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Original Paper

The Integration of Digital and Real Economy and Enterprise Competitiveness

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Abstract

Against the backdrop of the surging global digital wave and the multiple challenges faced by the real economy, the integration of digital and real economy has become a key issue for enterprises to enhance their competitiveness. The research selects the data of A-share listed companies in China from 2013 to 2022 as the research object, empirically examines the promoting effect of the integration of digital and real economy on enhancing enterprise competitiveness, and further analyzes and discusses the mechanism effects of cash level, technological innovation, and information disclosure on enhancing enterprise competitiveness. The following conclusions are drawn: First, the integration of digital and real economy can significantly promote the growth of enterprise competitiveness, and this positive effect remains valid after endogenous and robustness tests. Second, the integration of digital and real economy positively regulates the growth of enterprise competitiveness by influencing the cash level, technological innovation ability, and information disclosure quality of enterprises. Third, from a macro perspective, the promoting effect of the integration of digital and real economy on the growth of enterprise competitiveness is greater in the central and western regions; from a micro perspective, the promoting effect of the integration of digital and real economy on the growth of enterprise competitiveness is greater in private enterprises. Results enriches the traditional theory of enterprise competitiveness, expands the research scope of the integration of digital and real economy, and provides factual support and policy implications for enhancing the degree of integration of digital and real economy in China and promoting the high-quality development of economy in China.

Keywords

Integration of Digital and Real Economy, Enterprise Competitiveness, Cash Level, Technological Innovation, Information Disclosure

1. Introduction

Report to the 20th CPC National Congress of the Communist Party of China clearly put forward that it is necessary to "accelerate the development of digital economy, promote the deep integration of digital economy and real economy, and build a digital industrial cluster with international competitiveness", which has pointed out a new direction for China's economic development. The integration of number and reality is an omni-directional, all-angle and all-chain transformation brought by digital technology to traditional industries. Through the infiltration of digital technology, the R&D, production, sales and circulation of the real economy have been comprehensively improved, thus cultivating new models, new formats and forming new productive forces. In the process of deep integration of digital economy and real economy, enterprises, as the main body of the market, their performance and coping ability in this change are directly related to their position and development prospects in the market, and what is behind this is the competitiveness of enterprises. Under the background of the integration of data and reality, enhancing the competitiveness of enterprises is the core path to build a digital industrial cluster with international competitiveness. Therefore, it is very important to study the mechanism of the integration of numbers and facts on the competitiveness of enterprises.

The existing literature has fully studied the specific effects of the integration of numbers and facts, which have different manifestations at the macro, meso and micro levels. Macroscopically, the integration of number and reality is an important driving force to promote the high-quality development of the overall economy, but its impact on regional economy is significantly heterogeneous. The integration of number and reality empowers high-quality economic development through factor integration and technology integration (Yang & Ding, 2024). Factor-based integration is manifested in the reconfiguration of digital factors and traditional production factors, which improves the efficiency of factor utilization; Technical integration relies on digital technology innovation to promote industrial technology progress and then promote economic growth. However, for different regions, their economic development is influenced by the integration of numbers and facts. Due to the good digital foundation in the eastern region, the integration of digital and real plays a more obvious role in promoting high-quality economic development, while the central and western regions are relatively backward (Liu et al., 2024). And in the face of external shocks, areas with high degree of digitalization show stronger anti-risk ability (Luo et al., 2024). As far as the middle view is concerned, the integration of number and reality promotes the transformation and upgrading of industrial structure (Liu & Slender, 2022), to promote the construction of modern industrial system (Xia & Su, 2024), enhance the competitiveness of modern industrial system (Chen, 2024), but also provides a new scene for industrial innovation (Cao, 2023).

Microscopically, the integration of number and reality provides an important driving force for the high-quality development of enterprises through technological innovation, green transformation and productivity improvement, but its comprehensive promotion still needs to overcome challenges such as regional and technological differences. First, the integration of number and reality has significantly

improved the innovation ability of enterprises through digital means (Wang, 2025)., especially in technology research and development and product iteration; Second, the integration of numbers and facts promotes the green transformation of enterprises, optimizes resource allocation through digital technology, reduces carbon emissions, and realizes sustainable development (Cao & Yue, 2024). Thirdly, the integration of number and reality promotes the transformation and upgrading of manufacturing enterprises by enhancing the new quality productivity of enterprises, and then enhances the market competitiveness of enterprises (Zhang & Zhang, 2024).; Fourthly, the integration of number and reality can also significantly promote the high-quality development of enterprises by optimizing production processes, improving management efficiency and expanding market space (Jiang et al., 2024). However, the effect of the integration of numbers and facts is heterogeneous, and large enterprises benefit more obviously, while small and medium-sized enterprises face technical threshold and financial pressure (Huang & Gao, 2023). Generally speaking, a large number of scholars have studied the important role of digital-real integration in macro-meso-micro, but few scholars have studied the mechanism of digital-real integration on enterprise competitiveness. Therefore, it is of great practical significance and theoretical value to discuss the relationship between the integration of numbers and facts and the competitiveness of enterprises.

2. The marginal contribution of this paper mainly includes the following three aspects: first, under the background of the new round of scientific and technological revolution and industrial transformation, starting from the urgent need of deep integration of digital economy and real economy, we innovatively explore the driving role of digital and real integration in enhancing the competitiveness of enterprises, and systematically explore the action path of digital and real integration in promoting the growth of enterprise competitiveness; Secondly, it enriches the theoretical system of the integration of number and reality and expands the research on the factors affecting the competitiveness of enterprises. In this paper, the competitiveness of enterprises is deeply analyzed, and the relationship between the integration of numbers and facts and the growth of enterprise competitiveness is empirically tested for the first time. The essential logic of the integration of numbers and facts to promote the growth of enterprise competitiveness is clarified from the perspectives of cash level, technological innovation and information disclosure. Thirdly, the integration of number and reality has opened up a new path for improving the competitiveness of enterprises by virtue of the extensive coverage of cutting-edge technologies, the deep embedding of multiple scenarios and the efficient innovation of cross-border collaboration. This trend not only accelerates the high-end transformation of China's industrial structure, but also promotes the application and iterative upgrading of core technologies such as big data and artificial intelligence, which has far-reaching strategic significance for high-quality economic development.

