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Enhancing performance through merger and acquisition or strategic alliances? In knowledge innovation based

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This paper investigates the relationships among merger and acquisition (M&A), strategic alliances and organizational performance. This paper compares the influences of M&A and strategic alliances from 1993 to 2008 on both stock price and trading volumes of underlying stock around the announcement date on Taiwan stock market. The empirical results indicate a strong relationship between strategic alliance event and SCAR and SCAV in electronics industries. The SAV results for M&A events are positive and significant for non-electronics industries, and there is a strong relationship between M&A event and SCAR and SCAV. Furthermore, among the listed companies, the SAV results for M&A events and strategic alliance event are positive and significant, and there is positive effect in SCAR and SCAV for M&A events, and there is also positive effect in SCAV for strategic alliance events.

Key words: Merger and Acquisition, strategic alliance, trading volumes, stock price, knowledge innovation.

INTRODUCTION

In knowledge innovation-based environments, those businesses that can master knowledge and technology will be able to gain a competitive edge (Alam, 2009). An organization must respond quickly to all changes in its external environment, be able to handle large amounts of complex information, use new technology, and have proactive thinking and innovation for the most effective management of knowledge (Yeh, Lai and Ho, 2006; Lin and Tseng, 2005; Wadhwa, Rao, Chan, 2005; Wei, Choy and Yeow, 2006; Gottschalk, 2006).

To enhance competitiveness, enterprises strive to create innovative knowledge approaches (Huang and Lin, 2006; Darroch, 2002; Porter and Scott, 2001; Wong, 2005) in order to enhance performance (Beheshti, 2004). Therefore, knowledge management capabilities and knowledge innovation have become important topics for improving business performances (Yang and Yu, 2002;

Wadhwa, Bhoon, and Chan, 2006; Lin and Kou, 2007; Ho, 2008; Omerzel and Antonc̆ic, 2008).

Individual companies cannot provide all the knowledge resources necessary to operate. Companies are forced to choose a cooperative coexistence business model to replace the traditional mutual competitiveness (Alam, 2009). Therefore, enterprises must have a sound business strategy to cope with foreign competition and challenges, and the ability to recognize and adopt new opportunities in order to continue in a leading position (Lin, Wang and Chen, 2009).

In order to adapt to changes in the environment, high-tech industries have, through horizontal and vertical integration, gained cross-sector combinations, or other forms of strategic alliances; such expanded scale of production maintains business competitiveness (Alam et al., 2009). As enterprises grow, they tend to generate economies of scale through external growth methods, such as M&A or strategic alliance (Porter, 1985). Lewis (1990) proposed that, when faced with resources, risks, and control demands, M&A and strategic alliance are important rapid growth strategies to achieve maximized shareholder

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equity.

Although M&A and strategic alliance can integrate R&D strengths and achievements of enterprises in order to obtain external resources and external growth strategies, they may have positive or negative impact on business performance. No consensus has been reached in the verification of past literature (Cassiman, Colombo, Garrone and Veugelers, 2005). Although, M&A and strategic alliance may create positive economic impact on the enterprises, it may also create negative rivalry, transfer of benefits, or have indirect and adverse affects on investors or creditors.

Some scholars advocate that M&A integrates the R&D strengths of the acquirer and the target company, which enhances R&D innovation investments and achievements after integration (Ahuja and Katila, 2001; Prabhu, Chandy and Ellis, 2005). However, other scholars argue that, to improve market force after a M&A, redundant resources will be abolished for reduced investment by the enterprise in R&D innovative activities (Ernst and Vitt, 2000; Hitt, Hoskisson, Johnson, Moesel, 1996), and thus, M&A does not create value for an enterprises, and may even result in damage to the corporate value (DeLong, 2001; Houston, James and Ryngaert, 2001).

In the past, enterprises used M&A to achieve business growth, however, current investment-laws and regulations governing M&A are relatively more complex compared with strategic alliance. The reactions of employees and management issues in cases of strategic alliance are less severe than M&A. However, as the involvement of strategic alliance is not as high as M&A, in addition to low frequency of interactions, it may lead to difficulties in internalization of external knowledge (Karim and Mitchell, 2000; Makadok, 2001).

Discussions in literature and empirical studies on knowledge innovation have failed to define the impact relationships of M&A and strategic alliances on business performances. Therefore, this study plans to discuss and compare Taiwan's electronic industry as subjects, as well as the impacts of M&A and strategic alliance on business performance, on the basis of knowledge innovation.

