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Corporate Digital Transformation and M&A Efficiency: Evidence Based on Chinese Listed Companies

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Abstract: In order to help enterprises to achieve high-quality development and improve the capital market regulatory policies by supporting with more factual basis from China, this paper conducts research on clarifying impact mechanism of digital transformation on M&A efficiency of listed companies. Taking the mergers and acquisitions of listed companies from 2007 to 2021 as a research sample, the influence mechanism of the digital transformation degree of companies on their M&A efficiency was studied. The research results show that the digital transformation of listed companies will improve their M&A efficiency. Digital transformation will reduce the degree of mispricing stocks of M&A companies, curb conflicts between managers and agents of M&A companies, and improve their M&A efficiency. Further research finds that the promotion effect of digital transformation on M&A efficiency is more significant in non-state-owned companies, with a higher degree of financing constraint and high analyst attention. In the future, regulatory authorities should actively promote the digital transformation of listed companies, curb mispricing and management agency problems in the capital market with digital governance, and improve the efficiency of mergers and acquisitions in the capital market. This paper not only provides a more factual basis on concrete case from China but also enriches the related empirical analysis on corporate digital transformation and M&A efficiency.

Keywords: digital transformation; mispricing in capital markets; M&A efficiency; agency issues

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1. Introduction

In recent years, the number of M&A and restructuring transactions and the transaction value of China's capital market have generally shown an upward trend. According to PwC's "*2021 China M&A Market Review and 2022 Outlook*" report, the number of M&A transactions in China in 2021 was 12,790, a year-on-year increase of 21%, which created a new high record. Growth in China's M&A market slowed down in 2022, with the value of M&A deals falling by 20% compared to 2021, but this figure still accounts for 15% of the global M&A transaction market. Theoretically, successful mergers and acquisitions not only optimize enterprise resources and enhance enterprise market share and core competitiveness but also help the national industrial upgrading and market-oriented industrial structure adjustment. However, the "three highs" phenomenon of high premium, high valuation, and high performance commitment in China's M&A market is very common, and the "three highs" phenomenon inevitably leads to frequent goodwill impairment events of listed companies in China; it is difficult to realize the economic synergy effect of mergers and acquisitions (Li et al. 2023; Liu and Wang 2019).

The literature has shown that information asymmetry is one of the key factors that make it difficult for M&A to achieve the expected benefits (Ahern and Sosyura 2014). Most of the acquired parties in China's M&A transactions are non-listed companies, and the effective information that can be publicly obtained is very limited; the information on the acquired parties is mostly around prospect analysis, which will lead to more complex processes for the value assessment of the acquired parties, and the authenticity of the

information cannot be studied (Li et al. 2019). From the perspective of market investors, due to the professionalism and complexity of M&A events themselves, it is difficult for market investors to effectively identify the potential risks and authenticity of M&A events, which increases the information asymmetry of M&A events to a certain extent. The information asymmetry between market investors and M&A events will reduce M&As to a tool for corporate arbitrage, making it difficult to realize the expected benefits of corporate M&As and even harming the interests of corporate shareholders and market investors (Sun et al. 2022). Some scholars have studied the information asymmetry of the acquired party from the aspects of performance compensation commitment, performance gambling clause, and learning from peer experience (Dou and Zhai 2020; Wu and Jiang 2023). There are also scholars who study the information asymmetry between the market and M&A events from the aspects of the "landport connect" transaction system, high-quality audits, and institutional investor research (Dou and Zhai 2020; Zhang et al. 2020).

The research perspectives and methods of the existing literature are different, but there is a consensus on how to improve the quality of information, alleviate information asymmetry, and improve the efficiency of mergers and acquisitions. In recent years, under the background of the deep integration of digital technologies such as cloud computing, big data, artificial intelligence, and blockchain within the real economy, the digital transformation of enterprises is gradually becoming the core strategy of the company to achieve high-quality development. The digital transformation of companies helps to enhance information advantage, but few scholars have studied its impact on M&A efficiency from the perspective of digital transformation. Based on this, this paper takes the M&A behavior of listed companies from 2007 to 2021 as a research sample to study the influence mechanism of the degree of digital transformation of companies on their M&A efficiency. The marginal contribution of this paper is reflected in two aspects: First, it provides empirical evidence for digital transformation to promote the efficiency of corporate mergers and acquisitions. second, it enables the empirical examination of the influence mechanism of digital transformation to promote M&A efficiency by alleviating the mispricing degree of M&A stocks and the problem of manager agency of M&A companies; the role channels for improving M&A efficiency of M&A are, therefore, enriched.

2. Research Hypotheses

2.1. Digital Transformation and M&A Efficiency

The company's digital transformation refers to strategic changes in the operation model and organizational structure through the introduction of digital technologies such as cloud computing, big data, artificial intelligence, and blockchain, or relying on internet platforms, thereby improving the company's value-creation ability and achieving the goal of high-quality development (Singh and Hess 2017). Digital transformation can help companies improve their ability to explore, analyze, and integrate information, which greatly reduces the information asymmetry in the investment process and improves the scientific nature of the company's investment decisions.

In terms of information mining, digital transformation will speed up the speed at which companies acquire, store, and process information, and will also enable them to obtain more comprehensive and higher-quality information related to mergers and acquisitions (Vial 2019). With the blessing of digital technologies such as algorithm recommendations and big data screening, M&A companies can obtain hard surplus information such as financial reports, transaction data, and operating data, as well as soft information such as management information, company reputation, and human capital from massive data. This not only enables the M&A company to reduce the search cost but also helps the M&A company to accurately analyze the production and operation status of the acquired company; reasonably analyze the potential synergy effect of the acquired company; effectively identify the risks of high premium, high valuation, and high performance commitment; and formulate reasonable M&A strategies. By creating a diversified digital platform, companies can access the latest industry trends and advanced technologies in real time and also reduce

information asymmetry between the company and the market, reducing corporate strategic risks (Mikalef and Pateli 2017; Zhai and Li 2022).

In terms of information analysis, with the help of digital technologies such as cloud computing and artificial intelligence, companies can optimize organizational structure, streamline decision-making processes, and also improve M&A efficiency (Pan and Xu 2023). Digital transformation will also provide more scientific information support for mergers and acquisitions and, with the empowerment of data technology, M&A companies can make M&A decisions based on quantitative analysis of data, rather than managers' subjective judgments based on experience, which can alleviate the opportunistic behavior of managers and help enhance the scientific nature of M&A decisions (Qi et al. 2020). With the help of big data prediction technology, the company can also realize the simulation and optimization of different investment solutions (Li et al. 2022).

