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# Obstacles and Realization Path of Artificial Intelligence to Promote the Upgrading of China's Manufacturing Value Chain

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***Abstract:*** *Artificial intelligence-enabled manufacturing intelligence is a necessary way for China to break through the "low-end lock" within the global value chain and realize high-quality development. As the core driving force of the new round of scientific and technological revolution, artificial intelligence promotes the transformation of China's manufacturing production mode to human-machine cooperation and cross-border integration. Through integrating government, market and social resources to build a new type of national system, Chinese enterprises gradually get rid of the dependence on processing and assembly, shift from low value-added segments to high value-added ones such as R&D and design, brand marketing and intelligent services, which will realize technological innovation, industrial upgrading and policy coordination, promote the transformation of manufacturing industry from "participant" to "leader", and finally create a modernized industrial system with integrity, advancement and safety.*

***Keywords:*** *Artificial Intelligence; Manufacturing Intelligence; Value Chain Upgrading*

## 1. Introduction

With the in-depth development of the Global Value Chain(GVC) division of labor network, the international division of labor has developed the global segmentation of production processes has evolved from inter-industry to intra-industry and intra-product, and the intelligence of manufacturing industry has emerged as the trend of the future development of the global manufacturing sector which is also the endogenous choice for developing countries to participate in the international division of labor and industrial competition. Achieving advancement in the global value chain positioning of China's manufacturing sector serves as a critical prerequisite for building a contemporary industrial framework and driving sustainable economic growth. Developed countries in Europe and the United States regard the development of intelligent manufacturing as the core content of enhancing new advantages in international competitiveness. In the course of its previously "compressed" rapid industrialization, China has developed the world's most comprehensive and extensive manufacturing system with complete supporting capabilities. Furthermore, it has established a fully categorized, systematically integrated, and large-scale industrial framework. As a global manufacturing powerhouse, China offers extensive application domains for artificial intelligence while prioritizing intelligent manufacturing as the core direction to facilitate the deep integration of informatization and industrialization present and future, so as to break free from the structural entrapment that binds industrial ecosystems to low-value positions while creating pathways to ascend into technologically advanced, innovation-driven echelons of global value architectures. However, the gradual rise of labor costs has prompted countries to formulate intelligent transformation and upgrading strategies for manufacturing industry, such as the *National Robotics Initiative 2.0: Ubiquitous Collaborative Robots* of the United States, the *Industry 4.0* of Germany, the *White Paper on Manufacturing 2018* of Japan and the *Basic Plan for Intelligent Robots* of South Korea. In 2015, President Xi firstly put forward the concept called "robotics revolution" and the State Council issued the "Made in China 2025" program of action, which emphasized the outstanding contribution of intelligent manufacturing engineering and robotics applications to the realization of the transition from big manufacturing contrary to a powerful manufacturing contrary, and formally kicked off the rapid development of China's artificial intelligence industry. Subsequently, in the *Guiding Opinions on actively promoting the "Internet Plus" action*, artificial intelligence was listed as one of the key promotion areas of "Internet Plus". In January 2022,

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the Ministry of Industry and Information Technology and the National Standards Commission jointly issued the *National Intelligent Manufacturing Standard System Construction Guide (2021 Edition)*.

