Social Mosaic Theory: Empirical Investigation of Re-engineering of Information System in Merger and Acquisition Performance and Efficiency

Xinyue Yang(✉)

Accounting, Corporate Governance, Beijing Jiaotong University, Beijing, China
448487896@qq.com

Abstract. Mergers and acquisitions could have a negative impact on the operations of the companies involved when Information Science methodologies are not properly implemented. The requirement to integrate individuals, information systems, business processes, and a wide range of information technologies across the merging firms is one of the most significant difficulties. The study uses the Social Mosaic Theory and social network asymmetry with information asymmetry to analyze the influence of the usage of Business Information Technology on the efficiency of company mergers and acquisitions. Using the iFand database, which contained the merger transaction, a total of 22,758 valid samples were collected from A-share listed companies between 2008 and 2018 in addition to financial parameters gleaned from the CSMAR database and the Internal data. Linear regression is used to test the significance of the hypothesis. With a p-value of 0.01, the results show that a high level of Information System use and re-engineering can enhance M&A process performance and efficiency. According to the findings, information science can help mergers and acquisitions run more smoothly while at the same time mitigating some of the downsides.

Keywords: Business Information Technology · Merger and Acquisition Efficiency · Social Mosaic Theory · Information System · Risk Management

1 Introduction

Mergers and acquisitions are vital to achieving industrial restructuring and resource redistribution. China's M&A boomed according to state policy. According to the statistics of the iFinD database, from 2008 to 2018, the total amount of M&A agreements of Chinese enterprises reached 8,586,946 million yuan, with more than 10,000 cases, with an average annual growth rate of 18.17%. Even in 2020, when the COVID-19 epidemic, economic and political uncertainties both at home and abroad are overlapping, the total value of M&A transactions has reached 8,586,946 million yuan and the number of M&A agreements has exceeded 10,000. The total value of M&A agreements in China has increased by more than 5% compared with the previous year, 278.47% higher

A. Luqman et al. (Eds.): PMIS 2022, AHCS 6, pp. 419–426, 2023.
https://doi.org/10.2991/978-94-6463-016-9_44

than 2010, and the amount involved has increased by 295.05%. In the future, with the endogenous power of high-quality economic development, the M&A market of Chinese enterprises will be further expanded. Therefore, while making use of M&A to rapidly expand enterprises, how to improve the efficiency of mergers and acquisitions to achieve stronger and better is the key to ensuring the leap-forward development of enterprises.

The utilization of business information technology, quantitative modeling, transmission, and information exchange impacts businesses, decision-makers, and the general public. The use of Business Information Technology (BIT) will impact the combined company's survival and growth. The impact of BIT on enterprise mergers and acquisitions, and their success, is a research question. This research examines the impact of Business Information Technology on M&A efficiency using embedding and social resource theories. Here comes the following problem: Can BIT reduce the likelihood of M&A? Can BIT reduce the impact of information asymmetry on M&A performance? The study employs a unique micro-analysis method that develops a social network and quantifies BIT interaction between firms. This paper uses the two dimensions of initiating merger and acquisition possibility and acquisition performance to replace merger and acquisition efficiency, and specifically studies the two problems of BIT and initiating merger and acquisition possibility, BIT and M&A performance. Second, it studies the impact of BIT on M&A behavior. The study, applying the macro social method to the micro-analysis, adds to the corpus of knowledge in Business Information Technology and M&A, as well as economic value creation in BIT.

The rest of this article is arranged as follows: the second part is the theoretical analysis and research hypothesis; the third part is research Methodology. Based on the brief analysis, the samples and data, and model construction of this paper; the fourth part is divided into empirical result analysis, including descriptive statistics and main regression analysis; and the fifth part is the conclusion.

2 Theoretical Analysis and Research Hypothesis

2.1 Business Information Technology and Company, Decisions and Economic Consequences

Business Information Technology and information flow can have an impact on executive incentives in an organization, according to Xie Deren and Chen Yunsen (2012). To mitigate the negative impact of information risk management on investment possibilities and effectively respond to economic policy uncertainties, BIT is a key channel to play the role of information transmission and governance [6]. At the same time, it can improve the governance effect of enterprises and reduce the degree of information asymmetry, thus alleviating the financing constraints of enterprises [11]. While doing so, it has the potential to enhance corporate governance while also decreasing information asymmetry, so easing financial limitations for businesses [11]. Risk management, according to Xu Nan and Cao Chunfang (2016), reduces the investment-cash flow sensitivity and KZ index of companies and has a u-type impact on the cash holding curve of companies.

