LEX LOCALIS-JOURNAL OF LOCAL SELF-GOVERNMENT
ISSN:1581-5374 E-ISSN:1855-363X
VOL. 23, NO. S6(2025)

DIGITAL TRANSFORMATION ENHANCES ENTERPRISE VALUE: MECHANISMS OF DYNAMIC CAPABILITIES AND RESOURCE RECONFIGURATION

Xin Huang [1], and Anan Pongtornkulpanich[2*]

[1,2]Chakrabongse Bhuvanarth International College of Interdisciplinary Studies (CBIS), Rajamangala University of Technology Tawan-OK, Bangkok, Thailand

[1]Email:xin.hua@rmutto.ac.th;
[2]anan_po@rmutto.ac.th;
* Corresponding author:anan_po@rmutto.ac.th

Abstract This study examines the impact of digital transformation on enterprise value, utilizing a comprehensive dataset of Chinese listed firms from 2010 to 2022. By adopting a quantitative approach based on panel regression models, the study empirically explores both the direct and indirect pathways through which digital transformation enhances firm value. The analysis incorporates key mediating variables, including financing constraints, innovation capability, risk-taking behavior, and operational efficiency. Findings demonstrate that digital transformation significantly increases enterprise value, and this relationship is partially mediated by improvements in R&D investment and resource reconfiguration. The study also examines the time effect and interaction intensity of digital engagement, revealing that both the duration and depth of transformation amplify its positive impact. These results contribute to the literature on the resource-based view and dynamic capabilities by clarifying the mechanisms through which intangible digital assets generate long-term competitive advantages. The study offers practical insights for corporate decision-makers, emphasizing the importance of sustained and strategically aligned digital investment. Limitations and directions for future research are discussed, particularly regarding cross-industry comparisons and alternative measurements of digital maturity.

Keywords: Digital Transformation; Enterprise Value; Dynamic Capabilities; Resource Reconfiguration; R&D Investment; Risk-Taking Behavior; Operational Efficiency; Panel Data Analysis; Financing Constraints; Chinese Listed Firms

1. Introduction

In the context of the global digital economy, the digital transformation of enterprises has become a strategic imperative for achieving sustained value creation and competitive advantage. Particularly in China, government policies and industrial development initiatives have increasingly emphasized the integration of digital technologies with traditional sectors, aiming to foster a robust digital ecosystem (Liang & Li, 2023; Meng et al., 2023). Despite this momentum, the empirical evidence on the economic outcomes of digital transformation remains fragmented. While numerous studies highlight its potential to enhance productivity, foster innovation, and improve operational efficiency, the specific pathways through which digital transformation contributes to firm value require further empirical clarification (Tian et al., 2023; Zhai et al., 2022; Zhang et al., 2023).

This study responds to this gap by conducting a quantitative investigation into the relationship between digital transformation and enterprise value, using a panel dataset of 562 A-share listed companies in China spanning the period from 2014 to 2023. Drawing upon resource-based theory, dynamic capabilities theory, and information asymmetry theory, we construct a theoretical model to explore how digital transformation affects enterprise value through mediating mechanisms such as financing constraints, innovation capability, risk-taking, and operational efficiency.

By employing a bidirectional fixed effects regression model and a series of robustness tests, this study aims to identify and quantify the causal mechanisms at play. In doing so, it seeks to enrich the understanding of digital transformation not merely as a technological upgrade, but as a strategic enabler of internal capability reconfiguration and resource optimization. The findings of this research are expected to contribute both to academic discourse on digital transformation and to the formulation of evidence-based strategies for enterprises pursuing high-quality development in the digital age.

2. Literature Review

2.1 Enterprise Value

Enterprise value represents a comprehensive measure of a firm's economic performance, market position, and innovation potential. Traditionally, it has been viewed through financial indicators such as return on assets (ROA), net profit, and earnings per share (Lungkang & Rusgowanto, 2022; Pan et al., 2023). However, contemporary research has expanded this definition to encompass non-financial dimensions, including market competitiveness and innovation premium (Alatawi et al., 2023; Tarquinio & Posadas, 2020). According to the resource-based view, enterprise value is a function of how effectively a firm mobilizes and configures its tangible and intangible assets to deliver superior performance (Chen et al., 2024).

In the digital era, the determinants of enterprise value have become increasingly complex. Researchers have argued that enterprise value is not solely derived from static resource endowments, but also from the firm's ability to innovate, adapt, and create customer-centric value propositions (Wu et al., 2024; Zheng et al., 2025). Especially in rapidly evolving markets, firms with stronger innovation outputs and higher responsiveness to market shifts are likely to realize greater long-term value.

2.2 Digital Transformation

Digital transformation refers to the strategic integration of digital technologies across all dimensions of a business, including its operations, organizational structure, and customer engagement models (Bresciani et al., 2021). It is characterized by the adoption of technologies such as big data, cloud computing, artificial intelligence, and blockchain to reconfigure traditional processes and generate new forms of value (Akter et al., 2022; Vărzaru & Bocean, 2024). Far from being a simple technological upgrade, digital transformation represents a shift in how firms operate and compete in a data-driven economy.