The deep coupling of capital and technology has boosted the rapid development of China's intelligent manufacturing industry, and a series of policies and measures have been introduced to regard artificial intelligence as a crucial area for the future transformation and improvement of the manufacturing industry. It is estimated that the application market size of artificial intelligence in China's manufacturing industry has sustained an annual growth rate of more than 40% since 2019, and is expected to surpass 14 billion yuan in 2025. China has also achieved the localization of core technologies and equipment in certain fields, facilitated the global extension of value chains through opening-up, and witnessed a rapid enhancement in both industrial foundation capacity and the modernization level of industrial chains. At the same time, China has not really formed a modern industrial chain to meet the requirements of high-quality development, and the value-added capacity of the manufacturing industry in the global value chain is weak, and the added value is low. Therefore, it is essential to "fullly utilize the supporting and leading role of artificial intelligence development and escort high-quality development"[1].In August 2019, the fifth meeting of the Financial and Economic Commission of the CPC Central Committee pointed out that China ought to fullly utilize its institutional advantages in allocating resources intensively to fulfill significant tasks and its market advantages in a very large scale, and lay a solid battle for upgrading the industrial base and modernizing the industrial chain. The outline of China's "14th Five-Year Plan" also clearly points out that "Efforts should be made to promote the optimization of the manufacturing industry base and the modernization of the industrial chain. This finally will improve the quality and efficiency of the manufacturing industry, keep the proportion of the manufacturing industry basically stable, and finally improve the modernization level of the industrial chain."[2] At the first meeting of the 20th Financial and Economic Commission of the CPC Central Committee, President Xi stressed that speeding up the building of a modern industrial system that is supported by the real economy is important for us to secure strategic initiative in future development and international competition. It is necessary to grasp the wave of new scientific and technological revolutions, preserve and boost the advantages of a comprehensive industrial system and robust supporting capabilities, efficiently gather global innovation factors, promote industrial intelligence, greening and integration, and build a modernized industrial system with completeness, advancement and safety. This means that the use of intelligent equipment to enable the high-quality development of China's manufacturing industry has risen to a new height, through artificial intelligence to enhance the modernization of the manufacturing industry chain and the research to the high-end of the global value chain has become an effective exploration to deepen the high-quality development of the manufacturing industry. Therefore, an in-depth discussion of the dilemmas, challenges and countermeasures of artificial intelligence to enhance the position of manufacturing industry in the global value chain division of labor will help China to cultivate new advantages in global competition in the manufacturing industry, promote the high-quality development of the manufacturing industry, and provide useful support for the realization of Chinese modernization.

## 2. The Necessity of Intelligent Upgrading of China's Manufacturing Value Chain

As an enabling technology at the forefront of industrial innovation, artificial intelligence has emerged as a key enabler of contemporary technological breakthroughs and sectoral paradigm shifts. It is profoundly changing the production mode of the manufacturing industry and promoting human-machine collaboration and cross-border integration in the manufacturing industry. To realize the intelligence of manufacturing production has become a strategic priority worldwide, and it is also the main orientation for enterprises to enhance their technical level. Artificial intelligence has not only improved the participation degree of China's manufacturing industry in the global value chain, but also improved its location within the value chain. Enterprises have increasingly integrated intelligent manufacturing into strategic value segments, and production has shifted from low-value-added segments to high-value-added segments, significantly contributing to the climbing position of the manufacturing industry in the global value chain. In particular, the use of industrial Internet from the information of auxiliary production links to the optimization and expansion of data analysis of core production links, significantly promoted the comprehensive improvement of the scope and depth of intelligent transformation of traditional industries. Artificial intelligence can drive industrial transformation and has a significant spillover effect, which is a crucial module for countries to establish their core competitiveness. Flexibility, customization, networking and other changes in manufacturing methods have become an important direction of exploration, to study the sudden changes caused by the technological revolution, especially the process of creative destruction of "comparative advantage" by

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the revolution in the techno-economic paradigm. Under the system of international division of labor, a country's standing in the global value chain is closely related to its overall product technology level. The status of the value chain will eventually be reflected in specific products, raw materials and common components correspond to the low-end production links of the product value chain, and the R&D and production links of core components correspond to the high-end value chain. Therefore, marketing from R&D and design to branding as well as business model innovation based on smart products and smart services is an important direction for the extension and expansion of the whole industry chain and the whole value chain. The crucial points for China to engage in the international division of labor lies in leveraging the knowledge spillover effect of division and cooperation to enhance the technological level of industries, improve the position in production division, and achieve a climb to the high-end of the global value chain. Through the intelligence of manufacturing, it should complete the industrial upgrading transformation from processing and assembly of components to original equipment manufacturing and then to own brand manufacturing as soon as possible.

