The Impact of the National Information Consumption Pilot Policy on Corporate Digital Transformation

Xiaohan Gong

School of Management, Hefei University of Technology, Hefei, China.

Abstract. Against the backdrop of the deepening development of the digital economy, whether demand-side policies can effectively promote corporate digital transformation is an important issue for understanding the micro-level effects of digital economy policies. Taking the National Information Consumption Pilot Policy as a quasi-natural experiment, this paper uses data from Chinese A-share listed companies from 2009-2020 and adopts a multi-period difference-in-differences model to examine the impact of the information consumption pilot policy on corporate digital transformation. The results show that the National Information Consumption Pilot Policy significantly promotes the digital transformation of enterprises in pilot regions. This conclusion remains robust after replacing the dependent variable, adjusting the policy variable, conducting PSM-DID estimation, and performing parallel-trend and placebo tests. Mechanism tests indicate that the policy mainly works through efficiency-related channels, including improving total factor productivity, enhancing investment efficiency, and reducing the operating expense ratio. Heterogeneity analysis further shows that the policy effect is stronger among firms with a higher proportion of employees holding at least a bachelor's degree, firms located in regions with a higher level of marketization, and firms with a higher management shareholding ratio. This paper extends research on the determinants of corporate digital transformation from the perspective of demand-side policies and provides empirical evidence for improving information consumption policies and promoting corporate digital upgrading.

Keywords: National Information Consumption Pilot Policy, Corporate Digital Transformation, Total Factor Productivity.

1. Introduction

The digital economy has become an important force for promoting high-quality development in China. Corporate digital transformation, as a concentrated manifestation of the digital economy at the micro-organizational level, is reflected not only in the adoption of big data, artificial intelligence, cloud computing, blockchain, and mobile Internet technologies in production, sales, management, and service processes, but also in the reshaping of value creation through data resources and digital capabilities. Existing studies generally find that digital transformation can improve firms' resource allocation efficiency, market responsiveness, and operating performance, and can further affect total factor productivity, labor income share, and competitive advantage [17-19]. Therefore, examining the external drivers of corporate digital transformation has both theoretical significance and strong practical value.

Existing literature on the drivers of corporate digital transformation has largely emphasized supply-side factors, including digital infrastructure, government subsidies, fiscal spending on science and technology, digital ecosystems, managerial digital awareness, and executives' information technology backgrounds [12-13, 16]. These studies show that technology supply, policy support, and the talent environment can improve the external conditions for firms to adopt digital technologies. Whether firms actually advance digital transformation, however, also depends on whether market demand can generate sustained pressure for transformation and credible expectations of investment returns. When demand for digitalization is insufficient, firms may lack incentives to invest even if technology supply improves. Conversely, when consumers' demand for online, intelligent, and personalized products and services expands rapidly, firms have stronger incentives to use digital technologies to identify demand, redesign processes, and improve operating capabilities. Hence, there remains substantial scope to examine corporate digital transformation from the perspective of demand-side policy.

The National Information Consumption Pilot Policy provides an appropriate quasi-natural experiment for identifying this issue. Information consumption is a new form of consumption in the digital economy centered on information products, information services, and digital consumption scenarios. By fostering intelligent terminals, online services, digital platforms, and information infrastructure, the policy aims to unleash the potential of information consumption, expand domestic demand, and promote the development of digital industries. Unlike supply-side policies that directly subsidize firms or merely build infrastructure, the pilot program emphasizes expanding consumption scenarios and releasing market demand to generate demand-pull effects. Demand-side policies can reshape firms' innovation and production decisions by improving market expectations, enlarging potential demand, and encouraging technological responses [54, 11]. For listed companies, the pilot program can expand the market for digital products and services, strengthen identification of user needs, and encourage firms to optimize resource allocation and business processes. Digital transformation itself is a systemic change centered on customer value, operating processes, and business models [52, 51]. Therefore, the information consumption pilot program may ultimately accelerate corporate digital transformation.

The direction of this policy effect is not completely self-evident. On the one hand, the pilot program can enlarge demand for digital consumption and expose firms to stronger competitive pressure for online and intelligent operations, thereby encouraging digital investment and capability building. On the other hand, digital transformation requires large investment, has a long construction cycle, and involves considerable uncertainty. Its effects also depend on whether firms can coordinate digital technology investment, organizational and managerial change, and complementary resource allocation [29, 55]. If firms cannot convert demand expansion into sustainable operating resources, digital capabilities, and organizational capability accumulation, policy incentives may not fully translate into actual transformation outcomes. Excessive digital investment or investment without complementary conditions may even cause higher costs, resource misallocation, and lower productivity [30, 31]. Moreover, the information consumption pilot program primarily targets cities and household consumption rather than providing direct, firm-specific support. Whether its effects can be transmitted effectively to firms' internal digital transformation remains an empirical question. It is therefore necessary to test the policy's micro-level effects systematically with firm-level data.

Using Chinese A-share listed companies from 2009-2020 as the study sample, this paper treats the National Information Consumption Pilot Policy as an exogenous policy shock and constructs a multi-period difference-in-differences model to test its impact on corporate digital transformation. Corporate digital transformation is measured primarily by the frequency of digitalization-related keywords in listed firms' annual reports. The key explanatory variable combines whether a firm's city entered the national pilot program and the timing of policy implementation. After controlling for firm fixed effects, year fixed effects, and firms' financial and governance characteristics, the results show that the policy significantly improves corporate digital transformation. Additional robustness tests, the parallel-trend test, PSM-DID estimation, and a placebo test all support this conclusion. Mechanism analysis indicates that the policy works primarily by improving total factor productivity, investment efficiency, and the operating expense ratio. Heterogeneity analysis indicates that human-capital foundations, regional marketization, and management incentives strengthen the policy effect.

This paper makes three potential marginal contributions. First, it extends research on the drivers of corporate digital transformation from a demand-side policy perspective. Whereas prior studies have focused more on supply-side factors such as digital infrastructure, fiscal science and technology expenditure, government subsidies, and managerial characteristics, this paper emphasizes the pull effect of expanded information-consumption demand and supplements the market-demand explanation of digital transformation. Second, it enriches micro-level evidence on the economic effects of the National Information Consumption Pilot Policy. Existing studies mainly address macro- or city-level outcomes, including high-quality urban development, industrial structure upgrading, urban innovation, and entrepreneurial activity [4-5, 7, 11]. This paper further reveals the policy's micro-level role through the lens of corporate digital transformation. Third, by integrating mechanism

and heterogeneity analyses, it shows that the policy effect is not merely an average increase but depends on efficiency improvements, human-capital foundations, regional market conditions, and corporate-governance incentives, thereby providing more targeted evidence for subsequent policy optimization.

The remainder of this paper is organized as follows. The next section reviews the literature. The following section presents the research hypotheses and empirical design. The subsequent sections report the main empirical tests, further analyses, and conclusions and policy implications.

2. Literature Review

2.1. National Information Consumption Pilot Policy

Against the joint backdrop of Digital China construction and the strategy of expanding domestic demand, activating consumption potential through digital technologies and using market demand to steer industrial upgrading have become important policy directions for promoting high-quality development. The Outline of the Strategic Plan for Expanding Domestic Demand (2022-2035) calls for a complete domestic-demand system, higher-quality consumption, and an unobstructed domestic circulation. The Overall Layout Plan for the Construction of Digital China calls for stronger digital infrastructure and data-resource systems, as well as deeper integration of digital technology with all fields of economic and social life [32, 33]. Information consumption lies at the intersection of these two strategies. Through information products, information services, and digital application scenarios, it both meets residents' upgrading consumption needs and transmits market signals to firms through expanded consumption, scenario opening, and data feedback, thereby guiding the adjustment of technology adoption, product supply, and business models.