Whether M&A and strategic alliance can create values for shareholders has been a topic of considerable concern in global capital markets. Many past scholars have pointed that, both M&A and strategic alliance can create unique and hard-to-imitate comprehensive effects, which generate relatively long standing competitive advantages, as well as positive abnormal returns for the enterprises (Harrison et al, 2001; Jensen and Ruback, 1983; Jarrell and Poulsen, 1989; Schwert, 1996; Cotter, Shivdasani, and Zenner, 1997; Akhigbe, Borde, and Whyte, 2000; Billett, King, and Mauer, 2004; Fee and Thomas, 2004; Spyros and Georgia, 2007; Travlos, 1987).

In addition, stock prices and share trading performances of an enterprise are subject to investors' expectations of business performance after M&A or strategic alliance. Therefore, analysis of the stock price and share trading volume will allow better understanding of the real benefits of the two strategies of business operations. Therefore, this paper infers that, both M&A and strategic alliance can generate abnormal returns, as well as considerable enhancements to stock trading volume and stock prices.

LITERATURE REVIEW

The connection of knowledge innovation with M&A and strategic alliance

Innovation in information technology promotes the development of a knowledge economy, making knowledge a major factor in the manufacturing processes of an enterprise. High-tech industries are knowledge-intensive industries, with competitiveness growing from the accumulation, creation, and application of knowledge. To avoid a rigidity of core technological capabilities of an enterprise, moderation of external resources that activate knowledge basics and the ability to pursue innovation are necessary conditions for continuity in high-tech enterprises.

In addition, R&D investments cost large amounts of capital, and the life cycle of high-tech products tends to be relatively short; therefore, high-tech products generated from internal R&D often result in an inability to take advantage of the expected benefits due to a high attrition rate. Hence, through M&A, enterprises often directly access R&D resources, technologies, knowledge, and achievements of a target companies to strengthen and build innovation capabilities and core competencies, as well as establishing durable competitive advantages (Anand and Khanna, 2000; Helfat and Peteraf, 2003).

M&A is an important strategic operation acquired through the external growth of an enterprise (Glueck, 1979; Pricewaterhouse Coopers, 2005, 2007). It enables the enterprise to expand business and technological scopes, change original paths of learning, overcome rigid core crisis, integrate internal resources and external learning opportunities, and it is the best way to create dynamic capabilities for an enterprise (Eisenhardt and Martin, 2000; Karim and Mitchell, 2000; Seth, Song, and Pettit, 2002).

In addition to comprehensive benefits through complementary combinations of M&A (Hoskisson, Hitt, Wan and Yiu, 1990; Krishnan, Joshi, and Krishnan, 2004; Chung, Singh, and Lee, 2000), the processes of M&A will enable the enterprise to integrate learning resources, reconfigure resources, and regroup internal and external resources (Teece, Pisano and Shuen, 1997). It contributes to increased constructs of competitiveness for the enterprise and improves business operational efficiency (Harrison, Hitt, Hoskisson and Ireland, 2001).

After M&A, an enterprise can construct and promote a combined learning and knowledge database from the two
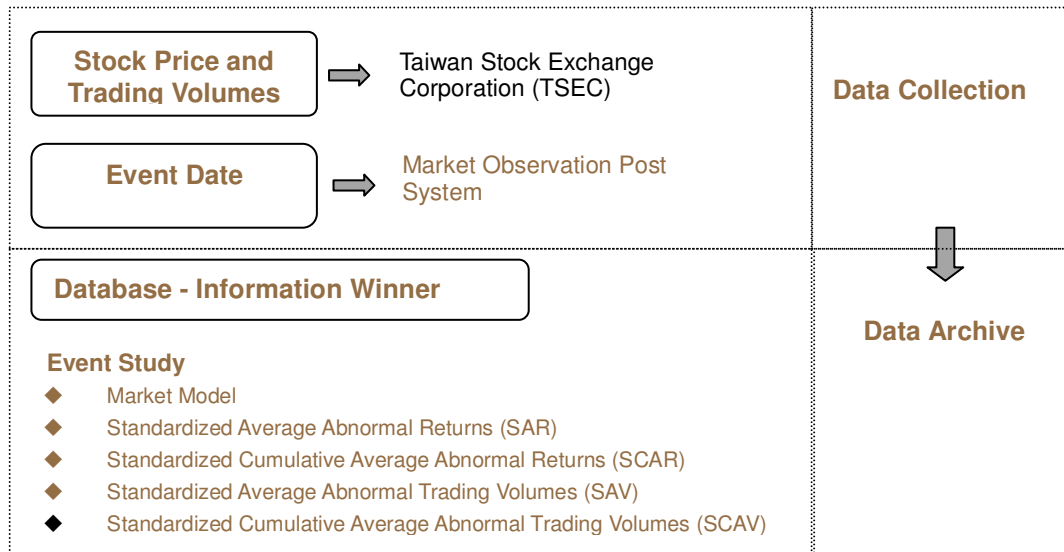
Figure 1. The research of system process.

parties (Helfat and Peteraf, 2003; King, Dalton, Daily, Covin, 2004). Through resource transfers, the acquirer and the target company combine resources, which enable both parties to increase external technical support on the basis of the existing capabilities (Szulanski, 2000; Seth et al, 2002; Chung et al, 2000). At the same time, some enterprises conduct cross-organizational cooperation through strategic alliance to obtain external resources and knowledge. Strategic alliance is a key strategic choice, which links activities of the companies strategies (Porter and Fuller, 1986) to ensure, maintain, or enhance competitive advantages (Harrigan, 1988).