In terms of information integration, digital transformation will inevitably improve the efficiency of M&A companies in the negotiation and decision-making process on the basis of improving information discovery and information analysis of M&A companies and assist M&As to be completed quickly. Based on empirical learning theory, digital technology will continue to strengthen companies' ability to obtain information and integrate, enabling them to better grasp industry trends and market trends and better select M&A timing and target companies. Moreover, the ability of the acquiring company to discover, analyze, and apply digital technologies can facilitate its digital M&As, further obtain the key digital technologies of the acquired company, and empower the company's operation.

Based on the above analysis, this paper puts forward

Hypothesis 1. *Digital transformation will improve the M&A efficiency of listed companies.*

2.2. The Role Channel Based on Mispricing in the Capital Market

Market-driven M&A theory holds that managers whose stock prices are overvalued will acquire the target company with their own overvalued stocks and, when the stock valuation of the acquiring company is higher, the probability of mergers and acquisitions in order to obtain "valuation arbitrage" is higher (Shleifer and Vishny 2003). At the same time, because investors have higher than usual expectations for the operating efficiency of listed companies after mergers and acquisitions and the stock price of companies usually rises to a certain extent after mergers and acquisitions, M&As catering to the market are considered to be an important means to avoid stock prices from restoring fundamentals (Luo and Yang 2019). Due to the asymmetry of information such as professionalism and complexity of mergers and acquisitions and the influence of irrational factors common among Chinese investors, Chinese market investors are currently unable to effectively identify the quality of M&A transactions, which further stimulates the motivation of listed companies to carry out valuation arbitrage through mergers and acquisitions when the stock price is overvalued (He et al. 2022). However, mergers and acquisitions initiated by M&A companies when the stock price is overvalued only increase the stock price in the short term but do not bring synergies to the M&A company in the long run. In the long run, "valuation arbitrage" M&As are more likely to lead to goodwill impairment and increase the risk of stock price collapse (He et al. 2022).

In recent years, the key role of digital economy in China's high-quality development has been continuously highlighted. The degree of digital transformation has increased the information content of the company's stock price and enhanced the ability of investors to discover value. Due to the abundant sources, low barriers to entry, and easy access to digital information (Demertzis et al. 2018), investors will be better able to obtain more information about companies. The more digital transformation a company has, the more information containing the company's characteristics will be passed on to investors, making the company's stock price gradually trend towards its intrinsic value. The high-quality disclosure brought about by digital technology will help external investors obtain company information, improve stock price liquidity (Wu et al. 2021), boost and capital market valua-

tion efficiency. Research by Wang Shengnian and Lanlan Huang (Wang and Huang 2022) found that high-quality accounting information can alleviate stock mispricing by improving investors' irrational behavior. In addition, due to digital transformation, companies will receive more attention from market investment, and the high attention of investors is conducive to the transmission of private information to the stock price, which increases the content of stock price information. With the help of digital technology, the speed of information dissemination and circulation is accelerated, which can enable market investors to keep abreast of the company's M&A decisions, so that more information is reflected in the stock price, which also forces the company to choose to provide higher quality information (Du et al. 2022). Therefore, digital transformation will help reduce the information asymmetry of external investors to the acquired company, increase the pricing efficiency of the capital market, and alleviate the mispricing of stocks.

Based on the above analysis, this paper proposes

Hypothesis 2. *Digital transformation will alleviate the degree of mispricing of stocks of M&A companies, thereby improving M&A efficiency.*

2.3. The Role Channel Based on the Manager's Agency Problem

According to the principal–agent theory, the goal of the management as a shareholder agent is not necessarily to maximize the interests of shareholders, but it may enhance its own interests and control by expanding the size of the company. Therefore, mergers and acquisitions may become a tool for management to pursue personal maximization. Even for acquired companies with higher synergies, managers will be more inclined to choose target companies with low synergies but higher personal benefits. Especially in the context of the immature development of the external supervision of China's capital market and the manager market, the management lacks the motivation for strategic mergers and acquisitions, ignores the synergy effect of corporate mergers and acquisitions, and will blindly acquire for reasons such as obtaining private interests or catering to the market (Chen et al. 2015). Overvaluation of listed companies' stock prices will further increase the "encroachment" of executives. On the one hand, because overvalued stock prices ease the company's level of financing constraints, ample free cash flow encourages managers to engage in more risky and high-premium M&A activity. On the other hand, when the stock price of a listed company is low, the manager's ability to work will be questioned, so the manager will consider his career or reputation, in order to maintain or push up the short-term stock price when the stock price of the listed company is overvalued, cater to the market, and, thus, increase the stock price through mergers and acquisitions.

High-quality information disclosure is an important part of corporate governance; the higher the quality of information disclosure by the acquirer, the less negative the influence of managers on M&A performance (Wang and Liu 2019). The degree of digital transformation of the company will significantly enhance the transparency of internal information, improve the control and supervision of managers by shareholders and investors, and alleviate the agency problem between shareholders and managers (Goldfarb and Tucker 2019). The more digital a company is, the higher its level of governance. Relying on the company's digital information platform, the company's stakeholders can obtain the decision-making information of the management in a timely and efficient manner, inhibit the irrational decision-making behavior of managers seeking personal benefits from mergers and acquisitions, and improve the efficiency of mergers and acquisitions (Zhao et al. 2020).

Based on the above analysis, this paper puts forward

Hypothesis 3. *Digital transformation will suppress manager–agent conflicts, thereby improving the efficiency of mergers and acquisitions.*

3. Research Design

3.1. Sample Selection and Data Sources

This paper takes the mergers and acquisitions of listed companies from 2007 to 2021 as a research sample and excludes the sample of financial institutions: (1) Exclude ST or *ST companies; (2) Remove companies with negative net assets and net profit; (3) Remove companies with missing values; (4) If a listed company has multiple mergers and acquisitions in the same year, the largest merger and acquisition is retained. A total of 2350 observations are finally obtained. The sample data came from the Guotai database, and the article used Stata15.0 to process and regress the data. In order to avoid the interference of extreme outliers on the regression results, this paper winsorized the extreme values at the 1% and 99% quantiles of all continuous variables.

