Research on the Impact of Digital Transformation on Manufacturing Enterprise Innovation

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Abstract. Small and medium-sized enterprises in the manufacturing industry are the foundation of the real economy and the key to high-quality economic development in the future. In the current era of booming digital economy, in order to fully stimulate the innovation potential of small and medium-sized enterprises, enhance the overall competitive advantage of the manufacturing industry and the high-quality development of the manufacturing industry, digital transformation is the key. This paper takes the manufacturing smes listed on the SME board from 2012 to 2022 as samples, constructs a fixed-effect model to verify the impact of digital transformation on the innovation of manufacturing smes, and uses the intermediary effect model to study the role of financing constraints of enterprises. The empirical results show that digital transformation has a significant positive effect on manufacturing innovation, and by reducing the financing constraints of smes in manufacturing, digital transformation can help stimulate their innovation potential. The research results provide valuable reference for promoting the long-term sustainable development of smes and promoting the digital transformation of enterprises.

Keywords: Digital transformation, Small and medium-sized manufacturing enterprises, Financing constraints, Enterprise innovation.

1 Introduction

As China's smes continue to develop, they play a key supporting role in economic growth and employment promotion, and have become an indispensable and important part of China's social and economic development. However, in the global scope, the development of small and medium-sized enterprises generally face the double bottleneck of financing difficulties and high financing costs, and seriously restrict their growth potential and market expansion. Digital transformation is conducive to broadening the financing ideas and financing channels of enterprises, so as to help smes solve financing problems. Manufacturing industry is a high investment, capital intensive industry, but also the upstream industry of the supply chain, has a high demand for capital. In view of its financing status has a vital impact on the healthy development of the whole industrial chain, this paper takes the financing of the manufacturing industry as the focus of in-depth research. This paper obtains the data of manufacturing smes listed

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on China's small and medium-sized board, and uses the intermediary effect model to verify that financing constraints exist in manufacturing smes, and financing constraints can be effectively alleviated through digital transformation to a certain extent. Therefore, this paper puts forward relevant feasible suggestions for manufacturing smes, financial institutions and government decision-making departments, which will help promote the sustainable development of manufacturing smes.

2 Literature Review

2.1 Influencing Factors of Enterprise Innovation

In the process of pursuing economic benefits, innovation activities, as its core driving force, are closely connected with the pulse of market demand. This dynamic process is not only profoundly affected by the digital transformation of the "supply side", but also accompanied by the significant effect of the scale expansion of the "demand side", which together produce a complex and far-reaching compound effect on enterprise innovation activities [1]. On the "supply side", the influencing factors of enterprise innovation can be further divided into external environmental factors and internal factors.

External environmental factors mainly include government subsidies, intellectual property protection degree, digital technology, open environment, demand scale expansion and so on. He Zhengchu (2023) et al believe that it is necessary to further increase industrial policy support and improve the intellectual property protection mechanism. Through the application of digital technology to alleviate the level of information asymmetry, improve the scientific and intelligent level of R&D decision-making, and finally achieve the improvement of innovation efficiency. It further uses the SFA model to conduct empirical research, and the results show that digital economy, government support, industry competition, education environment and open environment are important external environmental factors that affect the innovation efficiency of enterprises [2]. Zeng Jingyan et al. (2023) showed that the expansion of demand scale can dilute innovation costs, reduce innovation risks and improve innovation returns, encourage enterprises to increase innovation input, and form scale effects [3].

Internal factors include R&D investment, enterprise scale, equity structure, executive incentive mechanism and so on. Li Xuesong et al. (2022) proposed that under the internal-oriented model, enterprises acquire knowledge from the outside to achieve internal innovation, and effectively promote the performance of new products by making up for innovation resources, improving R&D process and reducing R&D costs [4]. Miao Xiaonan (2024) adopted Benchmark regression, robustness test, endogeneity analysis and mechanism of action to verify that digital transformation can significantly improve the innovation ability of enterprises, and has an effect on corporate innovation by increasing R&D investment and improving human capital [5].

