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CONTENTS

Consequences of Mergers and Acquisitions on Firm Performance: A Sector-Level Study of Public Listed Companies in China

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ABSTRACT

As the motives of mergers and acquisitions (M&As) are different across industries, this study examined the synergy effects of technological gains and capital intensity on the operating performance of the acquiring firms after M&As. The sample comprised 434 completed M&As initiated by Chinese firms listed on the Shanghai and Shenzhen Stock Exchanges with 2,170 observations over the years 2012 to 2016. On average, the firms performed better after M&As. The results show that the operating performance of public health, information technology, telecommunication and financial service firms within the high-technology sector increased after M&As. This suggests that high-technology firms can benefit from M&As through a more extensive knowledge base and financial synergy. We also found that good governance characterized by board independence affects firm performance positively. Therefore, the acquisition of technology through M&As could be an essential corporate growth strategy in the Chinese capital market, which is transforming from a state-controlled economy to a more market driven one. The findings provide useful insights to both corporate players and policy-makers on the types of M&As that stand higher chances to generate positive outcomes and those that need extra measures and further scrutiny to prevent inefficient allocation of resources.

KEYWORDS: M&As, China, Knowledge-based, High-technology

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INTRODUCTION

All public listed companies need to improve their operations, increase liquidity, widen their equity base, and achieve better economies of scale. In the past few decades, the abundance of low-cost labor in China has made the country internationally competitive in cheap and labor-intensive manufacturing. As a result, many international companies have set up extensive operations in China for export-oriented manufacturing. However, the value that is added by workers is relatively small compared to the total value of the manufactured products exported from China (Morrison, 2019). Over the years, due to a decline in its working-age population, the country is beginning to lose the advantage of low-cost labor to other emerging economies that provide low-cost production such as India and Thailand (Radu, 2019). Efficiency, sustainability, and independent innovation are increasingly essential for businesses to be successful in China (Molnar, 2017).

Mergers and acquisitions (M&As) are vital in the efficient allocation of resources in an economy (Bhabra & Huang, 2013) and are popular external growth strategies among business entities. Nonetheless, M&As were not popular in China until the economic reform in the late 1990s (Chi et al., 2011). Before the reform, the Chinese economy was dominated by state-owned enterprises (SOEs) under central planning (Bhabra & Huang, 2013). Unlike the Western capital markets, the capital market in China is still underdeveloped (Z. J. Lin et al., 2009) in which extensive corporate exercises are targeted to acquire non-tradable property rights and physical assets (C. J. Lin et al., 2013). Substantial corporate restructuring is needed for some SOEs with large numbers of redundant staff (Cheung et al., 2010). The capital market in the China's transitional economy suffers from higher agency costs, which has led to higher operational risks and unsatisfactory corporate performance (X. Fu et al., 2014).

Different from M&As in the Western countries that are driven by market needs with the mission to maximize profits, M&As in China are under the strong influence of the Chinese government through SOEs that maintain dominant shareholdings of many public listed firms that were formerly under the centrally planned socialist system (Firth et al., 2012). Political connections are likely to provide exclusive benefits to these firms

and alleviate investor fears of bankruptcy (Liu et al., 2012). Zhou et al. (2012) also found that the gains from government intervention outweigh the inefficiency of state ownership in Chinese M&As. In summary, the Chinese acquisition market is considered highly immature and different in the aspects of liquidity, openness, volatility, corruption, taxation and governance costs (Ahmed et al., 2020).