2. Theoretical Analysis and Research Hypothesis

(A) the number of real integration and enterprise competitiveness

The integration of numbers and facts can directly promote the growth of enterprises' competitiveness, which can have a positive effect mainly by broadening financing channels, obtaining technical resources and strengthening behavior norms. The specific mechanism is as follows: First, the integration of numbers and facts can broaden financing channels and promote the strengthening of enterprises' cash reserves. The integration of data and reality brings new opportunities for enterprise investment. High-quality investment opportunities will attract more investors, and the private equity investment market will also favor such enterprises. The opportunities for enterprises to obtain equity investment will increase and the financing channels will be broadened. At the same time, the expected increase in return on investment will enable enterprises to accumulate more cash, enhance cash reserves and provide financial guarantee for the subsequent development of enterprises (Xiong & Song, 2024; Zhang et al., 2023); Second, the integration of numbers and facts is beneficial for enterprises to acquire more technical resources and increase their R&D investment. The digital economy promotes the flow of R&D elements, and enterprises in high-digital-real integration areas can break geographical and industry restrictions and establish cooperative relations with more scientific research institutions and universities. Through cooperation in Industry-University-Research, enterprises can share scientific research achievements, obtain key technical resources and provide a solid foundation for R&D activities (Zhao & Luan, 2024). With resource security, enterprises naturally have more motivation and ability to increase R&D investment (Li et al., 2024); Third, the integration of number and reality allows enterprises to control production and operation by digital technology. For example, in supply chain management, we use big data and the Internet of Things to trace products, strictly examine suppliers' performance in environmental protection and labor rights and interests according to digital information, and standardize enterprise industrial chain behavior. At the same time, the digital platform helps enterprises to disclose data such as production and operation, environmental impact and employee welfare, and enhance information transparency. In order to maintain their reputation, enterprises actively regulate their behaviors, and practice social responsibilities such as energy conservation and emission reduction, safeguarding employees' rights and interests, and participating in public welfare (Wu & Hu, 2024). In addition, digital transformation improves the communication efficiency between enterprises and stakeholders. Through social media and other channels, enterprises adjust their behaviors and improve their products and services according to the demands of consumers, community residents and investors, which also improves the level of corporate social responsibility (Shen et al., 2022). To sum up, this paper puts forward the following assumptions:

H1: The integration of numbers and facts can directly promote the growth of enterprise competitiveness.

(B) the number of real integration, cash level and enterprise competitiveness

Pecking order theory was first put forward by Myers and Majluf (1984). This theory holds that under

the situation of asymmetric information, corporate financing will follow a specific order and give priority to internal retained earnings, which is an internal financing method with no asymmetric information and low cost. When internal funds are insufficient, enterprises will choose debt financing with relatively low cost and can use financial leverage to enhance shareholders' income. Equity financing is often the last choice for enterprises when they can't meet the capital demand through the first two ways because it may send bad signals to the market and increase the financing cost. This theory is helpful for enterprise managers to formulate reasonable financing strategies.

From the perspective of pecking order financing theory, the integration of number and reality can significantly improve the cash reserve capacity and then enhance the competitiveness of enterprises by optimizing the financing order and capital structure of enterprises. The specific action paths are as follows: First, the integration of number and reality can significantly improve the operational efficiency and profitability of enterprises (Cao & Li, 2018). Through accurate cash flow forecasting and management (Peter, 2006), enhanced the ability to accumulate internal retained earnings. Application of Digital Supply Chain Financial Platform (Sheng & Li, 2010), so that enterprises can accelerate capital turnover and further expand internal financing sources; Second, the application of blockchain technology and digital credit evaluation system has effectively reduced the degree of information asymmetry (Xie, 2011). So that enterprises can obtain debt financing at lower interest rates. At the same time, the data transparency of the digital and real integration platform enhances the accuracy of financial institutions' evaluation of corporate solvency and significantly improves debt financing conditions; Thirdly, the integration of digital and real information can be achieved by constructing diversified digital financing channels (Yu et al., 2006), reducing the path dependence of enterprises on equity financing; Fourthly, the intelligent decision support system helps enterprises to balance financing costs and financial risks and realize the optimal allocation of capital structure. The above-mentioned digital transformation based on pecking order theory enables enterprises to reduce financing costs and enhance cash reserves at the same time, which in turn translates into three competitive advantages: First, abundant cash flow guarantees strategic investment and R&D investment; Second, the optimized capital structure has improved financial stability and anti-risk ability; Third, the digital financing system itself constitutes an organizational ability that is difficult to imitate. To sum up, this paper puts forward the following assumptions:

H2: The integration of number and reality can promote the growth of enterprise competitiveness by raising the cash level.

(C) the number of real integration, technological innovation and enterprise competitiveness

The theory of technological innovation points out that "innovation" is the establishment of a new production function, that is, the realization of a new combination of production factors and production conditions. Innovation generally includes five aspects: first, making new products that are not known to consumers; Second, adopt production methods that are actually unknown in this industrial sector; Third, open up markets that the country and those specific industrial sectors have not yet entered; Fourth,

obtain new supply sources of raw materials or semi-finished products; Fifth, form a new organizational form and create or break the original monopoly. Innovation is not only aimed at a simple technology or technological invention, but also a mechanism that keeps running. Only by introducing discoveries and inventions in production practice and having a shock effect on the original production system is innovation.

From the perspective of technological innovation theory, the integration of number and reality can systematically enhance the technological innovation ability of enterprises and then promote their competitiveness growth through the efficient circulation of data elements. The specific action paths are as follows: First, the integration of number and reality can improve the circulation efficiency of enterprise data elements (Han et al., 2023), reduce the information barrier of R&D and improve the accuracy of R&D investment of enterprises (Zhang, 2023); Secondly, digital technology is deeply embedded in the production process, which accelerates the technical iteration (Pei et al., 2021). And integrate industrial chain resources through platform-based collaboration to enhance technological innovation capability (Han et al., 2022); Finally, enterprises build technological competitive advantages by creating brand-new product forms, innovating production processes, opening up new global markets, obtaining more efficient raw material supply channels and forming platform-based organizations, so as to enhance market competitiveness in an all-round way. In this process, the integration of number and reality not only achieves a breakthrough in technology, but also constructs a dynamic mechanism for continuous innovation. The fluidity of data elements promotes the networked collaborative trend of innovation activities, the permeability of digital technology accelerates the industrial application of innovation results, and the predictive ability of intelligent algorithms greatly reduces the uncertainty of innovation process. In the end, enterprises can continue to maintain their technological leading edge and gain compound competitive advantages such as product premium ability, cost optimization space and organizational agility in market competition. To sum up, this paper puts forward the following assumptions:

H3: The integration of numbers and facts can promote the growth of enterprises' competitiveness by enhancing their technological innovation ability.