2.2 Research on the Impact of Digital Transformation on the Innovation of Small and Medium-Sized Manufacturing Enterprises

At present, the academic community has conducted in-depth and diversified discussions on the essence and core issues of digital transformation. Scholars mainly define enterprise digital transformation from two perspectives: organizational change [1][5][6] and digital technology support [7][8][9]. Based on existing views, this paper defines digital transformation as traditional enterprises and organizations actively learning and deeply applying cutting-edge digital technologies such as artificial intelligence, blockchain, cloud computing and big data in the context of the rapid development of the digital economy, so as to comprehensively innovate their organizational form, optimize their operating model, and reshape the entire process of product production and sales. Digital transformation aims to achieve a significant increase in efficiency and a significant reduction in cost through technology empowerment, thus enhancing the core competitiveness of enterprises, expanding market share, ensuring that they maintain a leading position in the fierce market competition, so as to provide customers with better products and services. At present, the impact of digital transformation on micro enterprises is mainly reflected in four aspects: production efficiency, management efficiency, enterprise performance and enterprise innovation. In enterprise production, the deep application of digital technology is changing the enterprise innovation process and industrial innovation ecology, reducing product research and development and manufacturing costs. Xiao Xiang et al. (2023) found that digital transformation will stimulate innovation vitality and promote R&D investment of enterprises. On the one hand, driven by digital technology, the boundaries between research and development and production, manufacturers and consumers are increasingly blurred, and the innovation process is gradually integrated. On the other hand, data, as a new production factor, participates in the innovation process, promotes the integration of existing innovation factors and improves its utilization efficiency [10]. In terms of enterprise management, digital transformation is conducive to improving the efficiency of enterprise operation management and strengthening risk management. Kang Yanyan et al. (2024) pointed out that digitalization and related technologies can empower operation management and improve the efficiency of several aspects of enterprise operation management [6]. In terms of enterprise performance, most scholars believe that digital transformation can improve enterprise performance. Chi Maomao et al. (2020) found that the digital transformation of smes will help improve their new product development performance [11]. In terms of enterprise innovation, scholars have found the positive effect of digital transformation on enterprise innovation through research. Xiao Xiang et al. (2023) propose that digital transformation will make knowledge sharing and cooperation more efficient and promote joint innovation among enterprises. Driven by digital technology, enterprises will shift from the traditional "closed innovation" to "open innovation" mode. [10]. Liu Chang et al. (2023) pointed out that digital transformation can help enterprises enhance their independent innovation capabilities and promote collaborative innovation and open innovation [12].

Existing research has widely recognized the positive role of digital transformation in promoting innovation and performance of smes. Based on the data of listed manufacturing companies in China from 2008 to 2020, Li Xuesong et al. (2022) conducted a study using the Heckman two-stage model. The results show that the digital transformation of enterprises promotes their integration into the global innovation network, and the innovation performance of enterprises is therefore significantly improved [4]. Miao Xiaonan et al. (2024) believe that digital transformation can help enterprises realize innovation in design, production and sales, and form a new business model and profit model [5]. Scholars have empirically studied the impact of digital transformation on enterprise innovation according to different indicators and methods. Du Chuanzhong et al. (2022) used micro enterprise data to build an econometric model, and the empirical analysis showed that the application of digital technology significantly improved the innovation efficiency of Chinese manufacturing enterprises [13].

Based on the above analysis, hypothesis 1 is put forward: the innovation of smes in manufacturing industry is positively affected by digital transformation.

2.3 The Impact of Financing Constraints on Smes' Innovation

Smes are an important part of our modern national economy, but they face a series of financing constraints. CAI Jing et al. (2016) proposed that for many small and medium-sized enterprises, it is difficult to bear the financing gap of R&D activities solely by relying on their limited internal funds, and external financing has become an important channel source of R&D funds for enterprises to ensure the continuous progress of R&D projects [14]. Therefore, unstable financing conditions and financing pressure force enterprises to prioritize survival rather than long-term development, and thus compress the resources used to promote innovation and technological innovation [15]. Therefore, in order to give full play to the important role of smes, it is urgent to analyze and solve the financing problem. The internal factors that affect the financing constraints of smes include enterprise investment risk [15], enterprise scale [16], operation performance [16], etc. External environmental factors include information asymmetry [3], incomplete financial market [3], and digital inclusive finance [17].