Nonetheless, the Chinese capital market has undergone significant changes following the transformation to the market-oriented economy recently whereby M&As recorded a growth rate of 20% and reached US$167 billion in 2008 (Bhabra & Huang, 2013). In 2017, China recorded a net purchase of US$ 131 billion in cross-border acquisitions, overtook the United States by US$16 billion (United Nations Conference on Trade and Development, 2020). Consequently, China has risen to be a main player in the global M&As market (Oh & No, 2020), with high-level financial resources available for domestic and foreign consumption (Zhou et al., 2012). As noted by Oh & No (2020), in early 2000s, the Chinese government has provided strong support to its corporate sector to invest aboard with the aims to improve global competitiveness and securing supplies of natural resources. In particular, the Belt and Road Initiative implemented since 2013 centered on massive infrastructure investments across Asia, Africa and Europe (Morrison, 2019). In another more recent government policy of 'Made in China 2025', ten priority high-tech sectors were identified in an effort to acquire advanced technology and boost innovation (Oh & No, 2020).

In view of the dramatic increase in the M&As activities driven by its unique contextual environment and the distinct characteristics of the Chinese capital market, the objectives of this study were twofold. First, the emergence of China as a major player in M&As has motivated the researchers to examine whether M&As enhance the performance of companies that acquire other companies after the transformation from a state-controlled economy to a more market-driven one. This is because the Chinese corporate setting which features a strong influence of state-owned enterprises is different from the Western countries that are targeted at profit maximization. Secondly, the initiative of the Chinese government on acquisition of advanced technological innovation and capital-intensive infrastructure development provides an avenue to examine both the effects

of technological gain and capital intensity on the operating performance of the acquirers. As documented by Christofi et al. (2019), the emerging literature, particularly in the area of technological innovation cross-border M&As, is lacking in terms of theoretical underpinning and empirical inquiry from a micro-foundational perspective. This study thus attempted to contribute to this strand of research with evidence from both domestic and cross-border M&As.

LITERATURE REVIEW

In the extant literature of M&As, there are two main measurements for the post-M&A financial performance, namely, the market-based economic indicators and accounting-based indicators (F. Zhang et al., 2020). Market-based economic indicators are widely used measurements in finance literature and share market valuations to determine the success or failure of M&As. Tobin's q, market to book value (MTBV), price-to-earnings (PE) ratio, and equity value are market-based financial indicators that measure the impacts of M&As on firm performance (Bruner, 1999; Lys & Vincent, 1995; Thompson & Kim, 2020). These indicators assume that the capital market is efficient, and changes in the equity value of both the acquiring and the target companies reflect the economic impact of the M&As (Andriuskevicius, 2019). However, share price around the time of takeover may be overvalued or undervalued by the market participants (Xu et al., 2018). In other words, share prices are more sensitive to the public announcements made by companies rather than their operating performance (Sagheer Uddin & Azam, 2020). Sometimes, significant premiums are paid to gain control of undervalued companies even when no synergy effects are expected to result from the M&As (F. Fu et al., 2013). Capital market studies categorize capital market efficiency into weak, semi-strong, or strong forms. Yang et al. (2015) presented evidence that the Chinese capital market is less informational efficient as compared to developed markets. On the other hand, accounting-based indicators use accounting data to measure post-M&A financial performance (Yeh & Hoshino, 2002; Healy et al., 1992). These indicators include return on assets (ROA), return on equity (ROE), and earnings per share (EPS) (Fraser & Zhang, 2009). Compared with ROE, ROA fully reflects the utilization rate of assets by the firm (Salvi et al., 2018).

Empirical research has shown that post-M&A performance in different sectors obtained mixed results (Choi et al., 2020). Rhoades (1998) did not find a significant improvement within the banking sector because the operating costs did not reduce after the M&As. In contrast, a study by Houston et al. (2001) showed that the M&As of banks, which were accompanied by detailed projections of cost savings, could generate higher abnormal returns. Liargovas and Repousis (2011) concurred that shareholders of commercial banks received a substantial positive cumulative average abnormal return for M&As after the 1990s. In the information technology and telecommunications sector, Lys and Vincent (1995) found that the shareholders suffered a significant loss of value due to substantial commitment and overconfidence of top management. For instance, the market value of the automobile firm decreased after the merger between Volvo-Renault in 1993 because the shareholders were dissatisfied with the potential synergy (Bruner, 1999). Choi et al., (2020) concluded that lacking of research at industry levels contributes to the inconsistent and weak results on the relationship between M&As and firm performance.

