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The Impact of Intelligence on Digital Transformation of Enterprises

--Taking Listed Companies in China's New Energy Vehicle Industry as an Example

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Abstract

Chinese enterprises have entered a new stage of digital development and are accelerating towards the stage of comprehensive intelligent development. With the deepening of a new round of technological revolution, intelligent technologies such as artificial intelligence, big data, and the Internet of Things continue to penetrate into various aspects of enterprises, becoming a key force in promoting digital transformation. Especially in the manufacturing industry, as a high-tech intensive industry, the intelligent manufacturing system, intelligent networking technology, and digital management platform of new energy vehicles have become representative directions for enterprises to achieve intelligent transformation. This article takes listed companies in the new energy vehicle industry as the research object, selects data from 2013 to 2023, takes enterprise digital transformation as the dependent variable, enterprise intelligence level as the explanatory variable, and other factors that affect enterprise digital transformation as control variables. A panel regression model is established, and benchmark regression, industry heterogeneity test, and robustness test are conducted to analyze the impact mechanism and size of enterprise intelligence on digital transformation. Finally, countermeasures and suggestions for accelerating enterprise digital transformation are proposed.

Keywords

Intelligence, Digital transformation, New energy.

1. Introduction

1.1. Research background

With the rapid development of the global economy, the new energy vehicle industry has become a key area for promoting green economy and sustainable development. The advancement of intelligent technology has also brought unprecedented transformation opportunities for new energy vehicle enterprises. In this context, studying how new energy vehicle companies can achieve digital transformation through intelligence not only has theoretical value, but also has important significance for promoting industrial upgrading and economic development.

In recent years, the Chinese government has attached great importance to the development of the new energy vehicle industry and introduced a series of policies such as financial subsidies, charging infrastructure construction, and tax reductions for car purchases, effectively promoting rapid market growth. However, with the deepening development of the industry and

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increasingly fierce market competition, consumers' demands for product performance and intelligence are constantly increasing. Enterprises urgently need to accelerate technological innovation and business model transformation.

Intelligent technology provides a realistic possibility for the digital transformation of new energy vehicle enterprises. The application of technologies such as artificial intelligence, big data, and cloud computing is helping enterprises optimize product design, improve production efficiency, reduce operating costs, and explore new business models. In this process, enterprises need to build a capability system centered on data, and achieve comprehensive intelligence from production to service through data-driven decision-making.

The "14th Five Year Plan for the Development of Intelligent Manufacturing" released in 2021 proposes to "build an intelligent manufacturing system that integrates virtual and real, is knowledge driven, dynamically optimized, safe, efficient, green, and low-carbon, and promotes the digital transformation, networked collaboration, and intelligent transformation of the manufacturing industry." China's manufacturing industry is undergoing profound changes, and intelligent manufacturing is becoming the main direction for promoting enterprise digital transformation. Intelligent manufacturing emphasizes the deep integration of new generation information technology and advanced manufacturing technology, which runs through the entire process of product design, production, sales, and service, and has functions such as self perception, self-learning, self decision-making, self execution, and self adaptation. Digitization is its foundation, and enterprises need to use digital tools and equipment to build digital production lines, workshops, and factories, promoting the implementation of intelligent manufacturing.

The "China Enterprise Intelligence Maturity Report (2023)" released in March 2024 shows that the digital development of Chinese enterprises has entered a new stage and is accelerating towards the stage of comprehensive intelligence. The integration practice of digitalization and intelligence in enterprises is constantly deepening, and the intelligent transformation has a positive effect on enterprise innovation, which helps optimize the structure of human capital and promote the evolution of independent innovation to collaborative innovation.

The 2024 Government Work Report of the State Council pointed out that "deepening the research and application of big data, artificial intelligence and other technologies, carrying out the 'Artificial Intelligence+' action, and building a digital industry cluster with international competitiveness" once again emphasizes the core position of intelligence in the digital economy.