The National Information Consumption Pilot Program is the local implementation of this strategic orientation. In August 2013, the State Council issued Several Opinions on Promoting Information Consumption and Expanding Domestic Demand, which proposed information-consumption pilot and demonstration-city (county and district) construction in qualified areas and made arrangements for improving information infrastructure, developing intelligent information products, fostering new information services, building public service platforms, and expanding the information-consumption experience [34]. In December 2013, the Ministry of Industry and Information Technology identified Beijing and 67 other locations as the first batch of national information-consumption pilot cities (counties and districts); in January 2015, it announced Shanghai and 35 other locations as the second batch. The two batches covered 104 cities and counties/districts in total [35, 36]. On this basis, the Ministry of Industry and Information Technology selected 25 information-consumption demonstration cities from pilot areas in 2016 and issued the Guidelines for the Construction of National Information Consumption Demonstration Cities in 2016. In 2017, the State Council proposed further advancing pilot and demonstration-city construction, and in 2019 the Ministry of Industry and Information Technology established a dynamic management mechanism through the Measures for the Management of Information Consumption Demonstration City Construction (Trial) [39, 37, 38]. The policy therefore gradually formed a progression of batch pilots, demonstration leadership, and dynamic management, providing an institutional basis for using the exogenous policy shocks created by cities entering the pilot at different times in a multi-period DID design.

Studies of the economic consequences of the National Information Consumption Pilot Policy have accumulated progressively. At the macro level, the policy has been found to promote high-quality economic development in pilot cities [4], facilitate industrial structure upgrading [5], and improve industrial structure through both supply-side optimization and demand-side expansion [6]. Yan et al. further find that information consumption pilots raise urban innovation [7]. These studies suggest that information consumption pilots are not simply consumption-stimulus policies: by expanding demand, improving digital infrastructure, promoting factor agglomeration, and optimizing the industrial environment, they generate comprehensive effects on regional development. At the micro level, research has begun to investigate the policy's effects on firm behavior. Wang et al. find that

information consumption promotes corporate digital transformation primarily through demand-pull and innovation-driven channels [8]. From the perspective of expanding domestic demand, Han and Wu argue that information-consumption pilots promote corporate digital transformation through digital equipment investment, human-capital upgrading, and technological innovation [9].

Overall, existing research has initially demonstrated that information-consumption policies have firm-level economic effects, but the specific mechanisms, robustness, and heterogeneity through which they affect corporate digital transformation warrant further discussion. This paper therefore uses the National Information Consumption Pilot Policy as a quasi-natural experiment and firm-level data to investigate the impact of demand-side policy on corporate digital transformation, complementing the literature on micro-level mechanisms and firm heterogeneity.

2.2. Corporate Digital Transformation

Corporate digital transformation is a systemic process in which firms embed digital technologies into strategy, organization, processes, and business models. Vial, Verhoef et al., and Gong and Ribiere all emphasize that digital transformation is not merely a technical application but a reconstruction of organizational value-creation logic and sources of competitive advantage [52, 51, 43]. For Chinese firms, digital transformation is reflected both in annual-report disclosures on artificial intelligence, big data, cloud computing, blockchain, digital platforms, and intelligent manufacturing, and in actual data-processing, process-optimization, and intelligent-decision capabilities formed through production and operations.

Prior research mainly explains the drivers of corporate digital transformation from supply-side and internal organizational perspectives. Wu et al. find that fiscal science and technology expenditure promotes corporate digital transformation [13]. Yu et al. show that government subsidies and supply-chain collaboration affect corporate digitalization [14]. Wu et al. find that executives' information-technology backgrounds significantly advance digital transformation [15]. Using the National Big Data Comprehensive Pilot Zones as a quasi-natural experiment, Sun et al. find that policy empowerment promotes corporate digital transformation through an improved digital ecosystem [16]. Together, these studies show that the technological environment, policy support, and managerial cognition are important conditions for transformation.

Regarding the consequences of digital transformation, existing research shows that it can raise total factor productivity, improve human-capital structure, strengthen financial performance, and support high-quality development. Zhao et al. find that digital transformation raises firms' total factor productivity [17]. Xiao et al. show that it increases labor income share through adjustments in human-capital structure [18]. Using large language models to remeasure digital transformation, Jin et al. find that digital transformation significantly improves corporate financial performance [19]. International evidence similarly suggests that information technology, data-driven decision-making, and big-data analytics capability shape organizational structure, operating efficiency, and firm performance [40, 41, 47].

Overall, research on corporate digital transformation has developed rich theoretical and empirical evidence, but there remains relatively little analysis of how demand-side policy affects it. The information-consumption pilot program provides an appropriate institutional setting for observing how demand-side shocks influence corporate digital transformation by expanding digital consumption demand, promoting digital scenarios, and improving the digital market environment.

3. Research Hypotheses and Empirical Design

3.1. National Information Consumption Pilot Policy and Corporate Digital Transformation

The National Information Consumption Pilot Policy is an important policy arrangement for promoting information consumption, releasing domestic-demand potential, and cultivating new momentum in the digital economy. Compared with conventional consumption policies, it emphasizes not only demand expansion but also the integration of consumption demand and digital technology

applications through information-infrastructure construction, improvements in information-product supply, and the expansion of digital service scenarios. Studies indicate that expanding consumer demand can shape firms' innovation investment, resource allocation, and operating adjustments through market signals [21, 22], while digital infrastructure, digital ecosystems, and policy support can improve the environment for digital technology adoption and advance corporate digital transformation [12, 16]. As a demand-side policy tool, the pilot program may therefore accelerate corporate digital transformation by releasing demand for information products and services.

Specifically, the National Information Consumption Pilot Policy can enlarge the digital market faced by firms. The policy promotes new consumption scenarios such as intelligent terminals, online education, live-streaming e-commerce, and digital platform services, continuously increasing consumers' demand for intelligent, personalized, and online products and services. Under demand expansion, firms need to rely more heavily on digital technologies for market identification, product iteration, and operational management in order to gain market share, improve responsiveness, and meet consumer preferences. Existing research finds that information-consumption pilots promote corporate digital transformation through demand-pull and innovation-driven channels, while expanding domestic demand can enable transformation through digital equipment investment, human-capital upgrading, and technological innovation [8, 9]. The pilot program may thus become an important external force driving corporate digital transformation.

Hypothesis 1. The National Information Consumption Pilot Policy promotes corporate digital transformation.

3.2. Demand Expansion, Improved Operating Resources, and Corporate Digital Transformation

The National Information Consumption Pilot Policy first leads to demand expansion. By cultivating information-product consumption, information-service consumption, and digital consumption scenarios, it expands the digital market accessible to firms and creates more market opportunities for digital products and services. As information-consumption demand grows, firms' order volumes, sales revenue, and operating cash flow may improve. Research indicates that consumption-demand expansion improves market expectations and relieves operating pressure by expanding revenue sources [21, 22]. At the same time, the policy itself seeks to expand domestic demand and release digital consumption potential, so demand expansion provides a practical basis for subsequent digital investment [8, 9].

