

The Factors Which Influence Financial Performance after Mergers and Acquisitions-

The Case of High-Tech Companies in Taiwan

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Abstract

This paper examines the factors which affect the performance of high-tech companies after M&A in Taiwan. In this study, the sample of firms was selected from an exhaustive list of mergers published in the Securities Data Company (SDC) database during five recent years (2005-2009).

The study explores four major variables, namely firm size, R&D expense intensity, degree of competition, and growth opportunities, and examines various high-tech industries in order to uncover possible factors affecting the performance of mergers and acquisitions, using the debt ratio as a control variable.

This study finds that the impact of the environment in which mergers and acquisitions take place has a greater contribution to firm performance, particularly with regard to firms involved in the computers and peripherals industry in Taiwan.

Key words: Mergers and acquisitions, performance, Taiwan, high-tech industry

Introduction

The main idea of this paper concerns the possible effect that mergers and acquisitions (M&A) have on the performance of companies in high-tech industries. The management literature states a general evaluation of the performance of M&A from, such as horizontal, vertical, related or unrelated M&A. IMD national competitiveness survey, 14th in 1995, to 18th in 1996, to 23rd in 1997. The only factor which Taiwan has been gaining ground on is its technology technical strength, rising from 17th in 1996 to 10th in 1997.

A number of the studies in the M&A literature, such as Ravenscraft and Scherer (1989) show that the profitability of target firms, on average, actually declines after an acquisition, suggesting that implementation difficulties probably play an important role in determining the final performance of an M&A. However, Salter and Weinhold (1979) and Lubatkin (1983) found that related M&As show superior performance because of synergetic effects through economies of scale and scope. Compared to unrelated acquisitions, related acquisitions provide

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much better financial performance arising out of economies of scale and scope.

In Taiwan, M&A activity is expected to continue to be dominated by the financial and high-tech sectors. In the high-tech sector, in particular, value creation is very important. According to a report on innovation strength published by the Economist Intelligence Unit (EIU) should rank 6th in the world and 2nd in Asia during the 2007-2011 period. The report highlights that Taiwan's outstanding performance in technological innovation and R&D capability, as well as its efforts to build an innovative society. Therefore, R&D expenses are a critical consideration for high-tech M&A. For a company seeking rapid growth, it can grow externally by acquiring technical assets from other companies in order to obtain other R&D resources. The reason why undertaking M&A activities are an effective way for R&D-dependent companies to grow is that these companies can achieve synergies by taking advantage of the target firms' management system and R&D ability. From the technology standpoint, the companies involved can thus achieve complementary synergies using each company's technology and patent portfolios (Ling-Feng, Hsieh Yao-Tsung, Tsai, 2005).

The surviving way for high-tech companies to increase their competitiveness is for them to enlarge their economic base and to integrate vertically and horizontally (M&A trends in Taiwan, 2007), and thus raise the professional skills of their staff. In short, high-tech firms can obtain skills, human resources, greater market share and decreased R&D failure risk by means of M&A. When these factors are discussed in previous research, they are called the technological motives of M&A, and this study will study the effects of these on the technological performance of high-tech M&A companies in Taiwan.

Literature Review

Bennis Wai Yip So (2006) indicates that the government played a positive role in the growth of high-tech industries in Taiwan, giving the example of its decision to Hsinchu Science Park.

Kumar (2009) undertakes a comparative study of the effects of M&A on the wealth of shareholders of the acquirer and target firms. The study is based on four subsets of a sample consisting of 252 acquirer and 58 target firms involved in acquisitions, and 165 acquirer and 18 target firms involved in mergers during the period 1998-2006. The results indicate that M&A are positive net present value activities for both bidding and target firms. The average announcement day excess returns was found to be highest for target firms involved in mergers, followed by those for acquirer firms involved in mergers.

Kimberly, Taco H., and Bruce T. (2009) explore the independent and interactive effects of procedural justice and informational justice on post-deal value creation in large, related acquisitions. The results show that informational justice and procedural justice affect different components of value creation. The paper concludes that procedural justice reduces the positive effects of informational justice on financial returns during the integration process, while it magnifies the effects of informational justice on the target firms' market position during integration efforts.

Kruse, Park and Suzuk (2007) examine the long-term operating performance of Japanese companies using a sample of 56 mergers of manufacturing firms in the period 1969 to 1997. By examining the cash-flow performance in the five-year period after an M&A, the research finds evidence of improvements in operating performance, and also that the pre- and post-merger performance is highly correlated.