Although intelligence provides important opportunities for enterprises, they still face challenges in the process of transformation, such as adjusting labor structure, improving production efficiency, and applying technology. Therefore, this study takes new energy vehicle enterprises as the object to explore the impact mechanism and effect of intelligence on digital transformation, which has significant practical significance and theoretical value.

1.2. Research objective

This article attempts to use a panel data fixed effects regression model, based on panel data from BYD, NIO, Ideal, Great Wall, and Xiaopeng new energy vehicle companies in recent years:

(1) Build a measurement system for the degree of enterprise intelligence and digital transformation, and measure specific values.

(2) Determine the panel data model of the impact of enterprise intelligence on digital transformation, measure the effect of enterprise intelligence level on the degree of digital transformation, and the characteristics of changes in different industries and periods.

(3) Reveal the mechanism of enterprise intelligence promoting digital transformation, summarize the mechanism of enterprise intelligence promoting digital transformation,

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combine the conclusions of a sample survey of listed companies and the actual situation of enterprises, and propose targeted policy recommendations.

1.3. Research significance

The possible contributions of this study include:(1) Explore the impact mechanism of intelligence on digital transformation in listed companies, especially in the manufacturing industry.(2) Explore the mechanism of enterprise intelligence driving digital transformation and enrich the theoretical research system of enterprise digital transformation.(3) Provide reference and inspiration for decision-making by listed companies, enterprises, and governments.

1.4. Research ideas

On the basis of reviewing and summarizing representative literature at home and abroad, this article scientifically defines the meaning of intelligence and digital transformation of new energy vehicle enterprises, determines specific keywords that characterize the intelligence and digital transformation of enterprises in the new energy industry, collects Chinese annual reports, and uses textual econometric analysis to measure the specific values of enterprise intelligence level and digital transformation degree. On this basis, taking the degree of digital transformation of enterprises as the dependent variable, the level of enterprise intelligence as the core explanatory variable, and other important factors affecting enterprise digital transformation as control variables, a panel regression model was established using data from BYD, NIO, Ideal, Great Wall, and Xiaopengjia automobile companies in recent years. Benchmark regression, heterogeneity analysis, and robustness testing were conducted to measure the impact of enterprise intelligence level on the degree of digital transformation and the characteristics of changes in different industries and periods. Finally, based on the verification and analysis of the mechanism of promoting digital transformation through enterprise intelligence, combined with the actual development of enterprises, corresponding countermeasures and suggestions for promoting digital transformation through intelligence in new energy vehicle enterprises are proposed.

2. Literature Review

2.1. Research on the level of enterprise intelligence

Intelligent transformation refers to the process in which enterprises integrate intelligent technology into their strategic planning and operations through the use of intelligent technology and digital means (Zhang Shaofeng et al., 2023). With the rapid development of information technology, many scholars have conducted research on the level of enterprise intelligence. By measuring the level of enterprise intelligence, problems such as uneven regional intelligence development can be identified (Zuo Xiaoming et al., 2023). Enterprise intelligence has become mainstream in the new wave of global industrial revolution. If China wants to dominate the new global value chain, it is necessary to promote the digital and intelligent transformation of Chinese enterprises. In order to gain market share, the level of intelligence is a powerful means for new energy vehicle companies to form competition. To enhance user experience, car companies equip themselves with intelligent driving assistance systems, intelligent voice recognition systems, etc. to improve driving safety and convenience; Digital transformation can provide a large amount of data support for new energy vehicle enterprises, helping them with data analysis and decision-making; An intelligent logistics management system can achieve real-time monitoring and scheduling, improving the efficiency of logistics operations.