Multiple theoretical perspectives underscore the importance of digital transformation. From a dynamic capabilities perspective, digital tools enable firms to sense opportunities, seize resources, and reconfigure operational capacities in response to market dynamics (Ghosh et al., 2022; Khurana et al., 2022). Empirical evidence suggests that digital transformation enhances decision-making accuracy, accelerates innovation cycles, and improves customer experience (Bresciani et al., 2021; Gao et al., 2023).

In the context of Chinese enterprises, digital transformation is further driven by national policy incentives and infrastructural investment. Nonetheless, many firms face challenges such as insufficient digital culture, weak data capabilities, and high transformation costs (Ghosh et al., 2022; Wu et al., 2023). This underscores the importance of identifying the specific conditions under which digital transformation leads to measurable improvements in enterprise value.

Digital tools enable real-time data analysis, collaborative R&D, and open innovation ecosystems, thereby enhancing firms' ability to produce novel products and services (Marshall et al., 2021). Empirical studies have confirmed that investment in digital infrastructure correlates with higher R&D intensity and stronger innovation output (Du & Wang, 2024). Financing constraints represent another critical pathway. Drawing from information asymmetry theory, digital technologies improve the transparency of firm operations, reducing the risk premium imposed by external investors and enhancing access to credit. Digital financial systems, such as enterprise blockchain and automated credit scoring, have been shown to alleviate traditional capital bottlenecks for firms (Li et al., 2023; Zheng et al., 2024).

Through enhanced data visibility and forecasting, digital transformation empowers firms to pursue higher-risk, higher-reward initiatives while maintaining better risk controls. This transformation in risk posture has been associated with greater strategic flexibility and opportunity capture in volatile markets.

Operational efficiency serves as a foundational channel. Digital platforms reduce transaction costs, streamline production processes, and improve real-time responsiveness. Several empirical studies have demonstrated that digitalization enhances supply chain integration, customer targeting, and internal coordination, which in turn contribute to value creation (Aslam et al., 2025; Dolgui & and Ivanov, 2022; Klingenberg et al., 2022).

Thus, it leads to the following hypotheses:

H1: Digital transformation has a positive impact on enterprise value

H2: Digital transformation positively affects the dynamic resources adaptability

H3: Dynamic resource adaptability positively affects enterprise value

H4: The digital transformation of enterprises can effectively improve their innovation ability, thus promoting the growth of enterprise value.

H4(a): Enterprise digital transformation can effectively improve the level of financing constraints, thus promoting the growth of enterprise value.

H4(b): Enterprise digital transformation can effectively improve the level of enterprise innovation ability, thus promoting the growth of enterprise value.

H4(c): Enterprise digital transformation can effectively improve the level of enterprise Assumption of risk, thus promoting the growth of enterprise value.

H4(d): Enterprise digital transformation can effectively improve enterprise operation efficiency, and then enhance enterprise value.