3.2. Description of Variables

3.2.1. Variable to Be Explained: M&A Efficiency (*Inv*)

Since M&A is one of the most important investment methods of a company, this paper uses the investment efficiency of the occurrent year M&As as a measure of M&A efficiency. At present, most of the literature uses inefficient investment to measure investment efficiency; inefficient investment is the behavior of inconsistency between the company's actual investment expenditure and the optimal investment level, borrowing from Richardson's (Richardson 2006) residual measurement model to measure investment efficiency: the larger the absolute value of the residual (i.e., the greater the degree of inefficient investment), the lower the company's investment efficiency. Build a model as follows:

$$\begin{aligned} Investment_{i,t} = {} & u_0 + u_1 Lev_{i,t-1} + u_2 Growth_{i,t-1} + u_3 Age_{i,t-1} + u_4 Cash_{i,t-1} + u_5 Roa_{i,t-1} \\ & + u_6 Asset_{i,t-1} + u_7 Investment_{i,t-1} + \sum Year + \sum Industry + \varepsilon_{i,t} \end{aligned} . \quad (1)$$

Among them, $Investment_{i,t}$ is equal to the ratio of the company's new investment in the current year to the total assets at the end of the previous year; $Lev_{i,t-1}$ is equal to the company's asset–liability ratio at the end of the previous year; $Growth_{i,t-1}$ is equal to the company's operating income growth rate at the end of the previous year; $Age_{i,t-1}$ is equal to the company's listing years as of the end of the previous year; $Cash_{i,t-1}$ is equal to the ratio of the company's annuity holdings to the total assets at the end of the previous year; $Roa_{i,t-1}$ is equal to the company's stock yield at the end of the previous year; and $Asset_{i,t-1}$ is equal to the logarithm of the company's total assets at the end of the previous year. In addition, the model controls for new investments, $Investment_{i,t-1}$, sectors, and years that lag one period behind. After regression to the model (1), the residual value is obtained; the absolute value of the residual value indicates the degree of inefficient investment. The larger the absolute value of the residual value, the lower the investment efficiency.

3.2.2. Explanatory Variable: Degree of Digital Transformation (*Digtran*)

This paper draws on the research of (Zhang et al. 2021) to measure the degree of digital transformation based on the total frequency of occurrence in annual reports for all keywords related to "big data" applications. Since the annual report disclosed by a listed company is based on an objective statement of the company's actual operation, and the vocabulary in the annual report can reflect the company's strategic direction and development layout to a certain extent, it is scientific to take the frequency of big-data-related keywords in the text information of the annual report of the listed company as a measure of the degree of digital transformation. Since artificial intelligence technology, blockchain technology, cloud computing technology, big data technology, and digital technology applications constitute the core technologies of enterprise digital transformation, this paper uses the sum of the frequency of these five keywords in the annual report as the measurement index of the company's digital transformation.

3.2.3. Intermediary Variables: Capital Market Mispricing (*Misp*)

In this paper, the price-to-book ratio regression method (Rhodes-Kropf et al. 2005; Hu and Li 2019) is chosen to measure the degree of mispricing in the capital market. It will be broken down as follows:

$$\frac{M}{B} = \frac{M}{V} * \frac{V}{B}. \tag{2}$$

After taking the logarithms on both sides, let the $\log M = m$, $\log V = v$, and $\log B = b$, equation be converted to

$$m - b = (m - v) + (v - b). \tag{3}$$

$(m - v)$ is the deviation between market value and intrinsic value; $(v - b)$ is an intrinsic growth opportunity for the company. Part of the deviation between market value and intrinsic value may originate at the company level or at the industry level. As a result, $(m - v)$ will continue to be broken down into enterprise-level and industry-level mispricing. For the first company of the specific t year, the mispricing at the i enterprise level is the difference between the stock price of the i company t period and the average valuation level of the industry during the t period; industry-level mispricing is the difference between the valuation of the industry and the long-term valuation of the industry during the i company's t period. The equation translates to

$$m_{i,t} - b_{i,t} = [m_{i,t} - v(\theta_{i,t};\alpha_{j,t})] + [v(\theta_{i,t};\alpha_{j,t}) - v(\theta_{i,t};\alpha_j)] + [v(\theta_{i,t};\alpha_j) - b_{i,t}]. \tag{4}$$

This $[m_{i,t} - v(\theta_{i,t};\alpha_{j,t})]$ represents the difference between the stock price and the value estimated by the same industry coefficient for the same period, i.e., company-level mispricing; $[v(\theta_{i,t};\alpha_{j,t}) - v(\theta_{i,t};\alpha_j)]$ represents the difference between the company's current industry estimate and the long-term industry value estimate, that is, industry-level mispricing; and $[v(\theta_{i,t};\alpha_j) - b_{i,t}]$ represents the difference between the long-term value of the company and its book value, i.e., the growth opportunity of the company. The company is regressed by year t and industry j according to the model (5) to obtain the estimated value $v(\theta_{i,t};\alpha_{j,t})$ of the company in the t period. This article focuses only on the degree of mispricing $[m_{i,t} - v(\theta_{i,t};\alpha_{j,t})]$ at the company level, i.e., its absolute value is the assignment of the value.

$$m_{i,t} = \alpha_{0,j,t} + \beta_{1,j,t} b_{i,t} + \beta_{2,j,t} \ln (NI)^+_{i,t} + \beta_{3,j,t} I_{(<0)} \ln (NI)^+_{i,t} + \beta_{4,j,t} LEV_{i,t} + \beta_{5,j,t} LEV^2_{i,t} + \varepsilon_{i,t} \tag{5}$$

where $m_{i,t}$ is the market value of the company i at the end of the year t, taking the logarithm of the sum of the market value of equity and the market value of bonds; $b_{i,t}$ is the logarithm of the i company's total assets at the end of the year t; $NI^+_{i,t}$ is for the company's net profit after deduction (only positive numbers of NI are taken here); and $I_{(<0)}$ is a dummy variable. If the net profit after deduction is negative ($I_{(<0)}$), take 1; otherwise, take 0 to separate the sample of enterprises with positive net profit after deduction and negative value. $LEV_{i,t}$ is the i company's financial leverage for the year t, i.e., (total assets – shareholders' equity)/total assets.

Another mediation variable in this article is the manager agency problem (*Agent*). Drawing on the research of Luo Qi and Luo Hongxin (Luo and Luo 2017), the shareholding ratio of the largest shareholder of the company is selected as the measurement index of the management agency problem. Usually, the larger the indicator, the more serious the company's agency problem.