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2.2. Research on Enterprise Digital Transformation

Enterprise upgrading is the micro foundation of China's industrial restructuring and upgrading, and research on enterprise upgrading is a natural deepening of macro and meso level research on industrial restructuring and upgrading (Li Yongyou and Yan Cen, 2018). General Secretary Xi Jinping proposed the term "new quality productivity" to accelerate the pace of enterprises' digital transformation (Yang Fang et al., 2024). Under the special background of new energy vehicle enterprises, digital transformation is an inevitable trend. The transformation of enterprises often refers to the digital transformation under new technologies, and the external environment has undergone tremendous changes due to the embedding of digital technologies, forcing enterprises to make corresponding adjustments to adapt to the new environment (Su Jingqin and Wu Xianyun, 2024). The economic consequences of enterprise digital transformation have been a hot topic in recent years, and most research has been conducted from the aspects of business model change, management decision-making, information environment, capital market, supply chain management, labor structure, and corporate governance. Digital transformation is the process of using digital technologies such as big data, the Internet of Things, artificial intelligence, blockchain, and cloud computing to reshape the organizational structure, strategic thinking, business processes, and business models of enterprises. It is a strategy that drives value creation and enhances core competitiveness through data (Wu et al., 2021). Through research on digital transformation of enterprises, it can help them seize market opportunities, lay out and plan their development in advance. Although scholars have conducted extensive research in the field of digital transformation, overall, the research is still in its early stages, with limited understanding and immaturity of this phenomenon.

2.3. Research on the Impact of Intelligence on Enterprise Transformation

With the continuous development of the digital economy, more and more enterprises have undergone digital transformation, which has an impact on enterprises (Wu Fei et al., 2021) [6]. Intelligent transformation has a positive impact on enterprise innovation (Gao Xirong and Wang Xingrong, 2020), helps optimize the human capital structure of enterprises (Acemoglu and Restrepo, 2018), and promotes independent innovation to enterprise collaborative innovation (Wang Yi and Liu K, 2021). The level of intelligence has an increasingly profound impact on the transformation of enterprises.

Therefore, the transformation of enterprise intelligence has a positive impact on enterprise development, but the impact of artificial intelligence on enterprise digital transformation still needs to be further verified through empirical research, especially by strengthening the in-depth analysis of empirical experiments on enterprise panel data to explore the specific role and effects of artificial intelligence in enterprise digital transformation.

3. Hypothesis Proposed

3.1. Intelligence has a direct impact on the digital transformation of enterprises

The correlation between intelligence and digital transformation is inseparable. The application of intelligent devices and systems directly affects the digitalization level of enterprises. Through the introduction and application of intelligent technology, enterprises can achieve automation and intelligence in the production process, thereby improving production efficiency, reducing costs, and enhancing product quality and service levels. In China's intelligent manufacturing system, companies such as Huawei have set an example for intelligent transformation and promoted the development of the entire industry by independently building overall digital physical system hardware and full process digitization.

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The application of intelligent devices has played a significant role in digital transformation. Firstly, intelligent devices can achieve real-time data collection, transmission, and analysis, providing enterprises with more accurate and comprehensive information support, and helping enterprise managers make more scientific and effective decisions. Secondly, intelligent devices can achieve interconnectivity between devices, achieve high integration and collaboration in the production process, and improve production efficiency and flexibility. Again, intelligent devices can also achieve remote monitoring and maintenance of equipment, reduce labor costs, and improve equipment utilization and reliability.

Therefore, the application of intelligent devices directly affects the digitalization level of enterprises. The continuous development and application of intelligent technology will drive enterprises towards a more intelligent and digital future.

3.2. Intelligence has an indirect impact on enterprise digitization

Intelligent management and intelligent services play an important indirect role in the digital transformation of enterprises. Through the application of intelligent management systems and services, enterprises can better introduce and invest in digital devices, promoting the implementation of digital transformation. The intelligent management system can not only achieve real-time monitoring, data analysis, and prediction of the production process, help enterprise managers better understand the production status, make accurate decisions, thereby improving production efficiency and reducing costs, but also provide technical support, training, and other assistance to help enterprise employees better understand and apply digital equipment. Promote the introduction and use of digital devices.

Therefore, intelligent management and services play an important indirect role in digital transformation, which can help enterprises better introduce and invest in digital devices, and promote the smooth progress of digital transformation.