For mutual needs, risk pooling, and cooperation of common goals (Lewis, 1990), it is a commitment maintained through mutually beneficial processes and interdependence (James, 2001). Through strategic alliance, enterprises exchange knowledge with partners, and then, integrate it into its own organization, which is also an effective way to strengthen the competitive advantage of an enterprise. Hence, numerous high-tech companies take advantage of M&A and strategic alliances to obtain external R&D capabilities and achievements for external growth (Puranam, Singh and Zollo, 2006; Smith, 1991).

METHODOLOGY

Sample selection

The purpose of this study is to discuss the differences on impact statements of M&A and strategic alliance on stock prices and stock trading volumes between 1993 and 2008. The data are taken from company trading information and major information published in the "Market Observation Post System" of the Taiwan Stock Exchange, and data matrix subject to the declaration date of M&A and strategic alliance.

Regarding the data of listed company M&A samples, there are a total of 110 initial screening samples, with 39 samples are deleted due to insufficient estimation periods or the data are not applicable. There are 81 merger and acquisition sample companies remaining; upon the removal of non-electronic companies, 53 electronic companies remain as samples of this study.

Regarding strategic alliance data, there are 100 initial screening samples, with 24 samples deleted due to insufficient estimation periods, and 16 samples are removed due to improper data, 60 companies of strategic alliance remaining; upon removal of non-electronic samples, 54 electronic companies of strategic alliance are chosen as samples of this study.

This study executes tests to determine whether there is any related information effects on the M&A and strategic alliance occurring near the announcement date, a described event study is performed. The event date is defined as the announcement date of M&A and strategic alliance, and the announcement date of information disclosure, namely Day 0. The event window of interest begins from Day -15 and ends on Day +15.

Research design

This investigation adopted event study (Brown and Zhang, 1997) to explore stock price whether it will receive the influence of the specific event. The method had already been applied extensively in the finance and the accounting research domain, on the research approach of the real example so far, still plays a very important role. The research of system process and framework is shown in Figure 1.

Probing into the stock price will declare to enterprises M&A and strategic alliance change the response of information, the expected return was derived using the market model where the model parameters α and β were obtained from the estimation period, namely $R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$,where R_{it} indicates the expected return on stock i on trading day t and R_{mt} denotes the return on the market portfolio on day t. α_i is the intercept, β_i is the systematic risk of individual stock and ε_{it} residuals is the

component of returns which is abnormal or unexpected. Abnormal returns on stock i on day t (AR_{it}) are calculated for a reference period surrounding the event date. These are obtained as the difference between the observed returns and those predicted by the market model

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt} \qquad (1)$$

Next, we compute the average abnormal returns for day t as

$$\overline{AR_t} = \frac{1}{N} \sum_{i=1}^{N} AR_{it}$$

, where $t = -15, -14,..., 0,..., 14, 15$. The cumulative average abnormal returns (CAR_t) through τ days ($\tau = \tau_2 - \tau_1$) for a portfolio of N stocks can be calculated as:

$$CAR_i(\tau) = \frac{1}{N} \sum_{t=\tau_1}^{\tau_2} \sum_{i=1}^{N} AR_{it} \qquad (2)$$

The standardized cumulative average abnormal returns (SCAR) will start from special date τ_1 accumulate to the τ_2 day in event period, it may obtain the SCAR, the event period of the SCAR from the τ_1 to the τ_2 total t day, namely

$$SCAR(\tau) = \frac{1}{N} \sum_{t=\tau_1}^{\tau_2} \sum_{i=1}^{N} \frac{AR_{it}}{S_{it}} \qquad (3)$$

Where τ indicates event date from the τ_1 to τ_2 as a examination period.