In the global division of production in the manufacturing industry, the western developed countries control the R&D and circulation links at both ends of the Smiling Curve. The intellectual elements such as patented technology, brand and trademark, and management concept invested in the products are difficult to be replaced by other countries in the international market, so the price is often high. Since 1990s, the international transfer of manufacturing industry has been carried out on a global scale with an unprecedented momentum. In order to maximize profits, multinational companies in developed countries transfer standardized production links, production and manufacturing links with significant returns to scale or sensitive to wage costs to developing countries, but keep key core technologies and production links with high added value stay at home. Meanwhile, the scope and level of China's manufacturing industry engages in the international division of labor continue to expand and deepen, and the position of the value chain in the process of participating in the international division of labor within the product has been enhanced substantially. The eastern coastal areas are deeply involved in the manufacturing global value chain network by virtue of their geographical location advantages. The labor-intensive processing links in the manufacturing industry develop rapidly, but the industrial structure, development mode and path dependence accumulated by the long-term rapid development of China's manufacturing industry still need to be solved urgently. In the technology-oriented international economic environment, the positive effect of intelligent manufacturing on the promotion of global value chain mainly comes from the intelligence of high-level production links, that is, the intelligence of capital and technology-intensive production stage, so as to lay a foundation for its extension to the high-end of the division of labor value chain. China should extend the value chain of manufacturing industry through intelligence, change the mode of labor division and benefit distribution position in globalization, and form a reasonable benefit distribution pattern with multinational corporations. According to the W*orld Development Report 2020: Trade for Development in the Era of Global Value Chains* released by the World Bank, as of 2008, global trade in which 52 percent was accounted for by trade based on global value chains, but its growth slowed after the financial crisis amid rising protectionism. In particular, China-US trade frictions have been escalating and uncertainties in foreign trade have been further exacerbated since 2018. It is of great urgency to proactively look for new drivers to resist external risks and achieve high-quality economic development. In the global value chain division of labor, developing countries and developed countries have changed from the structural international division of labor of exporting primary products and engaging in manufacturing production to the problem of high end and low end of the value chain and the control and dependence of core technologies in the new international division of labor. Manufacturing industry is the pillar industry of our country's national economy, and it is also the powerful driving force to realize Chinese modernization. To realize the transition and upgrading of the manufacturing sector in the global value chain and the transformation and upgrading of the industrial structure, break the "low-end lock" dilemma of manufacturing industrial structure and production mode, and continuously promote the profound integration of artificial intelligence and manufacturing industry are the urgent problems to be solved for China's industrial development and high-level opening-up. It is foreseeable that artificial intelligence will have a profound and continuous impact on the way a country's manufacturing industry participates in the global value chain. China should fully leverage the advantages of the national system to research and develop core technologies, and implement the national catch-up strategy from the high end of the value chain of the emerging manufacturing industry rather than waiting for the intelligent manufacturing industry in developed countries to mature and then introduce its technology. A key element of the manufacturing value chain is the improvement of technological capabilities. The intelligence of the manufacturing industry facilitates climbing the "ladder of technology" to reach the high end of the global value chain, continuously securing new competitive advantages in foreign trade, and thereby assisting the manufacturing sector in transitioning from a "participant" in the global value

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chain division of labor to a "leader".

