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The Dynamic Relationship between Digital Technology and the Transformation and Development of the Real Economy

-- Based on the Multidepartmental Schumpeter Endogenous Growth Model

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Abstract

With the rapid development and widespread application of digital technology, the real economy is facing opportunities and challenges for transformation and upgrading. However, the current discussion on the empowerment of digital technology for the transformation and development of the real economy is mostly limited to paradigm analysis, lacking theoretical research and testing of China's actual situation. At the same time, these discussions mainly remain at the national macro level or a single industry level (such as manufacturing, finance, etc.), lacking cross industry research. Therefore, based on the "creative destruction" mechanism and the introduction of digital technology development factors, this article establishes a dynamic stochastic general equilibrium model for multi-sector Schumpeter endogenous growth, deduces and analyzes the transmission mechanism of digital technology driving industrial structure adjustment and economic growth, as well as the heterogeneous impact of its application and transformation in different physical industrial and financial sectors on industrial structure transformation and economic growth. Finally, it provides policy reference for the optimization path of digital technology empowering the transformation and development of the real economy in China.

Keywords

Digital technology; Real economy; Industrial structure transformation; Economic growth.

1. Introduction

Amidst the rise and fall of cutting-edge technologies such as big data, cloud computing, artificial intelligence, and blockchain, the new generation of ICT (Information and Communication Technology) technology is leading a new chapter in industrial transformation, injecting new vitality into the real economy. The G20 Digital Economy Development and Cooperation Initiative points out that the digital economy is a series of economic activities that take digital knowledge and information as the core production factors, modern information networks as important carriers, and the effective use of ICT as the key driving force for improving efficiency and optimizing economic structure. As the material foundation of the digital economy, digital technology is deeply integrated with various fields of the economy and society, continuously releasing the value of data elements, giving birth to a new paradigm centered on digital transformation, comprehensively driving changes in production methods, lifestyles, and governance methods, reshaping industrial forms and economic patterns.

Since the 19th National Congress of the Communist Party of China, Xi Jinping has repeatedly emphasized the importance of "expanding and strengthening the digital economy, implementing the new development concept, promoting the deep integration of the Internet, big data, artificial intelligence, and the real economy, and building a modern economic system". China's economy is in a transitional stage from high growth to high-quality development, and digital transformation is an inherent requirement for high-quality economic development. The digital economy has become the third economic and social form after the agricultural economy and industrial economy. Accelerating industrial digital transformation and digital economy construction through the development and application of digital technology is an important content of the 14th Five Year Plan. The 14th Five Year Plan for National Economic and Social Development of the People's Republic of China and the Outline of the Long Range Goals for 2035 clearly propose to "accelerate digital development and build a digital China". Digital technology is the core of the new infrastructure of the national digital economy. Facing the needs of high-quality development of China's economy at this stage, it provides a fulcrum for enterprises' digital transformation, intelligent upgrading, and integrated innovation. It plays a multiplier role in improving production efficiency, promoting industrial structure optimization and adjustment, and building a new driving force for economic growth. It will become a new engine for improving the quality and efficiency of China's economy and building a dual cycle development pattern.

At present, the discussion on the empowerment of digital technology for the transformation and development of the real economy is mostly based on paradigm analysis, lacking theoretical research and testing of China's actual situation, and mainly staying at the national macro level or the level of a single industry such as manufacturing and finance. This article is based on the "creative destruction" mechanism, introduces the development factors of digital technology, establishes a dynamic stochastic general equilibrium model of multi-sector Schumpeter endogenous growth, deduces and analyzes the transmission mechanism of digital technology driving industrial structure adjustment and economic growth, explores the dynamic relationship between digital technology, industrial structure adjustment and economic growth, and provides theoretical support for digital technology empowering the transformation and development of the real economy. The research in this article has important reference significance for optimizing the path of digital technology empowering the transformation and development of the real economy in China in the next step.

The main marginal contributions of this article are as follows: firstly, empowering the transformation and development of the real economy with digital technology includes the penetration and application of digital technology in various industries to improve production efficiency, enhance industry output value, and thereby promote economic growth; It is also reflected in the integration of digital technology with enterprise production and operation, as well as the integration with the financial sector, to varying degrees, improving the contribution of each department's output value, promoting the optimization and adjustment of industrial structure, and accelerating the rational flow of factor resources towards the direction of industrial digital transformation and development. This article introduces the development factors of digital technology into the production function of the production department and the profit function of the financial department, constructs a dynamic stochastic general equilibrium model of multi-sector Schumpeter endogenous growth, explores the transmission path of digital technology promoting industrial structure transformation and economic growth, and improves the shortcomings of existing research on theoretical mechanism analysis. Secondly, existing relevant literature mainly discusses the impact of digital technology on economic growth or industrial development at the national macro level or a single industry level, while neglecting the different effectiveness of the development and application of digital technology in different economic sectors for the transformation and development of the real economy. This

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article specifically analyzes the heterogeneous effects of the application and transformation of digital technology in the physical and financial sectors on industrial structure transformation and economic growth, providing empirical evidence for in-depth analysis of the actual situation of digital technology promoting the transformation and development of the real economy in China.

