Cuadernos de Economía (2022) Volume 45,Issue 128 Page124-131

Asociación Cuadernos de economía

Cuadernos de economía

www.cude.es

ARTÍCULO

Empirical Research Based on Chinese-Listed Companies Around the Performance of Corporate Mergers and Acquisitions

Jiachen Zhang[1], Qingbang Mu[2], **Brian Sheng-Xian Teo[3], Jaizah Othman[4]**

[1] *Graduate School of Management, Management and Science University, Shah Alam, 40100, Malaysia;* zjc@haut.edu.cn

[2] *School of Management, Henan University of Technology, Zhengzhou 450001, China;* mqb@haut.edu.cn
[3] *International Academic Affairs Department, Management and Science University, Shah Alam, 40100, Malaysia;* brian_teo@msu.edu.my
[4] *Faculty of Business Management & Professional Studies, Management and Science University, Shah Alam, 40100, Malaysia*

[*] *Correspondence:* brian_teo@msu.edu.my

Jel Codes:

M14; N14

Keywords: Chinese Companies, Mergers and Acquisitions (M-As), Operational Performance, High-Tech Domain, Financial Synergy.

Abstract: This study compared the synergistic effects of technology improvements and capacity utilization on the firm performance of the acquiring companies following mergers and acquisitions (M&As) across industries, given the diverse motives for M&As. From 2012 to 2016, the sample consisted of mergers and acquisitions initiated by Chinese companies listed on the Shanghai and Shenzhen Stock Exchanges. On average, the firms performed better after the M-As. According to the data, the operational performance of enterprises in the high-tech sector, particularly those in public health, computing, telecommunications, and banking, has improved following M&As. This evidence illustrates that M&As can benefit high-tech enterprises by providing a larger talent pool and stronger financial synergy. It was discovered that good governance, as exhibited by an unbiased board, positively impacts corporate success. Since China's capital market is changing from a government-driven to a market-driven environment, the acquisition of innovation through mergers and acquisitions may be a crucial corporate growth strategy. The findings can assist business professionals and policymakers in determining which types of mergers and acquisitions are more likely to yield positive outcomes and which require additional controls and scrutiny to prevent the misallocation of resources.

Author Correspondence: brian_teo@msu.edu.my

https://doi.org/10.32826/cude.v1i128.714

1. Introduction

From a limited number of trades comprising 2,000 agreements worth $250 billion, 40.000 (M&A) transactions totaling over $400 billion have been finalized. This astronomical increase in mergers and acquisitions is attributable to various reasons, motivations, market mechanisms, and institutional variables that influence firm decisions to engage in M&As, whether analyzed together or separately. It appears that the ultimate objective of corporate managers who make purchases, regardless of their initial intentions, is to increase long-term profit, although this is not always the case. In the "free cash flow" hypothesis, Jensen provides an excellent example of a platform that can eventually lead to greater efficiency. (Kar et al., 2021) Jensen argues that takeover-induced reorganization and reconstruction result in long-term financial gain. In recent decades, mergers and acquisitions (M&As) have become more prevalent as an internationalization strategy among firms from emerging economies. Due to the rapid expansion and growing relevance of M&A, most research has focused on improving their efficiency. The success of mergers and acquisitions, especially acquirer productivity, has also been thoroughly researched. Particularly adhering to business needs and requirements becomes more difficult due to these transactions, which expose organizations to a greater variety of new stakeholders from numerous places. Typically, businesses modify their service quality to fulfill the needs or expectations of stakeholders from varying institutional, cultural, and economic backgrounds. As can be seen, a company's ability to integrate after an overseas M&A decides whether the deal would increase results or eat up valuable space, so hindering the company's competitiveness (Cho et al., 2021).

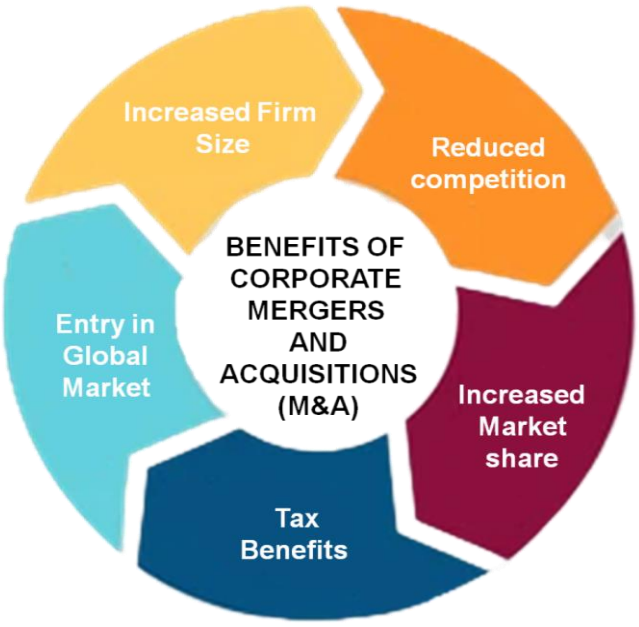

Figure 1: Benefits of Corporate Mergers and Acquisitions (M&A)

The advantages of Mergers and Acquisitions (M&A) in business are depicted in Figure 1. Mergers and acquisitions (M&A) are a significant component of business structure that contribute to a company's continued development. Digital networks are currently altering the M&A landscape because acquirer companies can use them to: discover and evaluate the range of target companies' consumers' online practices and customer reviews; increase consumer, colleague, and market capability in the benefits and efficiency of the firms; mitigate weak consumer reactions to M&A; and facilitate the post-M&A partnership. It is uncertain whether and how organizational acceptance of online networking works (D. Wang et al., 2021), despite the prominent role that social media use by businesses and investors have been demonstrated to play in M&A research. The expansion of the country and its enterprises move in the same direction. Mergers and acquisitions are two of the most common business expansion tactics. Most potential benefits of mergers and acquisitions focus on boosting earnings and shareholder value (Mody et al., 1995). Mergers and acquisitions are vital for corporate success in today's global economy, given the importance of capital resources such as information, talent, and client contacts and the intensifying competition among individuals and innovation. M&A is a global process involving businesses worldwide since the management of these organizations desires to take advantage of the aforementioned potential benefits and synergies. The BRICS nations are significant (Bansal et al., 2021). As a proportion of BRICS enterprises' global M&A volume, BRICS countries play a key role in this industry. Dusty and increase the variety of things it provides.