From a theoretical perspective, motives of M&As can be broadly classified into three distinct types: agency, hubris and synergy (Berkovitch & Narayanan, 1993). Jensen and Meckling (1976) suggest that managerial irrationality gives rise to the Agency problem when managers act to pursue their private interest at the expense of shareholders' wealth. On the other hand, the Hubris Theory proposed by Roll (1986) argues that market inefficiency causes some market participants to make systematic mistakes in corporate takeovers. Driven by their bias perceptions and judgement, hubristic managers could engage in poor acquisition decisions as they believe to have the capability to create synergies in achieving value maximization (L. Fu & Wang, 2019). Similarly, irrational investors who are overconfident and optimistic tend to react to merger announcements more positively when they dominate the market (Rosen, 2006).

From an economic viewpoint, the main reason for M&As is to obtain synergy effects, including economies of scale and exploitation of asymmetric information between the acquiring and target firms (Kwilinski et al., 2020). It is argued that firms can optimize management efficiency and operational efficiency through M&As (Brahma et al., 2018). Usually, there are some restructuring processes among various departments and

personnel to reduce operating costs after M&As (Jiang, 2019). Besides, M&As between suppliers and buyers within the supply chain can secure the source of raw materials for manufacturers. Gudmundsson et al., (2020) documented that variable costs decreased significantly for horizontal airline M&As involving unprofitable firms.

In general, M&As enable access to new resources and new markets, optimization of resources and suppression of competitors to gain a more significant market share. Furthermore, the members in the same group of companies have access to the internal cash flows for more investment opportunities (Myers, 1983). The younger firms can obtain financial support from the parent company after the M&As. This financial aid will reduce the dependence on external borrowings and lower the cost of capital. At the same time, the firm may gain industry-specific human resources that are essential for the success of a business.

Based on the synergistic effect, after the completion of the M&As, the acquiring and target firms will go through a series of integration processes to achieve the financial results of 'one plus one is greater than two'. In summary, the literature suggests that efficiency gains from M&A may arise from economies of scale, economies of scope, more efficient allocation of financial resources, relocation of research and development (R&D), knowledge spill overs, cost savings and other benefits (Fernández et al., 2019). Grounded on the argument suggested by the Synergy Theory, this study proposed the following hypothesis:

H_1: M&As are positively related to corporate performance

Lee (2017) noted that a technology-seeking motive is important in M&A activities based on evidence derived from cross-border M&As that yield synergy gains. W. Zhang et al., (2018) explored the relationship between M&As and firm performance of listed Chinese pharmaceutical firms from 2008 to 2016. The results show that value-chain-extension M&As and technology-seeking M&As are positively related to firm performance (W. Zhang et al., 2018). As noted in Lee (2017), prior studies documented that pharmaceutical firms engage in M&A when seeking patents for drugs. Studies also showed that M&A is used to acquire technology from other industry players in the market and a high correlation is reported between R&D expenditure and M&A activities.

