far exceeding the comprehensive performance before the M&A of listed companies. Moreover, the average performance of the mixed M&A is significantly higher than that of horizontal M&A and vertical M&A, and the percentage of positive value increases year by year. Therefore, according to the above analysis, different types of M&A have produced different effects. Mixed M&A is more conducive to the performance improvement of listed companies in the Internet industry. Hypothesis 2 is established.

5. Summary and conclusions

Based on the current market economy environment, this paper takes the performance of listed companies in the Internet industry as the research object, and builds a performance evaluation system to study the impact of M&A activities on the short-term performance of listed companies in the Internet industry. The study found that the performance of listed companies in the Internet industry within two years after M&A has not been significantly improved. And among different types of M&A, the positive promotion effect of mixed M&A is more significant.

Combined with the conclusions, this paper proposes the following suggestions. First, companies must make appropriate M&A strategic decisions based on their operational conditions and long-term development. Although mixed M&A are more conducive to the current development of the company in the short-term, enterprises should carefully select the type of merger based on their own needs and existing conditions in the long term. Second, companies should strengthen internal control. The owner should supervise the decision-making process of the manager and correct the deviation of the decision in time to ensure the smooth implementation of the M&A. It is beneficial to prevent the failure of the merger due to the wrong judgment. Third, the government should establish and improve the legal system related to M&A, reduce or even eliminate unfair trade practices, punish illegal M&A, and provide a standardized external environment for corporate mergers and acquisitions activities.

References

[1] Nicholson, D. R. (2016) Long-term performance of mergers and acquisitions in asean countries. J. Research in International Business & Finance, 36:373-387.

[2] Arvanitis, S., Stucki, T. (2012) Do mergers and acquisitions affect the performance of acquiring firms? evidence for swiss small- and medium-sized firms. J. Social Science Electronic Publishing, 33(7):752-773.

[3] Zhang B. Z., Sheng Q.W. (2016) Analysis on the performance of M&A of internet finance enterprises. J. Finance and Accounting Monthly, 10:46-51.

[4] Roll, R. (1986). The hubris hypothesis of corporate takeovers. Journal of Business, 59(2), 197-216.

[5] Pang Q., Zhang J.P. (2015) Research on M&A performance of listed companies based on factor analysis. J. Friends of Accounting, 17:64-68.

[6] Li S.Y., Zhang J. (2017) An empirical study on the performance of M&A of listed companies in China. J. Modern Business, 32:100-101.
[7] Li S., Li H. (2003) Research on asset restructuring performance of Chinese listed companies. J. Management World, 11:126-134.