The creation of synergies and the correction of management faults are the two primary ways in which mergers and acquisitions can increase the efficiency of purchasers. Operations and finances are capable of generating synergies. Administrative crossovers can be caused by economies of scale, economies of scope, a reduction in agency costs, and the transfer of knowledge or skills. They are more widespread in mergers and acquisitions involving comparable organizations (Sergeevic, 2021). M&as are essential components of business reorganization. A merger is an act of joining two or more enterprises. Compared to mergers, acquisitions include the retained ownership of the acquired company by the acquiring corporation. Despite the emergence of new analytical tools, numerous studies and positions on this subject have been developed over time (Garg, 2021). In these studies, the performance of the merged companies and the precise reasons that contributed to their success are analyzed in depth. There are numerous methods for evaluating a company's success after a merger. Still, one of the most reliable is financial studies that emphasize net income or return on capital as the specific financial statement measurements. Specifically, the analysis of financial statements and accounting performance of businesses are conducted by exporting and comparing various accounting measures from them or by employing financial ratios for several years preceding the merger and the year following the merger (Pazarskis et al., 2021).

Mergers and acquisitions (M&A) are major globalization phenomena that necessitate a substantial reallocation of economic activity. Between 2016 and 2020, the global value of mergers and acquisitions surpassed $4 trillion, producing an unprecedented volume wave. Since the 1980s, cross-border mergers and acquisitions (M&A) among European Union (EU) countries have increased, with a brief downturn during the financial crisis. Substantial scholarly consensus exists that the EU's financial and banking union significantly impacts the rise of M&A activity within the EU. Interregional mergers and acquisitions can also produce brand-new production landscapes in terms of the spatial concentration of sectors. Therefore, understanding the types of mergers and acquisitions that improve EU integration in certain areas and the geographical characteristics that facilitate this process is necessary. In the framework of labor economics, the growth in the spatial center of economic activity in significant cities produced by the allocation of territory during mergers and acquisitions has been extensively examined (Aquaro et al., 2021). Occasionally a company's decision to engage in M&A is optional and sometimes necessary. To expand, a company must undergo both organic and inorganic expansion through mergers and acquisitions. Thus, in an era of intense competition between businesses, studying factors influencing mergers and acquisitions has assumed the utmost importance (Ahmed et al., 2020). Businesses that want to broaden their customer base to increase sales or profits must decide to expand their

operations. Organizations must decide whether to prioritize process quality or enter new markets via a Greenfield or Brownfield approach. While brownfield or mergers and acquisitions (both domestic and international) result in ownership changes for the acquiring company, greenfield investments involve the creation of new businesses (Kapil et al., 2021).

2. Contributions

- By methodically using logical, statistical procedures to describe, show, and assess data throughout various periods for this study, cross-sectional data were subjected to a panel data analysis.
- To exclude the dummy variable from the data, Pearson correlation is applied.
- The creation of hypotheses was used to analyze the key metrics.
- On the whole, the firms did better after the M-As by using these techniques.
- Thus, we proposed a Panel data analysis and Pearson correlation (PDA-PC)

The remaining paper is divided into the following sections. Section II presents the relevant literature and problem statement. In Section III, the suggested model's objectives are given. Results and discussion are included in Section IV. Section V contains the conclusion of the suggested research.

3. Literature Survey

Using data from Chinese listed enterprises, Yang et al. (2022) explored the difference in difference (DID) approach to the impact of mergers and acquisitions on Chinese acquirers. The model framework should not affect the behavior of DID results because DID's restrictions are based on distance measurement without considering the raw values for each expert and not on how these discrepancies are modeled. García et al. (2022) examined the enterprise of (M&A) and its contribution to corporate strategy using agency theory on corporate governance. According to numerous authors, the primary origins of agency theory include the shift from management (Shahabaz et al., 2021), conflicts of interest, risk aversion, and asymmetric knowledge. Motivated by the failure of trade diplomacy to regulate overseas support and the increase in Chinese investment in mergers and acquisitions, Blockx (2021) chose a Commission regulation strategy to prevent foreign subsidies from distorting the domestic market. However, there may be occasions where departing from the Welfare benefits framework is essential or preferred. It will take longer to search through the data. K-nearest neighbor (KNN) was investigated by Kalaivani et al. (2022) to evaluate the long-term performance of enterprises undergoing M&A integration. The combination of various data analytics tools and data collection techniques enables businesses to make decisions regarding mergers and acquisitions, as well as profitable insights and the effects of pre-and post-merger integration in a typical organizational setting.

It is extremely inefficient operationally, and determining the correct value for K is difficult. Luo et al. (2021) employed a Genetic Algorithm (GA) for the efficient compensation of the offer acquired through mergers and acquisitions (M&A) procedures. There are specified hypotheses and evaluation indicators. Z. Li (2022) found that regression analysis and mean test results indicate that the presented hypotheses are correct in certain instances. GA requires less knowledge about the topic, but it cannot be easy to create an optimal solution and execute the formulation and functions effectively. Q. Wang et al. (2021) presented the sparsity technique, which optimizes the sparsity of the hypothetical theory of mergers and acquisitions M&A while simultaneously determining the ideal solution. A sparse matrix carries significantly less information than a non-sparse matrix since a high proportion of its members must equal 0. A sparse vector cannot model all occurrences. Hong et al. (2022) used AdaBoost to learn multiple weak classifiers (decision trees) to create a good decision-making model with an enormous monetary transaction database and method to assess cross-border M&A choices through the analysis of strong pass data of the world's economic industry under ecology modeling for the utilization of advanced nation-, deal-, and firm-level markers associated with feasible development. Because every classifier must rectify the mistakes of its predecessors, it is susceptible to outliers.