2.2 Business Information Technology and Efficiency of Corporate M&A

How will BIT affect the efficiency of mergers and acquisitions in the context of mergers and acquisitions? This paper uses the two dimensions of initiating merger and acquisition possibility and acquisition performance to replace merger and acquisition efficiency, and specifically studies the two problems of Information Systems (IS) and initiating merger and acquisition possibility, Information Systems (IS) and merger and acquisition performance, which is based on the two dimensions.

2.2.1 Business Information Technology and the Possibility of Initiating Merger and Acquisition

The first and most significant decision for businesses is whether or not to initiate mergers and acquisitions during the transaction process and what type of merger and acquisition is initiated. Projects involving the combination of two or more businesses demonstrate a "doing more but not well" performance in practice (Zhang Xin, 2003). It's easier to connect with more individuals if you're using BIT and IS more frequently, which means you'll have a stronger ability to deliver on your promises. Mergers and acquisitions are more likely to succeed if companies can effectively assess investment prospects, increase their success rate, and limit the number they initiate. The higher BIT means more connections with more people and shorter contact paths, easy access to information and expertise circulating through the network, and greater ability to deliver. It is beneficial for enterprises to accurately grasp the investment opportunities, improve the success rate of mergers and acquisitions, and reduce the initiation frequency of mergers and acquisitions.

H1: The greater the use of business information technology is, the less likely a company is to initiate mergers and acquisitions.

2.2.2 Business Information Technology and M&A Performance

According to Granovettor's social mosaic theory, an enterprise's economic behavior and outcomes are influenced by the social interactions surrounding it. Having a similar IS can facilitate information flow and communication between the owner and the target party, reduce management risk, and lessen knowledge asymmetry between the two parties. Both parties are more likely to make optimal decisions if they have information advantages. BIT information is cheap and reliable, also serving as a smoother communication mechanism for the two parties, which is an important channel to transfer relevant information, promote mutual understanding, and reduce the degree of information asymmetry between both parties, thus reducing the transaction cost of the merger and the risk of overpayment by the merger parties. It also reduces the degree of knowledge asymmetry between the parties, lowering the transaction cost of the merger and lowering the risk of overpaying by the merging parties. Considering the analysis, the hypothesis is proposed.

H2: The use of Business Information Technology can improve the performance of mergers and acquisitions.

3 Research Methodology

3.1 Sample Selection and Data Sources

Between 2008 and 2018, A-share listed firms were chosen for this study. The data was screened using existing research, and a total of 22,758 valid samples were obtained. The iFand database provided the merger transaction data in this article, as well as financial metrics from the CSMAR database and Internet data. This paper used 1% winsorization for all continuous variables to eliminate the effect of extreme values on the results.

3.2 Variable-Definition

3.2.1 The Explained Variable

3.2.1.1 M&A Possibilities

M&A is set as a virtual variable representing the possibility of the enterprise. If the enterprise initiates a merger and reorganization activity in that year, the variable will be 1, otherwise 0.

3.2.1.2 M&A Performance

M&A Business Performance (△ROA) and M&A Market Performance (△Q1) are used to represent corporate M&A performance (Zhang Wen et al., 2013, Chen Shihua et al., 2015; Chen Shenglan, Ma Hui, 2017). The greater the value of the above two indicators, the better the M&A performance.

3.2.2 Interpreting Variables

In the existing research, the use of Business Information Technology and the varying degree of use are reflected in three categories; center degree, intermediary center degree, and proximity center degree, all three indicators can reflect the use of BIT in different organizations. These metrics all have their advantages and utility, and all represent an aspect of the concept of centrality, which cannot be measured using a single centrality metric alone (WassermanandFaust, 1994; Larckeretal, 2010). Therefore, this paper uses simple summing and hierarchical analysis to combine the three measures to calculate the BIT.