## 3. Challenges of Upgrading China's Value Chain under Intelligent Manufacturing Conditions

### *3.1 Due to the deficiency in key core technologies, China faces a significant risk of falling into the "technology import trap"*

In the domain of artificial intelligence theory, technology and application, China, as the main research and development innovation center of intelligent manufacturing, still lags behind the world's leading level. The manufacturing industry is large but not strong, the level of enterprise automation and intelligent operation is not high, and the lack of international competitiveness restricts the upgrading of China's global value chain. China relies heavily on imports of basic materials, technology, parts and components. In the field of emerging industries, enterprises focus on expanding production scale to obtain higher market returns, but lack independent research and development capabilities of key and core technologies which has led to the phenomenon of "low-end high-end industries" in strategic emerging industries. Countries that rely too much on technology import and ignore independent innovation are prone to fall into the risk of "technology import trap". For example, in 2021, China's auto parts enterprises have reached about 15000, with a total income of about 4 trillion yuan from their main business. The annual compound growth rate of industry revenue is 14.58%, and the overall industry is in a state of rapid growth. However, key core technologies remain underdeveloped in national high-tech fields such as automation instruments, intelligent services for the Internet of Things, MEMS(Micro Electromechanical System)sensors, robot 3D vision and high-end numerical control systems. In 2021, the size of China's industrial software market was 241.4 billion yuan, with a year-on-year growth of 24.8%, significantly higher than the global market. But compared with China's identity as a manufacturing power, the scale of industrial software accounts for less than 10% of the global market scale, and its development lags behind obviously. Among them, the basic R&D and design industrial software has a small volume and is the short board of industrial software. General R&D and design software is still dominated by foreign enterprises, and the localization rate of CAD(Computer-Aided Design), CAE(Computer-Aided Engineering), EDA(Electronic Design Automation), BIM(Building Information Modeling)and other fields is less than 5-10%. The operating system controls the entrance of industrial ecology, and all the upper applications must be adapted to the operating system. At present, the overall level of its localization rate is low, which is the most important domestic substitution link. The core technology of China's information technology industry is subject to developed countries. Without an independent operating system, China's intelligent manufacturing industrial revolution will lack a solid industrial foundation. Therefore, in order to avoid the risk of "technology import trap" in the process of reconstructing the global value chain, China ought to focus on the fostering of independent innovation capacity, carry out the strategy of technological and economic catch-up from the high end of the value chain and the core technology, utilize intelligent manufacturing to facilitate the upgrading of the position in the international value chain, and acquire more benefits from the international division of labor.

### *3.2 Weak basic industries, AI-enabled manufacturing has not yet formed a scale effect*

At the present stage, China's manufacturing industry has the dilemma of "low-end lock-in". Artificial intelligence mainly promotes the climb of manufacturing value chain by improving pure technical efficiency, and the promotion effect of scale efficiency is not significant. For example, in 2011, after long-term research and development, Shenyang Machine Tool Group has made a thorough breakthrough in the core technology of CNC(Computer Numerical Control)machine tools, and successfully developed the first intelligent CNC machine tool in the world, realizing single machine intelligence, unit automation and factory management digitalization. In 2021, Central China CNC released the world's first intelligent CNC system called "Central China Type 9 Intelligent CNC System", through the high integration of electronic information technology and machine tool motion control technology, breaking the long-term foreign monopoly in the machine tool industry, narrowing the distance between China's CNC machine tool manufacturing and the world's advanced level. However, it is also necessary to improve the transformation mechanism of innovation achievements and promote the implementation of innovation achievements in order to upgrade intelligent manufacturing in the industrial field and build advanced intelligent production system. In 2019, the 19th Party Congress proposed to cultivate advanced manufacturing clusters, and manufacturing industries should pay attention to AI-enabled manufacturing, play a leading role in AI, actively

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cultivate advanced manufacturing clusters, promote innovation, technology, and efficiency-driven to achieve the status of the manufacturing industry's value chain, and fully tap the advantages of the manufacturing industry in terms of scale and intensification, to promote the transformation and upgrading of the manufacturing industry and the enhancement of added value.