(D) the integration of numbers and facts, information disclosure and enterprise competitiveness

Stakeholder theory emphasizes that enterprises should consider the rights and interests of all stakeholders in business decision-making, rather than just pursuing the maximization of shareholders' interests. The theory holds that the long-term success of an enterprise depends on the support and cooperation of all stakeholders, and advocates that multi-party win-win can be achieved by establishing sustainable cooperative relations. This theory provides a theoretical basis for corporate social responsibility, promotes the transformation of modern enterprise management from a single "shareholder first" model to a more comprehensive interest balance model, and requires enterprises to take into account social values and environmental impacts while pursuing economic benefits, thus enhancing their sustainable development capabilities and social recognition.

From the perspective of stakeholder theory, the integration of numbers and facts can ultimately promote the growth of enterprise competitiveness by optimizing the practice of corporate social responsibility, strengthening the transparency of information disclosure and shaping a good reputation. The specific action paths are as follows: First, the integration of numbers and facts enables enterprises to accurately identify the demands of stakeholders (Liu, 2008; Xu, 2009), promote the deep integration of social responsibility strategy and business (Wen & Fang, 2008), improve CSR performance (Wei, 2023); Second, enterprises rely on digital technologies such as blockchain to enhance the transparency of information disclosure (Yu & Gu, 2003). Through structured data (Wu, 2009) Meet the information needs of investors, regulators and other multi-subjects, and reduce information asymmetry; Third, high-quality information disclosure shapes the responsible image of enterprises (Li & Tang, 2005). Accumulate reputation capital and strengthen the trust of stakeholders; In the end, this virtuous circle forms a differentiated competitive advantage by attracting high-quality resources, reducing transaction costs and obtaining policy support, and realizes the spiral rise of enterprise value creation. The core of this action path lies in the reconstruction of the value co-creation model between enterprises and all parties in society by the integration of numbers and facts, and the long-term value growth is realized by balancing the interests of many parties. To sum up, this paper puts forward the following assumptions:

H4: The integration of numbers and facts can promote the growth of enterprise competitiveness by optimizing the quality of information disclosure.

3. The Research Design

(1) Data sources

In this paper, China A-share listed companies from 2013 to 2022 are selected as research samples. The data at the enterprise level mainly come from CSMAR database, Wind database and China National Intellectual Property Administration patent database, including the basic information and financial status of listed companies, and the macro data at the city level come from provincial statistical yearbooks and statistical bulletins. In order to improve the rigor and scientificity of the research, this paper processes the sample data as follows: first, eliminate ST and *ST listed companies; Second, eliminate financial enterprises and real estate enterprises; Third, eliminate the samples with serious missing data of major variables. Finally, according to the information of the registered place of the enterprise, the number-reality fusion index at the provincial level is matched with the data at the enterprise level, and 23,037 research samples, totaling 3,768 enterprises, are obtained.

(2) Definition of variables

1. Explained variable: enterprise competitiveness. Porter It is considered that the fundamental basis for an enterprise to maintain its above-average operating performance for a long time is its lasting competitive advantage, and the competitive advantage is exchanged with the enterprise performance. Newbert. The empirical conclusion shows that competitive advantage is related to performance, and competitive advantage is the premise of performance. Therefore, the competitive advantage of

enterprises can be measured by performance indicators in financial statements. Most domestic scholars use return on total assets (ROA) and return on equity (ROE) to measure enterprise performance. Based on Xu Zhaocheng and Hou Jingchuan (2020). According to the research, the phenomenon of earnings management of return on net assets (ROE) is very serious. Therefore, this paper uses return on total assets (ROA) to measure the competitiveness of enterprises. Return on total assets is the ratio of net profit to total assets. Among them, the net profit is determined by all kinds of operating income and operating costs of the enterprise, and the total assets are composed of fixed assets and current assets.

2. The core explanatory variable: the fusion of number and reality. This paper draws lessons from Zhu Huayou and others (2023). In this paper, entropy weight method and coupling coordination model are used to measure the level of log-real integration. Specifically, the digital economy measurement index draws lessons from the research of Zhao Tao and others (2020) and Where (2023). Measure the development level of digital economy from three dimensions: digital infrastructure, digital industry development and digital economic environment. Digital infrastructure is divided into hardware facilities and software facilities, digital industry development is divided into digital business and digital industry, and digital economic environment is divided into application environment and innovation environment, with 6 first-class indicators and 12 second-class indicators. The measurement index of real economy draws lessons from the research of Guo Han and Quan Qinhui (2022). Measure the development level of the real economy from three dimensions: industrial development, market environment and economic environment. The index system for measuring the level of digital-real integration is shown in Table 1.

Table 1. Index System for Measuring the Level of Number-real Integration

	dimension	Primary index	Secondary index	Indicator attribute
digital economy	Digital infrastructure	Hardware facilities	Long-distance optical cable line length	+
			Internet broadband access port	+
		Software facilities	Number of domain names	+
			Number of IPv4 addresses	+
	Development of digital industry	Digital service	Total telecom service	+
			Total postal service	+
		Digital industry	Electronic commerce sales	+
			Digital inclusive finance index	+
	Digital economy environment	Application environment	Mobile phone penetration rate	+
			Internet penetration	+
		Innovative	R&D expenditure	+

		environment	Number of patents	+
Real economy	Industry development	Industrial scale	Gross domestic product GDP (excluding financial real estate)	+
	market environment	consumer market	Total retail sales of social consumer goods	+
	economic circumstances	Trade economy	Total import and export volume of goods	+

4. Mechanism Variables

(1) Cash level. This paper refers to Chen et al.(2019) Liu Jingjian et al. (2018) Xiong Lingyun et al. (2020) In this paper, the ratio of cash to cash equivalents and total assets of enterprises is used to express the cash holding level of enterprises.

