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The Impact of Digital Government Development on the Rhetoric–Action Gap in Enterprise Digital Transformation

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Abstract. As the Digital China strategy accelerates, enterprise digital transformation has been recognized as a central pathway to high-quality growth. However, opportunistic behavior—characterized by rhetoric exceeding action—remains widespread, thereby undermining policy effectiveness. A Digital Government Development Index is constructed for China's prefecture-level cities using machine-learning methods. A panel fixed-effects model is employed to examine how digital government development affects the rhetoric–action gap in enterprise digital transformation. The gap is significantly reduced by digital government development. Three mechanisms are identified: the easing of financing constraints, the reduction of institutional transaction costs, and the stimulation of substantive innovation. More substantial governance effects are observed in low-competition, low-tech, and highly labor-intensive industries. New evidence is provided on how digital governance shapes firm behavior in the digital era, and an actionable policy framework is proposed for building a dual-incentive constraint system under resource constraints in developing countries.

Keywords: Digital government development, Enterprise digital transformation, Rhetoric–action gap

1. Introduction

Digital technologies are transforming economies by lowering transaction costs, strengthening supply chains, and unlocking data as a production factor, thereby fostering green innovation and sustaining competitive advantage. As the world's largest developing country and an emerging digital power, China's digitalization has been shaped by both policy and market forces. The 2021 "14th Five-Year Plan for Digital Economy Development" [1] set a target for core digital industries to contribute 10% of GDP, and China's digital economy has expanded rapidly, while the e-government index has continued to rise. Yet, despite widespread claims of digital transformation, many firms' actual digital investment remains limited, a rhetoric–action gap also observed in Brazil, India, and Mexico [2]. Evidence from China can thus inform domestic policy and provide lessons for other resource-constrained developing economies.

Enterprise digital transformation is central to the digital economy, but firms often publicize ambitious digitalization plans to secure subsidies, credit, or other resources, while high investment costs and risks impede substantive implementation [3]. This raises a core question: can digital

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government reduce the rhetoric–action gap in digital transformation? One strand of research argues that digital government promotes substantive transformation by providing resources, improving the business environment, and enhancing information flows [4-6]; another suggests that firms exaggerate digital progress to obtain policy support, resulting in "much talk, little action" [7,8].

This study examines whether and how digital government development narrows the rhetoric–action gap. We develop an incentive–constraint framework in which digital government both relaxes resource constraints and enhances transparency, thereby encouraging real action and disciplining empty rhetoric. Using annual report text and financial data, we construct a composite index of the rhetoric–action gap and estimate panel fixed-effects models. We further analyze heterogeneity across ownership, industry competition, and region to inform more targeted policy design. The remainder of the paper is organized as follows: Section 2 reviews the literature, Section 3 presents the research design and data, Section 4 reports empirical results, and Section 5 discusses policy implications.

2. Literature review

Enterprise digital transformation—the use of digital and intelligent technologies to redesign processes, management, and operations—reduces costs, raises efficiency, and enhances innovation capacity, thereby supporting high-quality development [6]. In China, despite strong policy support, many firms publicly commit to transformation but fail to implement it substantively, creating a rhetoric–action gap. Empirical studies typically measure digital transformation using textual analysis, where the frequency of digital terms in annual reports proxies digital rhetoric [9,10], and indicator-based measures, where the ratio of digital assets to total assets captures actual transformation [11,12]. However, the credibility of textual disclosures is contested: "Internet+" initiatives are often exaggerated to attract investors, and higher digital word frequency does not necessarily correspond to greater digital investment, as firms may overstate progress to obtain subsidies and ease financing constraints [13-15].

Digital government, understood as the use of digital technologies to restructure government functions, workflows, and organizations, shapes firms' production, investment, innovation, and digital transformation by improving labor productivity, stimulating investment, and strengthening resilience and sustainable innovation [16-19]. It provides key institutional support for enterprise digital transformation by alleviating resource constraints through digital public procurement, fiscal subsidies, and tax incentives, improving the business environment and lowering transaction costs via "One-Stop Online Services," open data, and digital infrastructure investment, and enhancing information transparency to reduce information asymmetries and guide expectations, thereby attracting venture capital and social investment into digital sectors [18,20-23]. Yet the relationship is not uniformly positive: policy fragmentation and dependence on public goods can hinder transformation, and government attention may incentivize firms to overstate digital progress, distorting the alignment between policy signals and corporate strategies [19,24].