3.2.3 Control Variable

Referring to the existing documents, this paper selects the natural logarithm (Size), asset-liability ratio (Lev), return on assets (ROA), revenue growth rate (Growth), two positions (Dual), equity concentration (First), and other variables to control the influence of the company's financial and governance factors on merger and acquisition decisions.

Table 1. Descriptive statistics of the main variables

	N	SD	Mean	Min	Max
BIT	1,855	70.93	144.2	38.63	408.5
M&A	1,855	0	1	1	1
△ROA	1,855	0.0706	−0.0087	−0.3249	0.1853
△Q1	1,855	1.3300	−0.2487	−4.8780	3.8838
Asset	1,855	1.0996	22.1505	20.0821	25.2377
Lev	1,855	0.1933	0.4212	0.0649	0.8601
Turnover	1,855	0.4245	0.6301	0.0890	2.4201
Growth	1,855	0.5487	0.2796	−0.2701	3.4082
ROA	1,855	0.0635	−0.0154	−0.3341	0.1587
First	1,855	14.4662	33.1174	8.09	71.87
DUAL	1,855	0.4521	0.2863	0	1

3.3 Model Construction

To test two hypotheses, the following models are used:

$$\text{M\&A} = \alpha + \beta_1 \times \text{NET} + \beta_2 \times \text{Size} + \beta_3 \times \text{ROA} + \beta_4 \times \text{Grouth} + \beta_4 \quad (1)$$

$$\text{performance} = \alpha + \beta_1 \times \text{NET} + \beta_2 \times \text{Size} + \beta_3 \times \text{ROA} + \beta_4 \times \text{Grouth} + \beta_4 \quad (2)$$

Since M&A is a binary variable, Model (1) was estimated using the Logit model. Model (2) is an OLS model.

4 Empirical Results

4.1 Descriptive Statistics and Correlation Analysis of the Main Variables

Table 1 reports the descriptive statistical results of the main variables presented in this paper. The average values of △ROA and △Q1 market performance of the enterprises initiating M&A are –0.0087 and −0.2487, respectively, indicating that the company's merger and acquisition activities cannot fully meet the expectation of improving enterprise performance within two years, and partially verify Wang Yan and Kan Shuo's views (2014). Moreover, the mean value of BIT is 144.2, showing that the whole organization uses BIT sparingly. Notably, the key explanatory variables had no significant associations.

Table 2. Business Information Technology and merger possibility

BIT possibility of initiating merger and acquisition			
	(1)	(2)	(3)
BIT	−0.0009*** (−2.82)	−0.0008** (−2.20)	−0.0013*** (−3.56)
Asset		−0.0012 (−0.05)	−0.0722*** (−2.71)
Lev		−0.5480*** (−3.79)	0.3493** (2.20)
Turnover		−0.2044*** (−3.44)	−0.0595 (−0.79)
Growth		0.6569*** (12.48)	0.6681*** (12.11)
First		−0.0111*** (−6.27)	−0.0068*** (−3.53)
ROA		−2.2028*** (−4.76)	−1.5353*** (−3.19)
Industry & Year	No	No	Yes
N	1700	1700	1700
p	0.0000	0.0000	0.0000

4.2 Main Regression Analysis

4.2.1 The Use of Business Information Technology and the Possibility of Merger and Acquisition

Table 2 shows the regression coefficients for Hypothesis 1. Regression (1) demonstrates a significant negative association between BIT and the potential of mergers and acquisitions (M&A) ($p < 0.01$), showing that the more BIT is used, the less likely the firm is to begin mergers and acquisitions. The preceding findings support Hypothesis 1, demonstrating that the higher the BIT, the more prudent the firm and the less likely mergers and acquisitions.

4.2.2 The Use of Business Information Technology Degree and M&A Performance

Table 3 shows the regression results for Hypothesis 2. The regression results show that the regression coefficients of M&A business performance (△ROA) and M&A market performance (△Q) are all significantly positive ($p < 0.01$), demonstrating that the more used, the better the enterprise's M&A performance. The above findings support Hypothesis 2, demonstrating that BIT can help improve corporate merger performance.

