Why Financial Performance of the Technology-based Merger and Acquisition is Counterproductive to Its Market Reaction: A Study Based On the Listed Chinese Pharmaceutical Companies

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***Abstract*--Recently, China's pharmaceutical industry is entering a period of rapid integration. The intrinsic nature of the pharmaceutical industry determines that technology and innovation is its main reason of merger and acquisition (M&A). Using a sample includes the listed Chinese pharmaceutical companies undertaking M&A in 2012, the paper finds that most of the companies announce that technology and patent are the main factors for them to acquire other companies. But such technology-based or innovation-based M&A（TM&A） only has a fleeting significant impact on profit growth and do not bring sustainable financial performance improvement; while it has a positive market reaction to the acquirers and makes their stock price improved significantly. Besides the factors about companies operation and strategy, the paper suggests that so called "market value management" of Chinese companies may be an important reason that financial performance and market reaction of the TM&A shows exactly the opposite.**

I. INTRODUCTION

Recently, China's pharmaceutical industry is entering a period of rapid integration, and merger and acquisition (M&A) is becoming the important strategy for the companies to develop their business.

In China, Pharmaceutical industry is a sunrise industry with stronger profit-earning ability. In recent years, national pharmaceutical industry keeps an average annual growth rate of 12% and has about RMB2.3 trillions Yuan output in 2014. Meanwhile, the proportion of total industrial output value in the national economy has increased from 2.35% in 2009 to 3.63% in 2014. Therefore, many non-pharmaceutical companies want to entry the industry through M&A, while many pharmaceutical companies want to snatch more resources and greater market share, to develop their technology, quality and brand advantags. So, in recent years, there are a number of M&As taken in China's pharmaceutical industry.

The particularity of the pharmaceutical industry determines the importance of R&D to its development. With the development of science and technology, the influence of patents, new technology and products on the core competence of pharmaceutical companies is becoming more and more important. However, due to the complexity of the development of new drugs and shortening of drug's life cycle, closed development and innovation has gone forever and M&As have become the effective way for companies to acquire innovative technology. Technology and innovation purpose are becoming the main causes of M&A in the pharmaceutical industry, which is looked good by the companies and the capital market. In 2012, there are 58 M&As in China's pharmaceutical industry, of which 54 companies announce that technology and innovation are the main cause and target of their M&A. On the other hand, this technology and innovation oriented M&A (TM&A) are also considered to be good news, often accompanied by the companies' stock price rose sharply in the short term.

However, does the TM&A be able to enhance the companies' technological and innovation capabilities, and then promote companies' performance and growth? The paper took the Listed Chinese pharmaceutical companies which had TM&As in 2012 as the research samples, and studied the financial performance and market reaction of such TM&As.

II. CHARACTERISTICS OF PHARMACEUTICAL INDUSTRY AND THEIR MOTIVATION OF M&AS

A. Characteristics of pharmaceutical industry

From a technical point of view, the pharmaceutical industry has the following characteristics:

(a) Different with general chemical production, its production process includes not only chemical synthesis, but also shape formation and commercialization. So, maybe a pharmaceutical company is small, but its engineering precision must high.

(b) The pharmaceutical industry is facing high competition with many fast updated. Therefore, the pharmaceutical companies should invest more in new drugs' development, and innovative technology and innovative capability is significant for their core competence.

(c) The pharmaceutical industry is high technical intensive. Because of human's attention to their health, the latest technologies are often used in the field of medicine, which requires the pharmaceutical companies pay attention to the cutting edge of the relative technology.

In China, pharmaceutical industry has maintained a rapid growth in recent years. However, the majority of pharmaceutical companies' scale are small, their production conditions is poor, and production concentration is far below the level of advanced countries, and their profitability is weak. They do invest in research and development inadequately, and lack of new products with independent intellectual property rights.

B. Motivation of M&A in Chinese pharmaceutical companies

For the acquirers, the main motivations of M&A of Chinese pharmaceutical companies are set out as follows.

(1) Innovative technology and patent protection. The survival and development of pharmaceutical companies depends on whether they can develop new drugs persistently. But the cycle of drug's research and development is long, needing high capital investment, so the companies usually are taking high risks, which is difficult to bear for many small and medium companies. On the other hand, patent protection can make the pharmaceutical companies with patent to gain the monopoly profit, while other companies can not product and sale such drug with no license. So, M&A has become a common way for pharmaceutical companies to gain innovative technologies and patent licenses.