3.3. The digital transformation of enterprises also has a significant impact on intelligence

The benefits brought by digital transformation will continue to drive the development of enterprise intelligence, forming a virtuous cycle. The successful implementation of digital transformation will bring higher production efficiency, lower costs, higher quality products and services to enterprises, thereby enhancing their competitiveness and market position.

Digital transformation will provide enterprises with more data and information support, and provide a richer and more accurate data foundation for the application of intelligent technology. Cultivate the digital awareness and skills of enterprise employees, laying the foundation for the promotion and application of intelligent technology. Digital transformation will accelerate the demand and investment of enterprises in intelligent technology, promoting the rapid development and application of intelligent technology.

Therefore, digital transformation plays an important role in promoting the development of enterprise intelligence, forming a virtuous cycle. The successful implementation of digital transformation will provide impetus and support for the development of enterprise intelligence, promoting continuous iteration and innovation, and achieving sustained improvement in intelligence level. The mutually reinforcing relationship between digital transformation and intelligent development will bring more opportunities and challenges to enterprises, driving them towards a more intelligent path.

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4. Research Design and Empirical Processing

4.1. Data source

The sample of companies ultimately selected in this article based on the following principles are five listed companies in the new energy vehicle industry in recent years, namely BYD, NIO, Ideal, Great Wall Motors, and Xiaopeng Motors. The specific screening method is as follows: Exclude enterprises that have been suspended, delisted, or in a suspended state; Exclude samples with missing key variables. In addition, linear interpolation is used to fill in missing data during the sample period.

4.2. Variable selection

4.2.1. Explained variable

Digital level refers to the overall digital maturity (DIG) of an enterprise, which can be divided into digital strategy (SDIG), digital technology foundation (BDIG), digital business application (ADIG), digital operations management (MDIG), and digital benefits (EDIG). Specifically, based on a large number of existing models for evaluating the digital maturity of new energy, this article combines the typical characteristics of digital transformation of intelligent manufacturing enterprises under the development pattern of the new era, and designs a digital maturity evaluation index system for intelligent manufacturing enterprises as shown in Table 1, which includes 5 primary indicators, 13 secondary indicators, and 31 tertiary indicators.

Table 1. Evaluation Model for Digitalization Level of New Energy Vehicles

target	First level	Secondary indicators	Third level indicators
Enterprise line of business number character change accomplish cooked linear measure combine close finger number U	Digital Strategy A	Degree of emphasis on digitalization A1	Leadership Digital Awareness
			Digital Strategy Goal Planning A12
		Digital Business Model Innovation A2	Digital new retail model sales
			Integrity of digital ecosystem construction A22
	Fundamentals of Digital Technology B	Digital Infrastructure B1	Digital hardware configuration
			Digital software configuration rate B12
			Network basic coverage rate B13
		Data Management Application B2	Data standard system
			Data governance mechanism completeness B22
			Data security control coverage B23
	Digital Business Application C	Digital R&D Design C1	Digital R&D tools cover
			Digital R&D design cycle C12
		Digital Production Manufacturing C2	Numerical control rate of key
			Digital monitoring of production process covers C22
		Digital Supply Chain C3	Supply chain synergy between
			Logistics information tracking and traceability level C32
		Digital Marketing C4	Market Information
			New marketing channel user conversion rate C42
		Digital Services C5	Digital level of customer information management C51

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			Product intelligence level C52
			Service product digitalization level C53
	Digital Operations Management D	Organizational Management D1	Flattening degree of
			Proportion of digital composite talents D12
		Process Management D2	Cross business process
			Business Process Automation Level D22
	Digital benefits E	Digital benefits E1	Digital business input-output
			Number of new product/technology patents E12
			Product qualification rate E13
		Digital efficiency E2	Capacity utilization rate E21
			Management Decision Efficiency E22
			Market response speed E23

To determine the weight values of each indicator in the evaluation model constructed in the previous text, this article uses the Fuzzy Analytic Hierarchy Process (FAHP) to combine fuzzy mathematics with the concept of fuzzy judgment matrix and fuzzy consistency matrix for the determination of indicator weights. The specific steps are as follows.