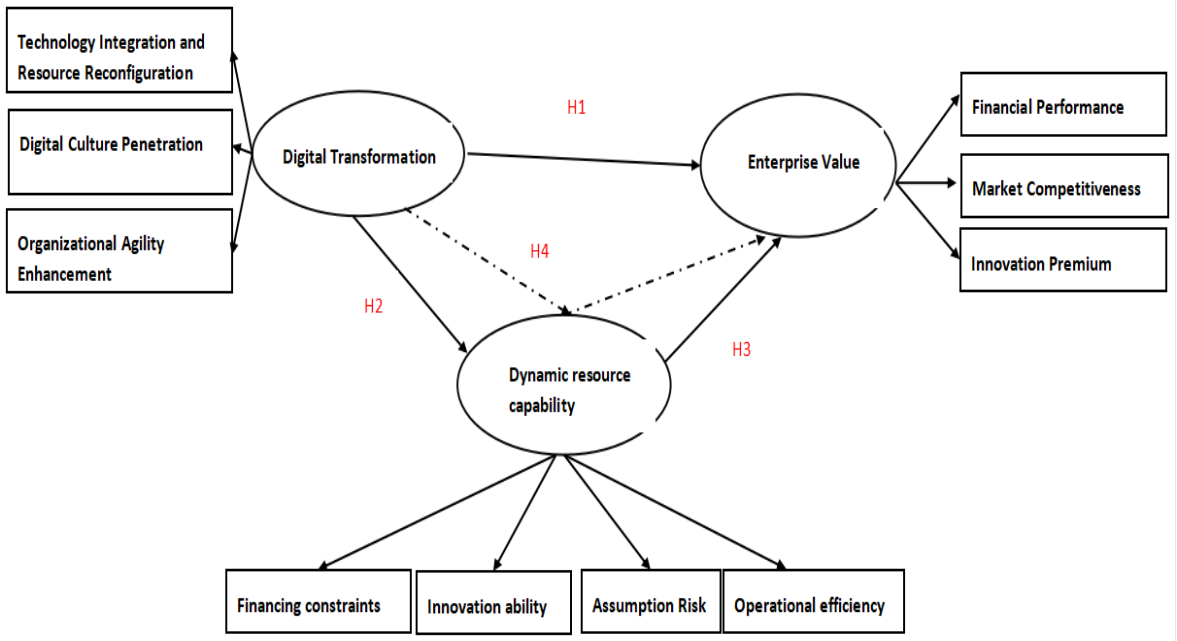

Figure 1. Conceptual Model

3.Research Method

In this study, data were collected through an online questionnaire administered via the "Wenjuanxing" platform, which is widely recognized for its reliability and user accessibility in academic research across China. The primary target population consisted of mid- to senior-level managers from A-share listed firms on the Shanghai and Shenzhen Stock Exchanges, particularly those involved in digital transformation initiatives. These respondents were selected due to their direct involvement in or oversight of digital strategy, innovation activities, and enterprise operations. The survey captured responses from a broad spectrum of industries, including manufacturing, information technology, energy, and finance. Geographic representation was ensured through the inclusion of firms from eastern coastal provinces (e.g., Guangdong, Jiangsu, Zhejiang), the central region (e.g., Hubei, Henan), and western development zones (e.g., Sichuan, Chongqing). A total of 562 valid responses were received and incorporated into the final empirical analysis. To ensure consistency between respondent profiles and the research objectives—and to mitigate sampling bias—the study adopted a stratified purposive sampling strategy. Specifically, the sample was stratified based on industry classification and level of digital transformation maturity as reported in public disclosures and annual reports. This approach enabled the study to capture inter-industry heterogeneity and sector-specific digital practices, thereby strengthening the robustness and generalizability of the empirical findings.

4. Results

Table 1 presents the regression results examining the impact of digital transformation on enterprise value, measured by Tobin's Q, across two model specifications. In both Model (1) and Model (2), digital transformation (Dt) exhibits a statistically significant and positive effect on enterprise value, with coefficients of 0.0056 and 0.0067 respectively, both significant at the 1% level (t = 17.7804 and 15.5905). These results provide strong empirical support for Hypothesis H1, suggesting that a higher degree of digital transformation is associated with a notable

increase in firm market value. Several control variables are also found to be statistically significant. Firm size (Size) shows a negative and highly significant relationship with Tobin's Q (β = -0.5370, t = -34.1902), indicating that, ceteris paribus, larger firms may experience lower market valuation relative to their assets. In contrast, return on equity (ROE) is positively associated with firm value (β = 0.0321, t = -50.3902), reflecting the importance of profitability in shaping investor perceptions. Additionally, sales revenue (Sale), capital structure (Cp), and firm age (Age) are negatively related to Tobin's Q, while ownership concentration (Firsthold) and investment efficiency (Iq) have positive and significant effects.

Both industry and year fixed effects are included to control for unobserved heterogeneity across sectors and time. Model (1) demonstrates relatively strong explanatory power, with an R^2 of 0.4403 and an adjusted R^2 of 0.4419, indicating that approximately 44% of the variance in firm value is explained by the model. In comparison, Model (2) exhibits a lower adjusted R^2 of 0.1575 but still provides statistically meaningful insights. The regression results confirm that digital transformation exerts a robust and positive influence on enterprise value, even after accounting for firm-specific characteristics and macroeconomic controls.

Table 1 Baseline Regression Results

	M（1）TobinQ	M（1）TobinQ
Dt	0.0056***	0.0067***
	17.7804	15.5905
size	-0.5370***	
	（-34.1902）	
Roe	0.0321***	
	-50.3902	
Sale	-0. 1831***	
	（-12.12）	
Firsthold	0.0054***	
	-8.12	
Cp	-0.553***	
	（-10.75）	
Iq	0.126***	
	-6.011	
Age	-0.0137***	
	（-9.2211）	
Ind	YES	YES
Year	YES	YES
N	562	562
R2	0.4403	0.1515
adj.R2	0.4419	0.1575

Table 2 reports the results of a mediation analysis examining the role of financing constraints (Sa) in the relationship between digital transformation and enterprise value (Tobin's Q). Model (1) shows that digital transformation (Dt) has a

positive and highly significant effect on Tobin's Q (β= 0.00642, t= 17.78), confirming its direct contribution to firm value. In Model (2), digital transformation is significantly negatively associated with financing constraints (β= -0.000103, t= -3.64), indicating that digitalization reduces firms' financing barriers. Furthermore, Model (3) includes both digital transformation and financing constraints as predictors of Tobin's Q. The results reveal that while Dt remains positively significant (β = 0.00669, t= 18.33), Sa shows a significant negative effect on firm value (β= -0.1543, t= -11.99). These findings support the partial mediation effect of financing constraints, suggesting that digital transformation not only enhances enterprise value directly but also does so indirectly by alleviating capital access issues.

