

# Analysis of the Mechanism of High-quality Economic Development by Artificial Intelligence Technology from the Perspective of Factor Upgrading

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**Abstract:** This paper through the literature reading method, analysis the mechanism of how artificial intelligence technology to promote the high quality development. Through the analysis we draw a conclusion that artificial intelligence technology can enable production factors and form intelligent labor, intelligent capital, intelligent land, intelligent information. On the basis of the intelligent production factors, industrial upgrading, structural optimization, economic growth, policy optimization, management optimization as the characteristics of the high-quality economic development become a reality. With the help of Cobb Douglas function, the equation of artificial intelligence technology promotes high-quality economic growth is constructed. For analysis, three suggestions which include to achieve core technology breakthroughs of artificial intelligence technology, create a good environment for the development of AI enterprises, and accelerate the integration of AI technology and production factors should be put forward.

## 1 INTRODUCTION

The report to the 19th National Congress of the CPC clearly stated that promoting the deep integration of the Internet, big data, artificial intelligence and the real economy serves as an important measure for China to deepen supply-side structural reform, build a manufacturing power, and promote high-quality economic development. As a comprehensive technology, artificial intelligence technology is of meaningful to promote high-quality economic development. In this context, this paper analyzes and studies the mechanism of how artificial intelligence and factor upgrading to promote the high-quality development.

## 2 JOURNALS REVIEWED

At present, there are many research categories on artificial intelligence technology. Some studies believe that artificial intelligence technology will improve human productivity. With the development and application of artificial intelligence technology, the influence of technology on people has gradually

deepened, which not only greatly improves the work efficiency and the production efficiency, but also can greatly enhance individual productivity (Li 2018). Human-machine fusion technology brings enhanced intelligence. Human-machine fusion technology can learn from each other and form a more intelligent system jointly, demonstrating a huge space that can be developed (Pan 2019).

After affirming the improvement of production efficiency of artificial intelligence technology, some studies have further analyzed the impact of artificial intelligence technology on high-quality economic development. Artificial intelligence technology promotes economic development in four ways. First, artificial intelligence technology replaces labor, expands the connotation of labor, increases the labor supply, and enriches the labor wealth; artificial. Second, artificial intelligence technology enables the three major industries to improve production efficiency. Third, artificial intelligence technology creates consumer surplus and improves social welfare. Fourth, artificial intelligence enables the government, correct government failure, improve government efficiency, and then correct market

failure and improve economic efficiency (Cheng 2021).

Some scholars analyze the resource agglomeration effect and talent agglomeration effect of artificial intelligence technology. For both the short-term analysis or the long-term analysis, the development of artificial intelligence industry has a strong impact on the development of China's economy, and the development of mega cities, thanks to the strong resource aggregation and talent gathering effect and the strong AI production chain, further enhance the degree of production automation and intelligence of the regional economy. It will bring China's economic development to a higher quality, but at the same time, it also expands the differences of the regional economic development (Chen, Tang, 2021).

In addition, some scholars have analyzed the mechanism of artificial intelligence technology for high-quality economic development from the economic characteristics of artificial intelligence technology. Artificial intelligence technology has the economic characteristics of permeability, synergy, substitution, creativity, and the mechanism of artificial intelligence in promoting high-quality economic development can be summarized as the expansion effect, enabling effect and activation effect on the three types of industries. Among them, the expansion effect of core industries and the enabling effect of fusion industry build a dynamic cycle process of promoting high-quality development, while the activation effect of potential related industries promotes high-quality economic and social development by providing non-matching, non-intensive, non-neat and unfair problem solutions (Guo, Fang, 2021). To sum up, the existing literature mainly focuses on the combination of artificial intelligence technology and human beings to improve the production efficiency, and then promote the high-

quality development, the agglomeration effect brought by artificial intelligence technology promotes the high-quality development and the industrial development brought by the economic characteristics of artificial intelligence, thus promoting the high-quality economic development. Therefore, it can be seen that the mechanism of artificial intelligence technology to promote high-quality economic development is mainly concentrated on the macro level. The existing research explores the essential factors of artificial intelligence technology to promote economic development is rarely. Therefore, with the help of Cobb Douglas production function, this paper studies the impact of AI technology on production factors, and then analyzes the mechanism of AI technology on high-quality economic development.