3.2.4. Variables

This article also controls the impact of factors such as corporate finance, governance, and mergers and acquisitions. At the financial level, there are company property rights attributes (*State*), company size (*Size*), company growth (*Growth*),the company asset–liability ratio (*Lev*), company operating years (*Age*), company operating cash flow (*Cash*), and company return on assets (*Roa*). At the governance level, there are equity checks and balances (*Sharesbalance*), the institutional shareholding ratio (*Inst*), and whether the two

positions are combined (*Dual*). At the M&A level, there are M&A scale, whether there is a major asset restructuring (*Mar*), and whether there are related party transactions (Rel). The article also controls the type, industry, and year of mergers and acquisitions. The definitions and descriptions of the main variables are shown in Table 1.

Table 1. Definitions and descriptions of major variables.

Type	Variables	Definition	Value
Dependent Variable	**Inv**	**M&A efficiency**	**The residual measure model yields the degree of inefficient investment; the larger the absolute value, the lower the efficiency of the acquisition**
Explanatory variables	Digtran	The degree of digital transformation	The sum of the frequency of the five keywords artificial intelligence technology, blockchain technology, cloud computing technology, big data technology, and digital technology application in the annual report
Mediation variables	Misp	The extent to which capital markets are mispriced	The absolute value of firm-level mispricing estimated using the price-to-book ratio regression method
Modulating variables	Agent	Manager agency issues	Company management expense ratio
Control variables	State	Property properties	The value of state-owned enterprises is 1; the value of non-state-owned enterprises is 0
	Size	Company size	The logarithm of the company's total assets
	Growth	Growth	Growth rate of main business revenue
	Lev	asset-liability ratio	Total liabilities at the end of the period/total assets
	Sharebalance	Equity checks and balances	2nd–5th largest shareholder shareholding ratio/1st largest shareholder shareholding ratio
	Dual	Whether the two positions are combined	If the chairman and general manager are the same person, 1 is taken; otherwise, 0 is taken
	Inst	Institutional shareholding	The proportion of shares of a listed company held by institutional investors
	Cash	Operating cash flow	The logarithm of net operating cash flow
	Age	Years of operation	The company's operating year
	Roa	Return on assets	Return on assets
	Asq	M&A scale	The logarithm of the buyer's expense value
	Mar	Whether there is a major asset restructuring	The value of major asset restructuring is 1; otherwise, the value is 0
	Rel	Whether there is a related transaction	The value of related transactions is 1; otherwise, the value is 0

4. Model Design

4.1. Benchmark Model Setting

In order to study the impact of a company's digital transformation degree on M&A efficiency (Hypothesis 1), this paper sets up a model (6).

$$Inv = a_0 + a_1 Digtran + a_i Control + \varepsilon_{1i} \quad (6)$$

Among them, the explanatory variable *Inv* is the proxy variable of M&A efficiency, and the explanatory variable *Digtran* is the proxy variable of the degree of digital trans-

formation. Since the degree of inefficient investment is measured, when the sign of the coefficient a_1 is negative and significant it means that the degree of digital transformation will reduce the degree of inefficient investment; that is, the degree of digital transformation will increase the efficiency of M&A.

4.2. Model Setting of Conduction Mechanism

In order to test whether the degree of digital transformation increases the efficiency of M&A by reducing the degree of mispricing of M&A companies and suppressing manager–agent conflicts (hypotheses 2 and 3); this paper adopts the causal mediation analysis method proposed by (Imai et al. 2010). The causal mediation method identifies the causal mechanism by which the processing variable affects the outcome variable through an intermediary variable via a potential outcome framework and a more general counterfactual framework and then defines the proportion of Average Total Effect (ATE), average causal mediation effects (ACME), and mediation effects. The causal intermediary analysis method can determine the causal effect of digital transformation on M&A efficiency and solve the endogenous problems of mutual causation that may exist in traditional intermediary analysis. For the test of Hypotheses 2 and 3, set M&A efficiency (Inv) as the outcome variable, the degree of digital transformation ($Digtran$) as the processing variable, and capital market mispricing ($Misp$) and the management agency problem ($Agent$) as the intermediary variables. According to sampling distribution simulation model (7) and model (8) of the model parameters, the potential value sequences of the mediation variable and the result variable are obtained, respectively, and then the average treatment effect (ATE) of the degree of digital transformation on M&A efficiency and the average causal intermediary effect (ACME) of capital market mispricing and manager agency problems can be obtained.

$$Misp/Agent = a_0 + a_1 Digtran + a_i Control + \varepsilon_{2i} \quad (7)$$

$$Inv = b_0 + b_1 Digtran + b_2 Misp/Agent + b_i Control + \varepsilon_{3i} \quad (8)$$

5. Empirical Analysis

5.1. Descriptive Analysis

Table 2 reports the results of descriptive statistical analysis of the main variables in the sample, including indicators such as sample size, maximum, minimum, median, mean, and standard deviation for each variable. For the measurement of M&A efficiency, the maximum value is 0.508, the minimum value is 0.001, and the average value is 0.06, which shows that there is a large gap in the M&A efficiency of M&A companies in China; the minimum value of the degree of digital transformation is 0, the median is 2, and the maximum value is 140, which shows that the proportion of listed companies undergoing digital transformation in China is low.

5.2. Benchmark Regression Analysis

Table 3 reports the regression of digital transformation to the efficiency of M&As of listed companies. The regression results in Table 3 (1) show that the degree of digital transformation reduces the degree of inefficient investment of the M&A company; that is, the degree of digital transformation increases the M&A efficiency of the company, and the regression coefficient is significant at the level of 5%. After grouping by overinvestment and underinvestment, it is found that the promotion effect of digital transformation on M&A efficiency has a more significant impact on the overinvestment sample, while there is uncertainty in the underinvestment sample. In general, digital transformation increases the M&A efficiency of companies; the higher the degree of digital transformation, the lower the degree of inefficient investment and the higher the efficiency of M&A. Hypothesis 1 has been verified.

Table 2. Descriptive analysis.

Variable	Sample Size	Average	Std.	Min.	Median	Max.
Inv	2350	0.060	0.079	0.001	0.034	0.508
Digtran	2350	11.916	24.689	0	2	140
Misp	2350	0.579	0.461	0.001	0.457	1.914
Agent	2350	34.767	14.756	8.540	33.120	72.960
State	2350	0.296	0.456	0	0	1
Size	2350	22.222	1.172	19.124	22.057	25.983
Growth	2350	2.212	1.343	0.886	1.778	8.027
Lev	2350	0.418	0.184	0.059	0.415	0.861
Sharebalance	2350	0.716	0.596	0.037	0.537	2.843
Dual	2350	0.313	0.464	0	0	1
Inst	2350	44.278	25.276	0.268	46.468	91.943
Cash	2350	19.200	1.562	12.610	19.147	22.968
Age	2350	17.466	5.684	4	17	32
Roa	2350	0.313	0.693	−0.588	0.125	3.168
Asq	2350	18.917	2.581	0	19.215	23.298
Mar	2350	0.206	0.404	0	0	1
Rel	2350	0.408	0.492	0	0	1

Table 3. Analysis of benchmark regression results.