Overall, existing studies clarify measurement approaches and identify mechanisms through which digital government affects firms, but important gaps remain. Most research measures enterprise digital transformation from a single perspective—either rhetoric or action—without integrating both into a unified framework. Moreover, while digital government is widely viewed as promoting transformation, its role in constraining opportunistic rhetoric is underexplored, and heterogeneity across ownership, industry competition, and regional digital infrastructure is rarely examined. This study addresses these gaps by analyzing how digital government development influences the rhetoric–action gap in enterprise digital transformation and by identifying the underlying

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mechanisms and heterogeneous effects, thereby enriching evidence on government–enterprise interactions in the digital era.

3. Methods and data

3.1. Data

This study uses panel data from A-share-listed firms in China (2012–2023), primarily obtained from the CSMAR database. The data underwent several preprocessing steps: (1) exclusion of ST and PT firms, and those with missing key variables; and (2) winsorizing continuous variables at the 1% level to address outliers. The final dataset includes valid firm-year observations. Macroeconomic data from the China Statistical Yearbook and municipal-level statistical yearbooks were used to construct control variables reflecting regional economic conditions.

3.2. Models for empirical analysis

To examine the effect of digital government development on the rhetoric–action gap in digital transformation, a baseline fixed-effects model was estimated:

$$GD_{itp} = \gamma + \alpha Dig_{itp} + \beta X_{itp} + \mu_i + \tau_t + \varepsilon_{itp} \tag{1}$$

Where i denotes a firm, t denotes time, p denotes a province. GDitp denotes the rhetoric–action gap in the digital transformation for firm i in province p and year t; Dig_{tp} measures the level of digital government development in province p in year t; X_{itp} denotes a vector of firm- and region-level control variables; μ_i and τ_t denote firm and year fixed effects, respectively; and ε_{itp} denotes the idiosyncratic error term. The coefficient α is interpreted as the effect of digital government development on the firms' rhetoric–action gap. A negative and statistically significant estimate indicates that digital government initiatives reduce the inconsistency between firms' statements and their actual actions in digital transformation.

3.3. Variables

The dependent variable, the rhetoric–action gap (GD), captures the inconsistency between a firm's stated and actual digital transformation. It is defined as:

$$\mathrm{GD}_{\mathrm{ipt}} = \left(\frac{\mathrm{Digital}_{\mathrm{dis,ipt}} - \mathrm{Digital\_Mean}_{\mathrm{dis,ipt}}}{\sigma_{\mathrm{dis}}} \right) - \left(\frac{\mathrm{Digital}_{\mathrm{per,ipt}} - \mathrm{Digital\_Mean}_{\mathrm{per,ipt}}}{\sigma_{\mathrm{per}}} \right) \tag{2}$$

where $\mathrm{Digital}_{\mathrm{dis,ipt}}$ is the log of the frequency of digital-related terms (e.g., "digitalization," "blockchain," "artificial intelligence") in annual reports, representing declared digital transformation, and $\mathrm{Digital}_{\mathrm{per,ipt}}$ is the ratio of digital intangible assets to total assets, representing actual digital transformation. Both components are standardized (z-scores) before differencing, and a higher $\mathrm{GD}_{\mathrm{ipt}}$ indicates greater overstatement of digital transformation and thus a larger rhetoric–action gap.

The key independent variable is digital government development (Dig). Dig is measured by a Digital Government Development Index constructed from municipal Government Work Reports using machine-learning-based textual analysis. Based on national policy documents (e.g., the 14th

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Five-Year Plan for National Informatization, Guiding Opinions on Strengthening Digital-Government Development, and the Digital China Development Report), a dictionary of 102 digital-government keywords was compiled. Term frequencies in city-level reports (after standard text preprocessing) were weighted by fiscal-expenditure ratios and transformed using the natural logarithm of one plus the weighted frequency to obtain a continuous, comparable indicator of local digital-government progress over time.