The standardized residual cross-sectional method ignores estimation period estimates of variance, thus, this paper uses the standardized residual cross-sectional for its t-test. The resulting of t-test statistic for AR_{it} is

$$t_{SROCSM}^{AR} = \frac{\frac{1}{N} \sum_{i=1}^{N} SAR_{iE}}{\sqrt{\frac{1}{N(N-1)} \sum_{i=1}^{N} \left(SAR_{iE} - \sum_{i=1}^{N} \frac{SAR_{iE}}{N} \right)^2}} \qquad (4)$$

The t-test statistic for the CAR_t for standardized residual cross-sectional is calculated as

$$t_{SROCSM}^{SCAR} = \frac{SCAR(\tau_1, \tau_2)}{\sqrt{\frac{1}{N(N-1)} \sum_{i=1}^{N} \left(SCAR_i(\tau_1, \tau_2) - \sum_{i=1}^{N} \frac{SCAR_i(\tau_1, \tau_2)}{N} \right)^2}} \qquad (5)$$

Where, $$SCAR_i(\tau_1, \tau_2) = \sum_{E=\tau_1}^{\tau_2} SAR_{iE}$$

Certain empirical results have an association between abnormal returns and abnormal trading volumes. Hence, stock trading volumes around announcement date was inspected. Trading turnover rate is substituted for trading volumes (Vol_{it}) in studies.

Daily trading turnover rate for stock i on day t is defined as:

$$Vol_{it} = \frac{Number\ of\ shares\ traded_{it}}{Number\ of\ shares\ outs \tan ding_{it}} \qquad (6)$$

Where $t = -106, -105, ..., -16$.

Normal trading volumes ($NVol_i$) for stock i are defined as the average trading turnover rate of the stock as estimated for the 90 days prior to the event window, namely;

$$NVol_i = \frac{1}{90} \sum_{t=-106}^{-16} Vol_{it} \qquad (7)$$

By average trading turnover rate (AV_t) before the event window, AV_t can be compared across different stocks of various sizes. Therefore, the AV_t for a portfolio of N stocks on day t is calculated as:

$$AV_t = \frac{1}{N} \sum_{i=1}^{N} \frac{Vol_{it}}{NVol_i} \qquad (8)$$

Where $t = -15, -14,..., 15$.

The abnormal trading volumes ($AVol_t$) in percentage terms on day t for a portfolio of N stocks and its standard deviation (SD) can be calculated as $AVOL_t = AV_t - 1$,

$$SD = \sqrt{\frac{1}{31} \sum_{t=-15}^{15} \left(AV_t - \overline{AV} \right)^2} \qquad (9)$$

Where, $\overline{AV} = \frac{1}{31} \sum_{t=-15}^{15} AV_t$

RESULTS

This section debates the empirical results for stock price and trading volumes for electronics industries, non-electronics industries and whole listed companies.

Table 1 uses the t-test statistics to examine the standardized average abnormal returns (SAR) and standardized average abnormal trading volumes (SAV) that appear in the event window from Days -15 to +15. For enterprises announcing M&A, the results demonstrate positive SAR and SAV, 0.1661 and 0.3822, for days -12 and 0, with the results being statistically significant at the 0.05 and 0.01 levels using the t-test. For strategic alliances, the results indicate positive SAR, 0.3503 and 0.2482 for days -1 and 13 and negative SAR, -0.2395, for day -10, with the results being statistically significant at 0.05 level by t-test. However, a significant and positive response is found for SAV, for days -11, -2 to 1, 3, 6 to 8, 13 and 15. Hence, the results indicate that if an electronics industry announces a strategic alliance, industry trading volumes will increase. Summing up the above results, the information effect of strategic alliances is significantly in SAV.

Table 2 shows the information effect of disclosure M&A and strategic alliance plans in the event window for

Table 1. SAR and SAV around announcement date of M&A and Strategic alliance for electronics companies.

Event window	M&A		Strategic alliance		Event window	M&A		Strategic alliance	
	SAR	SAV	SAR	SAV		SAR	SAV	SAR	SAV
-15	-0.0203	-0.0684	0.1880	0.0778	0	-0.0308	0.3822**	0.1502	0.8071**
-14	-0.0519	0.0742	0.0365	0.1087	1	-0.0273	0.1982	-0.1075	0.4792**
-13	0.0893	0.0471	0.1152	0.1301	2	-0.0352	0.1431	-0.0491	0.2698
-12	0.1661*	0.0533	0.2172	0.2861	3	-0.0186	-0.0747	-0.1488	0.4043*
-11	0.0299	0.0175	0.1186	0.5035*	4	-0.0610	-0.1212	0.0529	0.4541
-10	0.0912	0.0148	-0.2395*	0.1968	5	-0.0148	0.0147	0.0561	0.4605
-9	0.0173	0.1432	-0.0457	0.1350	6	0.0781	0.2274	0.1641	0.5710*
-8	0.0671	0.1442	0.1408	0.3804	7	-0.0341	0.0344	0.0916	0.5205**
-7	-0.0375	0.1991	-0.0292	0.0146	8	0.0401	0.3002	0.0918	0.6472**
-6	0.0265	0.1460	-0.0763	-0.0231	9	-0.0081	0.0984	-0.0914	0.2365
-5	0.0923	0.1033	0.1920	-0.0620	10	0.0082	0.2049	-0.0970	0.2689
-4	0.0396	0.0595	0.0813	0.0540	11	0.0194	0.0685	0.1720	0.1143
-3	0.0904	0.2391	0.2184	0.4271	12	-0.0076	0.0374	-0.0189	0.1625
-2	0.0922	0.2664	0.1970	0.6410*	13	-0.0309	-0.0268	0.2482*	0.4478*
-1	-0.0102	0.2309	0.3503**	0.6817**	14	-0.0856	0.1188	-0.0166	0.6317
					15	-0.0024	0.1226	0.0520	0.4436*