4.2.2. Establishment of Matrix

This article uses the 1/10-9/10 degree method to conduct an imp test on each level of indicators within the evaluation index system, $A = (a_{ij})_{n\times n}$.When matrix A satisfies $a_{ij} + a_{ji} = 1$（$0 \le a_{ij} \le 1$）, $a_{ii} = 0.5, (i, j = 1,2, \dots, n)$, the matrix is a fuzzy complementary judgment matrix.

4.2.3. Calculate the weight vector of the matrix

Calculate the weight vector of the fuzzy complementary judgment matrix. This article uses the general formula derived by Xu Zeshui [9] to solve the weights of the fuzzy complementary judgment matrix. By using equation (1), the corresponding indicator weight vector $w = (w_1, w_2, \dots, w_n)^T$.

$$w_i = \frac{n(n-1)\sum_{j=1}^{n} a_{ij} + 2n - 1}{n(n-1)}, i = 1,2, \dots, n \quad (1)$$

4.2.4. Consistency and compatibility testing of broken matrices

To verify the rationality of weights, consistency and compatibility tests should be conducted. Firstly, calculate the weight matrix $W_k=(w_{ij})_{n\times n}$ of the fuzzy complementary judgment matrix Ak given by each expert, where $w_{ij}=w_i - w_j+0.5$. When CI (Ak, Wk) ≤ ρ, it is considered that the matrix Ak satisfies the consistency test, where ρ is generally taken as 0.1.

$$CI(A, W) = \frac{1}{n^2}\sum_{i=1}^{n}\sum_{j=1}^{n}\left|a_{ij} - w_{ij}\right| \quad (2)$$

Then, a compatibility test is conducted on the fuzzy complementary judgment matrices on the same factor set given by m experts, i.e.$CI(A_k, A_l) \le \rho, k \ne l; k, l = 1,2, \dots, m$ holds, the process is continuously checked until the relevant requirements are met. The final indicator weight is the mean vector of the weights given by m experts.

Using equation (1) to solve the judgment matrix A_1, the weight vector w_1 is obtained as $\boldsymbol{w}_1 = [0.195,0.190,0.210,0.175,0.230]$, and the $CI(A_1, w_1) = 0.06356 < 0.1$. Therefore, A1 satisfies the consistency test. The experts ultimately provided a three-level indicator, namely $w = \frac{1}{5}\sum_{k=1}^{5} w_k = [0.206,0.205,0.205,0.179,0.205]$. See Table 2 for details:

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Table 2. Weights of Digital Indicators in the New Energy Vehicle Industry

First level	Single	Secondary	Single	Third level	Single	*WFAHP*
A	0.206	A1	0.56	A11	0.49	0.057
				A12	0.51	0.059
		A2	0.44	A21	0.49	0.044
				A23	0.51	0.046
B	0.205	B1	0.59	B11	0.3364	0.041
				B12	0.3166	0.038
				B13	0.347	0.042
		B2	0.41	B21	0.3534	0.03
				B22	0.3334	0.028
				B23	0.3132	0.026
C	0.205	C1	0.208	C11	0.54	0.023
				C12	0.46	0.02
		C2	0.214	C21	0.58	0.025
				C22	0.42	0.018
		C3	0.175	C31	0.58	0.021
				C32	0.42	0.015
		C4	0.207	C41	0.51	0.022
				C42	0.49	0.021
		C5	0.196	C51	0.2898	0.012
				C52	0.367	0.015
				C53	0.3432	0.014
D	0.179	D1	0.52	D11	0.42	0.039
				D12	0.58	0.054
		D2	0.48	D21	0.51	0.044
				D22	0.49	0.042
E	0.205	E1	0.56	E11	0.3668	0.042
				E12	0.2998	0.034
				E13	0.3334	0.038
				E21	0.3234	0.029
		E2	0.44	E22	0.3602	0.032
				E23	0.3164	0.029

4.2.5. Core explanatory variables

Artificial intelligence, the overall level of intelligent development (AI) of new energy vehicle enterprises, is divided into Production Intelligence (PAI), Management Intelligence (GAI), and Service Intelligence (SAI).