In the early stage, scholars paid attention to the development of small and medium-sized banks in the financial system and the path to ease the financing constraints of smes by the loan mechanism [14][18]. In recent years, with the development of digital technology and industry, scholars have begun to pay attention to government innovation subsidies, financial technology, ESG performance, and the path to ease the financing constraints of smes imposed by digital transformation. He Yanlin et al. (2022) believe that the financing constraints faced by enterprises' innovation activities can be alleviated through government innovation subsidies. [19]. Kang Yanyan et al. (2024) showed that ESG performance created favorable development conditions for easing financing constraints [6]. Among them, the research on digital transformation occupies the majority, specifically through improving information transparency, developing digital technology, reducing investors' information cost and transaction cost, digital subsidies and other measures to ease the financing constraints of smes. According to the research results of Wang Jingyong et al. (2022), the digital transformation of smes can

alleviate financing constraints by improving corporate information transparency, reducing financing costs, and strengthening innovation capabilities [20]. Kang Yanyan et al. (2024) believe that with the support of big data, blockchain and other technologies, enterprises can more efficiently draw various resources from the external environment through cutting-edge digital technology, so as to broaden the financing channels of enterprises, increase the financing convenience, and ultimately improve the innovation ability [6]. Xu Jinqiu (2024) further confirmed through the intermediary mechanism test that digitalization can alleviate financing constraints and improve investment efficiency mainly by reducing enterprise debt costs, extending debt maturities, optimizing debt structure, and digital subsidy effect [21].

Based on the above comprehensive analysis, we further propose hypothesis two: By easing the financing constraints of smes in manufacturing, digital transformation can help stimulate their innovation potential.

3 Empirical Analysis

3.1 Model Construction

3.1.1 Benchmark Model Setting

This paper establishes a benchmark model (1) to analyze the impact of digital transformation on the innovation of smes in manufacturing. Through the robustness test, the fixed effect model is selected. The model is as follows:

$$\text{PATENT1}_{i,t} = \alpha 0 + \alpha 1\text{Index}_{i,t} + \alpha 2\text{Size}_{i,t} + \alpha 3\text{Lev}_{i,t} + \alpha 4\text{Growth}_{i,t} + \alpha 5\text{ROA}_{i,t} + \alpha 6\text{PPE}_{i,t} + \alpha 7\text{Cashflow}_{i,t} + u_i + \varepsilon_{i,t} \quad (1)$$

Where, the subscript i is the company and t is the year. $\text{PATENT1}_{i,t}$ indicates enterprise innovation ability; $\text{Index}_{i,t}$ represents the development level of digital transformation. Other variables are the control variables of this paper, all of which represent the individual attributes of the company; u_i represents the individual effect of the firm; $\varepsilon_{i,t}$ are random error terms. In addition, the coefficient of $\text{Index}_{i,t}$ $\alpha 1$ reflects the impact of the degree of digital transformation on the innovation of smes in manufacturing. If it is positive, hypothesis 1 is valid.

3.1.2 Mediation Effect Model Setting

In this paper, the stepwise method is adopted to construct a mediation effect model, which is used to verify hypothesis 2. The model is as follows:

$$SA_{i,t} = \beta 0 + \beta 1\text{Index}_{i,t} + \beta 2\text{Size}_{i,t} + \beta 3\text{Lev}_{i,t} + \beta 4\text{Growth}_{i,t} + \beta 5\text{ROA}_{i,t} + \beta 6PPE_{i,t} + \beta 7\text{Cashflow}_{i,t} + u_i + \delta_{i,t} \quad (2)$$

$$\text{PATENT1}_{i,t} = \gamma 0 + \gamma 1\text{Index}_{i,t} + \gamma 2SA_{i,t} + \gamma 3\text{Size}_{i,t} + \gamma 4\text{Lev}_{i,t} + \gamma 6\text{Growth}_{i,t} + \gamma 7\text{ROA}_{i,t} + \gamma 8PPE_{i,t} + \gamma 9\text{Cashflow}_{i,t} + u_i + \eta_{i,t} \quad (3)$$

By the principle of mediation effect model, the total effect $\alpha 1$, $\gamma 1$ direct effect and indirect effect $\beta 1\gamma 2$:$\alpha 1$=$\gamma 1$+$\beta 1\gamma 2$. If $\gamma 2$ is negative, it indicates that the easing of financing constraints can promote the innovation of manufacturing smes.

3.1.3 Variable Selection

The explained variable is firm innovation ability. Research shows that the innovation ability of an enterprise can be well reflected by the number of patents [6], which is an effective indicator to measure technological innovation. Therefore, the number of patents of the company is selected as an indicator to measure the innovation ability of the enterprise, and it is expressed by PATENT1.