The * (**) denotes statistical significance at the 0.05 (0.01) level; the *t-value* uses Standardize Residual Cross-Sectional Method to test.

Table 2. SCAR and SCAV around announcement date of M&A and strategic alliance for electronics companies.

Event window	M&A		Strategic alliance		Event window	M&A		Strategic alliance	
	SCAR	SCAV	SCAR	SCAV		SCAR	SCAV	SCAR	SCAV
-15	-0.0203	-0.0684	0.1880	0.0778	0	0.6511*	2.0525	1.6148**	4.3586**
-14	-0.0722	0.0058	0.2244	0.1865	1	0.6238*	2.2507	1.5073*	4.8379**
-13	0.0171	0.0530	0.3396	0.3166	2	0.5886	2.3938	1.4582*	5.1076**
-12	0.1832	0.1063	0.5568*	0.6026	3	0.5700	2.3191	1.3094*	5.5120**
-11	0.2131	0.1238	0.6754*	1.1061	4	0.5089	2.1979	1.3623	5.9660**
-10	0.3043	0.1386	0.4360	1.3029	5	0.4942	2.2126	1.4183	6.4265**
-9	0.3216	0.2818	0.3903	1.4379	6	0.5723	2.4401	1.5824*	6.9975**
-8	0.3887	0.4260	0.5311	1.8183	7	0.5382	2.4745	1.6740*	7.5180**
-7	0.3512	0.6251	0.5019	1.8329	8	0.5783	2.7747	1.7658*	8.1651**
-6	0.3777	0.7711	0.4255	1.8098	9	0.5703	2.8731	1.6744*	8.4016**
-5	0.4699	0.8744	0.6175	1.7478	10	0.5784	3.0779	1.5774	8.6705**
-4	0.5095*	0.9339	0.6988	1.8018	11	0.5978	3.1465	1.7494*	8.7848**
-3	0.5999*	1.1730	0.9172	2.2289	12	0.5901	3.1839	1.7304*	8.9473**
-2	0.6921**	1.4394	1.1142*	2.8699*	13	0.5593	3.1572	1.9787*	9.3951**
-1	0.6819*	1.6703	1.4645*	3.5515*	14	0.4736	3.2760	1.9620*	10.0267**
					15	0.4712	3.3986	2.0141*	10.4703**

The * (**) denotes statistical significance at the 0.05 (0.01) level; the *t-value* uses Standardize Residual Cross-Sectional Method to test.

electronics industries. This investigation adopts standardized cumulative average abnormal returns (SCAR) and standardized cumulative average abnormal trading volumes (SCAV) to determine the reaction strength of M&A and strategic alliances around the event period. The empirical results by this study reveal statistically significant and positive SCAR in the event window for days -4 to 1. Thus it can be inferred that M&A news leak-age exerts a sustained influence on the stock market. For strategic alliance events, the empirical evidence indicates positive SCAR for days -12, -11, -2 to 3, 6 to 9, and 11 to 15, which is statistically significant at the 0.05 level based on *t-test*. Furthermore, there is positive SCAV for days -2, -1 and 0 to 15, which is statistically significant at the 0.05

Table 3. SAR and SAV around announcement date of M&A and Strategic alliance for non-electronics companies.