(2) Technological innovation. This paper draws lessons from Kong Dongmin and others (2017) Yi Jingtao et al. (2015), Quan and Yin (2017). The measurement method of enterprise innovation performance measures company innovation from two levels: innovation input and innovation output. The input of innovation activities is measured by R&D expenditure divided by sales, and the output of innovation activities is measured by the number of patents granted by enterprises every year. Innovation efficiency is an important index to measure the input-output ratio of innovation behavior, which reflects the efficiency of enterprise innovation behavior and can be used as an index to measure the technological innovation ability of enterprises.

(3) information disclosure. Refer to Zhou et al. (2011) Zhai al. (2014) Xu and Xu (2015). In this paper, Kim and Verrecchia are used to measure the quality of information disclosure. Kim and Verrecchia found that when the company's information is fully disclosed, investors' dependence on trading volume information will decrease, and at the same time, their dependence on information disclosure will increase, resulting in a decrease in the impact of trading volume on the rate of return; On the other hand, when the information disclosure is not sufficient, the greater the dependence of investors on the trading volume information, and the smaller the dependence on the information disclosure, which leads to the increase of the influence of trading volume on the yield. The influence coefficient of trading volume on yield is usually called KV index, which reflects the dependence of the market on trading volume information and then reflects the degree of information disclosure of listed companies. The higher KV index indicates the lower quality of information disclosure of listed companies, while the lower KV index indicates the higher quality of information disclosure of listed companies. In this paper, the following model is used to calculate the KV index:

$$\ln\left(\frac{P_t-P_{t-1}}{P_{t-1}}\right)=\sigma_0+\sigma_1\left(\frac{Vol_t}{Vol_0}-1\right)+\varepsilon \quad (1)$$

Among them, it represents the closing price of the stock on the day, the closing price of the stock on the

day, and the logarithmic rate of return of the stock; Represents the trading volume of the stock on the th day, the average daily trading volume of the stock in the sample interval, the standardized trading volume, and measures the deviation degree of the trading volume of the day from the average level; Represents the intercept term of the regression equation, and represents the expected rate of return when there is no abnormal change in trading volume; Represents the regression coefficient, that is, the KV index, which measures the sensitivity of the rate of return to the change of trading volume; Represents the error term, which represents the random fluctuation that the model can't explain.P_t t 日的收盘价，P_{t-1}t−1 $\ln\left(\frac{P_t-P_{t-1}}{P_{t-1}}\right)$ Vol_ttVol_0 $\left(\frac{Vol_t}{Vol_0}-1\right)$ $\sigma_0\sigma_1\varepsilon$

4. Control variables: Based on relevant research and other factors that may affect the competitiveness of enterprises, this paper selects asset-liability ratio (Leverage), total asset turnover ratio (ATO), equity concentration ratio (TOP1), equity balance ratio (Balance1), inventory ratio (INV) and institutional investor shareholding ratio (INST) as the control variables of the model. Information and definitions of each variable are shown in Table 1.

Table 2. Variable Definition

type	Variable name	variable symbol	Definition description
Explained variable	Enterprise competitiveness	Com	Measuring Enterprise Competitiveness with return on total assets (ROA)
Explanatory variable	Number-real fusion	Integration	Entropy weight method and coupling coordination model are used to measure the level of log-real fusion.
Mechanism variable	Cash level	Cash	Corporate cash and cash equivalents/corporate total assets
	technical innovation	Innovation	The input of innovation activities is measured by R&D expenditure divided by sales, the output of innovation activities is measured by the number of patents granted by enterprises every year, and innovation efficiency = innovation output/innovation input.
	information disclosure	σ_1	Measured by the KV index, the higher the KV index, the lower the information disclosure quality of listed companies, and the lower the KV index, the higher the information disclosure quality of listed companies.

Control variable	Asset-liability ratio	Leverage	Total liabilities/total assets at the end of the year
	turnover of total assets	ATO	Operating income/average total assets
	Ownership concentration	TOP1	Number of shares held by the largest shareholder/total number of shares
	Equity balance degree	Balance1	The shareholding ratio of the second largest shareholder/the first largest shareholder
	Inventory proportion	INV	Net inventory/total assets
	Proportion of institutional investors' shareholding	INST	Total number of shares held by institutional investors/total share capital

(3) Model setting

1. Benchmark regression model

$$Com_{i\tau t}=\beta_0+\beta_1 \text{Integration}_{it}+\gamma Controls_{i\tau t}+\lambda Industry_i+\delta Year_t+\epsilon_{it} \quad (2)$$

Among them, it represents the growth level of enterprise competitiveness of regional enterprises in the first year, the degree of integration of regional enterprises in the first year, and a series of control variables. It is an industry-fixed effect and a time-fixed effect, which control industry heterogeneity and macroeconomic fluctuations respectively. Is a random error term.$Com_{i\tau t}i\tau t\text{Integration}_{it}itControls_{i\tau t}\lambda Industry_i\delta Year_t\epsilon_{it}$

2. Mechanism effect model: This paper adopts stepwise regression method (Baron & Kenny, 1986). This paper examines the influence mechanism of digital-real integration on the competitiveness of enterprises through cash level, technological innovation and information disclosure, and controls the industry fixed effect and time fixed effect at the same time. The model settings are as follows:

(1) Cash level (cash) intermediary effect test.

$$\text{Cash}_{i\tau t}=\alpha_0+\alpha_1 \text{Integration}_{it}+\gamma Controls_{i\tau t}+\lambda Industry_i+\delta Year_t+\epsilon_{it} \quad (3)$$

$$Com_{i\tau t}=\beta_0+\beta_1 \text{Integration}_{it}+\beta_2 \text{Cash}_{i\tau t}+\gamma Controls_{i\tau t}+\lambda Industry_i+\delta Year_t+\epsilon_{it} \quad (4)$$

Among them, it represents the annual cash holding level of regional enterprises, and other variables are consistent with the above explanation. $\text{Cash}_{i\tau t}i\tau t$

(2) the intermediary effect test of technological Innovation.

$$\text{Innovation}_{i\tau t}=\alpha_0+\alpha_1 \text{Integration}_{it}+\gamma Controls_{i\tau t}+\lambda Industry_i+\delta Year_t+\epsilon_{it} \quad (5)$$

$$Com_{i\tau t}=\beta_0+\beta_1 \text{Integration}_{it}+\beta_2 \text{Innovation}_{i\tau t}+\gamma Controls_{i\tau t}+\lambda Industry_i+\delta Year_t+\epsilon_{it} \quad (6)$$