Improved operating resources further affect corporate digital transformation. Transformation typically involves substantial investment, a long cycle, and high uncertainty, requiring continuous expenditure on software systems, hardware upgrades, data-platform construction, and digital talent recruitment. When firms face tight financial constraints, they may be unable to carry out digital upgrading even when they are willing to do so. Prior studies show that digital transformation requires sustained investment in capital, technology, and talent, while inadequate operating resources constrain technological upgrading and innovation [13, 14, 17]. Therefore, by raising revenue and operating cash flow through demand expansion, the policy can alleviate financing constraints during transformation, provide financial support for digital equipment investment, R&D, and talent recruitment, and ultimately promote corporate digital transformation.

Hypothesis 2. The National Information Consumption Pilot Policy promotes corporate digital transformation by improving firms' operating resources.

3.3. Strengthened Demand Identification, Greater Resource Inputs, and Corporate Digital Transformation

The policy may also strengthen firms' need to identify market demand and consumer preferences. Information consumption is characterized by rapid updating, a high degree of personalization, and strong dependence on digital scenarios, making changes in consumer demand easier to observe through digital platforms, online transactions, and information-service scenarios. Facing continually

evolving demand, firms need to obtain user data more promptly, identify market trends, and adjust product and service supply. Data-driven decision-making improves firms' responsiveness to market changes, while digital technology applications support optimization of production, marketing, and supply-chain management [41, 50]. The expansion of digital consumption scenarios may therefore lead firms to place greater emphasis on demand identification and digital technology adoption.

Stronger demand identification can further prompt firms to increase resource inputs. To identify consumer preferences and meet digital market demand more effectively, firms need to invest more in digital equipment and improve software systems, hardware facilities, and data platforms. They also need to increase R&D investment to strengthen product iteration and technological innovation, and deploy more highly educated and technically skilled personnel to support data analysis, platform operations, systems maintenance, and digital product development. Existing research shows that digital equipment investment is an important basis for transformation, while human-capital upgrading and technological innovation provide talent and technical support [16, 18, 23]. Han and Wu also find that information-consumption pilots advance transformation through digital equipment investment, human-capital upgrading, and technological innovation [9]. Thus, by strengthening demand identification, the policy can stimulate greater investment in digital resources and promote corporate digital transformation.

Hypothesis 3. The National Information Consumption Pilot Policy promotes corporate digital transformation by increasing digital equipment investment, R&D investment, and the allocation of digital talent.

3.4. Capability Improvement and Corporate Digital Transformation

Additional resource inputs must ultimately translate into stronger capabilities for digital transformation to occur. Corporate digital transformation is not merely the purchase of digital equipment or use of digital tools; it is the systemic reconfiguration of business processes, organizational structure, and operating models by embedding digital technology into production, sales, management, and service activities. Digital equipment investment enhances data collection, storage, and processing capabilities; R&D investment strengthens technological innovation and product iteration; and the allocation of digital talent improves firms' capacity for digital platform construction, data analysis, and operations management. Existing research indicates that transformation raises resource-allocation and operations-management efficiency and promotes high-quality development by improving production efficiency and operating performance [17, 19].

Capability improvement is a key result of the policy's influence on corporate digital transformation. With stronger data-processing capability, firms can identify user needs and market changes more accurately. With enhanced product iteration capability, they can develop and optimize digital products and services faster. With improved operational and managerial efficiency, they can integrate internal resources more effectively and reduce management costs. Existing studies find that digital transformation improves performance through optimized business processes and management efficiency, while upgraded human-capital structure enhances firms' ability to use digital technologies [18, 20, 19]. Consequently, through demand expansion and strengthened demand identification, the pilot program encourages digital-resource inputs, improves data-processing, product-iteration, and operations-management capabilities, and ultimately promotes corporate digital transformation.

Hypothesis 4. The National Information Consumption Pilot Policy promotes corporate digital transformation by improving firms' ability to apply digital technologies.

3.5. Empirical Design

To test whether the National Information Consumption Pilot Policy promotes corporate digital transformation, this paper follows the research designs of Wang et al., Han and Wu, and Sun et al. on policy shocks and corporate digital transformation [8, 9, 16] and constructs a multi-period difference-in-differences model. The digital transformation indicator is the natural logarithm of one plus the frequency of digitalization-related keywords in annual-report text. Although the annual disclosure

frequency may be zero for some firm-year observations, the logarithmic measure is highly comparable in the corporate digital transformation literature. Related studies also commonly use ordinary least squares or fixed-effects models to estimate corporate digital transformation. The baseline analysis therefore employs a two-way fixed-effects model with firm and year fixed effects:

$$Digital_{ijt} = \beta_0 + \beta_1 TreatPost_{jt} + \gamma Controls_{ijt} + \mu_i + \lambda_t + \varepsilon_{ijt}. \quad (1)$$

In Eq. (1), i denotes firms, j denotes cities in which firms are located, and t denotes years. Digital_ijt is the digital transformation level of firm i in city j in year t and is the dependent variable. Existing literature measures corporate digital transformation using the frequency of digitalization-related text, digital investment, digital assets, and applications of digital technology. Compared with a single indicator of digital investment or digital assets, annual-report text more comprehensively reflects digital strategy, technology applications, and digital business deployment. Because digital transformation is not only financial investment but also strategic expression, organizational adjustment, and the digitalization of business processes, this paper follows existing practice and constructs its measure from annual-report text. Specifically, it collects annual reports of listed companies, constructs a digital transformation dictionary including artificial intelligence, big data, cloud computing, blockchain, digital platforms, digital technology, intelligent manufacturing, information systems, data analysis, mobile Internet, and e-commerce, and counts their frequencies. The natural logarithm of one plus the total frequency is used as the proxy for digital transformation. A higher value indicates more digitalization-related disclosure in annual reports and a higher level of digital transformation.

TreatPost_jt is the core explanatory variable for the National Information Consumption Pilot Policy. Because the policy was implemented in batches at the city level, the study matches the lists of pilot cities announced by the Ministry of Industry and Information Technology with listed firms' registered or office locations. TreatPost equals 1 if a firm is located in a national information-consumption pilot city and the year is after that city was selected, and 0 otherwise. The key coefficient of interest is beta_1 in Eq. (1). A significantly positive beta_1 indicates that, after controlling for other factors, the policy significantly raises the digital transformation level of firms in pilot areas, supporting the research hypothesis.

Controls_ijt denotes a set of controls. Drawing on studies of corporate digital transformation and corporate finance, the analysis controls for firm size (Size), leverage (Lev), return on assets (ROA), revenue growth (Growth), cash holdings (Cash), fixed-asset ratio (FixAsset), ownership concentration (Top1), state ownership (SOE), board size (Board), CEO duality (Dual), listing age (ListAge), and city-level GDP per capita (lnPGDP). Firm fixed effects control for time-invariant firm characteristics, while year fixed effects control for common annual shocks such as changes in the macroeconomic and institutional environment and in digital economy development. To mitigate within-firm correlation in error terms, standard errors are clustered at the firm level. Definitions of the main variables are provided in Table 1.