Businesses engage in M&As to tap the innovative potential of young, entrepreneurial organisations as an important source of new technological knowledge and to spur technological innovation (Christofi et al., 2019). It is argued that a firm can create a sustainable competitive advantage when it transfers and integrates the knowledge base of another firm (Barney, 1986; Dhir et al., 2020). The positive effect of the increased knowledge base depends on whether the unification of the knowledge base can provide opportunities for synergies in future research and development for the acquirer (Cloodt et al., 2006). In a knowledge-based economy, intellectual capital, such as patents and copyrights, rather than physical assets becomes the measure of success in enhancing competitive advantage and firm value (Al-Musalli & Ismail, 2012). In particular, when a high-technology firm increases its internal knowledge base by acquiring another firm in the same industry, it can use this knowledge to generate innovations. The acquired knowledge base also increases its ability to integrate and exploit new information for profitable ventures (Cohen & Levinthal, 1989). This suggests that when M&As involve technological components, they are expected to have more impact on the innovation capabilities of the acquiring firm (Cloodt et al., 2006). In summary, businesses engage in M&As for the expansion of its knowledge base involving high-quality knowledge from the target firm (Fernández et al., 2019). Alternatively, firms may acquire companies for the type of technology they need instead of increasing internal R&D investment, and as a result, it provides a substitution effect between internal R&D and technological capabilities of the acquiring firms (Fernández et al., 2019). This view is supported by empirical work of Ma and Liu (2017) and Szücs (2014). Drawing on a knowledge-based perspective in the context of technological innovation, this study proposed the following hypothesis:

H_2: M&As within the high-technology sector have a positive effect on the post-M&A financial performance of the acquirer.

On the other hand, M&A activities that aim to gain market penetration, competitive pricing, and economies of scale (Berkovitch & Narayanan, 1993) do not have a significant effect on subsequent innovation output (Ahuja & Katila, 2001). It is argued that non-technological acquisitions are less likely to provide a competitive advantage to an acquiring firm (Ahuja & Katila, 2001; Brahma et al., 2018). Empirically, Klien and Michaud (2019) noted that consolidation in the water sector did not realize the benefits

resulting from economies of scale given that the improved performance in post consolidation was insufficient to offset the initial cost increase. Similarly, Teti and Tului (2020) found no significant relationship between M&As and cumulative average abnormal returns for the acquiring firms in the infrastructure sector.

Agency problems arise whenever managers have the incentives to pursue their interests at shareholders' expense (Jensen & Meckling, 1976). Therefore, the actual outcome of the M&As could be detrimental to firm value as a result of agency costs when managers consume perquisites at the expense of the shareholders (Nguyen et al., 2012) or serve their own interests rather than those of shareholders (Liargovas & Repousis, 2011). According to Roll (1986), the arrogant and over-optimistic managers of the acquirer may overestimate the market value of the target company, which is harmful to the market value of the acquirer. The M&As between firms could lead to unfavourable firm performance due to disruptions in the activities and organizational routines of the combined firms (Hitt et al., 1996).

Researchers have argued that if M&As are expected to have little or no improvement to the technology and consume significant managerial time of the acquirer, then it can harm the post-M&A firm performance (Cloodt et al., 2006). In the context of the fast growing Chinese economy, several industries, including steel, coal, cement, chemicals, machinery, shipbuilding, and metallurgy are affected by excess capacity (Molnar, 2017). As a result, M&As may cause more corporate restructuring to address the issue of excess capacity. It is argued that the negative impact is more severe within the capital-intensive sectors that are more likely to be over-capacity. Given that the Chinese capital market also has the characteristic of capital-intensive M&A activities, this study further hypothesized the following:

H_3: M&As within the capital-intensive sector have a negative effect on the post-M&A financial performance of the acquirer.

SAMPLE, DATA AND METHODOLOGY

The sampling frame of this study consisted of firms that had completed M&A between January 1, 2012 and December 31, 2016, with data provided

by the Wind Datafeed Service (WDS). Prior studies of M&As in China were mainly based on global financial crisis around 2007-2008 and its relationships with firm value, stock market efficiency, corporate governance and macroeconomic performance (Ahmed et al., 2020). Given that the total M&A deals increased tremendously by 131% from USD 4.7 billion for 2001–2010 to USD 10.9 billion for 2011–2017 (Oh & No, 2020), this study attempted to examine the post financial crisis impact of M&As on firm performance from 2012–2016. The sample firms excluded unsuccessful M&A deals, delisted firms, and acquisitions below 50% of equity. If there were multiple M&As of the same firm, only the largest transaction was selected (Cartwright & Cooper, 1992). There were 1,128 M&A deals during the period chosen, and the final sample contained 434 successful merger deals of Chinese acquirers during the period, as depicted in Table 1.