Variable	(1)	(2)	(3)
	Inv	Overinvestment	Underinvestment
Digtran	−0.00016 **	−0.00033 **	0.00004
	(0.000)	(0.000)	(0.000)
State	−0.02477 ***	−0.03643 ***	−0.00587
	(0.004)	(0.008)	(0.004)
Size	−0.00092	−0.00385	−0.00009
	(0.003)	(0.004)	(0.002)
Growth	0.00145	−0.00022	0.00817 ***
	(0.002)	(0.003)	(0.001)
Lev	0.02397 **	0.04415 **	0.00009
	(0.011)	(0.019)	(0.009)
Sharebalance	0.00159	0.00363	0.00094
	(0.003)	(0.005)	(0.002)
Dual	0.00666 *	0.01188 **	−0.00464
	(0.004)	(0.006)	(0.003)
Inst	0.00018 **	0.00025 *	0.00007
	(0.000)	(0.000)	(0.000)
Cash	−0.00328 **	−0.00253	−0.00174
	(0.002)	(0.003)	(0.001)
Age	−0.00005	−0.00034	−0.00020
	(0.000)	(0.001)	(0.000)
Roa	0.00328	0.00707	−0.01068 ***
	(0.003)	(0.006)	(0.003)
Asq	0.00227 ***	0.00296 **	0.00002
	(0.001)	(0.001)	(0.001)
Mar	0.01782 ***	0.03779 ***	0.00628 *
	(0.005)	(0.008)	(0.004)
Rel	−0.01181 ***	−0.01754 ***	0.00101
	(0.004)	(0.006)	(0.003)
Constant	0.07469	0.11439	0.04464
	(0.047)	(0.081)	(0.039)
Sample Size	2350	1197	1153
Adj R-squared	0.077	0.117	0.126
Type of merger and acquisition	Control	Control	Control
Industry	Control	Control	Control
Year	Control	Control	Control

Note: () is a standard error; ***, **, and * indicate significant at the 1%, 5%, and 10% levels, respectively. Same below.

5.3. The Role of Mispricing in the Capital Market and Channel Testing

The impact of digital transformation degree on M&A efficiency is more significant in the sample of excessive M&A. In order to further verify the causal relationship between the degree of digital transformation and M&A efficiency and the transmission mechanism of capital market mispricing on the impact of digital transformation degree on M&A efficiency, the sample of overinvestment selected in this part continues to estimate model (7) and

model (8); the regression results are shown in Table 4. Column (1) is a regression of model (7), which shows that M&A companies with higher levels of digital transformation are less likely to misprice their stocks. Column (2) is the regression result of model (8), which shows that the lower the degree of mispricing of the stock of the acquiring company, the lower the degree of inefficiency of the acquisition; the coefficient is significant. This conclusion supports Hypothesis 2.

Table 4. Conduction mechanism test.

Variable	(1)	(2)	(3)	(4)
	Misp	Inv	Agent	Inv
Digtran	−0.00014 *	−0.00033 **	−0.04026 ***	−0.00031 **
	(0.001)	(0.000)	(0.014)	(0.000)
Misp		0.01209 *		
		(0.007)		
Agent				0.00060 **
				(0.000)
State	−0.02743	−0.03610 ***	0.50139	−0.03404 ***
	(0.033)	(0.008)	(0.797)	(0.007)
Size	0.13743 ***	−0.00551	0.21545	−0.00232
	(0.019)	(0.004)	(0.458)	(0.004)
Growth	0.15509 ***	−0.00210	−0.90286 ***	0.00108
	(0.012)	(0.003)	(0.306)	(0.003)
Lev	0.07283	0.04327 **	−4.59847 **	0.04574 **
	(0.081)	(0.019)	(2.028)	(0.019)
Sharebalance	0.04751 **	0.00305	−17.27336 ***	0.01234 *
	(0.021)	(0.005)	(0.517)	(0.007)
Dual	0.00114	0.01187 **	0.13637	0.01158 *
	(0.026)	(0.006)	(0.642)	(0.006)
Cash	0.01138	−0.00267	1.20049 ***	−0.00297
	(0.011)	(0.003)	(0.275)	(0.003)
Age	0.00097	−0.00035	−0.10751 *	−0.00022
	(0.002)	(0.001)	(0.058)	(0.001)
Roa	0.07204 ***	0.00620	0.85130	0.00637
	(0.024)	(0.006)	(0.607)	(0.006)
Asq	−0.00273	0.00300**	0.17689	0.00299 **
	(0.005)	(0.001)	(0.133)	(0.001)
Mar	0.09573 ***	0.03663 ***	0.24078	0.03730 ***
	(0.035)	(0.008)	(0.868)	(0.008)
Rel	−0.04560 *	−0.01699 ***	0.11976	−0.01718 ***
	(0.026)	(0.006)	(0.646)	(0.006)
Constant	−2.89279 ***	0.14938 *	16.47697 *	0.06857
	(0.347)	(0.083)	(8.425)	(0.079)
Sample Size	1197	1197	1197	1197
Adj R-squared	0.279	0.118	0.557	0.117
Type of merger and acquisition	Control	Control	Control	Control
Industry	Control	Control	Control	Control
Year	Control	Control	Control	Control

Note: () is a standard error; ***, **, and * indicate significant at the 1%, 5%, and 10% levels, respectively. Same below.

After simulating the potential values of capital market mispricing and M&A efficiency, the average treatment effect (ATE) of digital transformation degree on M&A efficiency and the average causal intermediary effect (ACME) of capital market mispricing can be obtained according to the causal intermediary analysis method, as shown in Table 5 causal intermediary results. Column (1) shows that the average treatment effect (ATE) fit value of the degree of digital transformation on M&A efficiency is −0.00033, and its 95% confidence interval is not included in 0, so the causal effect of the degree of digital transformation on M&A efficiency is established, which is consistent with the regression

results in Table 3 (2). Hypothesis 1 is confirmed again. Columns (2) and (3) report the average causal intermediary effect (ACME) and the proportion of intermediary effect of capital market mispricing; the 95% confidence interval does not include 0, so some of the intermediary effect of capital market mispricing is established. In summary, the degree of digital transformation is established by reducing the degree of mispricing of the M&A company's stock, thereby increasing the efficiency of M&A,. Hypothesis 2 is true.