2. Literature Review

Digital technology has evolved from the continuous development of a new technology group composed of computing technology, microelectronics technology, and modern communication technology. Its essence is to achieve functions such as recognition, transformation, storage, dissemination, and application of various types of information (Peng Gang et al., 2021). Some scholars also believe that the scope of current ICT technology is gradually narrowing with the maturity of electronic technology to technologies for data transmission, processing, etc., which is equivalent to general digital technology. At the same time, the ICT industry corresponds to digital industrialization and is an important component of the digital economy (Cai Yuezhou, Niu Xinxing, 2021).

The theory of endogenous economic growth believes that technological progress and total factor productivity are important factors driving sustained economic growth. The penetration effect of digital technology in various fields has brought about the popularization of new means of production with data as the core, changing the way the economy operates, and driving comprehensive changes in productivity and production methods through a series of complementary technologies and institutional construction (Zhang Xinchun, 2021). The existing literature on digital technology empowering economic development has studied the driving effect of digital technology on the development of different industries such as manufacturing and service industries (Li Xiaohua, 2021; Liu Pingfeng, Zhang Wang, 2021). The discussion mainly revolves around two perspectives: labor empowerment and capital empowerment. Among them, labor empowerment focuses on the integration and transformation of internal production and operation within enterprises and the optimization of industrial development structure, Capital empowerment includes two aspects: improving the quality of internal capital and enhancing external financial support. From the perspective of labor empowerment, the universal purpose characteristics and strong penetration ability of digital technology make it widely used in production activities and business management in various industries, promoting the digital transformation and industrial structure optimization of traditional enterprises. Digital technology can achieve unlimited replication, sharing, and real-time interconnection of data, and has unique advantages in reducing data processing and transaction costs, accurately configuring resources, and improving enterprise productivity through cost reduction and efficiency improvement (Goldfarb and Tucker, 2019; Xu Heng et al., 2020).

From the above analysis, it can be seen that digital technology can promote industrial structure adjustment and economic growth by integrating with the production business and operation management of physical enterprises. In addition, the deep integration of digital technology and finance also provides important support for economic transformation and development. New structural economics believes that economic development requires upgrading the factor endowment structure, which promotes industrial upgrading and optimization, thereby promoting high-quality economic growth. Financial capital, as a factor endowment at a specific time point in a region, its structural upgrading is bound to also drive economic development. The deep integration of digital technology and finance has given birth to digital finance, effectively filling the natural shortcomings of traditional finance, improving financing efficiency, reducing financing costs, and upgrading the factor endowment structure of the financial

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industry, thereby providing efficient and high-quality financial services for the real economy (Yang Zirong, Zhang Pengyang, 2018; Wu Ye, 2019). Although new technology empowers finance to some extent exacerbates the Matthew effect of traditional financial services in China's three major industries, it significantly promotes the optimization and transformation of industrial structure by accelerating the improvement of financial efficiency, helping to release the siphon effect on regional digital finance highlands (Tian Xiujuan et al., 2021; Li Rui, 2021).

Existing literature mainly explores the impact of digital technology on industrial structure transformation and economic growth at the national macro level or a single industry level, and there is little in-depth analysis of the theoretical mechanisms and transmission pathways involved. This article attempts to construct a multi-sector Schumpeter endogenous growth theory model that introduces the development factors of digital technology, and studies the heterogeneity of the application and transformation of digital technology in the real industry and financial sectors on industrial structure adjustment and economic growth. This provides theoretical support for empowering the transformation and development of the real economy with digital technology and provides reference basis for the next path optimization in China.

3. Theoretical Model

This article is based on the "creative destruction" mechanism of Aghion and Howitt (1988, 1992), referring to the multi-sector Schumpeter endogenous growth theory model of Yixin and Liu Fengliang (2015), drawing on the construction method of Ngai and Pissarides (2007) exogenous technology progress multi-sector growth theory model, and Acemoglu and Guerrieri (2008) horizontal technology progress multi-sector endogenous growth theory model, introducing digital technology factors, Establish a multi-sector Schumpeter endogenous growth model that includes the general product department, final product department, intermediate product department, and financial department.