Table 1. Variable Definitions and Construction

Variable	Variable Name	Definition
Digital	Corporate Digital Transformation	Natural logarithm of one plus the frequency of digital-transformation keywords in annual reports.
TreatPost	National Information Consumption Pilot Policy	Equals 1 if a firm is located in a pilot city and the year is after the city entered the pilot program; 0 otherwise.
Size	Firm Size	Natural logarithm of year-end total assets.
Lev	Leverage	Ratio of total liabilities to total assets.
ROA	Return on Assets	Ratio of net profit to total assets.
Growth	Revenue Growth	Year-on-year change in operating revenue divided by prior-year operating revenue.
Cash	Cash Holdings	Ratio of cash and cash equivalents to total assets.
FixAsset	Fixed-Asset Ratio	Ratio of net fixed assets to total assets.
Top1	Ownership Concentration	Shareholding ratio of the largest shareholder.
SOE	State Ownership	Equals 1 for state-owned enterprises and 0 otherwise.
Board	Board Size	Natural logarithm of the number of board directors.
Dual	CEO Duality	Equals 1 if the chairperson and general manager are the same person and 0 otherwise.
ListAge	Listing Age	Natural logarithm of years since listing.
lnPGDP	City Economic Development	Natural logarithm of city-level GDP per capita.

Note: Variable definitions are compiled from the research design and the existing regression output.

3.6. Data Sources

This paper studies Chinese A-share listed companies and constructs a sample using annual firm data from 2009-2020. The sample begins in 2009 to ensure a sufficiently long pre-policy observation period and ends in 2020 to observe post-policy changes in corporate digital transformation while maintaining data availability. The list of pilot cities comes from the Ministry of Industry and Information Technology's lists of national information-consumption pilot cities (counties and districts), which are matched with firms' cities. Financial and governance data come primarily from the CSMAR and Wind databases and include total assets, total liabilities, net profit, operating revenue, operating cash flow, fixed assets, ownership type, the largest shareholder's ownership ratio, and board size. Annual-report text comes from CNINFO, the Shanghai Stock Exchange, the Shenzhen Stock Exchange, and the CSMAR annual-report text database and is used to construct the digital transformation measure. City-level data come from the China City Statistical Yearbook, the National Bureau of Statistics, and provincial and municipal statistical yearbooks and are used to control for regional economic development and other city characteristics.

To ensure the validity of the sample, the original observations are processed as follows. First, financial listed companies are excluded. Second, ST and *ST firms are excluded. Third, observations with missing values for corporate digital transformation, the National Information Consumption Pilot Policy, or the main controls are removed. Fourth, to reduce the influence of outliers, the main continuous variables are winsorized at the 1st and 99th percentiles.

3.7. Descriptive Statistics

Table 2 reports descriptive statistics. The mean of corporate digital transformation (Digital) is 1.2857, indicating that sample firms, on average, have already exhibited some degree of digital transformation. Its standard deviation is 1.3868, with a minimum of 0 and a maximum of 5.0499, showing substantial variation across firms. The mean of the key explanatory variable, TreatPost, is 0.4081, indicating that approximately 40.81% of firm-year observations are exposed to the policy. Among the controls, the mean values of Size, Lev, and ROA are 22.1169, 0.4216, and 0.0377,

respectively, suggesting that sample firms are generally of stable scale, have moderate leverage, and possess a certain level of profitability. Growth, Cash, and FixAsset also vary, indicating considerable heterogeneity in operating conditions, resource allocation, and financial structure. Overall, the relatively large standard deviations of Digital and TreatPost indicate sufficient variation in firms' transformation levels and policy exposure for subsequent regression analysis.

Table 2. Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Digital	28461	1.2857	1.3868	0.0000	5.0499
TreatPost	28461	0.4081	0.4915	0.0000	1.0000
Size	28461	22.1169	1.2987	19.8376	26.1709
Lev	28461	0.4216	0.2096	0.0488	0.8911
ROA	28461	0.0377	0.0622	-0.2763	0.1888
Growth	28461	0.1668	0.3956	-0.5824	2.4276
Cash	28461	0.1755	0.1404	0.0104	0.6799
FixAsset	28461	0.2041	0.1586	0.0019	0.6921
Top1	28461	0.3466	0.1497	0.0880	0.7457
SOE	28461	0.3605	0.4802	0.0000	1.0000
Board	28461	2.1308	0.2019	1.6094	2.7081
Dual	28461	0.2711	0.4445	0.0000	1.0000
ListAge	28461	2.0312	0.9368	0.0000	3.2958
lnPGDP	28461	11.2788	0.5225	9.8215	12.0086

4. Empirical Results and Analysis

4.1. Baseline Regression Results

To test the effect of the National Information Consumption Pilot Policy on corporate digital transformation, the baseline regression is estimated using Eq. (1). Table 3 reports the results. Column (1) excludes control variables and includes only firm and year fixed effects. Column (2) additionally includes firm financial characteristics, corporate-governance characteristics, and city-level economic development. Comparing the two columns allows the stability of the estimated policy effect to be assessed.

Table 3. Baseline Regression Results

	(1) Without Controls	(2) With Controls
TreatPost	0.1855*** (0.0363)	0.1837*** (0.0348)
Size		0.2243*** (0.0235)
Lev		-0.2060** (0.0881)
ROA		-0.1015 (0.1310)
Growth		0.0248* (0.0127)
Cash		-0.2462*** (0.0835)
FixAsset		-0.5576*** (0.1063)
Top1		-0.5236*** (0.1479)
SOE		-0.0134 (0.0528)
Board		0.3145*** (0.0620)
Dual		0.0139 (0.0233)
ListAge		0.1593*** (0.0260)
lnPGDP		-0.1548* (0.0848)
_cons	0.3954*** (0.0217)	-3.1417*** (1.0381)
Observations	28461	28461
Within R^2	0.3664	0.3913

*Note: Standard errors clustered at the firm level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. The same notation applies below.*

4.2. Parallel-Trend Test

A key condition for the validity of the DID model is that the treatment and control groups follow similar trends before policy implementation. Table 4 and Fig. 1 report the event-study results. The coefficients for the four pre-policy periods, Did_before4, Did_before3, Did_before2, and Did_before1, are all statistically insignificant, suggesting no systematic pre-policy difference in digital transformation between treated and control firms. The coefficients for the implementation year and all subsequent periods are significantly positive. The coefficient in the implementation year is 0.1998, followed by 0.1923, 0.1640, 0.1871, and 0.1426 in later periods. These results indicate that after implementation of the information-consumption pilot policy, treated firms' digital transformation level increases markedly.

Table 4. Parallel-Trend Test Results

Variable	Digital Transformation
Did_before4	-0.0399 (0.0330)
Did_before3	-0.0634 (0.0390)
Did_before2	-0.0415 (0.0438)
Did_before1	0.0517 (0.0477)
Did_current	0.1998*** (0.0508)
Did_after1	0.1923*** (0.0533)
Did_after2	0.1640*** (0.0541)
Did_after3	0.1871*** (0.0547)
Did_after4p	0.1426*** (0.0538)
Firm Fixed Effects	Yes
Year Fixed Effects	Yes
Observations	28461
Within R^2	0.3917

Note: Did_before1 denotes one period before policy implementation, Did_current denotes the policy implementation year, and Did_after4p denotes the fourth and all subsequent post-policy periods.