Mantravadi and Reddy (2008) find that the impact of mergers on the operating performance of the acquiring firm is different in different industries in India. In particular, mergers have less positive impact on the profitability of firms in the banking and finance industry, while the pharmaceuticals, textiles and electrical equipment sectors saw a marginal negative impact

on operating performance (in terms of profitability and returns on investment). For the chemicals and agri-products sectors, mergers caused a considerable decline, both in terms of profitability margins and returns on investment and assets.

There are two side arguments about the size of the buying firm relative to the acquired target. The literature (Penrose, 1959; Shrivastava, 1986) reveals that the larger the size of the acquired target relative to the buying firm, the more difficult it is for the buyer's managers to understand all the parts where integration is needed. In addition, Walter (1985) and Mirvis (1984) suggest that when the acquired target is small relative to the buying firm, the human needs of the target will not be considered by the buyer. Because the buyer is generally unfamiliar with the inner resources of the acquired firm, it is unable to fully realize the financial potential of M&A activity.

Relative organizational size may have a direct influence on shareholder gains (Kusewitt, 1985), and thus this study considers the debt ratio as control variable.

In the following section, this paper will describe the general expectations with regard to the effect of M&As on the technological performance of companies. The high-tech companies which use M&A as strategy expect to gain more profits and have positive performance.

Research Model and Measure Methods

The data used in this study comes from several different databases. The first section describes the databases used in this study and the sample selection. The second section describes the methodology, which includes the independent samples T test and cross-sectional regression analysis. The final section describes the definition and measurement of the variables.

Data Source and Introduction of Variables Index.

The sample of firms was selected from an exhaustive list of mergers published in the Securities Data Company (SDC) database during five recent years (2005-2009). The high-tech industry is based on SDC classifications, and includes different segments in areas such as biotechnology, chemicals, computers, defense, electronics, communications, medical and pharmaceuticals. The high tech merger announcement dates and other merger transaction information were retrieved from SDC's Mergers and Acquisitions database. In addition, any missing data was obtained from the Market Observation Post System. Here is the summary about the distribution of M&A announcements

Table 3-1 Distribution of M&A announcements

Year	Number of M&A announcements	Percentage (%)
2005	11	18.97
2006	12	20.69
2007	12	20.69
2008	8	13.79
2009	15	25.86

Definition and measures of the variables

(1) Operating performance (Y).

We took the ROA as an indicator of the dependent variable, operating performance, and the companies in the sample were all high-tech firms from 2005 to 2009. We excluded M&A cases that were too small and deleted from the list were mergers where the relative size was less than 10% (Mantravadi & Reddy, 2008), as it was felt that such small acquisitions could not have a significant impact on the operating performance of the acquiring company.

(2) Firm size (FZ)

Previous studies have noted that information asymmetry is stronger for small firms than for larger ones (e.g. Grossman and Stiglitz, 1976; Vermaelen, 1981; Zeghal, 1984; Atiase, 1985; Freeman, 1987). Chauvin and Hirschey (1993) and Connolly Hirschey (2005) verified that there are meaningful differences in the effects of R&D expenditures according to firm size. They suggested that large firms have the higher level of information than small firms; besides, R&D expenditures are likely to be more effective for larger firm relatively. Therefore, firm size will influence the announcement effects of R&D expenditures and the market value effects of larger firms are greater than those for smaller small firms.

Based on the above discussion, we hypothesize:

H1: There is a positive relation between the operating performance of M&A companies and firm size.

(3) R&D intensity (RD)

R&D activity involves in a lot of money, and is a kind of high risk investment. Chan et al. (1990) argued that continual innovation is the key success factor to aid firm growth and competitiveness. Firms use R&D activity to develop new products or new technology, thereby helping to raise sales, reduce costs, increase market share, add enter new markets. (Breitzman, Thomas and Cheney, 2002). In addition, Woolridge and Snow (1900) suggested that the stock market encourages top managers to make long-term strategic decisions, such as undertaking R&D activity. In addition, there is a strong relationship between R&D activity and stock market valuation. For instance, Hill and Snell (1988) found that R&D expenditures are positively related to firm profitability. Therefore, R&D activity is an important strategic decision which is associated with a firm's competitive advantages and success.

R&D expenditures are related to the growth of a firm's profitability and productivity. Nevertheless, R&D expenditures have a high degree of information asymmetry, and thus outside investors can assess the intrinsic value of R&D expenditure. Therefore, some scholars have examined why R&D expenditures are associated with information.