To mitigate omitted-variable bias, we include firm-level controls (Size, log of total assets; ListAge, log of years listed; Dual, CEO duality dummy), financial controls (Lev, leverage; ROE, profitability; Cashflow, cash flow; Tobin's Q, investment efficiency; Growth, revenue growth), and regional controls (GDP per capita and Urbanization). Descriptive statistics (Table 1) show substantial variation in GD (mean = 0.0429, SD = 1.1810; max = 2.7756) and in Dig (mean = 0.1401), indicating notable heterogeneity in firms' digital behavior and regional digital-government development.

Table 1. Descriptive statistics

Variable	N	Mean	S.D.	Min	Max
GD	21992	0.0429	1.1810	-3.8665	2.7756
Dig	21992	0.1401	0.1401	0.0000	1.5371
Size	21992	22.1786	1.2225	18.2931	28.6969
ListAge	21992	2.0233	0.9430	0.0000	3.5264
Dual	21992	0.3190	0.4661	0.0000	1.0000
Lev	21992	0.4072	0.2013	0.0084	0.9964
Roe	21992	0.0459	0.1538	-0.9011	0.3083
Cashflow	21992	0.0487	0.0708	-0.6564	0.8385
Tobin	21992	2.0351	1.5175	0.6113	44.0249
Growth	21992	0.1470	0.3511	-0.5359	2.0003
GDP	21992	11.8110	0.7252	9.3760	13.1851
Urban	21992	0.6115	0.2484	0.1790	1.0000

4. Empirical analysis

4.1. Baseline regression

The baseline relationship between digital government development and the rhetoric–action gap in enterprise digital transformation is reported in Table 2. In Column (1), only the core explanatory variable is included, with firm and year fixed effects. The estimated coefficient on Dig is −0.625 and statistically significant at the 1% level ($p<0.01$), indicating a sizeable and precisely estimated negative relationship between digital government development and the rhetoric–action gap. After firm-level controls (e.g., listing age, cash flow, leverage) are added in column (2), the coefficient on Dig remains negative and statistically significant. Column (3), which additionally incorporates regional controls, yields a very similar estimate, with Dig still significantly negative at the 1% level. Taken together, these results suggest that stronger digital government development is associated with a marked reduction in firms' rhetoric–action inconsistency.

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Table 2. The results of main regression

Variables	(1)	(2)	(3)
	GD	GD	GD
Dig	-0.625	-0.644	-0.643
	(0.035)	(0.035)	(0.035)
Control variables	Yes	Yes	Yes
Area fixed	Yes	Yes	Yes
Time fixed	Yes	Yes	Yes
N	21989	21989	21989
R2	0.7459	0.7510	0.7510

Notes: Standard errors in parentheses p<0.1,p<0.05,P<0.01. This note applies to the following tables.

4.2. Robustness checks

To ensure the robustness of the baseline results, we conducted several additional tests. First, excluding firms located in centrally administered municipalities—where exposure to policy interventions is typically higher—does not alter the sign or significance of the coefficient on Dig. Second, winsorizing all continuous variables at the 1% level in both tails yields qualitatively unchanged estimates, indicating that the results are not driven by outliers. Third, to mitigate selection bias arising from regional differences in digital government development, we implemented propensity score matching, defining firms with Dig above (below) the sample mean as the treatment (control) group; nearest-neighbor matching with a 1:2 ratio and a 0.05 caliper produced 16,835 matched observations with standardized differences below 10% and an ATT t-statistic of 3.10, and the post-matching regressions continued to show a negative and significant coefficient on Dig. Finally, to address omitted-variable bias and reverse causality, we estimated a two-stage least squares model using a Bartik instrument based on local government fiscal revenue, which is strongly correlated with Dig (first-stage Kleibergen–Paap F-statistic > 10); the second-stage results again yielded a negative and statistically significant effect of Dig, confirming the stability of our findings across alternative specifications.