Consequently, the approach relies heavily on exceptions. Z. Li (2022) utilized immune genetic algorithms to optimize the convergence of the risk evaluation program, increase the uniformity and reliability of the M&A risk assessment technique, select the business M&A risk evaluation criteria, determine the weights for the evaluation indicators, and develop a prediction equation for enterprise M&A risk assessment. Immune genetic algorithms have the disadvantage of restricted regional indexing when addressing the issue of job-shop management, and it is difficult to address large-scale scheduling issues successfully. Vertakova et al. (2021) created a completely automated technique for the selection of hedging strategies in the implementation of Mergers and Acquisitions (M&A), which has the potential to become a useful financial planning tool for companies engaging in such agreements. Cost increases make it more difficult to implement in business (Salihu et al., 2022). Wanke et al. (2022) investigated a two-stage DEA technique based on frequently discovered corporate characteristics in this analysis to analyze the effectiveness drivers acquired during the mergers and acquisitions (M&A) process. It requires additional time and upkeep to accomplish. Therefore, the abovementioned methods can no longer accommodate mergers and acquisitions (M&A) in Chinese companies. To solve the limitations of existing technologies and significantly improve merger and acquisition (M&A) predictions, we introduced a Panel data analysis and Pearson correlation (PDA-PC).

4. Problem Statement

Efficiency and development mergers and acquisitions (M&As) are a significant component of a sustainability program in an era where corporate growth and sustainability are continual objectives. M& as have evolved as a critical strategy for obtaining technology, enhancing competitiveness, and gaining market share to survive the fierce competition. By applying forecasting techniques, Chinese enterprises can demonstrate to lawmakers and industry commissioners the rising opportunities, strategic shifts in the types of digital resources that decision-makers require, and accurate goal forecasts in the IT M&A market. Therefore, we recommended a Panel Data Analysis and Pearson correlation (PDA-PC) for effective mergers and acquisitions (M&As) to enhance Chinese enterprises.

5. Proposed Methodology

Mergers and acquisitions (M&As) have grown in popularity among corporations in emerging economies as an internationalization strategy. Consequently, by applying Panel Data Analysis and Pearson Correlation (PDA-PC) to strengthen Chinese enterprises by enhancing the efficacy of mergers and acquisitions (M&As). Figure 2 displays the suggested workflow.

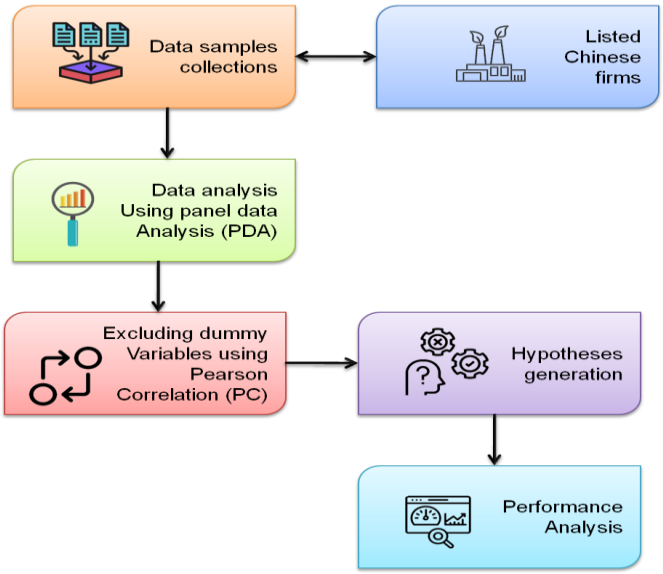

Figure 2: Flow of proposed work

5.1 Dataset

As the sample group, we selected the concluded cross-border Merger and acquisition M&A transactions of China's Shanghai and Shenzhen-mentioned enterprises from 2010 to 2020, as shown in the Wind Economic Connector. We filtered them based on the preceding criteria, such as by removing the related M&A transactions between investor and its international investment firm. In these M&A transactions, the intended business is located in the Cayman Islands, Bermuda, or other islands. A minimum transaction value of US Excludes M&A situations in which the announcement does not include the total amount of the M&A transaction. Exclude M&A situations in which the full price of merger and acquisition deals represented less than 1% of the acquisition's selling price, product sales, and net equity in the year of M&A disclosure. We successfully collected 600 M&A business activities as empirical samples after filtering them against the abovementioned criteria (Liu et al., 2021).

5.2 Data Analysis using Panel Data Analysis (PDA)

Data analysis is collecting, evaluating, and modeling data to identify relevant information for business choices. The goals of data analysis are to extract necessary data from a collection and develop solutions based on the research. As a little example of data analysis, every time we decide on our daily lives, we consider what has previously occurred or what could occur if a particular choice is chosen. This is essentially more than making decisions based on an examination of the past or the future. For this purpose, we compile their prior experiences or establish our professional objective through data analysis. Today, the method performed by an analyst for business objectives is known as data analysis. The panel data regression reveals that infrastructure facilities, economic liberalization, and economic cooperation are essential for attracting China's businesses.

On the other hand, per spending, labor expenses, unemployment, and trademark registration have little impact on China's investment in this country. This study's cross-sectional data collected over multiple cycles were exposed to panel data. Cross-border mergers and acquisitions, firm size, government businesses, audit committee independence, and net profit determined the report. Due to the potential consequences on security and economic defense, political opposition to mergers and acquisitions, M&As, and return on investments is nearly likely. Consequently, managerial ownership can suffer when cross-border mergers and acquisitions in a highly sensitive business are finalized. Larger organizations can more readily achieve high levels of consolidation because they have more backing, but they also have more severe primary conflicts and overinvestment difficulties. Although productivity and revenue drive mergers and acquisitions for competitive businesses, government businesses are frequently motivated by non-market factors. Corporate governance can reduce financial distress because autonomous commissioners supervise managers and defend the rights of minority common stockholders. These boards also contributed to formulating firm strategies, drawing on their knowledge of technologies and the profession. A robust and appropriate financial condition is necessary for operational processes and development opportunities. Therefore, the net profit condition of a corporation has a substantial beneficial impact on its economic success. Following is a description of the models utilized in this study:

$$ROA = \beta + \alpha_1 Merger_{a,b} + \alpha_2 Fsize_{a,b} + \alpha_3 Cross_{a,b} + \alpha_4 State_{a,b} + \alpha_5 Bindp_{a,b} + \alpha_6 Cash_{a,b} + \alpha_7 \epsilon_{a,b} \quad (1)$$

$$ROA = \beta + \alpha_1 Hightech_{a,b} + \alpha_2 Fsize_{a,b} + \alpha_3 Cross_{a,b} + \alpha_4 State_{a,b} + \alpha_5 Bindp_{a,b} + \alpha_6 Cash_{a,b} + \alpha_7 \epsilon_{a,b} \quad (2)$$

$$ROA = \beta + \alpha_1 Highcap_{a,b} + \alpha_2 Fsize_{a,b} + \alpha_3 Cross_{a,b} + \alpha_4 State_{a,b} + \alpha_5 Bindp_{a,b} + \alpha_6 Cash_{a,b} + \alpha_7 \epsilon_{a,b} \quad (3)$$

$$ROA = \beta + \alpha_1 Size_{a,b} + \alpha_2 Fsize_{a,b} + \alpha_3 Cross_{a,b} + \alpha_4 State_{a,b} + \alpha_5 Bindp_{a,b} + \alpha_6 Cash_{a,b} + \alpha_7 \epsilon_{a,b} \quad (4)$$

ROA is determined by dividing net income by net capital. The merger is a dummy variable whose value is 1 for the blog and 0 for all other companies. High tech = Dummy variable of 1, else 0 for post-M&A mergers and acquisitions in the healthcare system, finance, computerized management, and mobile telephony industries. High cap = Fake variable of 1 after mergers and acquisitions in the energy, automobile, and service industries; otherwise, it is 0. Size equals the logarithm of all assets Cross = Fake variable of 1, else 0. For cross-border mergers and acquisitions, State = Dummy Variable 1, if not 0. The size of a committee is divided by the size of the audit committee or Bindp. Cash is equal to the income-to-net-capital ratio.

This study focuses solely on the issues that affect Chinese firms in Asia. By focusing on Asia, this study adds various new factors and incorporates others from the model employed in an earlier study. Using panel data regression analysis, the definition and features of the dependent variable will be determined. All predictor variables were fitted to the data using the Panel Data Model to achieve comparability. To handle the hyperbolic series issue, the model's parameters are expressed in logarithmic form.

$$Lofdi = \beta + \alpha_1 (lfd)_{i,j} + \alpha_2 (lfd)_{i,j} + \alpha_3 (lfd)_{i,j} + \alpha_4 (lfd)_{i,j} + \alpha_5 (lfd)_{i,j} + \alpha_6 (lfd)_{i,j} + \alpha_7 (lfd)_{i,j} + \alpha_8 (lfd)_{i,j} + \alpha_9 (lfd)_{i,j} \quad (5)$$

5.3 Excluding Dummy Variables using Pearson Correlation

Over the past several decades, dummy variable reduction has attracted much academic and industry interest in estimating metadata from unlearned observations. We present a brand-new reduction criterion for dummy variables based on the Pearson correlation (PC) coefficient. Pearson correlation is a quantitative tool that evaluates the strength and direction of a linear relationship between two dummy variables. Numerous applications, such as pattern classification, data analysis, and chronology, have used this technology substantially. In this article, dummy variables indicate the post-M&A situation of the businesses. The default assumption of variance homogeneity was refuted by the Pearson correlation model, which was used to identify potential random effect concerns. The estimate instructions give Eicker-Huber-White homogeneity of variance

standard errors and resilient conventional inaccuracy for solving constant variance. All firm-level variables, excluding dummy variables, are discarded after the 1st and 90th percentiles to decrease the impact of outliers. After research, this post-M&A business in the investment and elevated industries was identified as a categorical variable in the respective econometric models. The objective of this study's eliminating dummy variable challenge is to extract from the unlearned observation the relevant data and (i) (zero-mean, clean data).

$$b(i) = a(i) + u(i) \tag{6}$$

Where u(i) is the undesirable additional data, which is thought to be generated by an uncorrelated, zero-mean random process, by processing b(i) over a linear filter, one may calculate.

$$y(i) = g^s b(i) = g^s(a(i) + u(i)) \tag{7}$$

Let i and j be two truly random numbers with zero means. The Pearson correlation coefficient (PC) is defined as

$$p(i,j) = \frac{D[ij]}{\sigma_i \sigma_j} \tag{8}$$

The $D[ij]$ Pearson correlation between the variables i and j, as well as the variances of the variables ${\sigma^2}_i = D^2[i]$ and ${\sigma^2}_j = D^2[j]$, are precisely trying to compensate. It will be more practical to deal with the Pearson correlation (PC) coefficient in the framework of dummy variable reduction.

$$p^2(i,j) = \frac{D^2[ij]}{{\sigma^2}_i {\sigma^2}_j} \tag{9}$$

The PC indicates the degree to which the two randomized variables, i and j, have a linear connection, i and j are deemed to be uncorrelated if $p^2(i,j) = 0$. The correlation between the two parameters is greater the nearer the value of p is near 1, $p^2(i,j) = 0$ indicates that the two variables are unrelated. The opposite is not true, too, as the PC only understands linear relationships among the two variables, i and j. If there is a nonlinear dependence, the PC can be zero. However, "autonomous" is identical to "uncorrelated" in the rare situation when I and j are simultaneously normal.

5.4 Hypotheses generation

By evaluating hypotheses in statistics, an economist's assumption on a demographic parameter is put to the test. The technique utilized by the researcher will rely on the type of data collected and the objectives of the investigation. To determine the validity of a claim, random samples are used to analyze hypotheses. These data may originate from a broader group or a system that generates data. In the subsequent discussions, the term "demographic" will be used to characterize each of these eventualities.