The core explanatory variable is the degree of digital transformation. This paper obtains the digital transformation Index of smes in manufacturing from CASMAR to measure the degree of digital transformation of each enterprise, which is represented by index.

Six control variables are selected in this paper:

(1) Enterprise scale. This indicator is calculated using the natural logarithm of the total assets of the enterprise, expressed by Size.

(2) asset-liability ratio. This index is calculated by the ratio of the company's liabilities at the end of the year to the total assets at the end of the year, reflecting the company's ability to obtain funds, expressed in Lev.

(3)Growth indicators. In this paper, the index selected by Tang Song et al. (2020) - net profit Growth rate is used to measure the growth of enterprises [22], which is represented by growth.

(4) Return on total assets. This index can reflect the enterprise's asset utilization efficiency and is represented by ROA.

(5)Proportion of fixed assets. This index is calculated by the ratio of the total fixed assets to the total assets at the end of the year, reflecting the production and technical conditions of the enterprise, and is the basis for the company's profit. At the same time, considering that manufacturing enterprises tend to have more mortgaged assets, this indicator can also be used as an important basis for evaluating the degree of difficulty in obtaining external funds, expressed in PPE.

(6) Corporate cash flow. This indicator reflects the health of a business's money flow and its ability to create value over the long term, and is represented by Cashflow.

The intermediary variable is financing constraint. At present, the representative financing constraint measurement methods in the academic circle include KZ index [23], WW index [24] and SA index [25]. In this paper, SA index is used to measure the financing constraints of enterprises, and the intermediary effect model is constructed with this index. The formula for calculating SA is -0.737*Size + 0.043*Size 2-0.04 *Age.

The specific meanings of each variable are as shown in Table 1.

Table 1. Variable definitions

Variable type	Variable	Variable interpretation
Explained variable	PATENT1	ln (Total patents +1)
Core explanatory variable	Index	Enterprise Digital Transformation Index
Control variable	ROA	Rate of return on total assets
	Size	ln (Total Business Assets)
	PPE	Total fixed assets/Total assets at year end

	Cashflow	(Net operating profit after tax + depreciation and amortization) - (Capital expenditure + increase in working capital)
	Growth	(Current period net profit - previous period net profit)/Previous period net profit
	Lev	Year-end liabilities/Total assets at year-end
Intermediate variable	SA	SA=-0.737*Size + 0.043*Size^2 - 0.04*Age

3.2 Data Description and Statistical Analysis

3.2.1 Sample Selection and Data Source

This paper takes manufacturing smes listed on the SME board as a sample, with a time range from 2012 to 2022. Data from iFinD Financial Terminal and CSMAR database.

Then the data is preprocessed: (1) the enterprises with ST and ST* are excluded; (2) Delete data missing indicators. After processing, the data of 3,128 listed companies was obtained, with a total of 21,555 annual observations.

3.2.2 Descriptive Statistical Analysis

The descriptive statistical results are shown in Table 2. The report includes sample size, mean, median, standard deviation, minimum and maximum values. During the sample period, the average annual number of patents for smes in manufacturing is 64, the standard deviation is 217.663, the median is 20, the minimum is 0, and the maximum is 7821. This index reflects the difference of innovation level among small and medium-sized enterprises in China's manufacturing industry.

For the digital transformation index, the average value is 36.295, the standard deviation is 34.125, the standard deviation is 10.049, the minimum value is 21.377, and the maximum value is 80.040, which shows that there is a large difference in the digital development level of China's manufacturing smes, reflecting the imbalance of development among enterprises.

Table 2. Descriptive statistical analysis

Variable	N	Mean	p50	SD	Min	Max
PATENT1	21752.000	2.972	3.045	1.498	0.000	8.965
Index	21752.000	36.295	34.125	10.049	21.377	80.040
Invest	21752.000	2.418	0.651	10.013	0.000	738.390
Size	21752.000	22.063	21.903	1.199	17.806	28.298
Lev	21752.000	0.396	0.384	0.290	0.008	31.467
Growth	21752.000	-1.011	0.035	51.299	-5712.555	1191.630
ROA	21752.000	0.045	0.043	0.118	-2.285	12.211
PPE	21752.000	0.221	0.198	0.132	0.000	0.872
Cashflow	21752.000	0.050	0.048	0.073	-1.686	0.839
FirmAge	21752.000	2.914	2.944	0.329	1.099	4.174
SA	21752.000	-3.830	-3.830	0.252	-5.690	-2.344

Note: Three decimal places are reserved for statistical results.

