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THE ANALYSIS OF THE CURRENT SITUATION IN CHINA'S INTELLIGENT MANUFACTURING INDUSTRY IN THE CONTEXT OF DIGITAL TRANSFORMATION

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For China, intelligent manufacturing is not only pivotal to realizing the «Manufacturing Power» strategy, but also serves as a key approach to promoting industrial upgrading and fostering high-quality economic growth. This article examines the current state of intelligent manufacturing in China from political, economic, social, and technological perspectives, analyzes the status of China's intelligent manufacturing industry in the context of digital transformation, and explores the challenges and opportunities it faces.

Keywords: intelligent manufacturing; digital transformation; China's manufacturing.

АНАЛИЗ ТЕКУЩЕЙ СИТУАЦИИ В ИНДУСТРИИ ИНТЕЛЛЕКТУАЛЬНОГО ПРОИЗВОДСТВА КИТАЯ В КОНТЕКСТЕ ЦИФРОВОЙ ТРАНСФОРМАЦИИ

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Для Китая интеллектуальное производство является не только ключевым элементом реализации стратегии «Производственная держава», но и важным способом содействия модернизации промышленности и высококачественному экономическому росту. В данной статье рассматривается текущее состояние интеллектуального производства в Китае с политической, экономической, социальной и технологической точек

зрения, анализируется состояние китайской индустрии интеллектуального производства в контексте цифровой трансформации, а также обсуждаются вызовы и возможности, с которыми она сталкивается.

Ключевые слова: интеллектуальное производство; цифровая трансформация; китайское производство.

The Chinese government places great emphasis on the development of intelligent manufacturing and has introduced a series of policies and strategies aimed at promoting the transformation and upgrading of the manufacturing sector. The «Made in China 2025» strategy explicitly aims to achieve the intelligentisation of the manufacturing industry, encouraging enterprises to increase investments in intelligent equipment, automation technologies, and information systems [1]. The «14th Five-Year Plan» for Intelligent Manufacturing Development sets a goal to significantly improve the technical level and market competitiveness of intelligent manufacturing equipment and industrial software by 2025 [2]. Additionally, the «Action Plan for the Digital Transformation of the Manufacturing Industry» aims to complete a round of digital transformation of industrial enterprises by 2030 [3]. These policies not only provide financial support and technical guidance but also incentivize enterprise innovation through tax breaks and subsidies. Political stability creates a favorable environment for the sustainable development of the intelligent manufacturing industry. A stable political climate fosters trust, attracts foreign investment, and promotes technological cooperation, facilitating the introduction and localization of intelligent manufacturing technologies. China’s intelligent manufacturing sector has experienced significant growth under the dual drivers of policy support and market demand. However, the continuity and effective implementation of these policies remain crucial for future development, necessitating a focus on strengthening policy enforcement.

Investment is a key factor driving the development of intelligent manufacturing. According to Figure 1, from 2014 to 2022, China’s funding for research and experimental development in high-tech industries has continued to rise, with a notable increase after 2020, reflecting the intensified investment by national and local governments in intelligent manufacturing. This influx of funding provides a solid economic foundation for the rapid development of intelligent manufacturing, enabling companies to better respond to market competition and technological advancements. As such, a positive investment environment and growing R&D expenditures will continue to form a robust foundation for the future growth of China’s intelligent manufacturing industry.

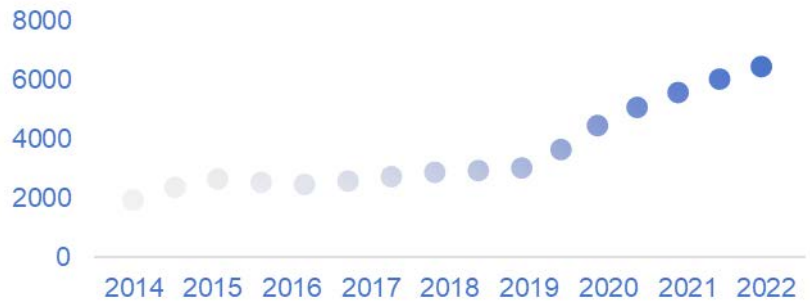

Fig. 1. China's R&D expenditure in high-tech industries over the past decade (large and medium-sized industrial enterprises) (in billion RMB).
Source: [4]

Social acceptance of intelligent manufacturing is gradually increasing, especially among the younger generation, as the dissemination of technology and innovation has led to the concept of intelligent manufacturing being progressively understood and recognized. With the growing popularity of intelligent products and services, consumer demand for high-tech solutions has surged, driving the market expansion of intelligent manufacturing. Increased public awareness and trust in intelligent manufacturing have also created a favorable social environment for the application and promotion of related technologies. However, the rapid development of intelligent manufacturing presents new challenges for talent cultivation and the labor market. Workers in traditional manufacturing industries need to be re-skilled to adapt to new intelligent production models.

Technological factors are pivotal in driving the development of China's intelligent manufacturing industry. As shown in Figure 2, the number of patent applications has increased by more than 95 % from 2014 to 2022, indicating a substantial rise in technological innovation capacity within companies in the intelligent manufacturing sector. This trend reflects the industry's emphasis on the development of new technologies and products.

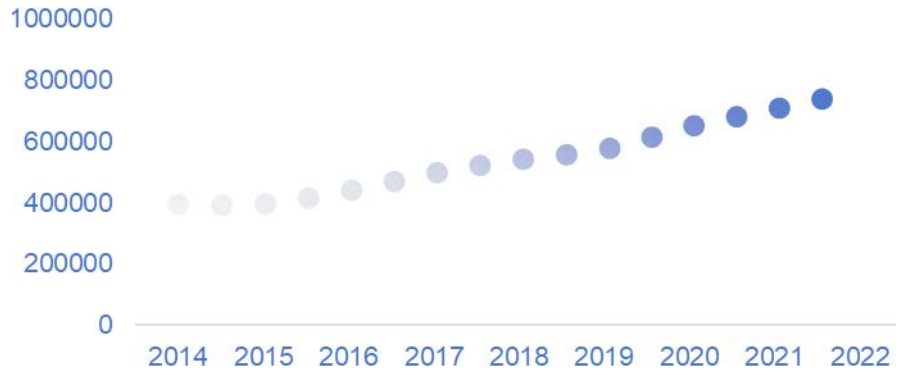

Fig. 2. Changes in the number of patents in large and medium-sized industrial enterprises in China over the past decade (in units).
Source: [4]

With the promotion of intelligent manufacturing, enterprises are actively investing in R&D and committing themselves to technological breakthroughs and product innovation, leading to intensified market competition. The accumulation of technology within the industry is increasing, providing strong support for future industrial upgrading. However, rapid technological progress also brings new challenges. Enterprises must address the complexity of intellectual property protection during the innovation process to ensure that their technological achievements are safeguarded against infringement.

China's intelligent manufacturing industry is experiencing rapid development, with technological innovation and policy support serving as strong drivers. As digital transformation deepens, companies have seen significant growth in R&D investment and patent applications, highlighting the industry's focus on technological advancement. However, intelligent manufacturing still faces challenges related to talent cultivation, market adaptability, and technology risk management. To promote sustainable development, it is recommended that the government further enhance policy support for technology R&D and talent cultivation in intelligent manufacturing. Enterprises should strengthen collaboration with universities and research institutes, foster joint training programs between academia and industry, and improve the technical capabilities of the workforce. Additionally, emphasis should be placed on information security and intellectual property protection to navigate the rapidly evolving market environment. Through multi-party collaboration and continuous innovation, China's intelligent manufacturing industry is poised to secure a more advantageous position in global competition.

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