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Table 3. Robustness tests

Variables	(1)	(2)	(3)	(4)	(5)
	Alternative sample range	Winsorization	PSM	Dig	2SLS
Dig	-0.658	-0.744	-0.633		-0.697
	(0.039)	(0.040)	(0.042)		(0.032)
IV				0.007	
Control variables	Yes	Yes	Yes	Yes	Yes
Area fixed	Yes	Yes	Yes	Yes	Yes
Time fixed	Yes	Yes	Yes	Yes	Yes
K-P F Value					487
N	20020	21989	16835	21989	21989
R2	0.7263	0.7505	0.7510	0.8243	0.7681

4.3. Heterogeneity analysis

4.3.1. Industry competition

Competition significantly influences firms' incentives for digital transformation. Using the Herfindahl–Hirschman Index (HHI), industries are categorized into low- and high-competition groups. As shown in Table 4, columns (1)–(2), digital government development reduces the rhetoric–action gap in both groups, with a stronger effect in low-competition industries. Firms in less competitive markets face weaker external pressure, increasing the risk of "talk more, do less." Digital government initiatives enhance transparency and external oversight while reducing implementation barriers and transaction costs, thereby encouraging more substantive digital transformation, particularly in low-competition industries.

4.3.2. Technology intensity

Rhetoric–action alignment in digital transformation is influenced by technological capability. Firms were classified into low-tech and high-tech groups following the study [8]and the 2012 CSRC Industry Guidelines: firms in codes C25–C29, C31–C32, C34–C41, I63–I65, and M73 were treated as high-tech. As shown in Table 4, columns (3)–(4), digital government development reduces the rhetoric–action gap in both groups, with a more significant effect in low-tech industries. Low-tech firms, with weaker digital foundations, benefit more from policy support, infrastructure, and technology spillovers. High-tech firms, being early adopters, already have higher levels of transformation, leading to a smaller marginal effect.

4.3.3. Labor intensity

Following [25], industries were classified by the R&D-to-payroll ratio (R&D expenditure divided by employee compensation). Ward's linkage hierarchical cluster analysis was used to separate technology-intensive (higher ratio) and labor-intensive industries.

Labor intensity influences firms' capacity and motivation for digital transformation.Firms were split into low- and high-labor-intensive groups for subsample regressions. As shown in Table 4,

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columns (5)–(6), the coefficient on Dig is negative and statistically significant in both subsamples, with a larger effect in highly labor-intensive industries. This is likely because such firms face greater labor-cost pressures, driving stronger incentives to automate. Digital government initiatives, such as smart-manufacturing platforms and digital-skills training, lower implementation barriers and encourage substantive digitalization. Moreover, labor-intensive industries depend more on stable policies and efficient procedures; the transparency and convenience provided by digital government enhance long-term investment confidence and focus efforts on actual transformation outcomes.

Table 4. Heterogeneity analysis

	(1)	(2)	(3)	(4)	(5)	(6)
	Highly competitive industry	Lowly competitive industry	Low technology industry	High technology industry	Low labor-intensive industries	High labor-intensive industries
Dig	-0.533	-0.646	-0.808	-0.558	-0.599	-0.711
	(0.049)	(0.054)	(0.082)	(0.035)	(0.038)	(0.073)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Area fixed	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed	Yes	Yes	Yes	Yes	Yes	Yes
N	10375	10492	8777	13166	14865	7062
R2	0.7739	0.7621	0.7064	0.7975	0.7685	0.7424

4.4. Mechanism analysis

4.4.1. Financing constraints

Digital government development enhances transparency and efficiency in public services, reducing information asymmetries between firms, government, and financial institutions. This alleviates financing constraints by improving access to subsidies and credit through one-stop online services and open data sharing, which also help lenders better assess firms' fundamentals. Financing constraints are proxied by the WW index and leverage ratio, with higher values indicating tighter constraints. As shown in Table 5, columns (1)–(2), the coefficients on Dig are −0.016 and −0.006, statistically significant at the 1% and 5% levels, respectively, indicating that stronger digital government is associated with looser financing constraints.

government platforms have been found to promote digital finance, easing financing difficulties and accelerating digital transformation [23]. Additionally, fintech improves lending efficiency, lowers default risk, and reduces behaviors like "greenwashing" [26]. Together, these factors make it more likely that resources are directed towards substantive digital transformation rather than rhetorical claims, thereby narrowing the rhetoric–action gap.