5.5 H1 Hypotheses

Effective mergers and acquisitions (M&A) are the outcomes of a company's relationship management, which includes individuals, systems, and software with the strategic objective of forming long-term partnerships with Chinese companies. Mergers and acquisitions (M&A) are defined as "A continuing process that involves the generation and use of market knowledge for the aim of creating and sustaining an income spectrum of client connections" According to this process-based approach to mergers and acquisitions (M&A), successful buyer-seller interactions are contingent upon the firm's ability to perceive and respond to shifting business demands and preferences. Relationship marketing presupposes that long-term client relationships are superior to transient ones. Therefore, hypothesis H1 was confirmed for ROA as an accounting performance metric when M&As are favorably connected with company success. This shows that investment businesses can leverage economies of scale to increase earnings or reduce operational expenses after mergers and acquisitions.

5.6 H2 Hypotheses

Professionals in Mergers and Acquisitions (M&A) and business have debated the profitability of customer relationship management expenditures. Others have found a positive association between M&A relationship management and corporate success, although some research indicates a negligible or negative impact. As a result, the challenge of M&A connection management is the well-accepted fact that the effects are rarely instantly evident in rapid key metrics but rather are accumulated over time. The responsibility hypothesis posits that serving the needs of consumers and partners increases financial performance and provides a framework for studying the relationship between M&A relationship performance and enterprise success. The data support hypothesis H2, which indicates that M&As in the elevated industry has a positive impact on the post-M&A economic performance of the target enterprises. According to the data, mergers and acquisitions may assist the banking business in acquiring new talents and knowledge and new customer.

5.7 H3 Hypotheses

Several companies are unaware of the connection between M&A analysis and their operations and how to capitalize on it. Based on the asset view of the organization, early research discovered a strong association between a company's ability to utilize M&A analysis tools and corporate technique coordination, which contributed to increased corporate profitability. Recent research has discovered a similar association between financial assets in M&A analytical tools and the valuation of a company. In addition to the additional component via consumer partner success, we recommend that consumer M&A insights are likely to influence sales positively. This is because purchaser M&A analytics enables organizations to change authentic client data and respond rapidly to their wants. The finance industry performed better due to mergers and acquisitions, most likely due to more complete and cautious financial due diligence before the acquisitions were done. However, the coefficient of capital-intensive mergers (High cap) was notable. Thus, the H3 theory was verified. This suggests that wealth sector acquisitions do not affect ROA. The results demonstrated that mergers in this area are advantageous for the acquiring company.

6. Performance Analysis

This research used a panel data analysis and Pearson correlation (PDA-PC) to examine the performance of enterprises involved in mergers and acquisitions (M&As) that Chinese acquirers convinced. This study uses the merger and acquisition M&A of Shanghai and Shenzhen enterprises between 2010 and 2020. This section analyzes the success of Chinese mergers and acquisitions. The primary considerations are accuracy, descriptive statistics, Pearson correlation, decision-making, computing time, and implementation cost. The efficiency of the proposed method, Panel data analysis, and Pearson correlation (PDA-PC) is assessed based on the following metrics: Panel data analysis and Pearson correlation (PDA-PC). The results were compared to those derived from conventionally used techniques, such as interval-valued intuitionistic fuzzy (IVIF), Graph neural networks (GNN), Support Vector Machine (SVM), and Conventional Neural Networks (CNN).

6.1 Accuracy

The degree to which a quantity's estimated value is closer to its real value is the degree to which the analysis is accurate. Compared to the existing methodology, the proposed method's mergers and acquisitions M&As in business are more accurate. The performance of accuracy is reported as a percentage. The proposed approach and the accuracy of existing mergers and acquisitions systems are discussed. Figure 3 depicts the accuracy of the planned and existing systems. The proposed method has a 96% accuracy rate, whereas IVIF has a 50% accuracy rate, GNN has a 75% accuracy rate, SVM has an 84% accuracy rate, and CNN has a 68% accuracy rate. It illustrates that the proposed technique is more effective than the already available technologies.

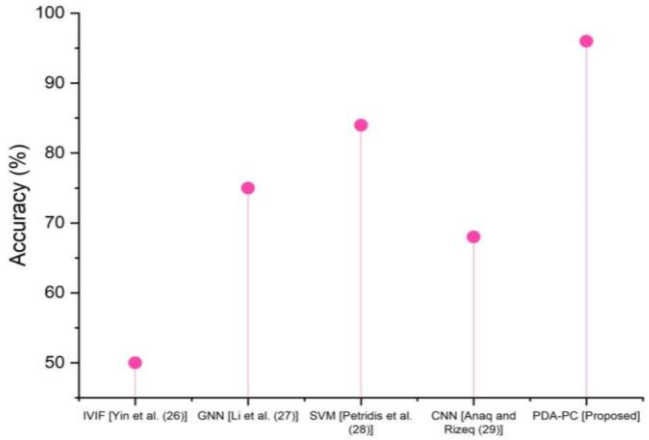

Figure 3: Accuracy for Proposed and Existing Methods

6.2 Descriptive Statistics

The financial efficiency of the board members, as evaluated by ROA, indicated their independence from management. During the research period, the post-M&A frequency distribution (Merger) revealed an increase in post-M&A observations. Compared to post-M&As in capital-intensive industries, the sample consisted of high-technology post-M&As (High tech) (High cap).