### *3.3 Comparative advantage in labor does not translate into competitive advantage in intelligent manufacturing*

The central issue of economic development is a country's technological and innovative capacity. Those backward economies that are integrated into the bottom of the GVC can hardly achieve value chain climbing and industrial upgrading under the GVC led by Multinational Corporations. Conversely, enterprises in developing countries that are rooted in the "National Value Chain" (NVC) system have gradually realized industrial upgrading, and the manufacturing industry has formed a certain international competitiveness. In the new form of international labor division, it is no longer what a country imports or exports, but what level of international division of labor it participates in, what type of factors and what level of factors participate in the international division of labor, and how much control it has over the whole value chain. In other words, it depends on the quantity and quality of factors involved in the international division of labor[3]. The rising labor cost, the promotion of intelligent manufacturing technology of multinational companies has reduced the production cost, and the developed countries have gradually moved the manufacturing industry back and implemented the strategy of "re-industrialization", which has formed great competitive pressure on China's manufacturing industry to ascend to the medium and high-end. The space for China's manufacturing industry to participate in the division of labor in the global value chain has been further compressed. Therefore, technological catch-up is a key factor for developing countries to leapfrog the "middle-income trap". Under the condition that China's comparative advantage in labor cost becomes the basis of product cost, it can only be shown as a competitive advantage in a specific value chain, but cannot be completely transformed into the competitive advantage of domestic manufacturing industry. Thus, the "participant" role which China played in the value chain dominated by western countries will be transformed into the "leader" in the new value chain.

### *3.4 Lack of leading manufacturing enterprises and internationally recognized brands leads to weak upgrading of China's global value chain*

China's manufacturing industry is developing rapidly, however, there remains a considerable gap compared with developed countries. The lack of intelligent manufacturing enterprises with core competitiveness and market leader position cannot show the strong spillover "head goose" effect of artificial intelligence on the development of manufacturing industry. China lacks independent international manufacturing brands with key core technologies and innovation capabilities, as well as large multinational corporations with independent brand-building capabilities and standard-setting capabilities. In addition, there is also a lack of key technical teams with the production capacity of the whole industrial chain, intelligent technology research and development, and the integration of intelligent research and development design and manufacturing. In order to better apply artificial intelligence technology to the manufacturing industry, it is necessary to cultivate leading enterprises that can lead the deep integration of artificial intelligence and manufacturing industry in different manufacturing industries. Manufacturing multinational companies in developed countries set industrial standards according to their own interests and preferences, and build a new pattern of international division of labor that is beneficial to themselves, which poses a great challenge for China to climb the global value chain. The enterprises and products participating in international competition in China's manufacturing industry lack internationally famous brands and technical talents for new product design and R&D. When purchasing advanced foreign technology and equipment urgently needed for industrial development, foreign-invested enterprises get most of the added value of technology. There is also the risk of interruption of product research and development and design caused by the dependence of key technologies on foreign countries. Some intelligent manufacturing enterprises have low product technology content, high degree of homogeneity, weak supporting service ability, weak product innovation and competitiveness, do not have the ability to independently design production lines, and insufficient ability to participate in global value chain allocation.

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## 4. The Realization Path of China's Manufacturing Value Chain Upgrading

China should accurately judge its position in the global value chain of manufacturing industry, and seek the feasible path of its transformation and upgrading in the global value chain of manufacturing industry.

### *4.1 Great importance must be attached to the innovation-leading role of artificial intelligence in state-owned enterprises*