Event window	M&A		Strategic alliance		Event window	M&A		Strategic alliance	
	SAR	SAV	SAR	SAV		SAR	SAV	SAR	SAV
-15	0.0673	0.0094	-0.0329	0.0720	0	0.1655	**0.7275****	0.1747	0.6617
-14	0.0633	0.1959	0.1117	0.1824	1	0.0863	0.6724**	-0.0345	0.1638
-13	-0.0438	0.1200	-0.1422	0.1276	2	-0.1340	0.5150**	-0.2206	0.0864
-12	0.0136	0.0618	0.0203	0.0538	3	-0.0660	0.5327**	0.0300	-0.0457
-11	0.0583	0.1840	-0.1092	-0.1133	4	0.1694*	0.4340**	-0.2364*	-0.1585
-10	0.0507	0.1773	0.1372	0.0516	5	0.1110	0.4665**	-0.0584	-0.0972
-9	0.0664	0.1672	-0.0501	0.0061	6	0.1060	0.4838**	0.2616	0.4319
-8	0.0221	0.3096*	-0.0408	0.2329	7	0.0733	0.3999**	0.1168	0.2721
-7	0.1077	0.3342*	-0.2504*	-0.0221	8	-0.0582	0.3173**	-0.1984	0.1877
-6	-0.0122	0.3093*	0.1060	0.0726	9	-0.0401	0.3081*	-0.1730	0.3220
-5	0.0109	0.2566*	-0.1621	-0.0635	10	-0.0555	0.3401	-0.0568	0.3056
-4	0.0313	0.4143**	0.2318*	0.1282	11	-0.0574	0.3523	0.2283	0.4292*
-3	0.0216	0.4757**	0.0840	0.2685	12	0.0093	0.4177**	-0.2171	0.2830
-2	0.0607	0.4131**	0.0446	0.1674	13	0.0136	0.2660*	-0.0072	0.1279
-1	0.0148	0.5180**	0.2132	0.2419	14	0.0268	0.1197	-0.1094	0.1479
					15	-0.0116	0.2535	0.2200	0.3616

The * (**) denotes statistical significance at the 0.05 (0.01) level; the *t-value* uses Standardize Residual Cross-Sectional Method to test.

and 0.01 levels using the *t-test*. The empirical results indicate a strong relationship between strategic alliance event and SCAR and SCAV.

For non-electronics industries, the results of the SAR and SAV lists in Table 3 demonstrate statistically significant and positive SAV around the M&A event divulgence date for days -8 to 9 using the t-test. Corporate law stipulates that convener convened board of directors of the director and supervisor and states the matter clearly seven days prior. Owing to inside information being disclosed ahead of time, industry declares that M&A events result from reaction to trading volumes. Furthermore, SAR is positive and statistically significant, with a value of 0.1694, on day 4. The empirical results listed in Table 3 show that message disclosure of strategic alliances have statistically significant and negative SAR, of -0.2504 and -0.2364, for days -7 and 4, and have statistically significant and positive SAR, of 0.2318, for day -4. The results reveal positive and abnormal trading volumes around the strategic alliance announcement date, 0.4292, for day 11. Therefore, SAV around announcement date of strategic alliance for non-electronics industry is insignificant. Overall, the SAV results for M&A events are positive and significant.

According to the results of Table 4 show, for M&A events, positive SCAR is observed for days 0, 1, 4 to 10. The SCAV for the event window from -8 to 15 shows statistically significant at the 0.05 and 0.01 levels. Thus, before disclosure of M&A information for non-electronics industries, trading volumes can increase, indicating that investors maintain an optimistic attitude and results from market trading volumes increase continuously. The

empirical results indicate a strong relationship between M&A event and SCAR & SCAV. For strategic alliance events occurring in non-electronics industry, standardized cumulative average abnormal returns and standardized cumulative average abnormal trading volumes were shown not to be affected; namely, no strong relationship was identified between two SCAR and SCAV. Thus investor behavior appears not to be influenced by strategic alliance announce during the event window.

Table 5 lists the results for SAR, SAV and the related t-test statistics for whole listed companies of stock and trading volumes in the event window around the M&A and strategic alliance announcement date. For M&A events of whole listed industry, the empirical evidence indicates positive SAR, 0.0921, for day 6, which is statistically significant at the 0.05 level using the *t-test.* Moreover, SAV is positive and statistically significantly on days -8 to 10 and day 12. For strategic alliance announcement events, the empirical result found that the positive SAR 0.1504, 0.2088, 0.1978, for days -4, 6, 11 is statistically significant at the 0.05 level by t-test. Statistically markedly shows the positive SAV for days -8, -3 to 1, 6 to 8, 11, 13 and 15. Overall, the SAV results for M&A events and strategic alliance event are positive and significant.

Table 6 lists SCAR, SCAV and their *t-test* statistics for whole listed companies of stock price and trading volumes in the event window around the M&A and strategic alliance announcement date. For M&A events, the research results of event window reveal positive SCAR for days -10 to 15 by *t-test*. Statistically significantly shows the positive SCAV for days -8 to 15. Substantially, when M&A information had leaked to the market, stock price

Table 4. SCAR and SCAV around announcement date of M&A and Strategic alliance for non-electronics companies.