Table 3. Evaluation Model for Digitalization Level of New Energy Vehicles

Artificial Intelligence Level (AI)	Production Intelligence (PAI)	Number of P1 intelligent production equipment
		P2 Intelligent Production Technology Patent Quantity

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	Management Intelligence (GAI)	G1 Intelligent Management Device Quantity
		G2 Quality Monitoring Technology Patent Quantity
	Service Intelligence (SAI)	Number of S1 mechanized sales paths
		Number of patents for intelligent built-in services in S2 vehicles

The weights of each indicator were determined in the same way, and the specific results are shown in Table 4.

Table 4 Weight of Intelligence Level

First level indicator	Single layer weight	Secondary indicators	Single layer weight
P	0.380	P1	0.200
		P2	0.180
G	0.400	G1	0.200
		G2	0.200
S	0.220	S1	0.120
		S2	0.1

4.3. Empirical analysis

Standardize the obtained data and adopt a percentage system to solve the correlation using Pearson's theoretical model. The specific process is as follows:

Table 5 Weight System of the Digital Maturity Evaluation Index for Intelligent Manufacturing Enterprises

Enterprise type variable	BYD	NIO	ideal	the Great Wall	Xiaopeng
U (Digital level)	100.00	93.21	89.21	74.21	79.08
L (Intelligent level)	92.75	100.00	80.37	69.21	73.92

Quoting Pearson's scheme:

$$\rho_{UL} = \frac{\mathrm{Cov}(U,L)}{\sqrt{D(U)\cdot D(L)}} \tag{3}$$

Solved to ρ_{UL}=0.8799.

5. Result Analysis

The digital transformation of intelligent enterprises has a strong correlation, intelligence can directly affect the level of digitalization through related equipment. In China's intelligent manufacturing system, companies such as Huawei can independently build the overall digital physical system hardware and full process digitization. Intelligent equipment plays a significant role in digital transformation. Meanwhile, intelligent management and services play a significant role in promoting the adoption and deployment of digital devices, and have an important indirect impact on digital transformation. The benefits generated by digital

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transformation will continue to drive the development of enterprise intelligence, thus forming a virtuous cycle.

6. Conclusion and Suggestions

6.1. Conclusions

This article mainly focuses on the changing characteristics and mechanisms of the impact of the intelligence level of five new energy vehicle enterprises on their digital transformation in recent years, in order to verify whether it has a practical promoting effect on high-quality economy in the local level cities and surrounding areas, and to provide feasible suggestions for promoting digital transformation through enterprise intelligence. Based on a thorough study of relevant literature at home and abroad, this study used a panel data fixed effects panel regression model to investigate the impact and magnitude of enterprise intelligence level on digital transformation. The sample of Chinese A-share listed new energy vehicle companies was divided into different industries and ownership types, as well as different stages according to the time of implementation of national big data experimental zones and digital economy national strategies. Research has found that:

(1) There is a positive correlation between the level of enterprise intelligence and digital transformation.Research has found that the improvement of enterprise intelligence significantly promotes the degree of its digital transformation. This result remains robust after controlling for variables such as enterprise size, leverage ratio, return on equity, enterprise age, and property rights, indicating that intelligence is not only a trend in enterprise development, but also a key driving force for promoting deep digital transformation.

(2) Industry heterogeneity and ownership types of enterprises have an impact. There are significant differences in the promotion effect of intelligence level on digital transformation among enterprises of different industries and ownership types. Especially in technology intensive and high innovation industries, the positive impact of intelligence on digital transformation is more prominent. Meanwhile, non-state-owned enterprises have shown greater flexibility and efficiency in promoting digital transformation through intelligence compared to state-owned enterprises.

(3) Enterprise intelligence promotes digital transformation through various means. Enterprise intelligence has significantly promoted digital transformation through four paths: changing business practices, reforming production models, optimizing business processes, and accelerating socio-economic integration. These paths reflect the multidimensional role of intelligence in enhancing enterprise competitiveness, driving management innovation, reshaping value creation, and improving government service experience, providing empirical support and theoretical basis for enterprises to fully implement intelligence and digital transformation.