Among them, it represents the innovation performance of regional enterprises in the first year, and

other variables are consistent with the above explanation.Innovation$_{i\tau t}i\tau t$

(3) the intermediary effect of information disclosure ()σ_1

$$\sigma\_1_{i\tau t}=\alpha_0+\alpha_1\text{Integration}_{it}+\gamma Controls_{i\tau t}+\lambda Industry_i+\delta Year_t+\epsilon_{it} \quad (7)$$

$$Com_{i\tau t}=\beta_0+\beta_1\text{Integration}_{it}+\beta_2\sigma\_1_{i\tau t}+\gamma Controls_{i\tau t}+\lambda Industry_i+\delta Year_t+\epsilon_{it} \quad (8)$$

Among them, it represents the KV index of regional enterprises in the first year, and other variables are consistent with the above explanation.$\sigma\_1_{i\tau t}i\tau t$

5. Empirical Analysis

(A) Descriptive statistics

In this paper, firstly, all variables involved in the research design are statistically described, and the results are shown in Table 3. According to descriptive statistics, we can draw the following conclusions: First, the average value of enterprise competitiveness (Com) is 0.037, and the median value is 0.038, indicating that the competitiveness of sample enterprises is relatively symmetrical, with the minimum value of -0.375 and the maximum value of 0.254, indicating that the fluctuation range of enterprise competitiveness is large, and some enterprises may face greater operational difficulties, while some enterprises have strong profitability, and enterprises are in the market. Secondly, the Integration of number and reality is measured by entropy weight method and coupling coordination model. The average value is 0.543, the median value is 0.520, the standard deviation is 0.177, and the range is 0.771, which shows that the degree of integration of number and reality in China is above average, but the uneven development among regions is prominent, and a few leading regions have improved the overall level. Thirdly, the average value of Innovation in mechanism variables is 0.154, and the median value is 0.171, showing a left-leaning distribution, and some enterprises have zero innovation ability, reflecting that innovation activities are unevenly distributed among different enterprises, and a few enterprises may lack innovation motivation.

Table 3. Descriptive Statistic

variable	Sample size	average value	median	standard deviation	minimum value	maximum
Com	23037	0.037	0.038	0.069	-0.375	0.254
Integration	23037	0.543	0.520	0.177	0.126	0.897
Cash	23037	-2.180	-2.116	0.829	-7.644	-0.008
Innovation	23037	0.154	0.171	0.093	0．000	0.417
σ_1	23037	0.086	0.043	0.137	0．000	3.513
Leverage	23037	0.419	0.411	0.199	0.046	0.925
ATO	23037	0.644	0.550	0.425	0．000	2.891
TOP1	23037	0.334	0.310	0.146	0.081	0.757

Balance1	23037	0.373	0.296	0.286	0.007	1．000
INV	23037	0.125	0.106	0.103	0.000	0.778
INST	23037	0.424	0.437	0.247	0.000	0.911

(2) Regression analysis

Table 4 shows the results of regression analysis. Columns (1) and (2) are the regression results with only explanatory variables and control variables, respectively, and columns (3) and (4) show the regression results with explanatory variables and control variables under the control of industry and year effects. As shown in Table 4, the coefficients of the real number fusion of core explanatory variables are both positive in the two regression models, and both are significant at the level of 1%, and the coefficient size is improved under the control of industry and year effects. This shows that the promotion of the integration of numbers and facts can significantly improve the competitiveness of enterprises. The higher the integration of numbers and facts, the higher the return on total assets of enterprises, that is, the stronger the competitiveness of enterprises in the market. The results prove the research hypothesis H1 of this paper.

Table 4. Regression Analysis

	(1)	(2)	(3)	(4)
	Com	Com	Com	Com
Integration	0.020***	0.008***	0.026***	0.009***
	(7.67)	(3.48)	(9.42)	(3.66)
Leverage		-0.144***		-0.147***
		(-66.96)		(-64.97)
ATO		0.037***		0.040***
		(36.87)		(38.03)
TOP1		0.052***		0.049***
		(12.50)		(11.75)
Balance1		0.010***		0.010***
		(5.62)		(5.46)
INV		0.001		0.005
		(0.26)		(1.23)
INST		0.031***		0.032***
		(15.47)		(15.77)
Constant	0.026***	0.035***	0.007	0.017***
	(17.84)	(14.72)	(1.60)	(3.92)
N	23,037	23,037	23,037	23,037

r2	0.003	0.212	0.030	0.232
Industry	No	No	Yes	Yes
Year	No	No	Yes	Yes

Note. *, * * and * * indicate significant at the level of 10%, 5% and 1% respectively, and the standard error in brackets is robust. The same below.

(3) Robustness test

1. Replace the explained variable measurement index.

In this paper, the return on equity (ROE) is used to re-measure the competitiveness of enterprises, and the capital utilization efficiency and short-term profitability of enterprises are measured by the ratio of net profit to owner's equity. A high ROE usually reflects excellent operational management ability and market bargaining power (Liu Hanmin et al., 2018).[33]. Column (1) in Table 5 is the result of measuring the competitiveness of enterprises with ROE, and the coefficient of number-real integration is significantly positive at the level of 1%, which further shows that number-real integration promotes the growth of enterprise competitiveness.

2. Tailing treatment.

In order to avoid the influence of outliers on the regression results, the data are truncated by 1% in this paper. Column (2) in Table 5 shows that after the continuous variables are truncated, the improvement of enterprise competitiveness by data-real integration is still significantly positive at the level of 1%. The research hypothesis H1 is also proved in a deeper level.

3. Quantile regression

In order to further explore the robustness of quantile regression model, this paper makes multiple quantile regression at the same time, specifically calculates 0.25, 0.50 and 0.75 quantile regression at the same time, and the self-help method is repeated for 1000 times. The coefficients of the Integration of the core explanatory variables in columns (3), (4) and (5) are all significantly positive at the level of 1%. It also proves the core point of this paper.