### 3 ARTIFICIAL INTELLIGENCE TECHNOLOGY AND PRODUCTION FACTORS UPGRADING

As a permeable, coordinated, alternative and creative technology, artificial intelligence technology can deeply affect all aspects of economic development, such as industrial upgrading, product upgrading, and resource cohesion. Under the four-sector economic system, GDP accounting:  $GDP = \text{consumption} + \text{investment} + \text{government purchase} + \text{net export}$ . This accounting method mainly calculates GDP growth from the perspective of economic expenditure, and it does not explore the root cause of economic development. In this paper, based on the analysis of the literature, the main logic is shown in Figure 1.

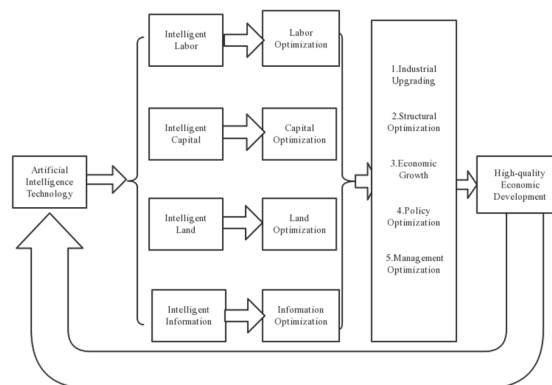


Figure 1. Influence of AI technology on economic development

As shown in Figure 1, simply do the following analysis.

### **3.1 Artificial Intelligence Technology Optimizes Labor Factors of Production**

The impact of AI technology as an epoch-making technology on the labor force is profound and long-lasting. First, it will change the main way of labor, instead of "no one does" "unwilling to do" "difficult to do" labor, reduce the physical burden, mental burden, thus essentially liberate labor force, thus labor have time and energy combine with the artificial intelligence technology, so as to realize from the basic labor force to intelligent labor force. Second, the penetration of artificial intelligence technology allows workers could "learn by doing", affecting the way of thinking, so as to realize the upgrading and reconstruction of the self-labor force, and the intelligent labor force could be an reality.

### **3.2 Artificial Intelligence Technology Optimizes Capital Factors of Production**

Technology and capital could mutually promote each other. Technology can promote new forms of capital and improve the return on capital, while the circulation and operation of capital can in turn promote the diffusion and application of AI technology. With the continuous development of AI technology, it also plays an increasing role in the process of capital operation. Capital can change its own form and operation mode with the development and application of AI technology to adapt to the development and changes of economy and society. It is under the promotion and influence of technological progress that the ability of capital to adapt to it is constantly enhanced, and then it can develop and maintain strong vitality in the long term. Driven by artificial intelligence technology, the integration of artificial intelligence technology and big data can make the utilization of capital smarter and smarter, and the capital can be accurately put so as to achieve higher capital utilization rate and return on capital. Driven by artificial intelligence technology, the traditional characteristics of capital factors of production have become intelligent capital.

### **3.3 Artificial Intelligence Technology Optimizes Land Factors of Production**

Land "is a natural complex on a certain area of the surface, including geological, landform, climate, hydrological, soil and other natural elements of vegetation". Driven by artificial intelligence technology, geological analysis, hydrological monitoring, geomorphological exploration, soil composition, vegetation analysis and so on are also becoming more and more scientific, thus the accurate planning and accurate use of land use could be an reality. The remote sensing, GIS geographic information system, GPS global positioning system and other high-tech technologies are organically integrated with geography, agriculture and other disciplines, the digital and intelligent agricultural production process become an reality. We will combine big data and artificial intelligence with characteristic agriculture such as tea, fruits and vegetables, promote the development of new models such as high-efficiency mountain agriculture and agricultural O2O, and promote the integrated development of agricultural products planting and processing based on digital technology, supply chain coordination and rural tourism. The combination of land and artificial intelligence technology seems to install a brain to the land, making the utilization of land become smart and forming intelligent land production factors.

### **3.4 Artificial Intelligence Technology to Optimize Information Factors of Production**

Traditional factors of production generally include land, capital and technology, but with the development of economy, information has become more and more important new factors of production. Because information has analytical, disseminated and usable characteristics, it plays an important role in production and economic development. Therefore, information can also be considered a factor of production. Under the development of artificial intelligence technology, the integration of information and AI technology makes the use, dissemination and replication of information more scientific, reasonable and intelligent. Artificial intelligence technology has realized the efficient and scientific use of information, making the policy formulation more reasonable and the management mode more reasonable, thus realizing the optimization of information production factors.