Across all three models, several control variables demonstrate consistent significance. Firm size (Size) is negatively related to Tobin's Q but positively associated with Sa, implying that larger firms may face fewer financing constraints yet are penalized in market valuation. Profitability (ROE) and investment efficiency (Iq) positively influence firm value, while capital intensity (Cp) exerts a negative effect. The inclusion of industry and year fixed effects further enhances model robustness. Notably, the adjusted R^2 values range from 0.4001 to 0.9201, indicating strong explanatory power, particularly in the model predicting financing constraints. Overall, these results substantiate the mediating role of financing constraints in the digital transformation–enterprise value nexus.

Table 2 Financing constraints

	(1)	(2)	(3)
	TobinQ	Sa	TobinQ
Dt	0.00642*** (17.78)	-0.000103*** （-3.64）	0.00669*** (18.3321)
Sa			-0.1543*** （-11.9907）
Size	-0.5469** -34.1799	1.215*** (945.3901)	-3.7171*** （-40.22）
Roe	0.0452*** -50.3799	-0.00140 （-0.2611）	0.1351*** (51.54)
Sale	-0.1729* -12.6099	-0.0078*** （-6.7711）	2.6212*** (34.71)
Firsthold	0.01501* -8.0099	0.000394*** (8.2302)	0.0088*** (6.46)
Cp	-0.5629** -10.8399	-0.0153* （-2.4911）	-0.5046*** （-10.56）
Iq	0.1311** -6.2899	0.0072*** (5.1803)	0.1011*** (5.35)
Age	-0.0056* -0.5469	-0.0449*** （-307.33）	0.0616*** (26.09)
Ind	YES	YES	YES
Year	YES	YES	YES
N	562	562	562
R2	0.4333	0.9111	0.4613
adj.R2	0.4001	0.9201	0.4013

Table 3 shows the mediation analysis results assessing the role of R&D investment (Rd) as a mechanism through which digital transformation (Dt) influences enterprise value (Tobin's Q). In Model (1), digital transformation exhibits a significant and positive effect on firm value (β = 0.0042, t= 17.78), confirming its direct contribution. Model (2) demonstrates that Dt significantly promotes R&D investment (β = 0.0076, t= 31.21), suggesting that digital transformation fosters innovation activities within firms. In Model (3), when both digital transformation and R&D investment are included as predictors, Dt remains positively significant (β = 0.0512, t= 14.01), and Rd also shows a strong and positive association with Tobin's Q (β = 0.1134, t= 19.29). These results provide robust support for a partial mediation effect, indicating that R&D investment serves as an effective transmission channel through which digital transformation enhances enterprise value.

In terms of control variables, firm size (Size) consistently shows a negative effect on Tobin's Q but a positive influence on R&D, implying that larger firms are more capable of investing in innovation but may experience diminishing marginal returns in market valuation. Profitability (ROE) and investment efficiency (Iq) positively influence both R&D and enterprise value, while sales revenue (Sale) and capital structure (Cp) reveal opposing effects—positively related to Rd but negatively associated with Tobin's Q. Firm age (Age) shows a significant negative effect across all models, suggesting that older firms may have lower innovation responsiveness and market value growth. All models control for industry and year fixed effects, with adjusted R^2 values ranging from 0.4002 to 0.4707, indicating acceptable explanatory power. Overall, the analysis confirms that digital transformation enhances firm value both directly and indirectly via strengthened innovation capabilities.

Table 3 Innovation Inputs

	(1)	(2)	(3)
	TobinQ	Rd	TobinQ
Dt	0.0042*** (17.78)	0.0076*** (31.21)	0.0512*** (14.01)
Rd			0. 1134*** (19.29)
Size	-0.5157*** （-34.19）	0.1155*** (18.11)	-0.5901*** （-36.32）
Roe	0.0351*** (50.39)	0.0081*** (13.31)	0.0346*** (49.02)
Sale	-0. 1183*** （-12.62）	0.4555*** (36.28)	-0.2424*** （-16.54）
Firsthold	0.0049*** (8.02)	-0.0068*** （-12.05）	0.0077*** (9.45)
Cp	-0.5073*** （-10.85）	0.2812*** (6.17)	-0.6106*** （-11.63）
Iq	0.1211*** (6.30)	0.0913*** (5.48)	0. 1095*** (5.71)
Age	-0.0157*** （-9.22）	-0.0246*** （-16.70）	-0.0124*** （-7.30）
Ind	YES	YES	YES

Year	YES	YES	YES
N	562	562	562
R2	0.4101	0.4515	0.4616
adj.R2	0.4002	0.4582	0.4707

Table 4 presents the regression results assessing whether risk-taking behavior mediates the relationship between digital transformation (DT) and enterprise value, as measured by Tobin's Q. In Model (1), DT demonstrates a strong and statistically significant positive effect on firm value (β= 0.0642, t= 17.82), affirming its direct contribution. In Model (2), DT is positively associated with risk-taking (β= 0.0955), but the coefficient is statistically insignificant, suggesting a weak direct effect of DT on firms' risk behavior. However, in Model (3), when both DT and Risk are included, DT remains significantly positive (β = 0.0593, t= 16.62), while Risk displays a significant negative effect on firm value (β = -0.0516, t= 27.85). This pattern indicates that although DT does not significantly influence risk-taking directly, risk-taking behavior negatively impacts firm value and partially mediates the DT–TobinQ relationship.