(2) Market expansion. In China, the market-access system of pharmaceutical industry is stringent; and there also has a specific breakdown of the different drug markets in which leading companies occupy the larger market share. So, M&A is a shortcut for the companies to enter the pharmaceutical industry or a special market segment, and expand market share or open up new market.

(3) Diversification strategy. Diversification can reduce the operation risk. Broad product distribution with more drug kinds and medical field can spread risk. M&A is also a convenient way to enrich company's production line and carry out diversified strategy.

In the all of the motivations, obtaining innovative technology and patent licenses is the main motivation for the Chinese pharmaceutical companies to conduct M&A. As Fig. 1 shows, in the 92 Chinese pharmaceutical companies' M&As from 2012 to 2014, 88 companies announce that technology and patent are the main factors when they acquire other companies.

III. PHARMACEUTICAL COMPANIES FINANCIAL PERFORMANCE AFTER TM&A: HAVE SYNERGISTIC EFFECT THERE?

A. Literature review

A company can obtain new technology and product through internal development and external acquisition. Nowadays, within the new competitive situation which D'Aveni named "hypercompetition" [23], there's no firm can build sustainable competitive advantage through one single innovation [7, 9, 22].

In most cases, the target of a company's TM&A is improving its technology capability and formatting innovation synergy effect. Chakrabarti and Hagedoorn[6], Sevilir and Tian[24] find there's a positive relation between M&A activity of a firm and its subsequent innovation outcome, acquiring innovation and obtaining synergy effect from the combination of innovation capability is an important motive for undertaking M&A[4]. In specifically, such synergy effect in M&A can derive from new products [17], increasing of innovation capability because of increasing of R&D investment [16], or lowering R&D cost through acquiring small innovative companies [18], and so on.

In China, the synergy effect of Technology M&A hasn't reached a consensus. Synergy is the main motivation for TM&A. Through TM&A, acquisition can obtain the technology of the target company[21], realize R&D cooperation, and complete production chain [3]. Wen and Liu find that TM&A has a positive effect on company's innovation performance while non-TM&A hasn't [26]. Yu and Shi suggest that the effect of TM&A on company's financial performance is uncertain[28]. Cheng et al. find that M&A can increase acquired company's R&D personnel, but can't promote its R&D intensity and patents[8]. Fang and Song consider that the technology obtained from outside is less likely the core technology, so it is difficult for the company form its own core competence through TM&A[12].

B. Does Chinese pharmaceutical companies have high financial performance after TM&A?

Do TM&A improve the companies' performance and growth capability? There isn't a consistent conclusion. So the paper takes the Listed Chinese pharmaceutical companies which have TM&A in 2012 as the research sample. According to the companies M&A announcement, there's 58 M&As of the pharmaceutical companies, while 54 of them are claimed that their main target of M&A are technology and innovation. One company has delisted, since some of them undertake more than one M&A in 2012, so the effective sample includes 42 companies. We then compare their financial performance before and after M&A.

In detail, the paper select 11 frequently-used performance indexes, which include Basic earnings per share (BEPS), net profit (NProf), net profit growth rate (NPGRate), operating income (OIncome), total operating income growth rate (OIGRate), net assets per share (NAPS), return on net assets (ROA), equity multiplier (EMult), return on sales (ROS), inventory turnover (ITurn) and total assets turnover ratio (TATurn). The results of means comparison are shown in table 1.