Table 3. BIT and M&A Performance

Cactor variable: M&A performance				
	Operating Performance (ROA)		Market Performance (Q)	
	(1)	(2)	(3)	(4)
BIT	0.0001*** (4.60)	0.0001** (2.40)	0.0025*** (5.86)	0.0026*** (6.20)
Asset	−0.0125*** (−5.81)	−0.0134*** (−6.59)	−0.1949*** (−4.83)	−0.2082*** (−5.15)
Lev	0.0354*** (3.01)	0.0308*** (2.72)	0.0815 (0.38)	−0.2304 (−1.29)
Turnover	0.0058 (1.48)	0.0082* (1.75)	0.0044 (0.07)	0.0498 (0.68)
Growth	0.0091** (2.35)	0.0065** (2.09)	−0.3798*** (−5.77)	−0.3908*** (−8.04)
DUAL	−0.0035 (−0.94)	−0.0025 (−0.67)	0.0187 (0.27)	0.0519 (0.89)
First	0.0003*** (2.84)	0.0003** (2.55)	0.0085*** (4.07)	0.0040** (2.13)
Industry & Year	No	Yes	No	Yes
Adjusted R^2	0.0318	0.0732	0.0589	0.3540
N	1800	1800	1800	1800
F	7.9418	2.8532	11.9866	13.8610
p	0.0000	0.0000	0.0000	0.0000

5 Conclusions

This article empirically evaluates the impact of Business Information Technology on the efficiency of mergers and acquisitions using A-share listed businesses from 2008 to 2018. The study indicated that the more BIT an organization uses, the less likely it is to initiate mergers and acquisitions, the better the acquisition performance will be. The results of this paper show that BIT is an important source of relevant strategic information such as mergers and acquisitions, and the enterprises should make full use of the information transmission role of BIT in the enterprise merger and acquisition activities. Enterprises should effectively build BIT relations, and make full use of the information advantages and control advantages brought by the BIT, so as to improve the efficiency of enterprise mergers and acquisitions.

In conclusion, BIT is a major source of relevant strategic information such as mergers and acquisitions, and organizations should fully utilize information transmission in mergers and acquisitions. To improve the efficiency of corporate mergers and acquisitions, companies should examine their own BIT usage, create IS properly, and fully utilize the benefits of IS. The study's limitations are as follows: (1) Only the impact of

BIT on M&A efficiency was studied, and other IS variables were not. Future research can be done in this area.

References

1. Chen Y (2015) Social networks and enterprise efficiency: evidence based on structural cave location. Account Res 01:48–55 + 97
2. Chen Y, Xie D (2012) Director network, independent director governance, and executive incentive. Financ Res 02:168–182
3. Chen Y, Xie D (2011) Network location, governance of independent directors and investment efficiency. Manage World 07:113–127
4. Liang S, Chen D, Fu B, Fang K (2018) Network Center and accounting robustness of independent directors. Account Res 09:39–46
5. Roy S et al (2021) The Artificial Intelligence and Inventory Effect on Banking Industrial Performance. Turk Online J Qual Inq (TOJQI) 12(6):8100–8125
6. Shao L, Han C, Chen F (2020) Study on the impact of economic policy uncertainty of director network based on corporate investment. Soft Sci China 05:184–192
7. Nithyanantham V, Ogunmola GA, Venkateswaran PS, Rajest SS, Regin R (2022) The impact of gender diversity on organizational performance in banks. Turk J Physiother Rehabil 32(3):45453–45489
8. Wang Y, Zhang G (2018) Director network and enterprise innovation: attracting investment and wisdom. Financ Res 06:189–206
9. Wan L, Zheng X (2014) Structural hole characteristics of directors' network and company mergers and acquisitions. Account Res 05:67–72 + 95
10. Xu N, Cao C (2016) Independent directors network with listed companies cash holding. Nankai Econ Res 06:106–125
11. Yin Z, Zeng H, Mao C (2018) Mechanism of director network to alleviate financing constraints: Information effect and governance effect. Financ Trade Econ 39(11):112–127
12. Yang M, Ai Q (2021) The post-acquisition performance of cross-border mergers and acquisitions conducted by Chinese firms in the high-tech industries: profitable or innovative? Thunderbird Int Bus Rev 63(3):355–367