Among the control variables, firm size (Size) exhibits a consistently negative and significant relationship across all three models, implying that larger firms tend to have lower market-based valuation. Return on equity (ROE) remains positively significant in Models (1) and (3), highlighting the role of profitability in shaping enterprise value. Other control variables such as sales (Sale), capital structure (Cp), and firm age (Age) also show significant effects, mostly in the expected directions. Notably, ownership concentration (Firsthold) exhibits a strong positive effect in Model (3), suggesting that firms with more centralized ownership may command higher market value. The models include both industry and year fixed effects to control for sectoral and temporal heterogeneity. The adjusted R^2 values—0.4881 for Model (1), 0.7803 for Model (2), and 0.4536 for Model (3)—demonstrate strong explanatory power, especially for the model predicting risk behavior. In sum, these findings suggest that while risk-taking has a detrimental effect on firm value, digital transformation continues to play a positive role in value creation, independent of its effect on risk propensity.

Table4 Assumption of Risk

	（1）	（2）	（3）
	TobinQ	Risk	TobinQ
DT	0.0642*** （17.82）	0.0955 （8.22）	0.0593*** （16.62）
Risk			-0.0516*** （27.85）
Size	-0.0557*** （-34.19）	-0.0932*** （-17.81）	-0.0509*** （-31.50）
Roe	0.0351*** （50.39）	0.0428 （1.91）	0.0349*** （50.77）
Sale	-0. 1813*** （-12.62）	0.0913 -1.96	-0. 1838*** （-13.13）
Firsthold	0.0049*** （8.02）	-0.0685*** （-3.48）	0.0526*** -8.72

Cp	-0.5073*** （-10.85）	-0.0602*** （-3.55）	-0.5041*** （-10.40）
Iq	0.121*** （6.30）	0.012 -1.94	0. 115*** -6.07
Age	-0.0157*** （-9.22）	-0.0492*** （-9.00）	-0.0131*** （-7.82）
Ind	YES	YES	YES
Year	YES	YES	YES
N	562	562	562
R2	0.4303	0.6818	0.4563
adj.R2	0.4881	0.7803	0.4536

Table 5 reports the results of a mediation analysis investigating the role of operational efficiency (Itv) in the relationship between digital transformation (Dt) and enterprise value, proxied by Tobin's Q. In Model (1), digital transformation exhibits a statistically significant and positive effect on firm value (β= 0.0607, t= 16.69), supporting the direct link between digitalization and enterprise value creation. In Model (2), DT significantly enhances operational efficiency (β = 0.0773, t= 26.74), indicating that firms engaging in digital transformation benefit from improved internal operational processes. Model (3) includes both Dt and Itv, and finds that both remain significantly positive—DT (β= 0.0572, t= 15.55) and Itv (β= 0.0445, t= 5.84)—suggesting that operational efficiency partially mediates the relationship between digital transformation and enterprise value. The control variables behave largely as expected. Firm size (Size) shows a consistently negative and significant effect on Tobin's Q across models, while it negatively affects Itv, suggesting that larger firms may suffer from structural inefficiencies. Return on equity (ROE) remains positively significant for firm value but shows no significant effect on operational efficiency. Variables such as sales revenue (Sale) and capital structure (Cp) display opposing effects—positively affecting Itv but negatively impacting Tobin's Q, indicating trade-offs between scale and valuation. Notably, ownership concentration (Firsthold) demonstrates a positive effect in all models, underscoring the role of centralized control in enhancing both operational efficiency and firm value. The adjusted R^2 values range from 0.4002 to 0.5511, indicating moderate to strong explanatory power, with Model (2) explaining a substantial portion of the variance in operational efficiency. Overall, the findings confirm that digital transformation promotes enterprise value not only directly but also indirectly through improved operational efficiency, validating Hypothesis H4(d).

Table5 Operating Efficiency

	（1）	（2）	（3）
	TobinQ	Risk	TobinQ
Dt	0.0607*** (16.69)	0.0773*** (26.74)	0.0572*** (15.55)
Itv			0.0445*** (5.84)
Size	-0.1155*** （-33.71）	-1.7005*** （-13.02）	-0.5646*** （-33.17）
Roe	0.0349***	-0.0426	0.0349***

	(49.99)	（-0.77）	(50.05)
Sale	-0. 1182***	2.5266***	-0. 1193***
	（-12.45）	(21.75)	（-13.12）
Firsthold	0.0495***	0.0410***	0.0477***
	(8.16)	(8.49)	(7.85)
Cp	-0.5606***	-1.206**	-0.5556***
	（-10.60）	（-2.87）	（-10.50）
Iq	0. 1116***	0.0451	0. 1116***
	(6.08)	(0.30)	(6.07)
Age	-0.0149***	0.0306*	-0.0151***
	（-8.84）	(2.28)	（-8.92）
Ind	YES	YES	YES
Year	YES	YES	YES
N	562	562	562
R2	0.4111	0.5001	0.4313
adj.R2	0.4002	0.5511	0.4441