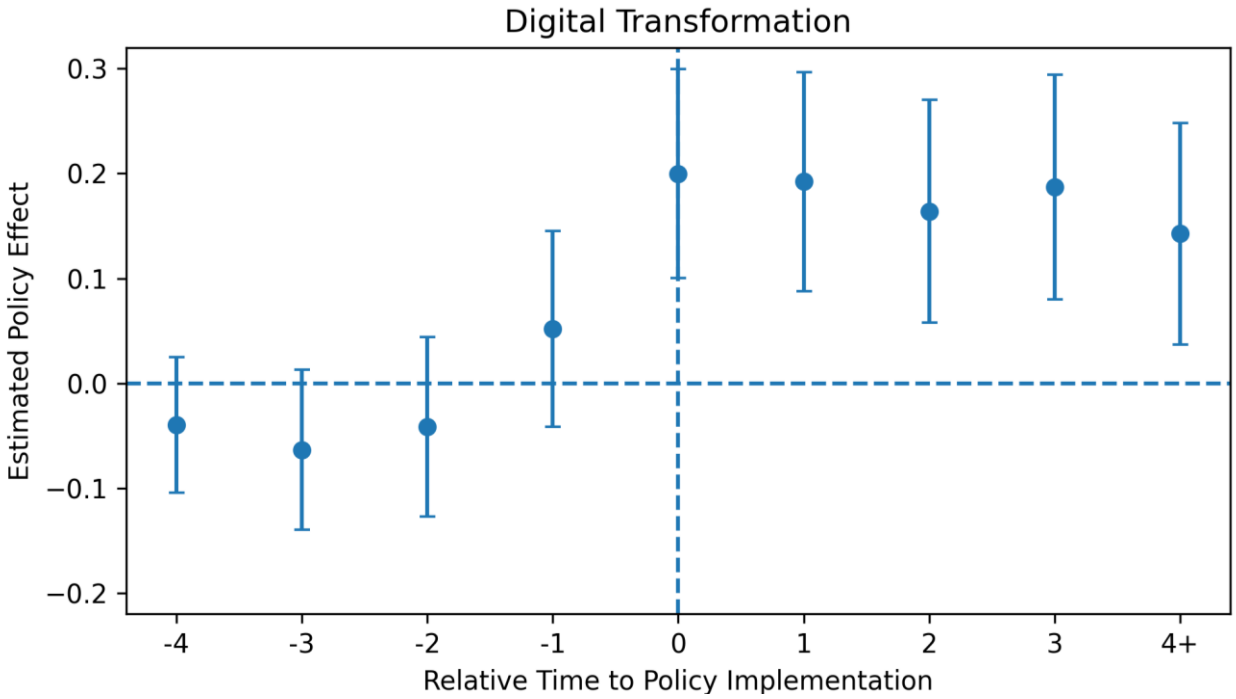


Fig. 1 Parallel-Trend Test.

Note: Dots are event-study coefficient estimates, error bars are 95% confidence intervals, and the vertical dashed line denotes the policy implementation time.

4.3. Alternative Variable Measures

To rule out the possibility that the results are driven by the particular measurement of variables, this paper replaces both the dependent variable and the core explanatory variable. First, the digital-investment string measure is used as an alternative proxy for corporate digital transformation. The TreatPost coefficient is 0.0016 and significant at the 5% level. Next, TreatPostAlt is used as an alternative policy measure. Its coefficient is 0.1850 and significant at the 1% level. These results show that the baseline conclusion does not depend on a specific variable definition.

Table 5. Robustness Tests Using Alternative Variable Measures

	(1) Alternative Dependent Variable (Digital Investment String)	(2) Alternative Policy Variable (TreatPostAlt)
TreatPost	0.0016** (0.0007)	
TreatPostAlt		0.1850*** (0.0346)
Size	0.0030*** (0.0006)	0.2248*** (0.0235)
Lev	-0.0103*** (0.0024)	-0.2073** (0.0881)
ROA	-0.0283*** (0.0039)	-0.1018 (0.1310)
Growth	-0.0011*** (0.0003)	0.0251** (0.0127)
Cash	-0.0043** (0.0022)	-0.2500*** (0.0835)
FixAsset	0.0087*** (0.0028)	-0.5543*** (0.1061)
Top1	-0.0050 (0.0032)	-0.5200*** (0.1480)
SOE	-0.0019* (0.0011)	-0.0121 (0.0530)
Board	0.0002 (0.0017)	0.3139*** (0.0620)
Dual	-0.0001 (0.0006)	0.0140 (0.0233)
ListAge	0.0015*** (0.0005)	0.1587*** (0.0260)
lnPGDP	0.0001 (0.0018)	-0.1589* (0.0848)
_cons	-0.0492** (0.0230)	-3.1063*** (1.0376)
Observations	28461	28461
Within R^2	0.0236	0.3910

4.4. PSM-DID Test

Because selection into the pilot program may be related to a city's economic base, consumption capacity, and level of digital infrastructure, this paper further applies propensity score matching combined with difference-in-differences estimation to alleviate sample-selection bias. Table 6 shows that in the matched sample, the TreatPost coefficient is 0.1625 and significant at the 1% level. Although the coefficient is slightly smaller than the baseline estimate, its sign and significance remain unchanged, indicating that the conclusion that the policy promotes corporate digital transformation is robust.

Table 6. PSM-DID Robustness Test Results

	(1) Digital Transformation
TreatPost	0.1625*** (0.0360)
Size	0.2202*** (0.0243)
Lev	-0.2073** (0.0932)
ROA	-0.0489 (0.1373)
Growth	0.0286** (0.0136)
Cash	-0.2695*** (0.0890)
FixAsset	-0.5510*** (0.1093)
Top1	-0.5370*** (0.1574)
SOE	-0.0033 (0.0551)
Board	0.3220*** (0.0641)
Dual	0.0063 (0.0246)
ListAge	0.1741*** (0.0274)
lnPGDP	-0.0931 (0.0936)
_cons	-3.7388*** (1.1325)
Observations	24626
Within R^2	0.4021

Note: The matched-sample regressions continue to control for firm and year fixed effects; standard errors are clustered at the firm level.

4.5. Placebo Test

A placebo test is further conducted by randomly generating false policy shocks and repeatedly estimating the model to assess whether the baseline result is caused by random factors. Table 7 reports descriptive statistics for 1,000 random trials. The mean of the false-policy coefficient b_did is -0.0003, its median is approximately zero, its standard deviation is 0.0365, and its maximum is 0.1145, all of which are well below the baseline estimate of 0.1837 for the actual policy variable. This indicates that the true policy effect is clearly separated from the center of the random distribution and that the baseline conclusion is not driven by random sampling or chance factors.

Table 7. Descriptive Statistics for the Placebo Test

Variable	Observations	Mean	Std. Dev.	Min	P25	Median	P75	Max
b_did	1000	-0.0003	0.0365	-0.1122	-0.0243	0.00007	0.0244	0.1145

Note: b_did is the estimated coefficient of the randomly generated false policy variable.