China should improve the construction of artificial intelligence technology innovation system of state-owned enterprises, break the technology blockade of western developed countries, improve the "industry-university-research" cooperation mechanism, guide universities and scientific research institutions to carry out orderly technology transfer, and realize the leap of the global value chain status of manufacturing industry. The manufacturing industry actively promotes R&D cooperation between state-owned enterprises and international large companies, vigorously cultivates high-quality technological innovation teams in state-owned enterprises, accelerates the localization and intelligence of key industrial chains, and speeds up the introduction of domestic upstream equipment components. The manufacturing industry should give full play to the role of the national system, concentrate efforts on breaking through the current limitations in the advanced process field of memory chips and related process equipment, promote the reform and development of technological innovation intermediary service institutions, and complete the transformation and upgrading of the industrial structure. This also provides new impetus for the high-quality development of all manufacturing enterprises and higher-level opening up to the outside world. The manufacturing industry guides the existing processing trade to extend from a single assembly and processing to the upstream and downstream industrial chains such as design and research and development, and core component manufacturing, thereby increasing the value-added rate of processing trade. Neither David Ricardo's theory of comparative advantage nor Eli Heckscher nor Bertil Ohlin's theory of factor endowment, which explains the source of comparative advantage, can be used as the basis for trade division of labor and adjustment of production structure. Third, industrial policy making should be based on the theory of technological catch-up, and technological catch-up rather than comparative advantage is the theoretical basis of successful countries in industrial policy making. China should apply the new national system to support the intelligentization of manufacturing, enhance the new national system for tackling key core technologies, and organically integrate the government, the market and society. China should concentrate resources and optimize mechanisms to tackle key problems. China should also increase policy support in key areas where semiconductors are a bottleneck and gain an advantage in short-cycle technological fields where new technologies emerge frequently, so as to quickly move up the value chain from low-end processing and assembly to high-end intelligent manufacturing and core technologies.

### *4.2 The state should vigorously develop basic industries to realize the qualitative transformation and upgrading of its competitive advantages*

Chinese enterprises should vigorously develop basic industries, focus on intelligent automation upgrading and transformation, independently research and develop digital intelligence control systems, break the long-term dependence on imports of core components "subject to developing countries" situation, and establish a sound technology research and development system and innovation ecosystem.

The sequence of traditional scientific research paths is mainly "basic research - technological innovation - applied research". After entering the era of big science, the coexistence of "basic research-technological innovation-applied research," "applied research-core technology-strategic basic research," and "data-driven basic research/applied research" has gradually formed[4]. The situation of China's economic growth relying too much on quantity expansion and price competition has not been fundamentally reversed. Therefore, it is essential to enhance international technical cooperation and exchanges, deeply study foreign technical standards, actively absorb foreign advanced technology, vigorously develop basic industries in major equipment manufacturing industry, automobile, shipbuilding, electronic information, key parts processing and manufacturing and other fields, and improve the intelligent control of core production technology links. To enhance the technological content and added value of manufacturing products, build a manufacturing powerhouse, and boost the international competitiveness of industries, it is necessary to implement the in-depth integration of a

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new generation of intelligent technologies like artificial intelligence and the Internet of Things with advanced manufacturing techniques. This can achieve the organic combination of technological introduction and independent innovation, effectively cut down the production costs of enterprises, enhances their international competitiveness, transform comparative advantages into competitive ones, and overcome "poverty" growth. In particular, China should attach importance to the role of artificial intelligence as a general technology, and cultivate large leading basic industries with competitive advantages and mature experience focusing on intelligent manufacturing. The manufacturing industry should promote the spirit of craftsmanship, strengthen quality standards, enhance industrial competitiveness, and prevent and resist hostile takeovers of domestic brand basic industries by multinational companies. The manufacturing industry should also promote technological transformation and optimization and upgrading of industries, fundamentally transform the manufacturing mode and enterprise form, and drive China's basic industries to move towards the medium and high end of the global value chain.