3.2.3 Correlation Analysis

The statistical results of correlation are shown in Table 3. The explained variable PATENT1 is significantly positively correlated with the core explanatory variable Index. There is a significant negative correlation between the SA index and financing constraint, and the digital transformation index has a significant negative correlation with financing constraint. At the same time, the absolute values of correlation coefficients between variables are mostly within 0.6, and most of them are significant at the confidence level above 1%, indicating that there is no multicollinearity between variables.

Table 3. Results of correlation analysis

	PATENT1	Index	Invest	Size	Lev	Growth	ROA	PPE	Cash-flow	Fir-mAge	SA
PATENT1	1.000										
Index	0.412***	1.000									
Invest	0.329***	0.182***	1.000								
Size	0.510***	0.172***	0.445***	1.000							
Lev	0.162***	0.058***	0.104***	0.292***	1.000						
Growth	-0.004	-0.013*	-0.000	0.000	-0.021***	1.000					
ROA	0.007	-0.059***	0.010	0.017**	-0.279***	0.040***	1.000				
PPE	-0.107***	-0.269***	-0.008	0.109***	0.107***	-0.004	-0.091**	1.000			
Cash-flow	0.031***	-0.069***	0.042***	0.097***	-0.173***	0.032***	0.273***	0.144***	1.000		
Fir-mAge	0.092***	0.043***	0.052***	0.176***	0.101***	-0.015**	-0.038**	0.043***	0.046***	1.000	
SA	-0.042***	-0.029***	-0.158***	-0.098***	-0.066***	0.017**	0.033**	-0.022***	-0.034***	-0.883***	1.000

Note: ***, ** and * are significant at the significance level of 0.1%, 1% and 5% respectively, the same below.

4 Empirical Result Analysis

4.1 Baseline Regression Analysis

Table 4 shows the baseline regression results. As can be seen from column (1), the coefficient of the core explanatory variable is significantly positive, which verifies hypothesis 1, that is, the innovation of smes in manufacturing is positively affected by digital transformation.

Table 4. Results of baseline regression and intermediate effect test

	(1)	(2)	(3)
	PATENT1	SA	PATENT1
Index	0.022***	-0.008***	0.013***
	(0.001)	(0.000)	(0.001)
Size	0.767***	-0.144***	0.604***
	(0.013)	(0.002)	(0.015)
Lev	-0.093***	0.007*	-0.086***
	(0.026)	(0.003)	(0.025)
Growth	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
ROA	-0.293***	0.071***	-0.213***
	(0.054)	(0.007)	(0.054)
PPE	0.203*	0.001	0.203*
	(0.085)	(0.011)	(0.084)
Cashflow	-0.006	-0.113***	-0.133
	(0.094)	(0.012)	(0.093)
SA			-1.126***
			(0.058)
_cons	-14.718***	-0.381***	-15.146***
	(0.264)	(0.033)	(0.262)
N	21555	21555	21555

4.2 Intermediate Effect Test

The intermediate effect test results are shown in Table 4. According to the testing process, the total effect of the core explanatory variables on the explained variables was first tested, and the results were shown in column (1) of Table 4. Model (2) and Model (3) were used to test the mediation effect. The results of model (2) are shown in column (2) of Table 4. The results show that the coefficient of the degree of digital transformation is significantly negative, indicating that the high degree of digital transformation of smes in manufacturing can effectively weaken the financing constraints of enterprises. Subsequently, the regression results of model (3) are shown in column (3) of Table 4. The results show that financing constraints play a partial intermediary role, and digital transformation stimulates the innovation potential of smes in manufacturing by reducing financing constraints. Hypothesis 2, that by easing financing constraints for manufacturing smes, digital transformation can help stimulate their innovation potential, is validated.

4.3 Robustness Test

This paper examines the robustness of the impact of digital transformation on the innovation of smes in manufacturing. The method of changing the explained variable was adopted.

The innovation measurement of an enterprise is divided into innovation input and innovation output. The R&D input of an enterprise can well reflect the importance of the enterprise to innovation, and is also a necessary prerequisite for obtaining patents. Therefore, this article changes PATENT1 to Invest (Enterprise R&D Investment). The results are shown in Table 5. The results show that the regression coefficient of the degree of digital transformation on the R&D investment of enterprises is significantly positive, which is 0.044. The direction is consistent with the regression result based on the number of enterprises' patents, which proves the reliability of the hypothesis and empirical results proposed in this paper.