Table 5. Causal mediation results of conduction mechanisms.

Mediation Variable	Average Effect	(1)	(2)	(3)
		ATE	ACME	Proportion of Mediation Effect
Capital markets are mispriced	Estimates confidence interval	−0.00033 [−0.00058, −0.00009]	-1.82×10^{-6} [−0.00002, −0.00001]	0.00553 [0.00311, 0.01700]
Manager agency issues	Estimates confidence interval	−0.00034 [−0.00061, −0.00010]	−0.00002 [$-0.00006, -4.20 \times 10^{-7}$]	0.06794 [0.03823, 0.22904]

Note: The confidence interval corresponds to the confidence interval at the 95% level, and the calculation results are obtained using 1000 quasi-Bayesian Monte Carlo approximation simulations.

5.4. The Role of Managers' Agency Problems in Channel Testing

In order to test the conduction mechanism of the manager's agency problem, the overinvested sample selected in this section continues to estimate model (7) and model (8), and the regression results are shown in columns (3) and (4) of Table 4. Column (3) is the regression result of model (7), which shows that the degree of digital transformation of M&A companies is negatively correlated with the problem of management agency, and is significant at the level of 1%. Column (4) is the regression result of model (8), which shows that the lower the agency problem of the managers of the M&A company, the lower the degree of M&A inefficiency; it is significant at the 5% level.

After simulating the potential values of the manager agency problem and M&A efficiency, the average treatment effect (ATE) of digital transformation degree on M&A efficiency and the average causal intermediary effect (ACME) of the manager agency problem can be obtained according to the causal intermediary analysis method, as shown in Table 5's causal intermediary results. The regression results show that, when the manager's agency problem is used as an intermediary variable, the average treatment effect (ATE) fitting value of the degree of digital transformation on M&A efficiency is −0.00034; its 95% confidence interval is not included in 0, so the causal effect of the degree of digital transformation on M&A efficiency is established, which is consistent with the regression result in Table 3 (2) and the regression result when capital mispricing is used as an intermediary variable. Hypothesis 1 is confirmed again. The confidence interval of the mean causal mediation effect (ACME) and the proportion of the mediation effect of the manager agency problem do not include 0, so the partial mediation effect of the manager agency problem is established. In summary, the degree of digital transformation is established to increase the efficiency of M&As by suppressing manager–agent conflicts. Hypothesis 3 is true.

5.5. Heterogeneity Analysis

This paper has confirmed the role of digital transformation in promoting M&A efficiency and some of the transmission mechanisms of capital market mispricing. However, the above analysis does not consider the heterogeneous impact of a company's property attributes, financing constraints, and analyst attention, all of which are likely to affect the degree of mispricing of the company, which in turn affects the heterogeneous impact of digital transformation on M&A efficiency. In order to further deepen the systematic understanding of the relationship between the degree of digital transformation and the efficiency of M&A, this part further analyzes the heterogeneity of the conclusions from the perspectives of the property rights attributes of the M&A company, the degree of financing constraint, and the attention of analysts.

5.5.1. Heterogeneity Analysis of Property Attributes

In China's capital market, the different property rights attributes have great differences in the company's investment and financing. In this paper, the sample is divided into non-state-owned enterprises and state-owned enterprises according to their property attributes, and the heterogeneity analysis results of property rights attributes in columns (1) and (2) of Table 6 show that the impact of digital transformation on M&A efficiency has a positive impact on both state-owned and non-state-owned groups. However, this promotion effect is only significant in the non-state-owned enterprise group and not in the state-owned enterprise group. Through the previous analysis, this paper confirms that the degree of stock mispricing of the M&A company and the agency problem of its managers are the mechanisms of the impact of the degree of digital transformation on the efficiency of M&A; for SOEs, because M&A is a major investment decision of the company, it usually needs to be strictly reviewed by government departments, and the management of SOEs is subject to greater regulatory pressure than non-SOEs, which inhibits the motivation of management to carry out valuation arbitrage through M&A to a certain extent. Non-state-owned enterprises generally have the problem of relatively concentrated equity, and it is more common for management to blindly pursue investment scale expansion in order to master more resources, so the role of digital transformation in promoting M&A efficiency is more significant in the non-state-owned enterprise group.

Table 6. Heterogeneity results of property attributes and financing constraints.

Variable	(1) Non-State-Owned Enterprises	(2) State-Owned Enterprises	(3) Low Financing Constraints	(4) High Financing Constraints
Digtran	−0.00018 *	−0.00023	−0.00013	−0.00019 *
	(0.000)	(0.000)	(0.000)	(0.000)
Size	0.00103	−0.00319	0.00068	−0.00071
	(0.004)	(0.003)	(0.004)	(0.004)
Growth	−0.00030	0.00975 ***	0.00038	0.00299
	(0.002)	(0.003)	(0.002)	(0.002)
Lev	0.02663 *	0.02270 *	0.01570	0.03874 **
	(0.015)	(0.013)	(0.014)	(0.018)
Sharebalance	0.00180	−0.00147	0.00219	0.00154
	(0.004)	(0.005)	(0.004)	(0.004)
Dual	0.00702	0.00238	0.00355	0.00783
	(0.004)	(0.006)	(0.005)	(0.005)
Inst	0.00019 **	0.00028 *	0.00009	0.00027 **
	(0.000)	(0.000)	(0.000)	(0.000)
Cash	−0.00357 *	−0.00165	−0.00296	−0.00461 *
	(0.002)	(0.002)	(0.002)	(0.002)
Age	−0.00017	0.00026	0.00040	−0.00051
	(0.000)	(0.000)	(0.001)	(0.001)
Roa	0.00539	−0.00758 *	0.00324	0.00178
	(0.004)	(0.005)	(0.005)	(0.005)
Asq	0.00239 ***	0.00164	0.00180 *	0.00278 **
	(0.001)	(0.001)	(0.001)	(0.001)
Mar	0.03031 ***	−0.01273 **	0.01755 ***	0.02003 ***
	(0.006)	(0.006)	(0.006)	(0.007)
Rel	−0.01533 ***	−0.00083	−0.01051 **	−0.01543 ***
	(0.005)	(0.005)	(0.005)	(0.006)
Constant	−0.03419	0.10996 **	0.03324	0.06334
	(0.076)	(0.054)	(0.067)	(0.070)
Sample Size	1655	695	1265	1085
Adj R-squared	0.071	0.082	0.075	0.088
Type of merger and acquisition	Control	Control	Control	Control
Industry	Control	Control	Control	Control
Year	Control	Control	Control	Control

Note: () is a standard error; ***, **, and * indicate significant at the 1%, 5%, and 10% levels, respectively. Same below.