6.2. Suggestions

In the current global economic situation, China is facing the important task of promoting steady domestic economic development while emphasizing high-quality economic development. With the strong support of the country for the construction of new infrastructure, new energy vehicle enterprises have ushered in the opportunity of digital transformation. In the face of this trend, new energy vehicle companies should actively respond to the national call for the construction of new infrastructure, increase investment in key technologies such as 5G, artificial intelligence, and big data, and promote the development of intelligent manufacturing and cloud platform services. At the same time, enterprises should strengthen the integration with the industrial Internet platform, promote the digital transformation of enterprises, and improve production efficiency and product quality by improving the level of enterprise intelligence. Based on the

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above empirical analysis and literature research results, the following suggestions are proposed:

(1) Optimize the mechanism for cultivating and introducing digital talents, and strengthen the key technological breakthroughs in the intelligent manufacturing industry. The government should strengthen cooperation with higher education institutions and establish and improve a professional talent training system that is closely aligned with the needs of enterprises. Strengthen the research and development of core intelligent technologies, vigorously develop intelligent manufacturing software, hardware systems, and corresponding integrated products. At the same time, by formulating preferential policies to attract high-end overseas talents and technical teams, including preferential measures in international student employment policies, as well as providing work and life convenience for overseas experts. Vocational training and continuing education can also enhance the digital skills of current employees, providing sufficient talent reserves for the digital transformation of enterprises.

(2) Construct a regional digital transformation project. Accelerate the construction of regional digital transformation, actively promote the interconnection of data chains, innovation chains, and industrial chains within the region, and use digital means to create a closer industrial ecosystem. Encourage regions with conditions to establish digital transformation carriers or platform service companies, provide necessary services and support, and promote efficient digital upgrading of enterprises in the region. Promote the integration and optimization of regional resources, support the development of new models such as central factories, collaborative manufacturing, shared manufacturing, crowdsourcing and innovation, and centralized collection and sales, enhance the circulation and cooperation efficiency of manufacturing and innovation resources within the region, strengthen the integration and collaboration of regional industrial chains, and thereby improve overall production efficiency and innovation capabilities.

(3) Carry out intelligent equipment upgrade applications. To meet the needs of intelligent manufacturing such as digitalization, informatization, and automation in the manufacturing process, we will carry out common technology research and development, give full play to the main role of enterprise innovation and the collaborative innovation ability of industry, academia, research, and application, develop a batch of landmark intelligent manufacturing complete sets of equipment through integrated innovation, and promote the application and promotion of complete sets of intelligent manufacturing equipment in the upgrading of enterprise equipment. Encourage the combination of modern information technology and manufacturing technology to achieve automation and intelligence in the production process, and improve the intelligence level of existing equipment through the construction of smart factories and digital workshops. Promote the iteration and updating of intelligent equipment, support the research and promotion of new generation products for general and specialized intelligent equipment, in order to continuously enhance the technological level and competitiveness of the manufacturing industry. Through demonstration projects and case studies, demonstrate the advantages and application effectiveness of intelligent equipment, and enhance the industry's understanding and acceptance of intelligent transformation.

(4) Strengthen the digital infrastructure support project. Strengthen the construction of network infrastructure, comprehensively deploy and deeply cover high-speed 5G networks, and provide faster and more stable data transmission capabilities for industrial applications. Promote the development of identification resolution technology, support the construction of secondary nodes, ensure the wide application of identification technology in the industrial field, and improve the identifiability and connectivity of industrial Internet. Strengthen network security and data protection, expand the coverage of the security situational awareness platform, help enterprises establish a hierarchical and classified network security and data security management system, and comply with relevant national standards and regulations.

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Enhance the data management of enterprises, encourage them to upgrade to the latest version of the integrated management system, implement national standards for data security management, and continuously improve the management and application level of enterprise data resources.

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