Event window	M&A		Strategic alliance		Event window	M&A		Strategic alliance	
	SCAR	SCAV	SCAR	SCAV		SCAR	SCAV	SCAR	SCAV
-15	0.0673	0.0094	-0.0329	0.0720	0	0.6980*	4.6740**	0.3359	2.0679
-14	0.1306	0.2052	0.0787	0.2545	1	0.7843*	5.3463**	0.3014	2.2317
-13	0.0868	0.3252	-0.0635	0.3821	2	0.6503	5.8613**	0.0808	2.3181
-12	0.1003	0.3870	-0.0431	0.4359	3	0.5843	6.3940**	0.1108	2.2724
-11	0.1586	0.5710	-0.1523	0.3226	4	0.7537*	6.8280**	-0.1256	2.1138
-10	0.2093	0.7483	-0.0151	0.3742	5	0.8647*	7.2946**	-0.1840	2.0166
-9	0.2757	0.9156	-0.0651	0.3803	6	0.9708*	7.7784**	0.0776	2.4485
-8	0.2978	1.2252*	-0.1059	0.6132	7	1.0441**	8.1783**	0.1944	2.7205
-7	0.4055	1.5594*	-0.3563	0.5911	8	0.9859*	8.4957**	-0.0040	2.9082
-6	0.3932	1.8687*	-0.2503	0.6637	9	0.9457*	8.8038**	-0.1770	3.2302
-5	0.4042	2.1253*	-0.4124	0.6002	10	0.8902*	9.1439**	-0.2337	3.5359
-4	0.4354	2.5396*	-0.1806	0.7284	11	0.8328	9.4962**	-0.0055	3.9650
-3	0.4570	3.0153**	-0.0966	0.9968	12	0.8421	9.9139**	-0.2226	4.2480
-2	0.5177	3.4284**	-0.0520	1.1643	13	0.8557	10.1799**	-0.2298	4.3759
-1	0.5325	3.9464**	0.1612	1.4062	14	0.8825	10.2996**	-0.3392	4.5239
					15	0.8709	10.5531**	-0.1193	4.8854

The * (**) denotes statistical significance at the 0.05 (0.01) level; the *t-value* uses Standardize Residual Cross-Sectional Method to test.

Table 5. SAR and SAV around announcement date of M&A and Strategic alliance for whole listed companies.

Event window	M&A		Strategic alliance		Event window	M&A		Strategic alliance	
	SAR	SAV	SAR	SAV		SAR	SAV	SAR	SAV
-15	0.0237	-0.0285	0.0865	0.0751	0	0.0677	0.5596**	0.1615	0.7378*
-14	0.0059	0.1367	0.0710	0.1438	1	0.0298	0.4418**	-0.0740	0.3289*
-13	0.0225	0.0846	-0.0030	0.1289	2	-0.0848	0.3341**	-0.1278	0.1824
-12	0.0895	0.0577	0.1268	0.1754	3	-0.0424	0.2373*	-0.0667	0.1899
-11	0.0441	0.1030	0.0140	0.2096	4	0.0547	0.1640*	-0.0799	0.1621
-10	0.0708	0.0983	-0.0665	0.1276	5	0.0484	0.2468**	0.0035	0.1947
-9	0.0419	0.1556	-0.0477	0.0736	6	0.0921*	0.3592*	0.2088*	0.5047**
-8	0.0445	0.2292**	0.0574	0.3101*	7	0.0198	0.2222*	0.1032	0.4021**
-7	0.0354	0.2685**	-0.1307	-0.0029	8	-0.0093	0.3090*	-0.0414	0.4282**
-6	0.0071	0.2299*	0.0074	0.0225	9	-0.0242	0.2061*	-0.1289	0.2773
-5	0.0514	0.1821*	0.0294	-0.0627	10	-0.0238	0.2744*	-0.0785	0.2864
-4	0.0354	0.2418**	0.1504*	0.0893	11	-0.0192	0.2143	0.1978*	0.2643*
-3	0.0559	0.3606**	0.1567	0.3515*	12	0.0008	0.2328*	-0.1099	0.2199
-2	0.0764	0.3418**	0.1270	0.4153*	13	-0.0085	0.1236	0.1310	0.2954*
-1	0.0024	0.3784**	0.2874**	0.4721*	14	-0.0292	0.1193	-0.0592	0.4011
					15	-0.0070	0.1898	0.1291	0.4045*

The * (**) denotes statistical significance at the 0.05 (0.01) level; the *t-value* uses Standardize Residual Cross-Sectional Method to test.

and trading volumes are clearly influenced. The empirical results presented in this study demonstrate the positive SCAR around the strategic alliance event disclosure date, 0.8661, 1.0276, 0.9537 and 0.9947 for days -1 to 1 and 7 using the *t-test*. For strategic alliance announcement events, the result presented in this study demonstrate positive SCAV for days -2, 1, days 0 to 15, which is statistically significant at the 0.05 and 0.01 levels by *t-test* respectively. To sum up, the empirical results presented that there is positive effect in SCAR and SCAV for M&A events, and there is positive effect in SCAV for strategic alliance events.