Table 1: Sample firms

	Number of Firms
Firms with M&A activities	1,128
(-) Unsuccessful M&A deals	(240)
(-) Delisted firms	(217)
(-) Multiple M&As of the same firm	(131)
(-) Below fifty percent of equity	(106)
Sample firms	434

This study followed the classification of high-technology sectors and capital-intensive sectors in other sector-level studies. Chan et al. (1990) classified pharmaceuticals, electronics, information processing technology, instruments, semiconductors, and telecommunications as high-technology according to the classification in the Business Week's annual R&D Score-board. Besides, the financial firms were also considered to be high-technology industry following the advancement in financial technology. On the other hand, firms in capital-intensive sectors include manufacturing, mining, and construction (King & Peng, 2013).

Table 2 shows the distribution of the sample firms over 2012 and 2016, according to their sectors. Following Chan et al. (1990) and Cui and Mak (2002), public health, information technology, and telecommunication service firms were classified within the high-technology sector. Financial firms were also classified as high-technology industry following the employment of financial technology in the finance operations. Thus, the

high-technology sector covered 39.17% of the total sample firms. Those firms in the capital-intensive sector included energy, manufacturing, and utilities (King & Peng, 2013) which constituted 28.80% of the total sample firms.

Table 2: Distribution of Sample Firms by Sector

Sectors	Number of firms	Percent
High-technology sector		
Public health	32	7.37
Finance	17	3.92
Information technology	119	27.42
Telecommunication service	2	0.46
Subtotal	170	39.17
Capital-intensive sector		
Energy	11	2.53
Manufacturing	97	22.35
Utilities	17	3.92
Subtotal	125	28.80
Other sectors		
Material	53	12.21
Optional consumer products	66	15.21
Consumer products	20	4.61
Subtotal	139	32.03
Total	434	100.00

METHODOLOGY

This study employed a panel data analysis on cross-sectional data over several periods. The control variables in this study included cross-border M&As, firm size, state-owned enterprises, board independence, and cash position. Cross-border M&As would most likely face political resistance due to potential impacts on national security and protection of the national economy. As a result, firm performance might be negatively affected after completion of cross-border M&As in a more sensitive sector. It is easier for larger firms to achieve high-levels of integration due to more resources; however, the principal-agent conflict and the overvaluation problem are more severe in larger firms. While M&As of private firms are motivated by efficiency and profitability, M&As of state-owned firms are often

driven by non-market factors. Board independence can reduce agency costs through the role of independent directors who monitor managers and protect the interests of minority shareholders (Fama, 1983). These directors also participated in the construction of corporate strategies based on their experience and knowledge in technology and the business environment (Weisbach, 1988). Having a healthy and sufficient cash position is vital for daily operations and investment opportunities. Therefore, cash position has a positive impact on the financial performance of a firm (Changqi & Ningling, 2010). The models for this study are presented as follows:

$$ROA_{i,t} = \alpha + \beta_1 Merger_{i,t} + \beta_2 Fsize_{i,t} + \beta_3 Cross_{i,t} + \beta_4 State_{i,t} + \beta_5 Bindp_{i,t} + \beta_6 Cash_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$ROA_{i,t} = \alpha + \beta_1 Higtech_{i,t} + \beta_2 Fsize_{i,t} + \beta_3 Cross_{i,t} + \beta_4 State_{i,t} + \beta_5 Bindp_{i,t} + \beta_6 Cash_{i,t} + \varepsilon_{i,t} \quad (2)$$

$$ROA_{i,t} = \alpha + \beta_1 Highcap_{i,t} + \beta_2 Fsize_{i,t} + \beta_3 Cross_{i,t} + \beta_4 State_{i,t} + \beta_5 Bindp_{i,t} + \beta_6 Cash_{i,t} + \varepsilon_{i,t} \quad (3)$$