Based on the above discussion, we derive the following hypothesis:

H2: There is a positive relation between the operating performance of M&A companies and R&D intensity.

(4) Degree of competition (HD)

Doukas and Switzer (1992) examine the effect of firms' market concentration on the announcement effects of increases in R&D expenditures. They find that the market concentration will result in the different market responses to such announcements. Specifically, their results showed that R&D expenditure announcements will have positive effects on the firm's stock price in a highly concentrated industry. In contrast, firms in a much less concentrated industry will experience the negative effects in response to such announcements. These results are consistent with the Schumpeterian hypothesis that when a firm in a highly competitive industry (i.e., in a less concentrated industry) allocates resources efficiently, they may perform R&D activities poorly. Therefore, the firm will have a low expected value of R&D's payoff and should see negative market responses to R&D announcements.

When examining the influence of industry competitiveness on the industry reaction to merger announcements, it may be important to focus in particular on takeovers involving bidders and targets in the same industry. Thus, the competitive effects of merger announcements in focusing increasing interest in takeovers were examined further in this work.

Based on the above discussion, we thus hypothesize:

H3: There is a positive relationship between the operating performance of M&A companies and the degree of competition.

(5) Growth opportunities (GO)

Szewczyk et al.(1996) used the investment opportunities hypothesis to examine the antecedents of the R&D announcement effects. The investment opportunity hypothesis indicates

that R&D investments with the promising growth opportunities are generally worthwhile to invest in, whereas other R&D investments may be wasteful. They found that the Tobin's q of a firm will influence the announcement effects of R&D expenditures, supporting the investment opportunities hypothesis. Specifically, a high Tobin's q firm will have a significantly positive reaction to an R&D increase announcement. Conversely, a low Tobin's q firm will have a negative reaction.

Based on the above discussion, we hypothesize:

H4: There is a positive relation between the operating performance M&A companies and their growth opportunities.

(6) Sub-high-tech industry (Di)

According to Taiwan's Hsinchu Science Park Administration in the Science-Based Industrial Park Investment 2002 Guide, high-tech industries include the following segments:

1. Integrated circuit industry (D1)

Including IC design, IC manufacturing (foundry), IC materials, IC Packaging, testing, manufacturing process equipment, silicon wafer materials.

2. Computer and peripheral equipment industry (D2)

Including computer systems, storage devices, input devices, output devices, network equipment, special soft - body and sub-zero critical electrical and mechanical and passive components.

Table 3-2 Taiwan Computer Hardware Market Segmentation, 2008

Taiwan Computer Hardware Market Segmentation: % Share, by Value, 2008	
Category	% Share
Computers	57.10%
Peripherals and Devices	28.40%
Storage Devices	14.50%

Source: Datamonitor

3. Communications Industry (D3)

Telecommunications systems (including telephones, modems, switches), microwave wireless communications systems and semi - conductors and other related components, fiber optic systems and components, and satellite communications systems.

4. Optoelectronics industry (D4)

PV systems and components (such as LT Poly Si TFT-LCD/PDP/OLED flat panel displays, color display tube, CD-ROM drive, digital stills cameras, contact-type image sensor, photoelectric and a semi-conductor, photoelectric diodes, etc.) and optical system components (such as equipment, lenses, etc.).

5. Precision Machinery Industry (D5)

Automation systems (such as PC-based NC controllers, robotics, water jet, factory equipments), automation devices (such as precision gear cutting tools, linear slide, servo motors, surface treatment, etc.).

Based on the above discussion, we hypothesize:

H5: Individual high-tech segments in Taiwan interact with the traits of M&A announcement companies.

Empirical Results

Based on the discussion so far, the regression equations can be examined as follows.

Cross-sectional regression analysis

In order to examine whether firm size (FZ), R&D expense (R&D), Growth opportunity (Tobin's q) and degree of competition (HI) affect the performance of M&A companies, this study follows the literature to select one control variable to proceed with the regression analysis, in this case choosing the debt ratio.

Table 4-1 shows cross-sectional regression of operating performance (ROA+1) associated with 58 M&A announcements between 2005 and 2009. The period of ROA is one year next to the M&A announcement of the company. There are a total of five models and each individual model is put one major variable into by turns. Models 1 to 5 examine the influence of the performance of the M&A companies' proxies on the announcement effects of the M&A companies without considering the control variable. The four models each only run one single variable and control variable (DR), and the variables are size (FZ), R&D expense (R&D), growth opportunity (Tobin's q) and degree of competition (HI). The value of firm size is 4.12 and the t-value is -0.23. Therefore, firm size is not significant in Model 1. This study also separates the high-tech industries into five segments and uses dummy variables to measure them. D1 to D5 are the integrated circuit industry, computers and peripheral equipment, communications, optoelectronics and precision machinery industry, respectively. The results show that only D2 (computers and peripheral equipment industry) in Model 1 is significant.