Table 6. SCAR and SCAV around announcement date of M&A and Strategic alliance for whole listed companies.

Event window	M&A		Strategic alliance		Event window	M&A		Strategic alliance	
	SCAR	SCAV	SCAR	SCAV		SCAR	SCAV	SCAR	SCAV
-15	0.0237	-0.0285	0.0865	0.0751	0	0.6746**	3.3992**	1.0276*	3.2669**
-14	0.0296	0.1083	0.1575	0.2189	1	0.7044**	3.8410**	0.9537*	3.5958**
-13	0.0521	0.1928	0.1546	0.3478	2	0.6196**	4.1751**	0.8258	3.7782**
-12	0.1416	0.2505	0.2814	0.5232	3	0.5772*	4.4125**	0.7591	3.9681**
-11	0.1857	0.3535	0.2954	0.7327	4	0.6318*	4.5765**	0.6792	4.1302**
-10	0.2566*	0.4518	0.2289	0.8603	5	0.6802**	4.8233**	0.6827	4.3249**
-9	0.2985*	0.6074	0.1812	0.9339	6	0.7724**	5.1825**	0.8915	4.8296**
-8	0.3430*	0.8366*	0.2386	1.2440	7	0.7922**	5.4046**	0.9947*	5.2317**
-7	0.3784*	1.1050*	0.1079	1.2411	8	0.7829**	5.7136**	0.9533	5.6599**
-6	0.3855*	1.3350*	0.1152	1.2636	9	0.7588**	5.9198**	0.8244	5.9371**
-5	0.4369*	1.5170**	0.1446	1.2009	10	0.7350*	6.1941**	0.7459	6.2235**
-4	0.4723*	1.7588**	0.2950	1.2902	11	0.7158*	6.4084**	0.9437	6.4879**
-3	0.5282**	2.1194**	0.4518	1.6417	12	0.7166*	6.6412**	0.8338	6.7078**
-2	0.6046**	2.4612**	0.5788	2.0571*	13	0.7081*	6.7648**	0.9647	7.0031**
-1	0.6069**	2.8396**	0.8661*	2.5291*	14	0.6789*	6.8841**	0.9055	7.4043**
					15	0.6719*	7.0740**	1.0346	7.8088**

The * (**) denotes statistical significance at the 0.05 (0.01) level; the *t-value* uses Standardize Residual Cross-Sectional Method to test.

Conclusion

Fiercely competitive of these days and fast-changing environment shortens product life cycles, prompting enterprises to recognize that effective management and operation of knowledge has become a very important topic, as knowledge innovation is strength in competition (Huang and Lin, 2006; Wadhwa, Bhoon, and Chan, 2006).

The result in this paper finds M&A can help save costs and achieve economies of scale among the same industry, and the acquiring firm requires fewer resources to integrate the difference with organization, creasing a corporate M&A effect and increasing investor investment willingness. Strategic alliances are characterized by elasticity, lower risk and smaller capital requirements, particularly in the case of electronic companies which frequently use strategic alliances to enter new markets, invest in new talent and improve their manufacturing ability.

Based on the findings, it is known that when faced with the pressures of knowledge innovation, enterprises will choose M&A or strategic alliance to learn, build, and add innovation to knowledge. However, investors prefer M&A as the response strategy. The possible reason may be that, strategic alliance is established based on specific goals, which may cause cooperative processes to be lacking in flexibility (Das and Teng, 2000), and when the alliance goals are achieved, the partners will end the alliance; therefore, alliance is often relatively short-lived (Hatfield and Pearce, 1994). On the contrary, in M&A, the acquirer and target company can learn and duplicate technological capabilities of each other to enhance the knowledge basis of both parties (Seth et al., 2002). Therefore, as far as the enterprise is concerned, on the basis of knowledge innovation, M&A can be regarded as the best method of organizational learning and innovation (Eisenhardt and Martin, 2000; Karim and Mitchell, 2000; Seth et al., 2002).

In recent years, governments have developed enterprise M&A laws to promote large-scale enterprises to adopt this method in an attempt to expand the economies of scale of enterprises and enhance business performances, thus maintaining proper competitive environments for improving business performances. It is recommended that enterprises should first understand the nature of M&A, and then adopt a proper M&A model in order to effectively integrate the enterprises, and generate comprehensive benefits from M&A.

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