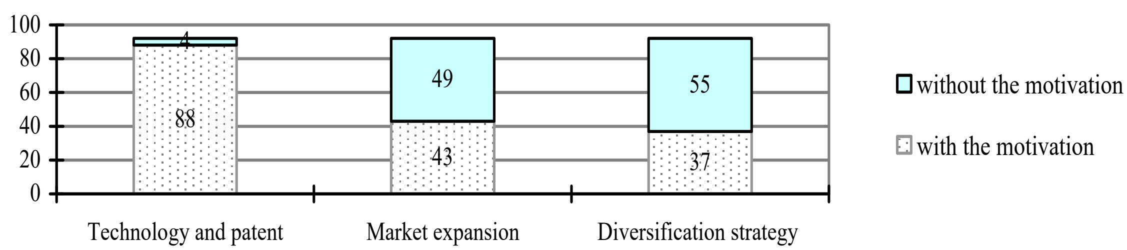

Figure 1. The motivation of Chinese pharmaceutical companies' M&A

TABLE 1. THE RESULTS OF MEANS COMPARISON

variable	Means		Mean Difference
	Before TM&A	After TM&A	
BEPS	0.4801	0.4207	0.0594
NProf	154443053.4107	240441604.4555	-85998551.0447
NPGRate	**16.2568**	**118.5642**	**-102.3075***
OIncome	2043366025.4352	3759512671.3214	-1716146645.8860
OIGRate	19.8470	23.81699	-3.9699
NAPS	5.1004	5.7496	-0.6492
ROA	**10.7390**	**7.6496**	**3.0894*****
EMult	1.8170	1.8285	-0.0115
NSRate	16.5724	12.5895	3.9830
ITurn	2.6140	2.5653	0.0487
TATurn	0.4961	0.2583	0.0423

Before and after TM&A means two years before TM&A and two years after TM&A
*p<0.1, **p<0.05, *** p<0.01. The same below.

According to table 1, the net profit growth rate (NPGRate) after TM&A is a weak little higher than before TM&A, while ROA after TM&A is strong larger than that after TM&A. Other nine indexes are no significant difference between before and after TM&A. That is, TM&A does not make the financial performance improving observably, which is not consistent with the aim of TM&A.

In order to verify this conclusion, this paper does another analysis to test TM&A's impact on the financial performance. In detail, the paper conducts factor analysis to reduce indexes, and then does a set of multiple comparisons of extracted common factors every six months after TM&A.

The results of factors show that there are four common factors (table 2).

TABLE 2. COMMON FACTORS AND THE ITEMS FACTOR INCLUDE

Factors	Items
Operation capacity	EMult, Iturn, TATurn
Earnings quality	BEPS, ROE, ROS
Profitability	NAPS, NProf, Oincome
Growth ability	NPGRate, OIGRate

The first common factor relates to equity multiplier (EMult), inventory turnover (ITurn) and total assets turnover ratio (TATurn), which represent the operation capacity. Factor 2, which relates to basic earnings per share (BEPS), return on sales (ROS) and return on net assets (ROA) can be classified as earning quality. Factor 3 represent the information of net assets per share (NAPS), net profit (NProf) and operating income (OIncome) which on behalf of company's profitability, while the last factor on behalf of company's growth ability which includes the information of net profit growth rate (NPGRate), total operating income growth rate (OIGRate). Such four extracted are used to construct a comprehensive financial performance. Then, a set of multiple comparisons of the comprehensive financial performance means have been take and the results are shown in table 3.

According to the table 3, we can find, at half a year after TM&A, the acquirers have a significant improvement of their comprehensive financial performance, and company with a sudden drop in the next six months. One year after TM&A, the acquirers' comprehensive financial performance is lower than that of before TM&A.

TABLE 3. COMPARISONS OF COMPREHENSIVE FINANCIAL PERFORMANCE'S MEANS

Variable	Means		Mean Difference
	Before TM&A	After TM&A	
Half a year after	**0.0626**	**0.1769**	**0.1143*****
One year after	**0.0626**	**0.0165**	**-0.0461*****
One and a half years after	0.0626	0.0598	-0.0028
Two years after	0.0626	0.0155	-0.0471

There are no significant differences of comprehensive financial performance between before with half a year after TM&A, and with one year after TM&A.

C. A brief summary

The paper test the means difference before and after TM&A through 2 steps.

Step 1, 11 frequently-used performance indexes are compared, and the there's only one index (Net profit) has improved, no other indexes improve significantly, while ROA dropt significantly.

Step 2, the paper constructs a comprehensive financial performance using factor analysis based on the above 11 indexes and takes a multiple comparisons every six month after TM&A. The constructed comprehensive index improved significantly in half a year after TM&A and then drop sharply in the next six months.

In summary, TM&A only has a fleeting significant impact on profit growth; it cannot bring sustainable financial performance improvement. This result goes against to acquires' initial object they delivered in their acquisition announcements.