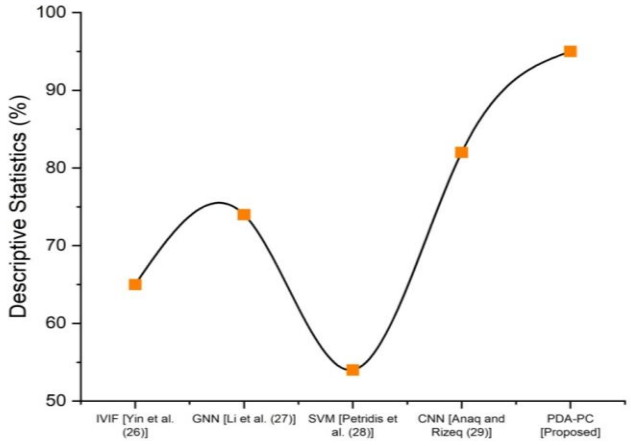

Figure 4: Descriptive statistics for Proposed and Existing Methods

However, due to political opposition, only cross-border M&As were prevalent. The IVIF scored 65%, GNN scored 74%, SVM scored 54%, CNN scored 82%, and the recommended approach scored 95%. Figure 4 illustrates the descriptive statistics of the proposed and existing methods. It indicates that the proposed system is more efficient.

6.3 Pearson Correlation

This study's primary variables, not dummy variables, exhibit a significant Pearson correlation. And the dummy variables are fully removed from this study. The positive correlation between the firm's size and the Board's independence with ROA suggests that enhanced corporate governance can improve operating performance following a reduction in agency expenses. The relationship between M&A and the Chinese corporation is a positive one. The IVIF earned 65%, GNN earned 85%, SVM earned 74%, CNN earned 60%, and the suggested approach earned 98%. It indicates that the proposed system is more efficient. Figure 5 depicts the Pearson correlation between proposed and existing approaches.

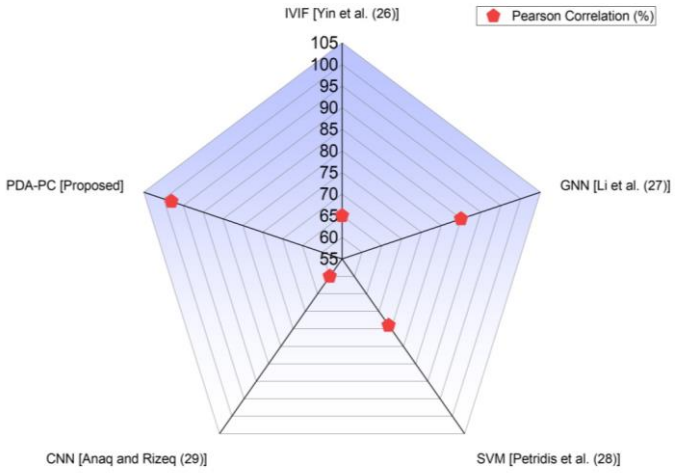

Figure 5: Pearson correlation for Proposed and Existing Methods

6.4 Decision-making

Choosing the appropriate course of action in light of the circumstances is required for decision-making. Typically, to make judicious decisions and consider potential outcomes, it is necessary to investigate a variety of alternatives. Consider how the M&A will affect the needs and preferences of Chinese businesses. Figure 6 depicts the decision-making process for proposed and existing techniques. The IVIF scored 50%, GNN scored 60%, SVM scored 80%, CNN scored 70%, and the recommended procedure scored 90%. Our model has a greater capability for decision-making than alternative approaches.

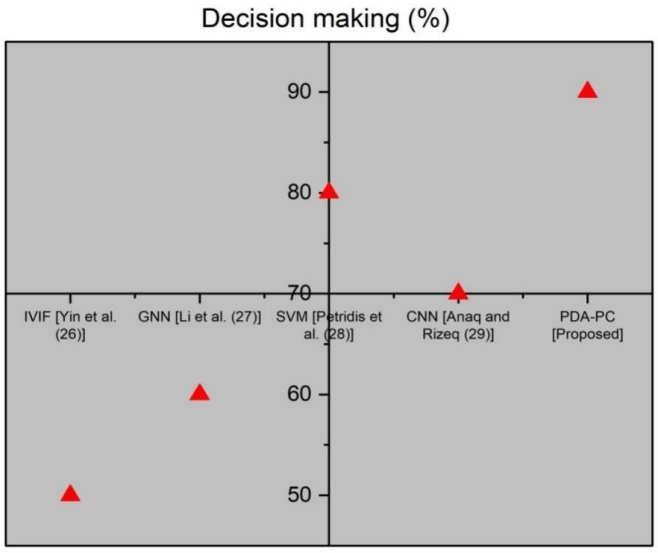

Figure 6: Decision making for Proposed and Existing Methods

6.5 Computation time

Experts and corporations utilize computation time as a crucial performance metric to evaluate a method's effectiveness in terms of execution time. Existing technologies demand more computer time than our proposed method. The IVIF scored 94s, GNN scored 84s, SVM scored 75s, and CNN scored 65s, whereas the suggested approach scored 57s. Figure 7 depicts the computation times for the proposed and existing methodologies.

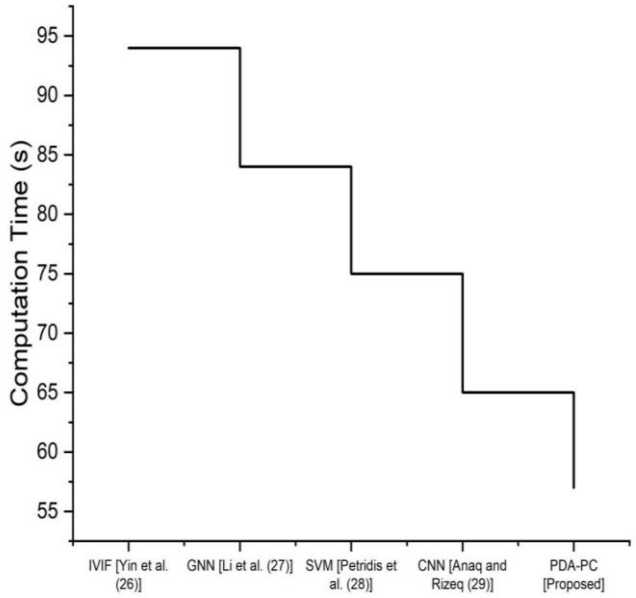

Figure 7: Computation time for Proposed and Existing Methods

6.6 Implementation Cost

Money is saved when a piece of technology is improved to function more efficiently over time. To maximize profits, the company seeks to increase overall efficiency and reduce procurement costs.