Table 5. Robustness test results

	(1)
	Invest
Index	0.044***
	(0.010)
Size	2.600***
	(0.101)
Lev	-0.206
	(0.204)
Growth	0.000
	(0.001)
ROA	-0.110
	(0.434)
PPE	0.323
	(0.676)
Cashflow	1.043
	(0.751)
_cons	-56.587***
	(2.106)
N	21555

5 Conclusion and Suggestion

5.1 Research Conclusion

According to the above benchmark regression analysis, the influence of core explanatory variable Index on explained variable PATENT1 is significantly positive, indicating that digital transformation significantly promotes innovation of manufacturing enterprises. According to the intermediary effect test, the influence of core explanatory variable Index on SA is significantly negative, indicating that the high degree of digital transformation of smes in manufacturing can alleviate the financing constraints of enterprises. The influence of SA on the explained variable PATENT1 is significantly negative, indicating that Part of the intermediary role is borne by financing constraints. By reducing financing constraints of smes in manufacturing, digital transformation can

help stimulate their innovation potential. Therefore, the following is the conclusion of this paper:

First, The innovation vitality of manufacturing enterprises has been significantly stimulated by digital transformation, which is achieved through the deep integration of cutting-edge digital technologies such as the Internet of Things, big data and artificial intelligence. The integration of these technologies not only promotes the intelligent transformation of the production process, but also optimizes the management process, enabling enterprises to accurately capture market demand, thus accelerating the iterative updating of products and the upgrading of service quality, and comprehensively promoting the innovative development of manufacturing enterprises.

Second, With the development of digital transformation, financing constraints of manufacturing enterprises play a certain intermediary role in innovation. Digital transformation is supported by policies, and digital technology is used to improve corporate information transparency and reduce investor costs, thus easing the financing constraints of smes and enabling enterprises to invest more funds in innovation activities.

5.2 Policy Suggestion

In order to more effectively inject the power of digital transformation into the real economy, the government should actively play the role of guide and supervisor to promote the smooth realization of digital transformation of small and medium-sized enterprises in the manufacturing industry; At the same time, as the core of the financial system, banks should use digital technology to strengthen the cooperation between banks and enterprises, deepen the innovation projects of enterprises, and provide necessary financial support for their innovation. Enterprises themselves should incorporate digital transformation into their long-term development strategies, increase investment in the digital economy, innovate business models and management models, and promote enterprise innovation.

5.2.1 Government Level

First, build a public service system for digital transformation. Goverment should give full play to the guiding and driving role of digital economy policies, accelerating improvement of the quality and efficiency of "soft foundations" such as digital transformation promotion centers. Special funding will be provided to focus on supporting the digital transformation of smes in manufacturing. Encourage multiple parties to participate in the digital transformation ecosystem to provide sufficient impetus for enterprise innovation.

Second, we need to improve the financing environment. Goverment should establish and improve a credit evaluation system for smes, use digital technologies such as big data and blockchain to improve the accuracy and efficiency of credit evaluation, promote policy-based financing guarantee institutions, and reduce financing thresholds and costs.

5.2.2 Bank Level

As an important financial intermediary, banks should promote the development of digital transformation, improve service efficiency and convenience, and support enterprise innovation.

First, drive the business towards digital development. Promote the online and intelligent development of banking business, develop exclusive financial products and services for the financing needs of real enterprises, especially smes, enhancing their financial service capabilities.

Second, we need to enhance our ability to prevent risks. Strengthen the construction of digital risk management mechanisms, ensure the sound operation of banks, promote cooperation between banks and enterprises, and help enterprises to digital transformation and industrial upgrading.

5.2.3 Enterprise Level

First, continuously improve the awareness of digital transformation, forward-looking increase digital transformation investment, to ensure the sustainability and effectiveness of investment. Enterprises should promote school-enterprise cooperation, cultivate innovative talents, and inject fresh impetus into enterprise innovation.

Second, innovate business models and strengthen data asset management. Enterprises should carry out e-commerce, customized production and other businesses to improve market competitiveness and broaden financing channels. Improve data collection, storage, processing and analysis mechanisms, ensure data quality and security, and provide strong support for decision-making.

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