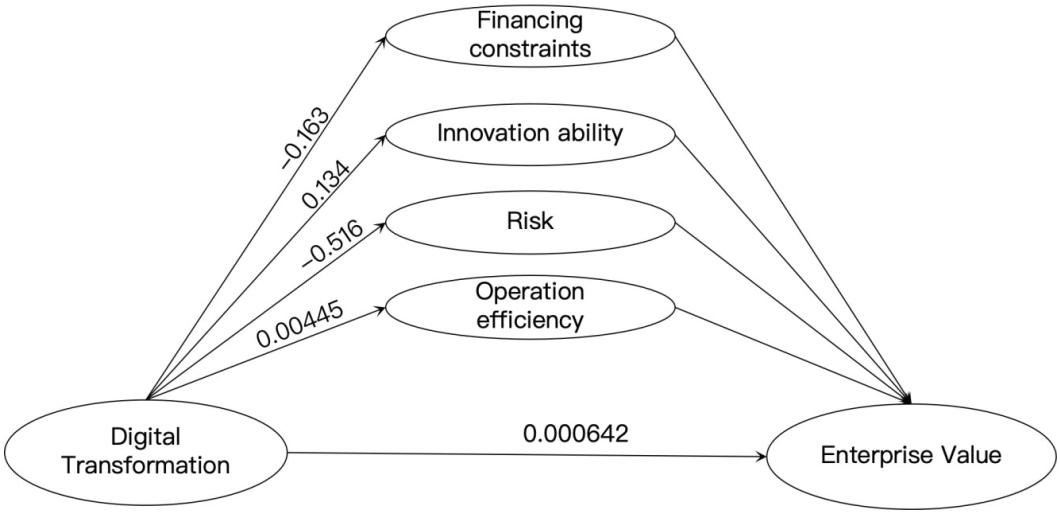

Figure 2 Mediation Effect Test Relationship

Table 6 presents the regression results from Models M(1) and M(2), both assessing the effect of digital transformation (Dt) on enterprise value, measured by Tobin's Q. Digital transformation demonstrates a positive and statistically significant relationship with firm value, with coefficients of 0.0225 (t= 14.34) and 0.0236 (t= 12.45) respectively, confirming the robustness of the direct effect of DT across model specifications. Model M(1) includes a comprehensive set of control variables, all of which show significant influence on Tobin's Q. Firm size (Size) is negatively associated with firm value (β = -0.1555, t= -33.99), suggesting that larger firms may face diminishing returns in terms of market valuation. Profitability (ROE) and investment efficiency (Iq) exhibit significant positive effects, indicating that firms with stronger financial performance and resource allocation tend to achieve higher valuations. In contrast, sales revenue (Sale), capital structure (Cp), and firm age (Age) are negatively associated with firm value, implying potential inefficiencies or maturity-related valuation constraints. Ownership concentration (Firsthold) is positively associated with Tobin's Q, highlighting the potential benefits of centralized

control. Both models include industry and year fixed effects to account for structural and temporal heterogeneity. The explanatory power of the models is substantial, with an adjusted R^2 of 0.4553 in Model M(1) and an even stronger 0.7008 in Model M(2), the latter reflecting the inclusion of additional unobserved variables or structural refinements. Overall, these results reinforce the conclusion that digital transformation significantly enhances enterprise value, even when controlling for a wide range of firm-level characteristics.

Table 6 Baseline Regression with Replacement Variables

	M(1)	M(2)
	TobinQ	TobinQ
Dt	0.0225***	0.0236***
	(14.34)	(12.45)
Size	-0.1555***	
	(-33.99)	
Roe	0.0350***	
	(50.23)	
Sale	-0.0185***	
	(-12.75)	
Firsthold	0.0461***	
	-7.51	
Cp	-0.0581***	
	（-10.99）	
Iq	0. 0128***	
	(6.65)	
Age	-0.0154***	
	（-9.04）	
_cons	17.33***	2.222
	-12.56	-1.32
Ind	YES	YES
Year	YES	YES
N	562	562
R2	0.4717	0.7515
adj.R2	0.4553	0.7008

Table 7 presents the regression results from Models M(1) and M(2), both examining the effect of digital transformation (Dt) on enterprise value, as measured by Tobin's Q. In both models, digital transformation is found to have a positive and statistically significant effect on firm value. In Model M(1), the coefficient of DT is 0.0606 (t= 17.08), indicating a strong direct impact. In Model M(2), the coefficient remains significant though slightly lower at 0.0236 (t= 12.45), suggesting the robustness of this relationship across model specifications. Control variables in Model M(1) show consistent patterns with theoretical expectations. Firm size (Size) is negatively associated with enterprise value (β = -0.4534, t= -33.45), possibly reflecting inefficiencies or diseconomies of scale in larger firms. Return on equity (ROE) exhibits a strong and positive association (β = 0.0307, t= 44.93), highlighting profitability as a core determinant of firm valuation. Similarly, investment efficiency (Iq) contributes positively to firm value (β= 0.0111, t= 5.90). Conversely, sales (Sale)

and capital structure (Cp) have significant negative effects, suggesting that higher revenue and leverage, in isolation, may not translate into higher market valuation. Firm age (Age) also shows a negative relationship, implying that older firms may be perceived as less growth-oriented. Meanwhile, ownership concentration (Firsthold) is positively associated with Tobin's Q (β= 0.0436, t= 7.26), reflecting potential governance benefits. Both models incorporate industry and year fixed effects to control for sector-specific and temporal influences. The explanatory power is high, with an adjusted R^2 of 0.4993 in Model M(1) and 0.5619 in Model M(2), indicating that nearly half or more of the variation in firm value is explained by the model variables.