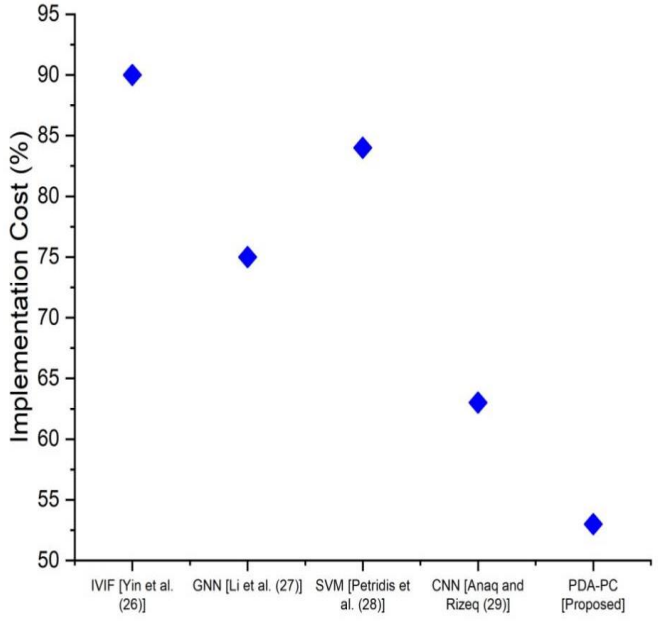

Figure 8: Implementation cost for Proposed and Existing Methods

Figure 8 illustrates the comparative cost-effectiveness of the suggested and existing solutions. Compared to the alternatives recommended, the already employed tactics are more cost-effective. The IVIF scored 90%, GNN scored 75%, SVM scored 84%, CNN scored 63%, and the suggested approach scored 53%.

Table 1: Comparative analysis of various parameters for existing and proposed methods

	IVIF	GNN	SVM	CNN	PDA-PC (Proposed)
Accuracy (%)	50	75	84	68	96
Descriptive statistics (%)	65	74	54	82	95
Pearson correlation (%)	65	85	74	60	98
Decision-making (%)	50	60	80	70	90
Computation time (s)	94	84	75	65	57
Implementation cost (%)	90	75	84	63	53

7. Discussion

Y. Li et al. (2021) developed a novel scheme based on an Interval Valued Intuitionistic Fuzzy (IVIF) framework, cross optimum by ratios, and a complex proportionate evaluation method to rank the importance of various business functions required throughout the M&A process, with a focus on the Chinese M&A market. The estimation and classification algorithms are memory-intensive and extremely sluggish. Z. Li (2022) investigated the application of Graph neural networks (GNN) in mergers and acquisitions (M&A) forecasting, which attempts to quantify the relationship between businesses, their owners, and their shareholders. Less processing of graph edges based on their types and relationships. GNN works are limited to a certain number of points. Petridis et al. (2022) evaluated the Support Vector Machine (SVM) model to lessen the fundamental difficulties in the retail banking sector, which assesses how well mergers and acquisitions (M&A) are functioning due to a large number of distinct key performance indicators (KPI) and determinants. Due to the length required training period, it may not perform effectively when a substantial amount of data is obtained. Conventional Neural Networks (CNN) were proposed by Anagnostopoulos et al. (2021) using "ball-point statistics" to convince the public and industry officials of the significance of mergers and acquisitions (M&As) in the IT industry and to support our explanation of the use of adaptable and reliable techniques for effective target acquisition. CNN training presents three major challenges: clustering, bursting slopes, and group asymmetry. These issues may degrade the performance of the model.

8. Conclusion

Mergers and acquisitions (M&As) have grown in popularity among corporations in emerging economies as an internationalization strategy. Due to their rapid growth and increasing importance for the internalization of firms, most research has centered on how to increase the M&A success rate. As a result, this study suggests a substantial and useful mechanism. The methodology is based on panel data analysis and Pearson correlation (PDA-PC) that examines the performance of mergers and acquisitions (M&A) and the specific factors that contributed to their success. In terms of accuracy (96%), descriptive statistics (95%), Pearson correlation (98%), decision-making (90%), calculation time (57s), and implementation cost (53%), the suggested PDA-PC technique beats the standard IVIF, GNN, SVM, and CNN algorithm approaches. In addition, the creation of hypotheses suggests that PDA-PCs are particularly effective in Chinese M&A transactions. Future research on the recommended topic may concentrate on managing the issues that arise during company mergers and acquisitions (M&A). In the future, we may consider implementing optimization strategies to improve other performance metrics and various mergers and acquisitions (M&A) procedures in these firms.

References

Ahmed, B., & Ali, A. (2020). Usage of traditional Chinese medicine, western medicine and integrated Chinese-western medicine for the treatment of allergic rhinitis. *Science Progress and Research, 1*(1), 1-9. Retrieved from https://sprjonline.com/wp-content/uploads/2021/03/1.pdf

Anagnostopoulos, I., & Rizeq, A. (2021). Conventional and neural network target-matching methods dynamics: The information technology mergers and acquisitions market in the USA. *Intelligent Systems in Accounting, Finance and Management, 28*(2), 97-118. Retrieved from https://web.archive.org/web/20210717164042id_/https://onlinelibrary.wiley.com/doi/pdfdirect/10.1002/isaf.1492

Aquaro, M., Damioli, G., & Lengyel, B. (2021). Innovative mergers and acquisitions and the broker regions of European integration. *Regional Studies*, 1-13. doi: https://doi.org/10.1080/00343404.2021.1998418

Bansal, A., & Rao, K. (2021). *Major Project Report on Analysis and Prediction of Mergers & Acquisitions*. Retrieved from http://dspace.dtu.ac.in:8080/jspui/handle/repository/18466

Blockx, J. (2021). The proposal for an EU Regulation on foreign subsidies distorting the internal market: how will it impact corporate mergers and acquisitions? *Available at SSRN 3936624*, 11. doi: https://dx.doi.org/10.2139/ssrn.3936624