4.4.2. Institutional barriers

Digital government development has advanced e-government, enabling cross-departmental data sharing and reducing the need for repeated offline visits or duplicate submissions. This shortens procedures, improves efficiency, and lowers institutional transaction costs [21]. As shown in Table 5,

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column (3), the IV coefficient of −0.123 on Dig is statistically significant at the 1% level, highlighting its role in easing institutional barriers. Additionally, digital government fosters innovation through improvements to the innovation environment, policy support, and technology spillovers [27]. Innovation, proxied by the natural log of patent applications, shows a positive effect of digital government development, with a coefficient of 0.264 in column (4) of Table 5, significant at the 1% level ($p < 0.01$).

These findings suggest that savings from reduced institutional costs are reinvested in digital transformation. As innovation drives digital transformation [5,7,10], increased innovation signals a shift towards long-term value creation, reducing "talk-more-do-less" behavior.

Table 5. mediation effect test

	Financing constraints		Institutional Barriers	
	(1)	(2)	(3)	(4)
	WW	Lev	Institutional barriers	Patent
Dig	-0.016	-0.006	-0.123	0.264
	(0.005)	(0.003)	(0.015)	(0.049)
Control variables	Yes	Yes	Yes	Yes
Area fixed	Yes	Yes	Yes	Yes
Time fixed	Yes	Yes	Yes	Yes
N	21989	21989	21989	21989
R2	0.3671	0.9724	0.9723	0.5498

5. Research conclusion

Promoting enterprise digital transformation is crucial for building a “Digital China.” However, limited attention has been given to the rhetoric–action gap, characterized by “much talk but little action.” Using A-share firms (2012–2023), we construct a rhetoric–action gap index from both disclosure ("rhetoric") and investment ("action") perspectives, and examine the impact of digital government development on this gap.The main findings are as follows: First, rhetoric–Action Gap: A significant gap exists in firms’ digital transformation. Second, baseline Effect: Digital government development reduces the rhetoric–action gap. After controlling for firm characteristics, regional macro variables, and fixed effects, higher levels of digital government are associated with less overstatement, motivating substantive action and constraining empty rhetoric. Third, mechanisms: The gap narrows because digital government eases financing constraints, lowers transaction costs, and stimulates innovation, shifting resources from rhetoric to real transformation. Fourth, heterogeneity: The effect is stronger in low-competition, low-tech, and high-labor-intensive industries, indicating differentiated governance impacts. Overall, digital government acts not only as a catalyst for digital transformation but also as a governance tool that promotes substantive change, fostering a truthful and sustainable transformation ecosystem.

References

[1] 14th Five-Year Plan for Digital Economy Development. (2021, December 11). National Development and Reform Commission. Retrieved from https: //www.ndrc.gov.cn/fggz/fzzlgh/gjjzxgh/202203/t20220325_1320207.html

[2] UNCTAD. (2022, April 15). Digital transformation in developing economies. UNCTAD. Retrieved from https: //www.unctad.org/digital-transformation