Table 4-1 Cross-sectional regression of operating performance associated with 58 M&A announcements between 2005 and 2009

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	-38.75 (0.65)	0.12 (0.64)	-1.03 (-0.13)	-1.17 (-0.15)	-53.92 (-2.65)
Firm Size	4.12 (-0.23)				6.43*** (3.33)
R&D		2.27 (0.18)			21.56 (1.09)
Tobin's q			0.89 (0.41)		1.42 (0.31)
HI				4.80 (0.57)	16.97 (0.88)
DR	-0.06 (-0.34)	-0.02 (-0.09)	-0.04 (-0.20)	-0.06 (-0.28)	-0.29 (-1.43)
D1	-4.11 (-0.37)	1.96 (0.17)	2.84 (0.24)	3.60 (0.30)	-1.59 (-0.14)
D2	-14.29* (-2.10)	-10.99 (-1.54)	-10.26 (-1.41)	-9.84 (-1.34)	-12.17 (-1.81)
D3	10.52 (0.50)	9.60 (-1.42)	10.74 (0.48)	11.57 (0.52)	-4.50 (0.36)
D4	-12.79 (-0.80)	1.52 (0.09)	1.38 (0.09)	0.79 (0.05)	-17.47 (-1.10)
Adj R-squared					
N	0.13 58	0.10 58	0.10 58	0.07 58	0.29 58

The T-statistics are in parentheses. ***, **, * denote significance at the 1%, 5% and 10% levels, respectively.

The Computer Hardware Industry Profile indicates that the performance of the market is forecast to decelerate in global market, with an anticipated compound annual growth rate (CAGR) of only 7.9% for the five-year period 2008 to 2013, compared to in YEAR. In addition,

customer loyalty to specific manufacturers in this industry is relatively low, while brand awareness is high, which restricts the entry of new players into the market.

Apart from computer and peripheral equipment industry (D2), other segments in high-tech industry in Taiwan have no significant effect on the performance (Y) of M&A companies. Model 5 includes all four variables and all segments in high-tech industries in Taiwan with the control variable and shows that size (FZ), R&D expense (R&D), growth opportunity (Tobin q) and degree of competition (HI), especially in the computers and peripheral equipment industry, have significant effects on the performance (Y) of M&A companies in high-tech industries in Taiwan, as the adjusted-R square correlation is 0.43.

Research Conclusions and Suggestions

This study collects 682 data from 2005-2009, as well as data on the sales of companies from the Market Observation Post System. After deleting the missing and incomplete data, the final full sample contains 58 M&A companies. According to the cross-regression analysis, the evidence supports H1: there is a positive relation between the operating performance of M&A companies and the firm size of the combined companies.

The results of the cross-sectional regression are thus verified, especially in the computers and peripheral equipment industry (D2). Therefore, there is a positive relation between the operating performances of M&A companies and firm size. The results partly support H5, in that only the computers and peripheral equipment industry (D2) has a significantly positive effect on the performance of M&A companies in Taiwan.

The three competitive advantages of Taiwan's computer industry can be summarized, as follows. The first one is "technology", the experience and technology of the computer industry in Taiwan are transferred into the notebook computer industry's biggest advantage. Desktop computers have standard components, but some of the specifications of notebooks are decided by the individual manufacturers, and there is no common standard. Consequently, Taiwan's advantage in this field lays in its varied technical capabilities and flexibility. More importantly, notebook computers contain many plastic components, which are produced by Taiwan's plastic injection firms. Therefore, the bargaining power is manipulated by Taiwanese firms, not world-class manufacturers.

The second one is the "cost," as the price war in information industry recently rises up, due to Taiwan's fast capacity expansion, combined with traditional mass production capability for cost reduction and the importance of Taiwan's cost advantage has attracted American and Japanese manufacturers in the world to Taiwan, including Compaq, IBM, NEC, Hitachi, Epson and Sharp.

The third competitive advantage is from "speed", as smaller firms are able to produce new models more quickly. The production cycle in Taiwan can be compressed into nine months, while Japanese companies still require at least 10 months.

The last competitive advantage is a "complete industrial environment." Taiwan's information industry has established a complete industrial structure, with the related firms having accumulated a lot of experience and skills.

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