Table 7 Replacement of Explained Variables

	M (1) TobinQ	M (2) TobinQ
Dt	0.0606*** -17.08	0.0236*** -12.45
Size	-0.4534*** （-33.45）	
Roe	0.0307*** -44.93	
Sale	-0. 3118*** （-8.30）	
Firsthold	0.0436*** -7.26	
Cp	-0.0669*** （-12.91）	
Iq	0.0111*** -5.9	
Age	-0.0146*** （-8.78）	
_cons	15.0099*** -11.84	2.1498 -1.56
Ind	YES	YES
Year	YES	YES
N	562	562
R2	0.5005	0.5787
adj.R2	0.4993	0.5619

Table 8 shows the results of a lagged regression analysis evaluating the dynamic impact of digital transformation (Dt) on enterprise value, proxied by Tobin's Q, across three models with different lag structures: current period (Dt1), one-period lag (Dt), and four-period lag (Dt4). In all three models, digital transformation demonstrates a consistently positive and statistically significant effect on Tobin's Q, though the strength of this effect diminishes over time. Specifically, the coefficient for current-period DT is 0.0593 (t= 16.55), which declines to 0.0311 (t= 12.64) after one period and further to 0.0187 (t= 7.62) after four periods. This trend suggests that while the positive impact of digital transformation on firm value is immediate and

substantial, its marginal influence gradually attenuates over time, indicating a decaying but persistent value effect. Control variables remain stable across all models and are largely consistent with theoretical expectations. Firm size (Size) positively influences firm value, reflecting economies of scale or investor confidence in larger firms. Return on equity (ROE), somewhat counter intuitively, shows a negative relationship with Tobin's Q, possibly indicating investor skepticism about the sustainability or quality of earnings. Sales (Sale) and capital structure (Cp) both exert significant positive effects, while ownership concentration (Firsthold)and investment quality (Iq) are negatively associated with firm value—potentially reflecting risks related to governance concentration and inefficient capital allocation, respectively. The models include industry and year fixed effects to control for unobservable sectoral and temporal influences. The adjusted R^2 values range from 0.4011 to 0.4888, indicating moderate explanatory power. Overall, the findings confirm that digital transformation contributes positively to enterprise value not only in the short term but also over extended periods, though with diminishing marginal returns over time.

Table 8 Extended Time Window

	(1)	(2)	(3)
	TobinQ	TobinQ	TobinQ
Dt_ 1	0.0593*** (16.55)		
Dt_		0.0311*** (12.64)	
Dt_ 4			0.0187*** (7.62)
Size	0.0352*** （50.46）	0.0351*** （50.31）	0.0349*** （49.95）
Roe	-0. 1182*** （-12.53）	-0. 0184*** （-12.68）	-0. 2184*** （-12.63）
Sale	0.0466*** （7.61）	0.0417*** （6.82）	0.0374*** （6.12）
Firsthold	-0.0569*** （-10.77）	-0.0519*** （-10.76）	-0.0578*** （-10.89）
Cp	0. 1024*** （6.42）	0.1301*** （6.77）	0. 1307*** （7.06）
Iq	-0.0157*** （-9.20）	-0.0160*** （-9.37）	-0.0162*** （-9.50）
_cons	17.2211*** (12.50)	17.2402*** (12.49)	17.2523*** (12.47)
Ind	YES	YES	YES
Year	YES	YES	YES
N	562	562	562
R2	0.4414	0.5001	0.4333
adj.R2	0.4011	0.4888	0.4222

Table 9 presents regression results assessing the impact of the duration of digital transformation (dutime) and its interaction with transformation intensity (dtdutime) on enterprise value, measured by Tobin's Q. In Model (1), dutime—representing the

number of years a firm has engaged in digital transformation—shows a positive and statistically significant effect on firm value (β= 0.0199, t= 6.32), indicating that longer engagement in digital transformation is associated with higher market valuation. In Model (2), the interaction term dtdutime also exhibits a significant positive effect (β = 0.0447, t= 9.60), suggesting that the combined effect of transformation intensity and duration amplifies the positive influence on firm value. This finding supports the view that sustained and deep digital initiatives produce compounded strategic benefits over time. Firm size (Size) has a significant negative effect on Tobin's Q, possibly due to inefficiencies in larger firms. Profitability (ROE) and investment quality (Iq) are positively associated with firm value, whereas sales revenue (Sale), capital structure (Cp), and firm age (Age) have significant negative effects, aligning with expectations about operational leverage, debt burden, and lifecycle stage. Notably, ownership concentration (Firsthold) positively influences firm value, indicating effective governance or strategic alignment in firms with centralized control. Model (1) reports a high adjusted R^2 of 0.6555, indicating strong explanatory power, while Model (2), though slightly lower (adj. R^2 = 0.5044), confirms the robustness of the interaction effect. Overall, the results suggest that both the longevity and intensity of digital transformation contribute significantly to enterprise value, with their interaction exerting a compounding positive effect.