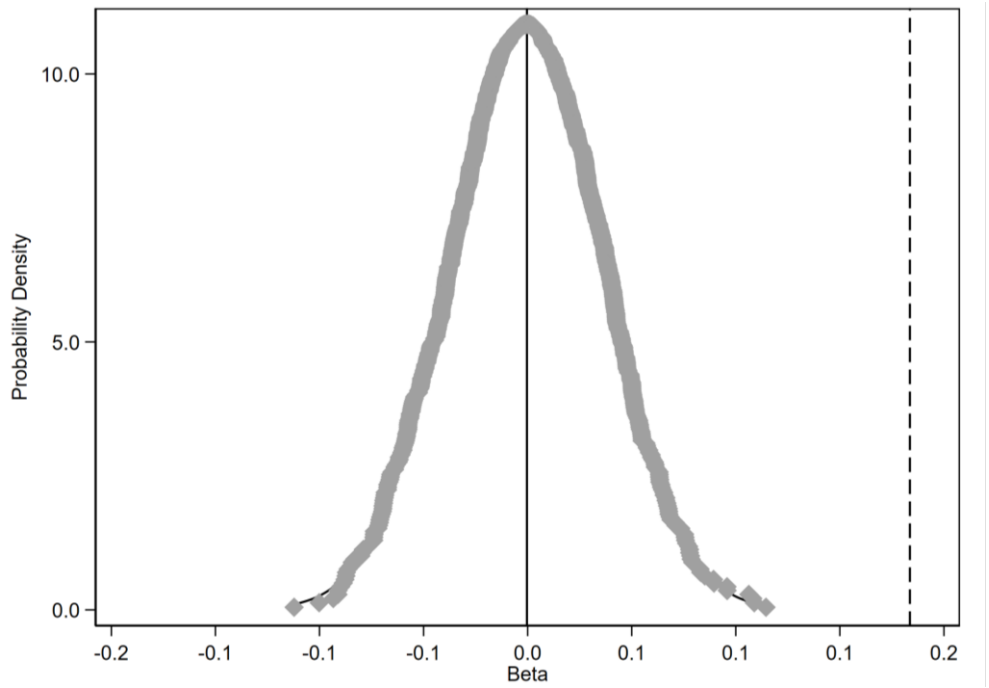


Fig. 2 Placebo Test Distribution.

5. Further Analysis

5.1. Heterogeneity Analysis

The National Information Consumption Pilot Policy promotes corporate digital transformation by expanding demand for digital consumption, improving digital infrastructure, and optimizing the digital ecosystem. Because firms differ in resource endowments, external institutional environments, and internal governance structures, however, the policy effect may not be uniform. To examine this heterogeneity, the analysis tests three dimensions: firm human-capital level, regional marketization level, and management shareholding ratio. Specifically, the baseline model adds interactions between each heterogeneity variable and TreatPost and focuses on the interaction coefficient. A significantly positive interaction coefficient indicates that the policy's promotion of corporate digital transformation becomes stronger as the relevant characteristic increases.

5.2. Human Capital Level

Corporate digital transformation requires talent with capabilities in data analysis, platform operations, system development, and digital management. Employees with higher educational attainment generally possess stronger digital-technology understanding, learning ability, and knowledge absorption capacity, allowing them to convert policy-induced market demand and digital-infrastructure advantages into actual digital technology applications more effectively. Xiao et al. show that digital transformation is associated with adjustments in firms' human-capital structure [18], and Zhu and Ma further find that digital transformation promotes the upgrading of human-capital structure [23]. Accordingly, when a higher proportion of employees have at least a bachelor's degree, firms can more readily recognize the digital market opportunities released by the pilot policy and translate them into momentum for digital upgrading.

This paper measures human-capital level by the proportion of employees holding at least a bachelor's degree and constructs its interaction with TreatPost. Column (1) of Table 8 shows that the interaction coefficient is 0.5082 and significant at the 1% level. Thus, the policy's effect on corporate digital transformation is stronger for firms with higher human-capital levels. The result indicates that talent reserves are an important condition for absorbing and using the benefits of information-consumption policies.

5.3. Marketization Level

Regions with higher marketization levels typically have more complete factor markets, more intense market competition, and more efficient information flows. Although the pilot policy can release demand for digital consumption, whether firms can convert this demand expansion into digital technology investment and operating-model adjustment depends on the maturity of local market mechanisms. Sun et al. argue that policy empowerment advances corporate digital transformation through an improved digital ecosystem [16]. Huang et al. find that Internet development raises productivity by improving resource allocation and production organization [2]. In highly marketized regions, firms can more readily access digital-related capital, talent, and technology services, and the policy effect may therefore be stronger.

Regional marketization is measured using the marketization index, and its interaction with TreatPost is included in the model. Column (2) of Table 8 reports an interaction coefficient of 0.0634, significant at the 1% level. This indicates that the policy has a stronger positive effect on corporate digital transformation in regions with higher marketization. A sound market environment thus enhances firms' ability to respond to expanded digital demand and digital policy support.

5.4. Management Shareholding Ratio

Digital transformation often involves long investment cycles, uncertain short-term returns, and high organizational adjustment costs. Whether managers have a long-term orientation therefore affects the strength with which firms advance digital strategy. Management shareholding aligns managers' personal gains with long-term corporate value, thereby alleviating agency problems and reducing short-termism. Jensen and Meckling suggest that equity incentives can, to some extent, mitigate conflicts of interest between managers and shareholders [53]. Wu et al. also find that managerial characteristics have an important effect on corporate digital transformation [15]. Firms with higher management shareholding ratios are therefore more likely to proactively seize the digital development opportunities created by the policy.

This paper measures internal incentives by the management shareholding ratio and constructs its interaction with TreatPost. Column (3) of Table 8 shows that the interaction coefficient is 0.0051 and significant at the 1% level. Therefore, the policy effect on corporate digital transformation is stronger when management shareholding is higher. This result indicates that internal incentive mechanisms can reinforce firms' willingness to pursue digital transformation and improve the efficiency with which they use external digital policy conditions.

Table 8. Heterogeneity Analysis Results

	(1) Digital Transformation	(2) Marketization Level	(3) Management Shareholding Ratio
HighEdu × TreatPost	0.5082*** (0.0621)		
HighEdu	-0.0258 (0.0435)		
Market × TreatPost		0.0634*** (0.0148)	
Market		-0.0020 (0.0179)	
MgtOwn × TreatPost			0.0051*** (0.0012)
MgtOwn			0.0003 (0.0014)
TreatPost	-0.1450*** (0.0547)	-0.4084*** (0.1416)	0.1565*** (0.0370)
Observations	28461	27096	26256
Within R^2	0.3968	0.4042	0.4027

*Note: Robust standard errors clustered at the firm level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. In the interaction models, the TreatPost coefficient is the policy effect when the heterogeneity variable equals zero; the interaction coefficient is the main focus.*

5.5. Mechanism Analysis

By cultivating information-product consumption, information-service consumption, and digital consumption scenarios, the National Information Consumption Pilot Policy expands the digital market demand faced by firms and induces faster adoption of digital technologies. Demand expansion and an improved digital ecosystem can, on the one hand, strengthen data-processing capability, resource-allocation efficiency, and productivity, and, on the other hand, optimize investment decisions and reduce management costs in operating activities. The policy's impact on corporate digital transformation may therefore be reflected in efficiency-improvement pathways, including higher total factor productivity, better investment efficiency, and lower operating expenses.

Following Zhao et al. and Song and Zeng [17, 28], this paper estimates total factor productivity using the OP and LP methods, measures investment efficiency with the absolute value of inefficient investment (Absinv), and measures operating expenses with the operating expense ratio (Ofee). A smaller Absinv indicates lower inefficient investment and higher investment efficiency, while a smaller Ofee indicates a lower operating expense ratio and stronger operating cost control. Table 9 shows that TreatPost has coefficients of 0.0425 and 0.0330 for total factor productivity estimated by the OP and LP methods, respectively, both significant and positive at the 5% level. This indicates that the policy significantly improves total factor productivity. Meanwhile, the coefficients of TreatPost for inefficient investment and the operating expense ratio are -0.0061 and -0.0053, respectively; the former is significantly negative at the 1% level and the latter is significantly negative at the 10% level. These results show that the policy reduces inefficient investment and, to some extent, lowers operating expenses and strengthens cost control.