4. Eliminate some areas

The degree of integration of numbers and facts in China's provinces is unbalanced. According to relevant statistics, the degree of integration of numbers and facts in Beijing, Shanghai, Jiangsu and Zhejiang provinces is relatively high. Therefore, after excluding these four areas, this paper makes regression analysis again, and the result is shown in column (6). At this time, the regression coefficient of the degree of integration of numbers and real numbers is significantly positive, which once again verifies the hypothesis H1 of this study.

To sum up, the results in Table 5 show that the integration of numbers and facts under different robustness tests still significantly promotes the growth of enterprise competitiveness, which proves the robustness of benchmark regression results.

Table 5. Robustness Test

	(1)	(2)	(3)	(4)	(5)	(6)
	Replace the explained variable	Tail shrinking treatment	Quantile 0.25	Quantile 0.5	Quantile 0.75	Eliminate some areas
Integration	0.015***	0.008***	0.014***	0.016***	0.015***	0.006***
	(0.005)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Leverage	-0.216***	-0.141***	-0.084***	-0.099***	-0.132***	-0.141***
	(0.005)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
ATO	0.077***	0.037***	0.022***	0.024***	0.035***	0.039***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
TOP1	0.089***	0.050***	0.039***	0.034***	0.031***	0.046***
	(0.009)	(0.004)	(0.003)	(0.003)	(0.004)	(0.005)
Balance1	0.017***	0.010***	0.011***	0.010***	0.011***	0.007***
	(0.004)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
INV	0.029***	-0.002	-0.005	-0.010***	-0.017***	-0.012**
	(0.009)	(0.004)	(0.004)	(0.003)	(0.003)	(0.005)
INST	0.075***	0.030***	0.018***	0.018***	0.020***	0.033***
	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Constant	0.016***	0.035***	0.007***	0.036***	0.071***	0.037***
	(0.005)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
N	23037	23037	23037	23037	23037	13963
r2	0.146	0.224				0.232
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes

(4) Endogenous test

There may be the following endogenous problems in this research model: first, reverse causality, the improvement of enterprise competitiveness may in turn promote the improvement of the level of digital and real integration; Second, the problem of missing variables, although the main variables are controlled, there may still be unobservable factors that affect both the integration of numbers and facts and the competitiveness of enterprises; Third, there are measurement errors, and the measurement of core variables may be biased. To this end, this paper uses the following methods to test:

1. Lagging variable method

In order to solve the possible two-way causal relationship between the integration of numbers and facts and the competitiveness of enterprises, this paper uses the lag variable method to build a dynamic panel

model. The main research idea is to lag the core explanatory variable Integration by one period and use the time sequence to alleviate the reverse causality. As shown in column (1) in Table 6, after controlling the individual fixed effect and time effect, the lag variable method test found that the coefficient of L.Integration was significantly positive at the level of 1% and the coefficient size was consistent with the results of regression analysis, indicating that the integration of number and reality had a certain lag effect on the growth of enterprise competitiveness.

2. Tool variable method

In this paper, the tool variable method is used to reduce the endogenous problems of the model, and Zhang Xun et al. (2019) are used for reference. The DISTANCE from the prefecture-level city where the enterprise is located to Hangzhou is selected as a tool variable. The results of stage I and stage II are shown in column (2) and (3). According to the results of LM test and F test, the tool variables selected in this paper have passed the test requirements of the tool variable method and there is no problem of weak tool variables, which shows that the tool variables are significantly related to endogenous variables. The core explanatory variable Integration in column (3) is significantly positive at the level of 1%, which further verifies the hypothesis H1 of this paper.

3.Heckman two-step method

In order to solve the problem of sample selectivity bias, this paper adopts Heckman two-step method to deal with endogenous problems. In the first stage, a dummy variable is constructed based on the average value of enterprise competitiveness and divided into high and low groups. With this dummy variable as the explained variable and the DISTANCE between the control variable and the prefecture-level city where the enterprise is located as the explained variable, the inverse Mills ratio IMR is calculated by regression. In the second stage, the IMR and control variables are added for regression analysis. As shown in column (4) and (5), the coefficient of the core explanatory variable Integration is still significantly positive, which once again supports the core conclusion of this paper.

Table 6. Endogenous Test

	(1)	(2)	(3)	(4)	(5)
	Lag one period	Tool Variable Method (Distance to Hangzhou)		Heckman two-step method	
L.Integration	0.009***				
	(0.003)				
Integration			0.039***	0.527***	0.045*
			(0.008)	(0.054)	(0.025)
DISTANCE		-0.000***		-0.000***	
		(0.000)		(0.000)	
IMR					-0.380***

					(0.044)
Leverage	-0.141***	-0.024***	-0.139***	-2.891***	-0.266***
	(0.002)	(0.006)	(0.002)	(0.051)	(0.084)
ATO	0.038***	0.024***	0.036***	0.741***	0.074***
	(0.001)	(0.003)	(0.001)	(0.023)	(0.021)
TOP1	0.046***	0.130***	0.046***	1.029***	0.101**
	(0.005)	(0.011)	(0.004)	(0.091)	(0.041)
Balance1	0.008***	0.077***	0.008***	0.380***	0.033*
	(0.002)	(0.005)	(0.002)	(0.040)	(0.017)
INV	0.001	-0.064***	-0.001	-0.656***	-0.060*
	(0.005)	(0.011)	(0.004)	(0.096)	(0.036)
INST	0.034***	-0.124***	0.034***	0.405***	0.037**
	(0.002)	(0.006)	(0.002)	(0.044)	(0.018)
Constant	0.033***	0.589***	0.019***	-0.074	0.811***
	(0.003)	(0.005)	(0.005)	(0.055)	(0.044)
N	18226	23037	23037	23037	23037
r2	0.215	0.123	0.217		0.198
Industry	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes

(E) Heterogeneity analysis

In order to deeply explore the internal relationship between the integration of number and reality and the growth of enterprise competitiveness, this paper will analyze the heterogeneity from macro and micro levels.

1. Macro-level: heterogeneity of regional digitalization level.

Digital infrastructure has the characteristics of regional imbalance, and the "digital divide" may amplify the difference of enterprise transformation effect. The 5G coverage rate in the eastern region is significantly higher than that in the western and central regions, which directly affects the implementation conditions of digital and real integration. Therefore, referring to the division of the "three zones" of the East, West and China by the National Bureau of Statistics, this paper makes regression analysis on the eastern, central and western regions respectively, and the results are shown in column (1), (2) and (3), in which the core explanatory variables in the eastern and central regions are significantly positive at the level of 5%, while in the western region they are significantly positive at the level of 1%, and the coefficient in the eastern region is 0.007, which is much smaller than that in the eastern region. The possible reason for the regional heterogeneity is that the eastern region has a high degree of integration of numbers and facts, so it is difficult to improve and promote it obviously, while

the central and western regions have a low degree of integration of numbers and facts, which has obvious promotion and promotion.