Where:

ROA	=	Ratio of net profit after tax divided by total assets
Merger	=	Dummy variable of 1 for post-M&As, otherwise 0 for all firms
Hightech	=	Dummy variable of 1 for post-M&As of firms within the public health, financial, information technology and telecommunication service sector, otherwise 0
Highcap	=	Dummy variable of 1 for post-M&As of firms within the energy, manufacturing and utility sector, otherwise 0
Fsize	=	The log of total assets
Cross	=	Dummy variable of 1 for cross border M&As, otherwise 0
State	=	Dummy variable 1 for state-owned enterprise, otherwise 0
Bindp	=	Ratio of number of independent directors divided by board size
Cash	=	Ratio of cash divided by total assets

Following the study by Bhabra and Huang (2013), a dummy variable was used in this study to indicate the post-M&A of the firms. In the subsequent analysis, these post-M&As firms in the high-technology and capital-intensive sectors were identified as dichotomous variables in the respective regression models. The Breusch–Pagan test was executed in

the linear regression model to identify any potential heteroskedasticity issues, and the null hypothesis of homoskedasticity was rejected. Therefore, the estimation commands specify Eicker-Huber-White heteroskedastic-consistent standard errors to overcome heteroskedasticity, and the robust standard errors are reported (Lam et al., 2013). To minimize the impact of outliers, we winsorize all firm-level variables at the 1st and 99th percentiles, excluding dummy variables. (Gungoraydinoglu & Öztekin, 2011; Judge & Korzhenitskaya, 2012).

RESULTS AND DISCUSSION

Descriptive Statistics

Table 3 reports the descriptive statistics for all variables in this study. The level of financial performance of acquirers measured by ROA ranged from -18.4% to 20.1% with a mean of 4.0%. The mean of board independence (Bindp) showed that 35.8% of the board members were independent of the management. The sample firms held 19.5% of the assets in cash for working capital and investment opportunities.

The frequency distribution for the post-M&As (Merger) indicated that 44.75% of the observations were post-M&A during the period of study. The sample firms were further categorized into high-technology sector and capital-intensive sector. The high-technology post-M&As (Hightech) constituted 16.04% of the sample compared to 13.64% of post-M&As within the capital-intensive sector (Highcap). However, there were only 8.06% of cross-border M&As, probably due to political resistance. Additionally, 10.83% of the sample firms were government-controlled and may have multiple socio-economic objectives.

Table 3: Descriptive Statistics

Variable	Obs	Min	Max	Mean	Std Dev
Panel A					
ROA	2,170	-0.184	0.201	0.040	0.045
Firm size (Fsize) (in billion RMB)	2,170	0.129	500.278	7.933	23.326
Board independence (Bindp)	2,170	0.210	0.560	0.358	0.053
Cash position (Cash)	2,170	0.008	0.773	0.195	0.138
Panel B	Obs	Value = 1		Value = 0	
		Frequency	Percent	Frequency	Percent
Merger	2,170	971	44.75	1,199	55.25
High tech merger (Hightech)	2,170	348	16.04	1,822	83.96
Capital intensive merger (Highcap)	2,170	296	13.64	1,874	86.36
Cross border merger (Cross)	2,170	175	8.06	1,995	91.94
State-owned enterprise (State)	2,170	235	10.83	1,935	89.17

Table 4 shows the linear correlation between the independent variables excluding dummy variables of this study. The firm size (Fsize) was significantly, negatively correlated with the ROA. Board independence (Bindp) was positively related to ROA, which indicated that better corporate governance can enhance the operating performance following lower agency costs. There is a positive relationship between cash position and ROA, consistent with the finding of Changqi and Ningling (2010). We also calculated the Variance Inflation Factor (VIF) to detect multicollinearity issues. Untabulated results showed that all VIFs were lower than 2.0, indicating that multicollinearity was not a concern (Sun & Cui, 2014).