5.5.2. Heterogeneity Analysis of Financing Constraints

Completing large-scale mergers and acquisitions usually requires the comprehensive use of cash, stocks, bonds, and other financing methods; whether the funds required for mergers and acquisitions can be raised and whether they can be raised at a lower cost directly determine the success of mergers and acquisitions. The allocation of credit funds by companies in China's capital market is low; there are many restrictions on equity financing and debt financing, and most companies are facing the problem of financing constraints. In this paper, the SA index in Guotai'an database is selected as the proxy variable of financing constraints, and the larger the SA index, the higher the degree of financing constraints of listed companies. The sample is grouped by median, with high funding constraints if greater than the median and low funding constraints if it is not. Columns (3) and (4) of Table 6 report the results of grouping model (6) according to financing constraints; whether it is a low financing constraint group or a high financing constraint group, digital transformation has promoted M&A efficiency. However, this impact is only pronounced in M&A companies with high financing constraints. It may be because, when the stock price of a listed company is overvalued by the market, companies with a higher degree of financing constraint are more likely to take advantage of the window opportunity of overvalued stock price to obtain more external financing and ease the level of financing constraint. Due to the broad prospects of the digital economy market, digital transformation can not only be supported and recognized by government departments and financial institutions but also continue to attract private funds and alleviate the financing constraints of companies to a certain extent (Huang and Liu 2020). At the same time, the improvement in information disclosure quality brought about by digital transformation can also alleviate the information asymmetry between M&A companies and lending institutions and ease corporate financing constraints (Zhang and Wang 2023). Therefore, M&A companies with a high degree of financing constraints are more sensitive to the digital transformation of M&A efficiency.

5.5.3. Analysis of Heterogeneity of Analyst Attention

As a link between listed companies and investors, the analysis reports of securities analysts are an important source for market investors to obtain company information (Huang and Fang 2021) and have important reference value for market investors' decision making. Especially for M&A, market investors need more professional investment opinion interpretation to understand the company's M&A decisions more comprehensively. In this paper, two indicators of analyst attention and research report attention in the Guotai'an database are selected for heterogeneity analysis, where analyst attention refers to the number of analyst teams tracking and analyzing listed companies in a year and research report attention refers to the number of research reports tracking and analyzing listed companies in a year. Table 7 reports the results of group regression; the promotion effect of digital transformation on M&A efficiency is only significant in the group with low analyst attention and low research report attention but not for the group with high analyst attention and high research report attention. The likely reason is that analysts' attention will reduce the degree of information asymmetry in the market to the company by paying attention to the company's information in a timely manner (Chen and Pan 2022), which in turn can alleviate the degree of stock mispricing. Therefore, the listed companies with lower attention from analysts and research reports have a more significant degree of mispricing of their shares than listed companies with higher attention from analysts and research reports, and the motivation of companies to carry out valuation arbitrage through mergers and acquisitions is more obvious. Combined with the transmission mechanism of mispricing in the capital market, the digital transformation of listed companies is more sensitive to the promotion of M&A efficiency.

Table 7. Heterogeneity results of analyst attention.

Variable	(1)	(2)	(3)	(4)
	Low Analyst Attention	**High Analyst Attention**	**Low Research Report Attention**	**High Research Report Attention**
Digtran	−0.00033 ***	−0.00004	−0.00030 **	−0.00008
	(0.000)	(0.000)	(0.000)	(0.000)
State	−0.02628 ***	−0.02401 ***	−0.02120 ***	−0.02653 ***
	(0.007)	(0.006)	(0.007)	(0.006)
Size	−0.00208	−0.00169	−0.00410	−0.00022
	(0.004)	(0.003)	(0.004)	(0.003)
Growth	0.00301	−0.00018	0.00454	−0.00086
	(0.003)	(0.002)	(0.003)	(0.002)
Lev	0.05180 ***	0.00780	0.04593 ***	0.01066
	(0.018)	(0.014)	(0.017)	(0.014)
Sharebalance	−0.00125	0.00412	−0.00228	0.00515
	(0.005)	(0.004)	(0.005)	(0.004)
Dual	0.00161	0.00745	0.00099	0.00832 *
	(0.006)	(0.005)	(0.006)	(0.005)
Inst	0.00039 ***	0.00005	0.00046 ***	0.00003
	(0.000)	(0.000)	(0.000)	(0.000)
Cash	−0.00608 **	−0.00175	−0.00515 **	−0.00252
	(0.003)	(0.002)	(0.003)	(0.002)
Age	−0.00021	−0.00009	−0.00029	−0.00006
	(0.001)	(0.000)	(0.001)	(0.000)
Roa	−0.00118	0.00639	0.00179	0.00602
	(0.006)	(0.004)	(0.006)	(0.004)
Asq	0.00126	0.00286 ***	0.00151	0.00260 ***
	(0.001)	(0.001)	(0.001)	(0.001)
MAR	0.02142 ***	0.01639 ***	0.01626 **	0.01971 ***
	(0.007)	(0.006)	(0.007)	(0.006)
Rel	−0.00909	−0.01363 ***	−0.00713	−0.01437 ***
	(0.006)	(0.005)	(0.006)	(0.005)
Constant	0.10481	0.04953	0.11274	0.07910
	(0.087)	(0.059)	(0.087)	(0.058)
Sample Size	947	1403	904	1446
Adj R-squared	0.077	0.083	0.075	0.084
Type of merger and acqusition	Control	Control	Control	Control
Industry	Control	Control	Control	Control
Year	Control	Control	Control	Control

Note: () is a standard error; ***, **, and * indicate significant at the 1%, 5%, and 10% levels, respectively. Same below.

5.6. Endogenous Testing

In order to alleviate endogenous problems such as mutual causation and estimation bias, this paper selects the degree of digital transformation that lags behind the first phase to solve the endogenous problem. Table 8 reports the test results of the regression, and the results still show that the digital transformation of M&A companies has a promoting effect on M&A efficiency, further demonstrating the robustness of benchmark regression.