Table 9. Mechanism Analysis Results

	(1) Total Factor Productivity (OP Method)	(2) Total Factor Productivity (LP Method)	(3) Inefficient Investment	(4) Operating Expense Ratio
TreatPost	0.0425**	0.0330**	-0.0061***	-0.0053*
	(0.0166)	(0.0153)	(0.0015)	(0.0029)
Size	0.3386***	0.4919***	0.0064***	-0.0194***
	(0.0142)	(0.0141)	(0.0012)	(0.0028)
Lev	0.3656***	0.4149***	0.0078*	-0.0336***
	(0.0503)	(0.0493)	(0.0046)	(0.0104)
ROA	1.2832***	1.3132***	0.0221***	-0.3255***
	(0.0860)	(0.0845)	(0.0067)	(0.0197)
Growth	0.2133***	0.2236***	0.0178***	-0.0317***
	(0.0084)	(0.0078)	(0.0013)	(0.0019)
Cash	-0.0393	-0.0876**	-0.0154***	0.0084
	(0.0403)	(0.0409)	(0.0044)	(0.0087)
FixAsset	-0.8374***	-1.0220***	-0.0506***	0.0107
	(0.0699)	(0.0689)	(0.0067)	(0.0129)
Top1	-0.1107	-0.0824	0.0027	-0.0036
	(0.0845)	(0.0787)	(0.0067)	(0.0157)
SOE	0.0105	0.0392	-0.0055**	-0.0146**
	(0.0329)	(0.0317)	(0.0025)	(0.0060)
Board	-0.0306	0.0037	-0.0035	0.0066
	(0.0353)	(0.0353)	(0.0032)	(0.0067)
Dual	-0.0137	-0.0076	0.0012	-0.0013
	(0.0118)	(0.0118)	(0.0011)	(0.0023)
ListAge	0.0246**	0.0229*	-0.0150***	0.0033
	(0.0124)	(0.0122)	(0.0025)	(0.0023)
lnPGDP	0.0703	0.0572	-0.0078**	0.0004
	(0.0596)	(0.0568)	(0.0034)	(0.0081)
Constant	-1.6222**	-3.0855***	0.0370	0.5903***
	(0.6821)	(0.6566)	(0.0456)	(0.1022)
Observations	28461	28461	22899	28461
Within R^2	0.4866	0.6166	0.0997	0.1698

*Note: Standard errors clustered at the firm level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Total factor productivity is estimated using the OP and LP methods; inefficient investment is measured by the absolute value of investment residuals; and the operating expense ratio is operating expenses divided by operating revenue.*

6. Conclusions and Policy Implications

Using the National Information Consumption Pilot Policy as a quasi-natural experiment and data on Chinese A-share listed companies from 2009-2020, this paper examines the impact of demand-side policy on corporate digital transformation using a multi-period difference-in-differences model. The results show that the policy significantly promotes corporate digital transformation. After controlling for firm fixed effects, year fixed effects, and a series of firm financial, governance, and regional economic variables, the TreatPost coefficient remains significantly positive at the 1% level. The conclusion remains robust after replacing the dependent and core explanatory variables, applying PSM-DID, and conducting parallel-trend and placebo tests.

Mechanism analysis shows that the policy promotes corporate digital transformation mainly by raising total factor productivity, improving investment efficiency, and reducing the operating expense ratio. In other words, digital consumption demand released by the pilot program does not remain only at the consumer end. Through market pressure and demand for technology applications, it can be transmitted into firms and induce improvements in production and operating efficiency and in resource allocation. Heterogeneity analysis further shows that the policy effect is more pronounced

among firms with stronger human-capital foundations, in regions with higher marketization, and among firms with higher management shareholding ratios. These results indicate that the effectiveness of demand-side policy requires complementary internal capabilities, an external market environment, and governance incentives.

This paper has three policy implications. First, the information-consumption policy system should continue to be improved by linking the expansion of information-consumption demand with the advancement of corporate digital transformation. When cultivating information-consumption scenarios, governments should focus not only on the scale of household consumption but also on how demand is transmitted into firms' production, marketing, supply-chain, and management activities, so that information-consumption policy becomes an important demand-side instrument for corporate digital upgrading. Second, policy should be better connected to firm capability building. Digital transformation depends on talent, data, technology, and organizational capability. Local governments can reduce the capability threshold for firms to respond to information-consumption demand through digital-talent training, circulation of data elements, public digital platform construction, and digitalization services for small and medium-sized enterprises. Third, attention should be paid to marketization and corporate-governance incentives. The finding that marketization and management shareholding strengthen the policy effect shows that a favorable resource-allocation environment and effective long-term incentives help improve the practical effectiveness of demand-side policy.

This study has several limitations. First, corporate digital transformation is measured mainly using annual-report keywords. Although this approach captures digital strategy and disclosure intensity effectively, it may still be affected by firms' disclosure preferences. Future research can combine software investment, digital equipment investment, patents, recruitment text, and digital-platform data for more comprehensive measurement. Second, the mechanism analysis focuses mainly on currently significant results, and more direct measures of pathways such as demand expansion, cash-flow improvement, and increased digital investment could be further explored. Third, policy intensity varies across cities. Future research can construct indicators of policy intensity and investigate how differences in policy text, fiscal investment, infrastructure construction, and platform ecosystems affect corporate digital transformation.

References

[1] C. Pei, J. Ni, and Y. Li, Political economy analysis of the digital economy, Finance & Trade Economics, 2018 (9).

[2] Q. Huang, Y. Yu, and S. Zhang, Internet development and manufacturing productivity improvement: Internal mechanisms and Chinese experience, China Industrial Economics, 2019 (5).

[3] T. Zhao, Z. Zhang, and S. Liang, Digital economy, entrepreneurial activity, and high-quality development, Management World, 2020 (10).

[4] L. Han, S. Hu, and L. Wu, Does information consumption promote high-quality economic development?, Academic Digest of Humanities and Social Sciences in Higher Education Institutions, 2023 (5).

[5] L. He and Y. Zhang, How does new consumption promote industrial structure upgrading? A quasi-natural experiment based on information-consumption pilots, Journal of Guangdong University of Finance, 2022 (5).

[6] C. Yan, X. Cai, and Z. Zhang, How does the National Information Consumption Pilot Policy affect industrial structure optimization? A dual perspective of supply and demand, Research on Economics and Management, 2023 (7).

[7] C. Yan, X. Cai, and Q. Dai, The effect of National Information Consumption Pilots on urban innovation, Economic System Reform, 2024 (1).

[8] X. Wang, Y. Wang, and J. Lu, Information consumption and corporate digital transformation, International Finance Research, 2023 (11).

[9] L. Han and L. Wu, The effect of information consumption on corporate digital transformation from the perspective of expanding domestic demand, R&D Management, 2025 (5).

[10] L. Han, L. Wu, and J. Zhou, An empirical study on the effect of expanding domestic demand on firm exports, International Trade Issues, 2023 (12).