Table 4: Pearson Correlation

Variable	ROA	Fsize	Bindp	Cash
ROA	1.0000			
Fsize	-0.0834*	1.0000		
Bindp	0.0739*	-0.1486*	1.0000	
Cash	0.2214*	-0.2924*	0.0805*	1.0000

*significant value of 0.05

Regression Results

The effects of M&As on ROA are presented in Table 5. Model 1 shows a positive relationship between M&As (Merger) and firm performance (ROA) for all sectors, with a coefficient of 0.0126 that indicated that the consolidated firms (acquirers) in China performed better after the M&As. Consequently, hypothesis H1 was supported for ROA as an accounting performance measure when M&As are positively related to corporate performance. This implies that acquirers can increase revenue or reduce operating costs through economies of scale after M&As. The coefficient of high-technology mergers (Hightech) in Model 2 showed that ROA increased by 0.86% after M&As. The results provide empirical evidence to support hypothesis H2 that M&As within the high-technology sector and has positive effect on the post-M&A financial performance of the acquirers. Consistent with the findings by Shih et al. (2010), the banking sector can obtain new knowledge and know-how as well as a customer base through M&As. Moreover, Houston et al. (2001) and Liargovas and Repousis (2011) found that the finance sector performed better after M&As, probably due to more robust and meticulous financial investigation before the deals were concluded. However, the coefficient of capital-intensive mergers (Highcap) in Model 3 was not significant. Thus, hypothesis H3 was not supported. This suggests that mergers within the capital-intensive sector do not affect the ROA negatively. The result indicated that mergers within this sector do not bring positive outcomes to the acquirers.

Following prior studies (Qizam & Fong, 2019), we ran the robustness test using a fixed effect model with least squares dummy variable (LSDV) regression (OLS with a set of year-dummies) to notice the year effect more distinctly. The results in Model 4 significantly hold for all the year-effect coefficients compared to Model 1, indicating that mergers generally bring a positive impact to the ROA. Similarly, Model 5 included year-fixed effects to test the significance of the estimated coefficients and the results were consistent with the Model 2, suggesting that mergers within the high-technology sector were beneficial to the operating performance of the acquirers. The results in Model 6 including year-effects were also consistent with Model 3, where mergers within the capital-intensive sector did not affect the operating performance of the acquirers.

In all models, two control variables contributed to operating performance. Board independence (Bindp) was positively related to ROA; this implied that corporate governance practice can reduce agency costs and improve operations of the acquirers after M&As. Similarly, cash ratio (Cash) was positively related to ROA; therefore, internal cash flows allowed more investment opportunities and better financial support from parent companies after the M&As.

Table 5: Effects of M&As on ROA

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Merger	0.0126***			0.0197***		
	(0.0021)			(0.0029)		
Hightech		0.0086***			0.0093***	
		(0.0024)			(0.0026)	
Highcap			0.0034			0.0033
			(0.0023)			(0.0024)
Cross	-0.0051	-0.0062*	-0.0059	-0.0051	-0.0063*	-0.0059
	(0.0036)	(0.0036)	(0.0036)	(0.0036)	(0.0036)	(0.0036)
State	-0.0026	-0.0039	-0.0041	-0.0034	-0.0042	-0.0040
	(0.0030)	(0.0029)	(0.0030)	(0.0030)	(0.0030)	(0.0030)
Fsize	-0.0057**	-0.0012	-0.0008	-0.0047*	-0.0006	-0.0009
	(0.0024)	(0.0023)	(0.0023)	(0.0024)	(0.0024)	(0.0024)
Bindp	0.0393*	0.0420**	0.0465**	0.0471**	0.0456**	0.0486**
	(0.0208)	(0.0210)	(0.0209)	(0.0208)	(0.0211)	(0.0211)
Cash	0.0751***	0.0714***	0.0715***	0.0705***	0.0686***	0.0696***
	(0.0076)	(0.0076)	(0.0077)	(0.0076)	(0.0077)	(0.0077)
_cons	0.0434**	0.0182	0.0149	0.0395**	0.0167	0.0174
	(0.0184)	(0.0180)	(0.0180)	(0.0184)	(0.0186)	(0.0186)
Year-effects	No	No	No	Yes	Yes	Yes
N	2170	2170	2170	2170	2170	2170
r2	0.0693	0.0591	0.0550	0.0789	0.0617	0.0575
Mean VIF	1.16	1.08	1.09	1.16	1.08	1.09