The characteristics and practical basis of this model are as follows: (1) From the above analysis, it can be seen that on the one hand, the integration of digital technology with enterprise production, manufacturing, organizational operations, and other aspects has effectively improved the productivity of the production department; On the other hand, the integration of digital technology and the financial sector can improve the efficiency of the financial sector and alleviate financing constraints. This model simultaneously depicts the process of the application and transformation of digital technology in the production and financial sectors, which affects the adjustment of industrial structure and drives economic growth. (2) China's financial system is dominated by commercial banks, with indirect financing accounting for a high proportion of the total social financing scale. With the continuous improvement of the financial system, direct financing plays an increasingly important role in the financing of technology research and development enterprises. Equity financing for enterprises faces lower liquidation risks than bank loans, which is particularly important for technology research and development departments with higher research and development risks and longer research and development cycles. This model is based on the financing characteristics of the production and technology research and development departments, which not only includes the improvement of financial intermediary functions by commercial banks relying on digital technology to reduce financing costs and increase profitability, but also considers the mitigating effect of digital technology on financing constraints in direct financing, making the theoretical model as close to the actual economic operation as possible.

3.1. General Product Department

The model economy includes a fully competitive general product sector, where representative manufacturers use the CES production function to combine the final products of all n industries in the economy to produce general products (Yixin, Liu Fengliang, 2015), which can be used for household consumption and government purchases.

$$Y_t = \left(\sum_{i=1}^{n} \omega_i Y_{it}^{\frac{\varepsilon-1}{\varepsilon}} \right)^{\frac{\varepsilon}{\varepsilon-1}} \tag{1}$$

Where, Y_t is a universal product. Y_{it} is the final product of the second industry, and i=1, 2, 3,..., n. parameter ω I represents the importance of the final product of the industry in the production of general products, and $0<\omega_i<1$, $\sum_{i=1}^{n} \omega_i = 1$. Alternative elasticity ε Represent alternative features between industry end products.

The CES setting form of the general product production function indicates that the scale return of production technology remains unchanged, meeting the concave characteristics and rice field conditions. In a completely competitive market environment, representative manufacturers of general products achieve maximum profits by selecting the optimal industry final product investment combination under the premise of fixed final product prices and general product prices in various industries.

3.2. Final Product Department

There are n industries in the economy, and the final product market and factor market of each industry are completely competitive. Consistent with standard literature practice, the final product department utilizes labor and intermediate products with a continuity of 1 for production, and its production function is the Cobb Douglas production function with constant returns to scale:

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$$Y_{it} = \left(\theta_{it} A_{it}\right)^{\alpha} L_{it}^{\alpha} \int_0^1 x_{it}^{1-\alpha}(j) d_j, i = 1, 2, \cdots, n \tag{2}$$

Among them, Y_{it} is the final product of the industry. L_{it} is the labor input used to produce the final product of the industry, and the total labor input of each industry is equal to the labor endowment. X_{it} (j) refers to the investment amount of specialized intermediate products j in the final product of the production industry. To simplify the analysis and focus on the development of digital technology, it is assumed that the technological level A_{it} is the level of digital technology development, θ_{it} is the conversion factor for the application of digital technology in the production department, then $\theta_{it}A_{it}$ is the improvement of production efficiency in the production department by digital technology, $\theta_{it}A_{it}L_{it}$is an effective labor force for improving production efficiency.

The setting form of the industry's final product production function indicates that the scale return of production technology remains unchanged, meeting the concave characteristics and rice field conditions. In a completely competitive market environment, the final product manufacturer of the i-th industry maximizes profits by selecting the optimal combination of labor and intermediate factor inputs, provided that the nominal wage level of labor factors and the price level of intermediate factors are established:

$$\max_{L_{iti} x_{it}(j)} P_{it} \left(\theta_{it} A_{it}\right)^{\alpha} L_{it}^{\alpha} \int_0^1 x_{it}^{1-\alpha}(j) d_j - w_{it} L_{it} - \int_0^1 P_{it}(j) x_{it}(j) d_j \tag{3}$$

In the case of complete competition in the labor market and intermediate goods market, the solution to the unconstrained maximization problem can be obtained as follows:

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$$w_{it} = P_{it}\alpha\left(\theta_{it}A_{it}\right)^{\alpha} L_{it}^{\alpha-1}\int_0^1 x_{it}^{1-\alpha}(j)d_j \tag{4}$$