5.7. Robustness Test

The robustness of the benchmark regression results has been verified many times using methods such as conduction mechanism analysis, regulatory effect analysis, and heterogeneity analysis, and the method of replacing explanatory variables continues to be used for robustness testing. The sum of the frequencies that appear in the annual report of the five keywords is used as the proxy variable of digital transformation, and the sum of the frequencies of "digitalization"-related content in the annual report of listed companies is selected as the proxy variable of digital transformation. Table 9 reports the robustness test

results after substituting the explanatory variables, which are consistent with the results of the primary regression in Table 3.

Table 8. Endogenous tests.

Variable	(2)	(3)
	Overinvestment	Underinvestment
Digtran	−0.00054 *	−0.00014
	(0.000)	(0.000)
State	−0.02899	−0.00175
	(0.021)	(0.011)
Size	−0.00128	0.00621
	(0.011)	(0.005)
Growth	−0.01433 *	0.00536 *
	(0.008)	(0.003)
Lev	0.04698	−0.05024 **
	(0.049)	(0.022)
Sharebalance	0.00595	0.01206 **
	(0.012)	(0.005)
Dual	0.00303	0.00214
	(0.014)	(0.006)
Inst	−0.00014	0.00027 *
	(0.000)	(0.000)
Cash	−0.00289	−0.00391
	(0.007)	(0.003)
Age	−0.00058	−0.00005
	(0.001)	(0.001)
Roa	0.00703	−0.00368
	(0.017)	(0.007)
Asq	0.00079	−0.00340 **
	(0.003)	(0.002)
Mar	0.05370 **	0.00639
	(0.022)	(0.010)
Rel	−0.02054	0.00856
	(0.014)	(0.007)
Constant	0.12147	0.06405
	(0.202)	(0.099)
Sample Size	271	275
R-squared	0.238	0.250
Type of merger and acqusition	Control	Control
Industry	Control	Control
Year	Control	Control

Note: () is a standard error; **, and * indicate significant at the 5%, and 10% levels, respectively.

Table 9. Robustness tests for substitution variables.

Variable	(1)	(2)	(3)
	Inefficient Investments	Overinvestment	Underinvestment
State	−0.02441 ***	−0.03432 ***	−0.00649 *
	(0.004)	(0.007)	(0.004)
Size	−0.00105	−0.00399	−0.00037
	(0.003)	(0.004)	(0.002)
Growth	0.00138	−0.00020	0.00771 ***
	(0.002)	(0.003)	(0.001)
Lev	0.02412 **	0.04497 **	0.00162

Table 9. *Cont.*

Variable	(1)	(2)	(3)
	Inefficient Investments	Overinvestment	Underinvestment
	(0.010)	(0.019)	(0.008)
Sharebalance	0.00075	0.00253	0.00079
	(0.003)	(0.005)	(0.002)
Dual	0.00558	0.01026 *	−0.00430
	(0.003)	(0.006)	(0.003)
Inst	0.00017 **	0.00023 *	0.00008
	(0.000)	(0.000)	(0.000)
Cash	−0.00342 **	−0.00285	−0.00174
	(0.002)	(0.003)	(0.001)
Age	0.00004	−0.00020	−0.00024
	(0.000)	(0.001)	(0.000)
Roa	0.00335	0.00737	−0.00995 ***
	(0.003)	(0.006)	(0.003)
Asq	0.00216 ***	0.00289 **	0.00004
	(0.001)	(0.001)	(0.001)
Mar	0.01853 ***	0.03858 ***	0.00679 *
	(0.005)	(0.008)	(0.004)
Rel	−0.01202 ***	−0.01819 ***	0.00112
	(0.004)	(0.006)	(0.003)
Constant	0.08644 *	0.08251	0.05067
	(0.045)	(0.082)	(0.037)
Sample Size	2453	1250	1203
Adj R-squared	0.078	0.113	0.129
Type of merger and acqusition	Control	Control	Control
Industry	Control	Control	Control
Year	Control	Control	Control

Note: () is a standard error; ***, **, and * indicate significant at the 1%, 5%, and 10% levels, respectively.

6. Conclusions and Enlightenment

This paper takes the M&A of listed companies from 2007 to 2021 as a research sample to study the influence mechanism of the degree of digital transformation of companies on their M&A efficiency. The results show that the digital transformation of listed companies will improve their M&A efficiency, which can be achieved by reducing the mispricing of the acquired company's stock and suppressing manager–agent conflicts. The heterogeneity analysis from the nature of property rights, analyst attention, and financing constraints shows that high financing constraint and low analyst attention companies have a greater degree of mispricing in the capital market; the promotion effect of digital transformation on M&A efficiency is more significant in non-state-owned companies, with a higher degree of financing constraint and higher analyst attention.

This paper obtains the following enlightenments: First, accelerate the cultivation of the data factor market to alleviate the prominent contradiction of the mismatch of supply and demand structure in the traditional factor market. High-quality access to and transmission of information is essential for the healthy development of the capital market. The transmission mechanism of capital market mispricing indicates that the development of the digital economy can further improve the information transmission efficiency of the capital market, and the digital transformation of companies can reduce the degree of capital market mispricing caused by market asymmetry to a certain extent. Therefore, the regulatory authorities should continue to encourage the digital transformation of companies, provide certain policy support, and focus on non-state-ownership, financing constraints, and companies with low corporate transparency, so as to give full play to the mechanisms of digital transformation of companies and improve the effectiveness of digital supervision of the capital market. Second, improve the company's digital governance capabilities and curb the motive of M&A arbitrage. The moderating effect of the management agency

problem shows that digital transformation can help enhance the transparency of corporate management, alleviate the problem of entrusted agency, and constrain managers' M&A catering motivation. Therefore, companies should actively carry out digital transformation, improve the level of digital governance, enhance the standardization of digital information disclosure of listed companies, alleviate the pandering motivation of mispricing in the capital market for mergers and acquisitions, and return to value investment.

Moreover, there are some limitations in this study that could be addressed in future research. First, the limited access to data and time constraints could be explored in depth and longer time periods could be allowed; these factors effect estimates in the model that are based on intervention and prospective observational studies. They are subject to biases and confounding factors that may have influenced the model estimates. Second, the research method section could be designed in a more rational and scientific way, such as using heterogeneity analysis and some other methods that could be corroborated since this paper used secondary data. Thirdly, more detailed and precision measurement of the variable selection is needed, such as in the case of the manager agency problem. However, limitations cannot obscure the virtues the this paper not only provides, with a more concrete case from China about digital transformation and M&A efficiency; it also enriches the related empirical analysis it is based on.

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