Research on the Prediction of the Impact of AI on China's Industrial Upgrading

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Abstract: This paper aims to actively promote the development and application of AI (AI) technology, accelerate the integrated development of AI technology and industries, and stimulate China's new round of economic growth by capturing the general laws of scientific and technological change and industrial upgrading, combing the current international and domestic AI development pattern, predicting the impact of China's AI development on industrial upgrading, and putting forward prospects for further studies. This paper aims to help achieve the strategic development goals of AI in the next stage and consolidate China's leading position in the new round of scientific and technological revolution

Keywords: AI; Industrial Upgrading; Integrated Development

1. Introduction

At present, facing the limitless potential and far-reaching influence of AI, more developed countries in Europe and the United States have incorporated AI development into their national strategic planning, trying to take the lead in a new round of scientific and technological revolution. Similarly, in China, the State Council issued the Development Plan for a New Generation of AI in 2017 to seize strategic opportunities and build a first mover advantage. Supported and driven by top-level policies, China's technology giants, led by Tencent, Baidu, Alibaba, etc., have included AI in their key strategic plans, and invested heavily in building AI laboratories and cultivating high-end AI talents. According to the US CB Insights report, in 2018, the global AI attracted $15.2 billion in financing, of which China has absorbed $7.3 billion. On the one hand, this data shows the strong attraction of AI for capital, and it also shows that the development of AI is highly valued and fully supported by the Chinese government.

2. Laws of the impact of the historical evolution of scientific and technological revolution and major technological changes on industrial development

At present, it is generally believed that human history has experienced three scientific and technological revolutions and is experiencing a new round of scientific and technological revolution (Zheng Hua and Nie Zhengnan, 2021). Each scientific and technological revolution has greatly promoted the transformation of the world industrial structure. The first scientific and technological revolution, which started in the middle of the 18th century, made steam power technology and mechanized production mode widely popular. The human society has changed from the traditional manual era to the mechanical production era, and light industry has developed rapidly. The second scientific and technological revolution, which began in the middle of the 19th century, marked the wide application of electric power, and enabled human society to move from the era of mechanization to the era of electrification, with heavy industry advancing by leaps and bounds. In the middle of the 20th century, the third scientific and technological revolution took place. Major breakthroughs were made in many fields, such as atomic energy, computers and aerospace technology. Human beings began to enter the information age. Looking at the evolution track of many scientific and technological changes and social and

economic development, it can be seen that there are general laws in the mechanism of the impact of scientific and technological revolution on industrial development. From the perspective of time, industrial development has a cyclical feature under the effect of scientific and technological progress, that is, a breakthrough in science and technology will drive the rise of certain industrial groups. When new technologies emerge, some existing industries will enter a recession because of it, and the original technology will become the starting point for the development of new technologies. From the perspective of space, the change with a certain technological breakthrough as the core will have a linkage effect on the surrounding technologies and industries, that is, it reflects the characteristics of cross integration. In terms of the form of influence, scientific and technological change can promote the upgrading of industrial structure by creating new industries or transforming existing industries and other ways. From the perspective of the impact process, the successful transformation from 'science' to 'technology' is the only way to realize the promotion of scientific and technological revolution on industrial development, and science that is only in theoretical deduction still needs to be tempered by practice to promote industrial development.

Due to historical reasons, the opportunities for industrial development brought by the first three scientific and technological revolutions have been missed by China, which once left a huge gap between China and developed countries affected by scientific and technological forces. However, in the 40 years since the reform and opening up, China's science and technology have developed rapidly, and now it has become the second largest economy in the world, which provides sufficient possibilities for China to seize the development opportunity of the new round of scientific and technological revolution that has risen.

3. Prediction of industrial upgrading with AI

At present, the development of AI has gradually penetrated into all walks of life, and the new technologies, services and models derived from it have begun to change the existing enterprise operation model. In the future, with the technological breakthrough of AI industry and its continuous integration with traditional industries, this change will be more profound and thorough. Its manifestations mainly include the following aspects.

First, AI will further improve industrial efficiency. At present, China's economy is experiencing a period of structural slowdown, and it is difficult to continue the model of relying on the traditional advantages of demographic dividend to drive economic growth. As a new factor of production, AI will inject fresh impetus into China's economic growth. With the continuous development and improvement of surrounding technologies, the technological bottleneck of AI will be gradually broken through, so that it can participate in the intelligent upgrading of various industries such as agriculture, manufacturing, finance, logistics, medical care, etc., change the industrial production efficiency, and provide endogenous power for China's future economic development.

Second, AI will develop from special intelligence to general intelligence, thus comprehensively driving industrial upgrading. The leap from special AI to general AI is an inevitable trend of AI development. This means that the future development of AI itself will be more interdisciplinary, and the impact on the industry will be more universal.

Third, AI will develop in the direction of independent intelligence and further promote the "intelligent governance" of the industry. At this stage, many key technologies of AI rely on supervised deep learning, such as deep neural network model, preset application scenarios, data collection, data marking and data training. The research on autonomous intelligence will reduce the process of manual intervention and greatly improve the autonomous learning ability of machine intelligence on the environment. The realization of autonomous intelligent skills will help enterprises to establish automatic learning systems, achieve intelligent governance of machine intelligence on the normal operation of enterprises, and thus reduce the cost of enterprise managers.

Fourth, the development of AI will lead to the convergence of factor input ratios in different links of the industrial value chain. Under new production methods and processes such as new materials, intelligent manufacturing and network collaboration, digital and intelligent technologies will become the main factors determining the cost of each link of the industrial value chain, while the position of traditional labor factors in production will decline significantly and will likely be replaced by human intelligence. As a result, the labor cost disadvantage of the developed countries will gradually weaken or even disappear, and the originally outsourced links such as processing and assembly will probably return to the developed countries.

4. Future research prospects to promote industrial development with AI

First，researchers should review the impact of previous scientific and technological revolutions on industrial development, reveal the general role of scientific and technological revolution on industrial development, and provide the historical experience and basic theoretical basis\for subsequent academic research on the new round of AI technological revolution and industrial structure upgrading.

Second, constructing a research system for the development of AI with multidisciplinary theories, accelerating the cross-penetration and deep integration of AI with other frontier disciplines such as economics, mathematics, cognitive science, neuroscience and social science, which will help expand the theoretical research edge of AI and stabilize the universal development direction of AI.

Third, it is essential to continuously predict the future domestic and global AI development trends, identify breakthrough theories and application fields, and provide direction for the future investment and financing decisions of Chinese enterprises and the resource tilt and policy guidance of government departments, so as to better improve industrial efficiency and promote China's economic structure upgrading and intelligent social development during the new era.

Fourth, from the perspectives of AI safety, management and control capabilities, and standardized use, further studies are required to facilitate the identification and analysis of the practical problems that may be faced in the development and application of AI, such as privacy protection, intellectual property rights, discrimination and prejudice, traffic regulations, and scientific and technological ethics, and puts forward countermeasures, so as to provide reference for the initial establishment of AI laws and regulations, ethical norms and policy systems in China.

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