2. Micro-level: analysis of ownership heterogeneity

There are systematic differences in resource endowment and policy constraints between state-owned enterprises and private enterprises. State-owned enterprises usually enjoy more government support and financing facilities, but the decision-making process is longer; Private enterprises, on the other hand, are more sensitive to the market and more flexible in transformation. This difference may lead to the differentiation of the effect of number-real fusion. Therefore, this paper divides the types of enterprises into private enterprises and state-owned enterprises, and further discusses and analyzes the promotion effect of digital and real integration on the competitiveness of enterprises, and makes regression analysis on state-owned enterprises and private enterprises respectively. As shown in column (4) and (5), the degree of digital and real integration of both enterprises is significantly positive at the level of 1%, but the promotion effect of digital and real integration on the competitiveness of private enterprises is significantly stronger than that of state-owned enterprises. The reasons for this difference may be as follows: private enterprises have short decision-making chain and high market sensitivity, which can quickly turn digital technology into cash flow advantage and obviously promote the competitiveness of enterprises; However, state-owned enterprises are constrained by the system, and the efficiency of technological innovation transformation is low, and the promotion effect is relatively weak.

Table 7. Heterogeneity Analysis

	(1)	(2)	(3)	(4)	(5)
	east	midland	western part of the country	state-owned enterprise	private enterprise
Integration	0.007**	0.032**	0.073***	0.020***	0.083***
	(0.003)	(0.013)	(0.011)	(0.003)	(0.022)
Leverage	-0.143***	-0.147***	-0.124***	-0.113***	-0.933***
	(0.002)	(0.005)	(0.005)	(0.003)	(0.021)
ATO	0.037***	0.034***	0.046***	0.021***	0.300***
	(0.001)	(0.002)	(0.003)	(0.001)	(0.010)
TOP1	0.049***	0.043***	0.063***	-0.091***	0.417***
	(0.005)	(0.010)	(0.011)	(0.008)	(0.038)
Balance1	0.012***	-0.004	0.016***	-0.039***	0.120***
	(0.002)	(0.004)	(0.005)	(0.003)	(0.017)
INV	0.010**	-0.028***	-0.043***	-0.001	-0.202***
	(0.005)	(0.010)	(0.012)	(0.005)	(0.041)

INST	0.028***	0.041***	0.032***	0.131***	0.134***
	(0.002)	(0.005)	(0.006)	(0.005)	(0.017)
Constant	0.036***	0.038***	-0.001	0.033***	0.476***
	(0.003)	(0.007)	(0.007)	(0.003)	(0.022)
N	16720	3650	2667	7741	14792
r2	0.213	0.256	0.259	0.271	0.180
Industry	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes

6. Mechanism Effect

In this paper, the mechanism effect model is used to identify and test the cash level, technological innovation ability and information disclosure quality of enterprises, and the specific results are shown in Table 8.

Columns (1) and (2) in the table discuss the action path of the intermediate variable cash level. In the first column (1), the integration of numbers and facts is significantly positive to the cash level of enterprises at the level of 5%, which shows that the integration of numbers and facts can promote the improvement of the cash level of enterprises. In the second column, the degree of integration of numbers and facts and the cash level of enterprises are significantly positive, which shows that the cash level of enterprises has a partial intermediary role, and the integration of numbers and facts can promote the growth of enterprise competitiveness by improving the cash level. The research assumes that H2 is established.

Columns (3) and (4) in the table discuss the action path of technological innovation of intermediate variables. In column (3), the integration of numbers and facts is significantly positive to the technological innovation ability of enterprises at the level of 1%, indicating that the integration of numbers and facts significantly improves the technological innovation ability of enterprises. In column (4), the degree of integration of numbers and facts is significantly positive at the level of 5%, and the technological innovation ability of enterprises is significantly positive at the level of 1%, indicating that the technological innovation ability of enterprises has a partial intermediary role. Therefore, the integration of number and reality can promote the growth of enterprise competitiveness by enhancing the technological innovation ability, and the research hypothesis H3 is established.

Columns (5) and (6) in the table discuss the action path of information disclosure of intermediate variables. In the fifth column, the coefficient of digital-real fusion is still significantly positive at the level of 1%, indicating that digital-real fusion can significantly reduce the KV index and optimize the quality of information disclosure. In column (6), the coefficients of information disclosure quality and data integration are highly significant, indicating that the optimization of information disclosure quality significantly enhances the competitiveness of enterprises. Therefore, the integration of data and reality

indirectly promotes the growth of enterprise competitiveness by optimizing the quality of information disclosure, and the research hypothesis H4 is established.

Table 8. Mechanism Effect Test

	(1)	(2)	(3)	(4)	(5)	(6)
	Cash level		technical innovation		information disclosure	
Cash		0.011***				
		(18.96)				
Innovation				0.058***		
				(9.60)		
σ_1						0.023***
						(7.21)
Integration	0.130**	0.009**	0.035***	0.008**	0.044***	0.009**
	(2.33)	(2.26)	(5.67)	(1.97)	(3.05)	(2.30)
Leverage	-1.663***	-0.152***	0.025***	-0.173***	-0.018***	-0.169***
	(-49.94)	(-51.02)	(7.71)	(-60.91)	(-2.82)	(-58.88)
ATO	0.204***	0.053***	0.004**	0.055***	-0.004	0.056***
	(12.58)	(38.70)	(2.44)	(40.10)	(-1.31)	(40.53)
TOP1	0.187***	0.045***	0.018***	0.047***	0.136***	0.043***
	(2.71)	(8.06)	(2.69)	(8.31)	(10.14)	(7.53)
Balance1	0.021	0.006**	0.008***	0.006**	0.045***	0.004*
	(0.74)	(2.39)	(2.83)	(2.40)	(8.59)	(1.78)
INV	-0.813***	0.022***	-0.001	0.013**	-0.040***	0.014**
	(-12.55)	(3.95)	(-0.16)	(2.42)	(-3.43)	(2.54)
INST	0.408***	0.030***	0.029***	0.032***	0.074***	0.035***
	(11.93)	(11.08)	(8.56)	(11.74)	(10.37)	(12.58)
Constant	-1.755***	0.043***	0.025***	0.023***	0.680***	0.023***
	(-20.28)	(6.48)	(2.71)	(3.49)	(18.39)	(3.42)
N	23,037	23,037	23,037	23,037	23,037	23,037
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes

7. Conclusions and Suggestions

(1) Conclusion

At present, China's economy is in a critical transition stage towards high-quality development, and the integration of data and reality has been deeply integrated into all aspects of economic development,

becoming the core force to promote sustained and steady economic growth and help the industrial structure to optimize and upgrade, laying a solid foundation for the improvement of enterprise competitiveness. Based on the data of A-share listed companies in China from 2013 to 2022, this paper explores the mechanism of the integration of numbers and facts on the growth of enterprise competitiveness. Through theoretical argumentation and empirical test, the following conclusions are drawn: (1) The integration of numbers and facts significantly promotes the growth of enterprise competitiveness. This conclusion is still valid after robustness test and endogenous test. (2) The integration of numbers and facts has a positive regulatory effect on the growth of enterprise competitiveness by influencing the cash level, technological innovation ability and information disclosure quality of enterprises. (3) Heterogeneity analysis shows that, at the macro level, the integration of data and reality in the central and western regions has a greater role in promoting the growth of enterprise competitiveness; At the micro level, the integration of numbers and facts of private enterprises plays a greater role in promoting the growth of enterprise competitiveness.

(2) Suggestions

Based on the research conclusion, this paper puts forward the following suggestions to promote the deep integration of numbers and facts and enhance the competitiveness of enterprises:

First, strengthen policy guidance and top-level design, and improve the system of digital and real integration. As the core subject of macroeconomic regulation and control and market order maintenance, government departments must work intensively in all aspects of policy formulation, implementation and supervision to create a good external environment for the integration of enterprises' data and reality. On the one hand, the government should coordinate the development of integration of data and reality from the national strategic level, and clarify the boundaries of powers and responsibilities of governments at all levels, industry authorities and enterprises. The central government is responsible for top-level design, formulating unified standards and policy support; Local governments implement specific measures to optimize digital infrastructure; Industry authorities promote cross-industry collaboration and data sharing; Enterprises accelerate digital transformation and improve data governance capabilities. At the same time, establish a dynamic evaluation mechanism to ensure the effectiveness of policies and promote the high-quality development of digital and real integration. On the other hand, in view of the uneven development of regional digital integration, it is necessary to optimize the allocation of resources, increase the financial tilt to the central and western regions, and then narrow the digital divide. At the same time, improve the market rules of data elements, promote data security legislation and transaction standardization, solve the problem of data islands, and stimulate the multiplication effect of data elements.

Second, build a multi-level talent training system to alleviate the shortage of digital talents. At present, one of the core bottlenecks in the integration of digital and real data in China is the structural shortage of digital technology talents, which lacks both high-end R&D talents and industrial workers with digital skills. In order to solve this problem systematically, it is necessary to build a multi-level talent

training system with the cooperation of "politics and Industry-University-Research". At the level of higher education, the Ministry of Education should promote colleges and universities to optimize specialty settings and strengthen the construction of digital economy, intelligent manufacturing, industrial Internet and other related majors. Increase the proportion of practical teaching in the curriculum system, and build an internship and training base with enterprises, so that students can master the professional skills of integrating number and practice in practice. At the same time, we should expand the enrollment scale of master of engineering and doctor of engineering in the digital field, and set up special scholarships to attract outstanding students; At the level of vocational education, it is suggested to implement an efficient cultivation plan, and enterprises should be encouraged to establish a digital lifelong learning system for on-the-job personnel; In the introduction of high-end talents, the government can provide scientific research funds, housing subsidies and other support to the imported top international digital technology experts. Enterprises can attract external digital and real integration professionals through generous salary, good career development space and comfortable working environment.

Third, build a panoramic strategy of enterprise digital transformation to fully stimulate the efficiency of digital and real integration. As the core subject of the integration of data and reality, enterprises need to build an all-round transformation system covering strategic planning, organizational change, technology application, data operation and ecological coordination. At the strategic level, we should formulate a road map for phased implementation in 3-5 years, clarify the priority transformation links and ensure special investment; In the organizational structure, we should promote agile reform and establish cross-departmental project teams, and at the same time bring digital indicators into the organizational assessment system; In terms of technology application, large enterprises should focus on independent research and development of core technologies such as industrial internet and digital twins, and small and medium-sized enterprises can tackle key technologies through Industry-University-Research cooperation; Data operation needs to build an enterprise-level data center, realize the data penetration of the whole chain, establish governance norms and explore the path of capitalization; Ecological synergy requires leading enterprises to open up and empower the industrial chain, and small and medium-sized enterprises to actively integrate into the industry platform and participate in the digital projects of industrial clusters. In addition, it is necessary to establish a fault-tolerant trial-and-error mechanism, support technical verification through innovation funds, and adopt the implementation strategy of pilot first and then promotion.

Fourth, strengthen technological innovation and application to promote the deep integration of digital economy and real economy. First of all, enterprises should increase R&D investment in key digital technologies, and set up special R&D funds in core digital technologies such as artificial intelligence, big data, cloud computing and Internet of Things. Secondly, establish a mechanism for transforming technological achievements within enterprises to shorten the period from research and development to practical application. For the new technology developed, it will be quickly applied in production,

management, marketing and other links, and optimized in time according to feedback. At the same time, encourage enterprises to participate in the formulation of technical standards in the industry, promote the wide application of new technologies in the industry, and enhance the technical discourse power of enterprises in the industry; Finally, according to the core business process of the enterprise, the application scheme of digital technology is customized. In the production process, the interconnection of equipment is realized by using the Internet of Things technology, and preventive maintenance is carried out by monitoring the equipment operation data in real time to reduce the equipment failure rate. In the marketing process, we use big data to analyze consumer behavior and preferences, accurately push product information, improve marketing effect, deeply integrate digital technology with traditional marketing, improve the overall integration level of quantity and reality, and promote high-quality economic development.

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