All the VIFs are lower than 2.0.
*** Significant value of 0.01; ** Significant value of 0.05; * Significant value of 0.10
ROA is the ratio of net profit after tax divided by total assets; Merger is a dummy variable of 1 for post-M&As, otherwise 0 for all firms; Hightech is a dummy variable of 1 for post-M&As of firms within the public health, financial, information technology and telecommunication service sector, otherwise 0; Highcap is a dummy variable of 1 for post-M&As of firms within the energy, manufacturing and utility sector, otherwise 0; Cross is a dummy variable of 1 for cross border M&As, otherwise 0; State is a dummy variable 1 for state-owned enterprise, otherwise 0; Fsize is the log of total assets; Bindp is the ratio of number of independent directors divided by board size; Cash is the ratio of cash divided by total assets. Robust standard errors are reported in parentheses

CONCLUSION

This study expanded upon the findings of single-sector studies of M&As by Yang et al. (2015) in a transitional economy, such as China. The outcomes of the research note that M&As have a strong positive association with consolidated firm performance in China, providing evidence that the synergistic effect does exist to enhance the efficiency of the acquiring firms.

The researchers further examined the multi-sector context of the high-technology sector, including public health, information technology, telecommunication service and financial firms, as well as the capital-intensive sector including energy, manufacturing, and utilities firms. The findings suggest that M&As could be a strategic growth path to realize competitive advantage within the high-technology sector. However, the attempt is only helpful through the technology learning process. The acquisition of intellectual properties is needed for sustainability in a knowledge-based economy through the transfer of knowledge and know-how rather than physical assets. Therefore, firms should aim to obtain technological competitiveness in M&As.

On the other hand, the findings within the capital-intensive sector, such as oil and gas companies implied that M&As within this sector are less likely to bring a new knowledge base to the post-M&A innovative performance (Yang et al., 2015). Furthermore, during the integration process, the managers of both the acquirer and acquiree have to deal with disruption of the existing organizational processes and routines (Hitt et al., 1996) that consume resources, rather than having the capacity to invest in long-term innovative projects. Larger firms require more corporate restructuring on average to integrate the daily operations of both acquiring and target firms after M&As.

The findings provide useful insights from the practical perspective to both corporate players and policy-makers on the types of M&As that stand higher chances to generate positive outcomes and those that need extra measures and further scrutiny to prevent inefficient allocation of resources. Investors who are concerned about value-maximisation of their investments, should pay attention to the role of independent directors as an effective monitoring mechanism to restrain managers from irrational behaviour in

the principal-agency relationship or as suggested by the Hubris Theory. To the government, given that both high-technology and capital-intensive sectors are important sectors to spur the growth of the Chinese economy, the relevant authorities need to set more specific guidelines to prevent poor quality M&As that are driven by irrational managerial behaviours. From the theoretical perspective, the results of the present study add new evidence about the synergy effect of technological innovation M&As in line with a knowledge-based perspective from an emerging economy. It could be worthwhile to conduct future research with alternative measures of firm performance, such as market-based performance and non-financial performance. In addition, future research could extend this study by examining M&As activities between the acquirer and acquiree from more dimensions as well as the long-term post-M&A financial performance to gain a more comprehensive assessment of the total impact of M&As.

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