## 4 INTELLIGENT PRODUCTION FACTORS AND HIGH-QUALITY ECONOMIC DEVELOPMENT

The optimization of artificial intelligence technology to labor, capital, land, information and other production factors brings about high-quality economic growth characterized by industrial upgrading, structural optimization, economic growth, policy optimization and management optimization. High-quality economic growth promotes high-quality economic development. Through the Cobb-Douglas production function (1).

$$Y=A(t)L^{\alpha}K^{\beta} \quad (1)$$

Among them, formula medium Y is the total industrial output value, A (t) is the comprehensive technical level, L is the invested labor force, and K is the invested capital.

Based on the analysis of this paper we improve the Cobb Douglas production function (2).

$$HG=T_{AI}L_{AI}^{\alpha}K_{AI}^{\beta}S_{AI}^{\gamma} \quad (2)$$

Among them, HG represents high-quality economic growth and  $T_{AI}$  represents the intelligent information,  $L_{AI}$  represents the intelligent labor,  $K_{AI}$  represents the intelligent capital,  $S_{AI}$  represents the intelligent land, and  $\alpha+\beta+\gamma=1$ .

Driven by intelligent elements, industrial upgrading, economic growth, policy optimization and management optimization have led to high-quality economic development.

## 5 POLICY SUGGESTIONS

### 5.1 Realize Breakthroughs in the Core Technologies of AI

We will gather superior teams, focus on the major national strategic needs, and strengthen demand-oriented basic research. We will strengthen multi-path exploration, cross-integration and disruptive technology supply of cutting-edge technologies. We will encourage diversified subjects to participate in future research, support universities and research institutes to set up artificial intelligence technology research institutes and AI colleges in areas with prominent advantages in scientific and educational resources and a strong industrial foundation, and support large science and technology enterprises to set up laboratories for artificial intelligence

technology and application research. Enterprises and non-governmental organizations will jointly set up artificial intelligence technology research awards to reward groups and individuals that have made breakthroughs in cutting-edge technologies and lead innovative ideas.

### 5.2 Create a Good Environment for the Development of Artificial Intelligence Enterprises

We will carry out the reform of "running once at most", so that the local artificial intelligence technology industry has a good environment for the development of the AI industry, reduce the approval steps of intelligent economy enterprises as far as possible, improve the service quality and efficiency of regional governments, and shorten the examination and approval time. Support will be given to financial and tax policies to encourage the development of smart enterprises.

### 5.3 Accelerate the Integration of Artificial Intelligence Technology and Production Factors

At the same time of the vigorous development of artificial intelligence technology, timely promote the integration of artificial intelligence technology with labor force, capital, land, information and other production factors, and actively build the intelligent labor, the intelligent capital, the intelligent land and the intelligent information, so as to realize the comprehensive optimization of the economic development of artificial intelligence technology. We will gradually make artificial intelligence technology a core factor of production and promote high-quality economic development.

## 6 CONCLUSIONS

This paper, on the basis of previous analysis, analyzes the mechanism of high-quality economic development with the help of Cobb-Douglas production function. This paper finds that AI technology has realized the transformation and upgrading of production factors by enabling labor, land, capital and information production factors. Labor, capital, land and information, under the promotion effect of artificial intelligence technology, have become the intelligent labor, the intelligent capital, the intelligent land and the intelligent

information, thus realizing the high-quality economic development characterized by industrial upgrading, structural optimization, economic growth, policy optimization and information optimization. The high-quality economic development will further promote the optimization and improvement of artificial intelligence technology.

## REFERENCES

- Chen, D.Y., Tang, Y.G. (2021) Analysis of the impact of artificial intelligence industry on regional economic development. *Technology Management Research. Commun.*,2: 138-144.
- Cheng, Ch.P. (2021) AI is ways to promote economic development. *Contemporary Economic Management. Commun.*, 3: 1-8.
- Guo, Ch. X., Fang, A. (2021) Artificial intelligence promotes high-quality economic development: mechanism, problems and countermeasures. *Guangxi Social Sciences Commun.*, 8: 8-17.
- Li, M. (2018) Artificial intelligence: Technology, Capital and Human Development (doctoral thesis, Zhongnan University of Economics and Law).
- Pan, Y.H. (2019) Artificial intelligence: Focus on providing new drivers for high-quality development. *Smart China. Commun.*,7: 50-51.