DOI: 10.54254/2754-1169/2025.BL31104

[3] Kwa T, West B, Becker J, et al. Measuring ai ability to complete long tasks [J]. arXiv preprint arXiv: 2503.14499, 2025.
[4] Das D K. Exploring the symbiotic relationship between digital transformation, infrastructure, service delivery, and governance for smart sustainable cities [J]. Smart Cities, 2024, 7(2): 806-835.
[5] Xiao J, Zhang H, Han L. How digital transformation improve government performance: the mediating role of partnering agility [J]. Ieee Access, 2023, 11: 59274-59285.
[6] Zhao J, Liu X. ICT, supply chain digital integration capability, and firm financial performance: The antagonistic effects of perceived government support and cognitive constraints on digital transformation [J]. SAGE Open, 2024, 14(2): 21582440241241887.
[7] Jiang L, Bai Y. Strategic or substantive innovation?-The impact of institutional investors' site visits on green innovation evidence from China [J]. Technology in Society, 2022, 68: 101904.
[8] Rachmad Y E. The Influencer's Power: Transforming Behavior through Viral and Gimmick Strategies [J]. United Nations Economic and Social Council, 2025.
[9] Li C, Long G, Li S. Research on measurement and disequilibrium of manufacturing digital transformation: Based on the text mining data of A-share listed companies [J]. Data Sci. Financ. Econ, 2023, 3: 30-54.
[10] Zareie M, Attig N, El Ghoul S, et al. Firm digital transformation and corporate performance: The moderating effect of organizational capital [J]. Finance Research Letters, 2024, 61: 105032.
[11] Jardak M K, Ben Hamad S. The effect of digital transformation on firm performance: evidence from Swedish listed companies [J]. The Journal of Risk Finance, 2022, 23(4): 329-348.
[12] Zhang Y, Li H, Yao Z. Intellectual capital, digital transformation and firm performance: evidence based on listed companies in the Chinese construction industry [J]. Engineering, Construction and Architectural Management, 2025, 32(4): 2128-2159.
[13] Zhou G J. Analysis and Research on the New Model of E-Commerce Poverty Alleviation: E-Commerce Live Broadcast of Agricultural Products [J]. Journal of Accounting, Finance & Management Strategy, 2022, 17(2): 33-59.
[14] Chen W, Srinivasan S. Going digital: Implications for firm value and performance [J]. Review of Accounting Studies, 2024, 29(2): 1619-1665.
[15] Chen C L, Lin Y C, Chen W H, et al. Role of government to enhance digital transformation in small service business [J]. Sustainability, 2021, 13(3): 1028.
[16] Yang J, Jiang Y, Chen H, et al. Digital finance and Chinese corporate labor investment efficiency: The perspective of financing constraints and human capital structure [J]. Frontiers in psychology, 2022, 13: 962806.
[17] Habib A, Ranasinghe D, Liu Y. Labor investment efficiency: a review of the international literature [J]. Journal of accounting literature, 2024.
[18] Dahlman C, Mealy S, Wermelinger M. Harnessing the digital economy for developing countries [J]. 2016.
[19] Liang L, Li Y. How does government support promote digital economy development in China? The mediating role of regional innovation ecosystem resilience [J]. Technological Forecasting and Social Change, 2023, 188: 122328.
[20] Chen S, Chao X, Wang C, et al. Government Digital Product Procurement and Enterprise Digital Transformation [J]. China & World Economy, 2025, 33(5): 139-166.
[21] Herold S, Heller J, Rozemeijer F, et al. Dynamic capabilities for digital procurement transformation: a systematic literature review [J]. International Journal of Physical Distribution & Logistics Management, 2023, 53(4): 424-447.
[22] Karaboga T, Gurol Y D, Binici C M, et al. Sustainable digital talent ecosystem in the new era: impacts on businesses, governments and universities [J]. Istanbul business research, 2020, 49(2): 360-379.
[23] Sikora-Fernandez D, Stawasz D. Public Information Asymmetry and Its Impact on Urban Governance Efficiency [J]. European Research Studies Journal, 2024, 27(S2): 403-415.
[24] Li Z, Yuan S, Zhang L, et al. Government Attention, Online Public Opinion and Enterprise Digital Transformation: An Analysis Through the Signal of Narrative Text [J]. IEEE Transactions on Engineering Management, 2025.
[25] Chen N, Sun D, Chen J. Digital transformation, labour share, and industrial heterogeneity [J]. Journal of Innovation & Knowledge, 2022, 7(2): 100173.
[26] Wang S, Shen H, Zhang H, et al. From greenwashing to genuine sustainability: Insights from FinTech and banking executives in emerging market experience [J]. Journal of Environmental Management, 2025, 373: 123690.
[27] Auboin M, Koopman R, Xu A. Trade and innovation policies: Coexistence and spillovers [J]. Journal of Policy Modeling, 2021, 43(4): 844-872.