Table 9 Double Differential

	（1）	（2）
	TobinQ	TobinQ
dutime	0. 0199*** (6.32)	
dtdutime		0.0447*** (9.60)
Size	-0.5501*** （-33.70）	-0.5555*** （-33.07）
Roe	0.0350*** (50.07)	0.0353*** (50.39)
Sale	-0. 1818*** （-12.93）	-0. 1808*** （-12.89）
Firsthold	0.0366*** (5.99)	0.0411*** (6.70)
Cp	-0.5083*** （-10.99）	-0.5707*** （-10.89）
Iq	0. 1401*** (7.25)	0.1355*** (6.98)

Age	-0.0164***	-0.0163***
	（-9.62）	（-9.56）
_Cons	17.3909***	17.3366***
	(12.57)	(12.54)
Ind	YES	YES
Year	YES	YES
N	562	562
R2	0.6617	0.5555
adj.R2	0.6555	0.5044

5. Discussion

This study provides robust empirical evidence supporting the theoretical linkage between digital transformation and enterprise value, thereby extending the resource-based view (RBV) and dynamic capabilities theory. By demonstrating that digital transformation exerts both direct and indirect effects on firm performance through mechanisms such as financing constraints, R&D investment, risk-taking behavior, and operational efficiency, the findings enrich our understanding of how intangible digital assets contribute to sustainable competitive advantage. The temporal dimension analysis further reveals that the impact of digital transformation is not static but evolves, with diminishing marginal returns in the long run. This temporal insight contributes to emerging literature on the strategic persistence and path-dependency of digital investments. Moreover, the inclusion of interaction terms and mediation paths advances the theoretical model by unpacking the black box between digital inputs and market-based valuation outcomes.

From a managerial standpoint, this study offers actionable insights for corporate leaders aiming to leverage digital technologies for value creation. First, firms should recognize that digital transformation is a long-term strategic process; both the intensity and duration of digital engagement significantly affect firm value. Hence, short-term or fragmented digital investments may yield limited returns. Second, the findings suggest that digital transformation facilitates better capital access, enhances innovation capacity, improves operational efficiency, and moderates excessive risk-taking—each of which are critical levers of firm growth. Managers should therefore align digital initiatives with core business functions, rather than treating them as isolated IT upgrades. Additionally, the positive role of ownership concentration implies that strong governance structures may amplify the value gains from digitalization, especially in emerging economies.

Despite its contributions, this study is not without limitations. First, the dataset is restricted to Chinese listed firms, which may limit the generalizability of the findings to other institutional contexts, particularly those with different digital ecosystems or regulatory regimes. Second, while the study leverages panel data and robust econometric modeling, it cannot fully establish causal inference. Future research may employ quasi-experimental designs, such as difference-in-differences or propensity score matching, to address endogeneity concerns more rigorously. Third, the measurement of digital transformation relies on text mining and proxy variables; future work could incorporate more granular digital maturity metrics, such as internal platform use, AI deployment, or data governance capability. Finally, subsequent

studies could explore cross-industry heterogeneity, digital transformation in SMEs, or the role of CEO characteristics and digital leadership in shaping transformation outcomes.

6. Conclusion

This study examines the impact of digital transformation on enterprise value, with a specific focus on the mechanisms by which digital capabilities affect firm performance. Drawing upon a comprehensive panel dataset of Chinese listed firms, the empirical analysis confirms that digital transformation significantly enhances enterprise value, both directly and indirectly. By incorporating mediating variables such as financing constraints, R&D investment, risk-taking behavior, and operational efficiency, this research provides a nuanced understanding of how digital strategies are translated into market-based valuation gains.

The findings underscore the critical role of digital transformation as a strategic driver of competitive advantage in the contemporary business landscape. Firms that invest consistently and intensively in digital initiatives tend to experience not only improved innovation and resource efficiency but also reduced capital constraints and more effective governance outcomes. Furthermore, the dynamic analysis of lagged and interaction effects reveals that the benefits of digital transformation are temporally extended, though marginally diminishing, thus reinforcing the importance of sustained digital engagement.

This study contributes to the growing body of literature on digital strategy and firm performance by integrating theoretical perspectives from the resource-based view and dynamic capabilities theory. At the same time, it offers practical insights for corporate leaders and policymakers aiming to design effective digital transformation roadmaps. Nevertheless, the study acknowledges several limitations, including contextual specificity and measurement constraints, which open avenues for future research to adopt comparative cross-country perspectives and explore additional moderating factors such as digital leadership, cultural readiness, and industry-specific digital intensity.

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