IV. HOW DOES THE CAPITAL MARKET RESPONSE?

A. Market reaction to the Technology-based Merger and Acquisition

In order to research the reaction of the capital market, an event study is conducted and the average abnormal returns (AAR) and cumulative abnormal returns (CAR) are calculated in a period of (-5, 5) around the TM&A announcement. The result of event study is shown in Fig. 2.

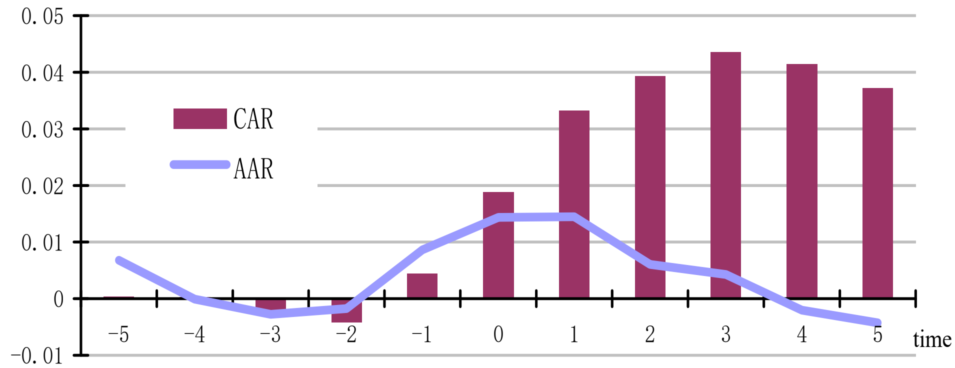

Figure 2. The market reaction to the TM&A

As can be seen from the above figure, the average abnormal returns (AAR) and cumulative abnormal returns improve from one day before TM&A announcement to one day after TM&A announcement. That is, the investors in the capital market regard TM&A as a good news of the acquirers.

B. Why Financial Performance of the Technology-based Merger and Acquisition is counterproductive to its Market Reaction?

Event study suggests that TM&A has a positive market reaction to the acquirers and makes their stock price improved significantly, while the T test of the acquires' financial performance of two years before and after M&A suggests that TM&A has a short-term financial performance effect along with significant fall then. There may be two reasons.

(a) Fulfilling M&A is just one step of M&A. Success of M&A is affected by several factors from before to after M&A[27]. According to existing researches, the certain relevancy of original and acquired technology and knowledge [1, 2, 14], company's existing knowledge and absorptive capacity[10, 11], organizational acquisition experience[5, 15, 19], and complementarily of the technology ability, knowledge and market capacity[28] and so on.

(b) The another reason is the so called "market value management" of Chinese companies. In China, it is common for the big shareholders and top management cash in on a share price soared. As insiders, big shareholders and top management in a company have much more accurate and timely information about the company, and can make more accurate judgment of the company's performance and growth. Therefore, they can not only accurately choose time to reduce their shares, they may also induce investor sentiment through positive earnings management and affect investors' judgment of the company and overvalue company's stock, which creating a share reducing opportunity for the big shareholders and top management to cash in [29]. So it is in M&A. though M&A cannot significantly increase the value in the long run, it can increase the value of Companies in the short run [20]. As the M&A processing, the stock price always go high in much time, and then big shareholders and top management have chance to reduce their shares and cash. The so-called "based on technology" may be just another means to induce investor sentiment.

V. CONCLUSIONS

After internal R&D, TM&A is the first and most important sources of technology (Granstrand, et al, 1994), and has become an important channel for the companies to achieve technological leapfrogging, improve their core competence (Xie, et al., 2011). The paper studies the financial performance and market reaction of TM&A, and obtains the following conclusions.

(a) Innovative technology and patent protection, market expansion, diversification strategy are the main motivations for Chinese pharmaceutical companies to undertaking M&A. In three of them, obtaining innovative technology and patent licenses is the most important motivation, most of the companies announce that technology and patent are the main factors for them to acquire other companies.

(b) TM&A only has a fleeting significant impact on profit growth; it cannot bring sustainable financial performance improvement; while it has a positive market reaction to the acquirers and makes their stock price improved significantly.

(C) Besides the factors about companies operation and strategy, the so called "market value management" of Chinese companies may be an important reason that financial performance and market reaction of the TM&A shows exactly the opposite. Some Chinese pharmaceutical companies do undertaking the TM&A for the higher short-term stock price instead of the technology innovation and R&D.

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