[11] H. Wang and X. Liu, The entrepreneurial effects of digital consumption policies, Journal of Finance and Economics, 2024 (3).

[12] H. Wang, Z. Yan, G. Guo, et al., Digital infrastructure policies and corporate digital transformation: Empowerment or disempowerment?, The Journal of Quantitative & Technical Economics, 2023 (5).

[13] F. Wu, X. Chang, and X. Ren, Government-driven innovation: Fiscal science and technology expenditure and corporate digital transformation, Public Finance Research, 2021 (1).

[14] D. Yu, C. Wang, and L. Chen, Government subsidies, supply-chain collaboration, and corporate digitalization, Business Management Journal, 2022 (5).

[15] Y. Wu, T. Zhang, L. Qin, et al., Executives' information technology backgrounds and corporate digital transformation, Business Management Journal, 2022 (12).

[16] W. Sun, N. Mao, F. Lan, et al., Policy empowerment, digital ecosystems, and corporate digital transformation: A quasi-natural experiment based on the National Big Data Comprehensive Pilot Zones, China Industrial Economics, 2023 (9).

[17] C. Zhao, W. Wang, and X. Li, How does digital transformation affect total factor productivity?, Finance & Trade Economics, 2021 (7).

[18] T. Xiao, R. Sun, C. Yuan, et al., Corporate digital transformation, human-capital structure adjustment, and labor income share, Management World, 2022 (12).

[19] X. Jin, C. Zuo, M. Fang, et al., The measurement challenge of corporate digital transformation: New methods and findings based on large language models, Economic Research Journal, 2024 (3).

[20] M. Fang, H. Nie, R. Ruan, et al., Corporate digital transformation and perceptions of economic policy uncertainty, Journal of Financial Research, 2023 (2).

[21] T. Lu and Y. Huang, Consumer demand-induced corporate innovation: Evidence from China's household appliance industry, Business Management Journal, 2021 (7).

[22] B. Zhou, Y. Shen, and X. Tang, Can fiscal subsidies for stimulating consumption really save firms? Evidence from the Home Appliances to the Countryside policy, Research on Economics and Management, 2021 (12).

[23] X. Zhu and Y. Ma, How does digital transformation promote the upgrading of corporate human-capital structure?, Business Management Journal, 2024 (2).

[24] K. Guo, S. Pan, and S. Yan, New infrastructure investment and industrial structure transformation and upgrading, China Industrial Economics, 2020 (3).

[25] S. Tang, X. Wu, and J. Zhu, Digital finance and corporate technological innovation: Structural features, mechanism identification, and effects under financial regulation, Management World, 2020 (5).

[26] Y. Shi, Y. Wang, and W. Zhang, Digital transformation of Chinese enterprises: Current status, problems, and prospects, Economist, 2021 (12).

[27] J. Li and Y. Cao, A configuration perspective on digital transformation drivers in manufacturing firms, R&D Management, 2022 (3).

[28] D. Song and Z. Zeng, The impact and mechanism of digital-intelligent transformation on total factor productivity of manufacturing enterprises: Evidence from Chinese listed manufacturing companies, Science & Technology Progress and Policy, 2025 (7).

[29] S. Liu, J. Yan, S. Zhang, et al., Can digital management transformation improve input-output efficiency?, Management World, 2021 (5).

[30] Z. Huang and P. Jiang, More is better or too much of a good thing? Corporate digital investment and total factor productivity, Chinese Rural Economy, 2024 (12).

[31] Y. Qi and X. Xiao, Corporate management transformation in the digital economy era, Management World, 2020 (6).

[32] CPC Central Committee and State Council, Outline of the Strategic Plan for Expanding Domestic Demand (2022-2035), 2022.

[33] CPC Central Committee and State Council, Overall Layout Plan for the Construction of Digital China, 2023.

[34] State Council, Several Opinions of the State Council on Promoting Information Consumption and Expanding Domestic Demand (Guofa [2013] No. 32), 2013.

[35] Ministry of Industry and Information Technology, List of the First Batch of National Information Consumption Pilot Cities (Counties and Districts), 2013.

[36] Ministry of Industry and Information Technology, List of the Second Batch of National Information Consumption Pilot Cities (Counties and Districts), 2015.

[37] State Council, Guiding Opinions on Further Expanding and Upgrading Information Consumption and Continuously Releasing Domestic Demand Potential (Guofa [2017] No. 40), 2017.

[38] Ministry of Industry and Information Technology, Measures for the Management of Information Consumption Demonstration City Construction (Trial), 2019.

[39] Ministry of Industry and Information Technology, Guidelines for the Construction of National Information Consumption Demonstration Cities in 2016, 2016.

[40] N. Bloom, L. Garicano, R. Sadun, and J. Van Reenen, The distinct effects of information technology and communication technology on firm organization, Management Science, 60 (12) (2014) 2859-2885.

[41] E. Brynjolfsson and K. McElheran, The rapid adoption of data-driven decision-making, American Economic Review, 106 (5) (2016) 133-139.

[42] A. Goldfarb and C. Tucker, Digital economics, Journal of Economic Literature, 57 (1) (2019) 3-43.

[43] C. Gong and V. Ribiere, Developing a unified definition of digital transformation, Technovation, 102 (2021) 102217.

[44] A. Hanelt, R. Bohnsack, D. Marz, and C. Antunes Marante, A systematic review of the literature on digital transformation: Insights and implications for strategy and organizational change, Journal of Management Studies, 58 (5) (2021) 1159-1197.

[45] F. Li, The digital transformation of business models in the creative industries: A holistic framework and emerging trends, Technovation, 92 (2020) 102012.

[46] K. Li, D. J. Kim, K. R. Lang, R. J. Kauffman, and M. Naldi, How should we understand the digital economy in Asia? Critical assessment and research agenda, Electronic Commerce Research and Applications, 44 (2020) 101004.

[47] O. Muller, M. Fay, and J. Vom Brocke, The effect of big data and analytics on firm performance: An econometric analysis considering industry characteristics, Journal of Management Information Systems, 35 (2) (2018) 488-509.

[48] S. Nambisan, Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship, Entrepreneurship Theory and Practice, 41 (6) (2017) 1029-1055.

[49] T. Saarikko, U. H. Westergren, and T. Blomquist, Digital transformation: Five recommendations for the digitally conscious firm, Business Horizons, 63 (6) (2020) 825-839.

[50] D. J. Teece, Profiting from innovation in the digital economy: Enabling technologies, standards, and licensing models in the wireless world, Research Policy, 47 (8) (2018) 1367-1387.

[51] P. C. Verhoef, T. Broekhuizen, Y. Bart, A. Bhattacharya, J. Q. Dong, N. Fabian, and M. Haenlein, Digital transformation: A multidisciplinary reflection and research agenda, Journal of Business Research, 122 (2021) 889-901.

[52] G. Vial, Understanding digital transformation: A review and a research agenda, Managing Digital Transformation (2021) 13-66.

[53] M. C. Jensen and W. H. Meckling, Theory of the firm: Managerial behavior, agency costs and ownership structure, Corporate Governance, Gower (2019) 77-132.

[54] J. Edler and L. Georghiou, Public procurement and innovation - resurrecting the demand side, Research Policy, 36 (7) (2007) 949-963.

[55] K. S. R. Warner and M. Wager, Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal, Long Range Planning, 52 (3) (2019) 326-349.