Cho, K., Han, S. H., Kim, H. J., & Kim, S. (2021). The valuation effects of corporate social responsibility on mergers and acquisitions: Evidence from US target firms. *Corporate Social Responsibility and Environmental Management, 28*(1), 378-388. doi: https://doi.org/10.1002/csr.2055

García, C. J., & Herrero, B. (2022). Corporate entrepreneurship and governance: Mergers and acquisitions in Europe. *Technological Forecasting and Social Change, 182*, 121845. doi: https://doi.org/10.1016/j.techfore.2022.121845

Garg, H. (2021). Digital twin technology: Revolutionaryto improve personalized healthcare. *Science Progress and Research (SPR), 1*(1), 32-34. doi: https://doi.org/10.52152/spr/2021.105

Hong, X., Lin, X., Fang, L., Gao, Y., & Li, R. (2022). Application of Machine Learning Models for Predictions on Cross-Border Merger and Acquisition Decisions with ESG Characteristics from an Ecosystem and Sustainable Development Perspective. *Sustainability, 14*(5), 2838. doi: https://doi.org/10.3390/su14052838

Kalaivani, S., Sivakumar, K., & Vijayarangam, J. (2022). Statistical Modelling Using Data Mining Tools in Mergers and Acquisition with Regards to Manufacture & Service Sector. *Journal of Applied Mathematics & Informatics, 40*(3_4), 563-575. doi: https://doi.org/10.14317/jami.2022.563

Kapil, S., & Dhingra, K. (2021). Understanding Determinants Of Domestic Mergers And Acquisitions Through Literature Review. *Indian Journal of Finance and Banking, 6*(1), 31-57. doi: https://doi.org/10.46281/ijfb.v6i1.1198

Kar, R. N., Bhasin, N., & Soni, A. (2021). Role of mergers and acquisitions on corporate performance: emerging perspectives from Indian IT sector. *Transnational Corporations Review, 13*(3), 307-320. doi: https://doi.org/10.1080/19186444.2020.1832427

Li, Y., Shou, J., Treleaven, P., & Wang, J. (2021). *Graph neural network for merger and acquisition prediction*. Paper presented at the Proceedings of the Second ACM International Conference on AI in Finance, 1-8. doi: https://doi.org/10.1145/3490354.3494368

Li, Z. (2022). Treatment and technology of domestic sewage for improvement of rural environment in China-Jiangsu: a research. *Science Progress and Research (SPR), 2*(1).

Liu, K., Wu, S., & Guo, N. (2021). Governmental governance of host countries and cross-border merger and acquisition performance: Evidence from listed enterprises in China. *PLOS ONE, 16*(8), e0256494. doi: https://doi.org/10.1371/journal.pone.0256494

Luo, Y., & Ren, D. (2021). Influence of the enterprise's intelligent performance evaluation model using neural network and genetic algorithm on the performance compensation of the merger and acquisition parties in the commitment period. *PLOS ONE, 16*(3), e0248727. doi: https://doi.org/10.1371/journal.pone.0248727

Mody, R., & Bhoosreddy, A. (1995). Multiple odontogenic keratocysts: a case report. *Annals of Dentistry, 54*(1-2), 41-43. Retrieved from https://europepmc.org/article/med/8572545

Pazarskis, M., Vogiatzoglou, M., Koutoupis, A., & Drogalas, G. (2021). Corporate mergers and accounting performance during a period of economic crisis: evidence from Greece. *Journal of Business Economics and Management, 22*(3), 577-595. doi: https://doi.org/10.3846/jbem.2021.13911

Petridis, K., Tampakoudis, I., Drogalas, G., & Kiosses, N. (2022). A Support Vector Machine model for classification of efficiency: An application to M&A. *Research in International Business and Finance, 61*, 101633. doi: https://doi.org/10.1016/j.ribaf.2022.101633

Salihu, S., & Iyya, Z. (2022). Assessment of Physicochemical parameters and Organochlorine pesticide residues in selected vegetable farmlands soil in Zamfara State, Nigeria. *Science Progress and Research (SPR), 2*(2), 559-566. doi: https://doi.org/10.52152/spr/2022.171

Sergeevic, S. S. (2021). The Impact of Corporate Mergers and Acquisitions on Company Performance in BRICS Countries. 1-48. Retrieved from https://dspace.spbu.ru/bitstream/11701/31147/1/Master_Thesis_Sheremetev_Sergei.pdf

Shahabaz, A., & Afzal, M. (2021). Implementation of High Dose Rate Brachytherapy in Cancer Treatment. *SPR, 1*(3), 77-106. doi: https://doi.org/10.52152/spr/2021.121

Vertakova, Y., Vselenskaya, I., & Plotnikov, V. (2021). Mergers and Acquisitions Risk Modeling. *Journal of Risk and Financial Management, 14*(9), 451. doi: https://doi.org/10.3390/jrfm14090451

Wang, D., Chen, Z., & Florescu, I. (2021). A Sparsity Algorithm with Applications to Corporate Credit Rating. *arXiv preprint arXiv:2107.10306*, 16. doi: https://doi.org/10.48550/arXiv.2107.10306

Wang, Q., Lau, R. Y. K., & Xie, H. (2021). The impact of social executives on firms' mergers and acquisitions strategies: A difference-in-differences analysis. *Journal of Business Research, 123*, 343-354. doi: https://doi.org/10.1016/j.jbusres.2020.10.004

Wanke, P., Antunes, J. J. M., Correa, H. L., & Tan, Y. (2022). Strategic fit of mergers and acquisitions in Latin American airlines: a two-stage DEA approach. *Benchmarking: An International Journal, 29*(5), 1513-1545. doi: https://doi.org/10.1108/BIJ-11-2020-0588

Yang, N., Zhang, Y., Yu, L., Wang, J., & Liu, X. (2022). Cross-border mergers and acquisitions, regional cultural diversity and acquirers' corporate social responsibility: Evidence from China listed companies. *International Review of Economics & Finance, 79*, 565-578. doi: https://doi.org/10.1016/j.iref.2022.02.041