### *4.3 Local governments should promote artificial intelligence to empower competitive industries*

Local governments should take measures according to their own endowments and local conditions, rationally distribute intelligent industries, empower manufacturing through artificial intelligence, and issue corresponding policies to vigorously promote the intelligent industrial chain. Capital-intensive and technology-intensive industries product technology complexity enhancement is more dependent on the degree of human capital, as an innovation element through the enhancement of the level of human capital, artificial intelligence improve product research and development path in order to enhance the technological complexity of China's manufacturing exports to realize a fundamental alteration in the mode of production and comprehensively enhance the overall level of China's manufacturing industry. Local governments should encourage enterprises to uphold the idea of sustainable development and engage in the global value chain, establish the dominant position of enterprises in technological innovation and investment in science and technology, increase investment in intelligent production, technological innovation and research and development, and apply artificial intelligence technology to transform and upgrade local advantageous manufacturing industries. In addition, enterprises should be encouraged to introduce advanced technology and key equipment, strengthen the digestion and absorption of key technologies of products featuring high technology and high added value, improve the ability of independent original innovation of enterprises, increase the proportion of high-tech products in the product structure, strengthen the construction of artificial intelligence technology, management system and intelligent production system. It is essential to take advantage of its own comparative advantages to identify strategic points of cooperation in the value chain, and strive to master the core key technologies of high-tech products, eliminate the "low-end locking", and promote the local manufacturing enterprises of small and medium size gradually to "specialization, refinement, and newness", in order to promote local manufacturing enterprises of small and medium size to gradually develop in the direction of "Specialization, Precision, Uniqueness, and Innovation" at both ends of the value chain, and to realize the high-quality development of manufacturing industry.

## 5. Conclusion

In the domain of artificial intelligence technology and its application, China, as the main research and development innovation center of intelligent manufacturing, still lags behind the world's leading standards. The degree of automation and intelligent operation of manufacturing industry remains relatively low, small and medium-sized enterprises generally lack international competitiveness, and the increasing returns to scale have yet to manifest significantly. Meanwhile, the developed countries have gradually moved the manufacturing industry back to implement the strategy of "re-industrialization", which has formed great competitive pressure on China's manufacturing industry to climb to the middle and high-end. The promotion of intelligent manufacturing technology in multinational corporations has reduced the production cost, and the space for China's manufacturing processing trade to participate in the division of labor in the global value chain has been further compressed. Artificial intelligence facilitates the ascent of the manufacturing value chain primarily by enhancing technical efficiency. Realizing the intelligentization of manufacturing production link is a new form of intelligent economy, and also the main direction for enterprises to improve their technical level. Artificial intelligence-enabled manufacturing intelligence is a necessary way for China to break through the "low-end lock" within the global value chain and realize high-quality development. Therefore, great importance must be attached to the innovation-leading role of artificial intelligence in

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state-owned enterprises. China should improve the construction of artificial intelligence technology innovation system of state-owned enterprises, apply the new national system for tackling key and core technologies, breaking through technological bottlenecks, and supporting intelligent manufacturing. The government, the market, and the social sciences will coordinate efforts, pool resources, optimize mechanisms, and work together to tackle key problems. The state should vigorously develop basic industries to realize the qualitative transformation and upgrading of its competitive advantages, push forward industrial technological change and optimization and upgrading, fundamentally transform the manufacturing industry mode and enterprise form, and promote China's basic industries to move towards the middle and high end of the global value chain. Local governments should promote artificial intelligence to empower competitive industries in order to promote local manufacturing enterprises of small and medium size to gradually develop in the direction of "Specialization, Precision, Uniqueness, and Innovation" at both ends of the value chain, and to realize the high-quality development of manufacturing industry, which will promote the transformation of manufacturing industry from "participant" to "leader", and finally create a modernized industrial system with integrity, advancement and safety.

## References

*[1] Standardization Administration of China. National Guidelines for the Construction of a New Generation of Artificial Intelligence Standard System, https: //www. gov. cn/zhengce/zhengceku/2020-08/09/content_5533454.htm*

*[2] Report on the review results of the 14th Five-Year Plan for National Economic and Social Development and the Draft Outline of the Vision Goals for 2035 by the Financial and Economic Committee of the 13th National People's Congress. Bulletin of the Standing Committee of the National People's Congress of the People's Republic of China, 2021(3): 503-505.*

*[3] Zhang Erzhen, et al., Trade and Investment Integration and China's Strategy. Beijing: People's Publishing House, 2004.*

*[4] Wu Yang. Path exploration of diversified investment in basic research in the era of big science[J]. People's Tribune: Frontier, 2023, (09): 68-80.*