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3.4. Intermediate Product Department

Manufacturers of intermediate product departments in various industries can freely enter. According to the "creative destruction" mechanism, intermediate product manufacturers become monopolists of this type of intermediate product by acquiring the latest technology, and their monopoly position is replaced by manufacturers who possess the new technology with the successful development of updated technology. Assuming that capital is the only input for the production of intermediate products, as the incumbent intermediate product manufacturer can obtain monopolistic profits, that is, having sufficient assets (expected profits) as collateral, banks show a strong willingness to provide sufficient financial support. At the same time, intermediate product manufacturers can utilize the institutional characteristics of banks such as collateral and liquidation to reduce the interest payments required to compensate for bank investment risks, Choosing bank credit at this time is beneficial for reducing information costs caused by information asymmetry (Zhang Yilin et al., 2016). Assuming that one unit of capital investment corresponds to the production of one unit of intermediate products, intermediate manufacturers maximize profits by selecting the production volume of intermediate products:

$$\max_{x_{it}(j)} \pi_{it}(j) = P_{it}(j)x_{it}(j) - D_{it}x_{it}(j) \tag{6}$$

Among them, D_{it} is the borrowing cost required for the production of intermediate products per unit, which can be seen as the loan interest rate of commercial banks. According to the first-order conditions, the supply volume of intermediate products and the monopoly profit of intermediate manufacturers are:

$$x_{it}^{*}(j) = \left[\frac{P_{it}(1-\alpha)^2}{D_{it}}\right]^{\frac{1}{\alpha}} \theta_{it}A_{it}L_{it} \tag{7}$$

$$\pi_{it}^{*} = \alpha\theta_{it}A_{it}L_{it}P_{it}^{\frac{1}{\alpha}}\left(\frac{1-\alpha}{D_{it}}\right)^{\frac{1-\alpha}{\alpha}} \tag{8}$$

3.5. Financial Department

The financial sector includes both direct and indirect financing sectors, which absorb deposits from the household sector and provide financing services for the production activities of the intermediate product sector and the research and development activities of the technology research and development department, thereby converting savings into investment. The direct financing department is represented by securities companies, and its income comes from the commission charged for providing equity financing for enterprises. The deep integration of digital technology and finance further solves the problem of information asymmetry in direct financing, reduces the probability of moral hazard and default risk, increases the cost of information fraud for bad enterprises in equity financing, and reduces the cost of listing and financing for good enterprises, It has promoted the development of China's securities listing from an approval system to a registration system, so the development of digital technology is inversely proportional to the cost of equity financing faced by enterprises. The indirect financing department is represented by commercial banks, and its revenue source is the loan deposit balance of commercial banks. Digital technology empowers commercial banks to enhance their ability to identify customers, price assets, and manage risks externally, thereby improving their profitability; On the other hand, it improves the efficiency of internal operations and management of commercial banks, reducing management costs and liquidity risks.

4. Model Estimation

4.1. Model solving

The conditions for clearing the commodity market are:

$$Y_t = C_t + Gov_t \tag{9}$$

The conditions for clearing the financial market are:

$$E_t + S_t = K_t + R_t \tag{10}$$

The conditions for clearing the labor market are:

$$\int_0^1 L_{it} d_i = L_t \tag{11}$$

4.2. Parameter estimation

Use Bayesian estimation to estimate the parameters of other structural parameters. The Bayesian estimation of parameters is first applied to the state space solution of the model using the Kalman filtering algorithm, and the likelihood value of the dynamically optimized model is calculated based on the sample data. Then, a random walk Metropolis Hasting algorithm is used to simulate 300000 times to generate a Monte Carlo Markov chain of the estimated parameters to obtain a posterior estimation sample of the structural parameters. The point estimation of structural parameters can be obtained from the mean or median of posterior samples, and the variance of point estimation of structural parameters can be obtained by calculating the simulated second-order moments of posterior samples. The actual observed variables in the parameter estimation of this model include real GDP, output of various industries, real wages, real household consumption, government expenditure, real interest rates, and the level of digital technology development. The sample interval is from the first quarter of 2015 to the second quarter of 2021, and the data is sourced from the website of the National Bureau of Statistics, EPS database, Guotai An database, and iFind database. This article uses the CensusX12 method to seasonally adjust the data to eliminate seasonal disturbances, uses HP filtering to eliminate trend terms, and uses the fluctuation part for Bayesian estimation and model evaluation. Set the prior distribution of the parameter to be evaluated, set the prior distribution of the parameter in the definition domain R to normal distribution, set the prior distribution of the parameter in the definition domain (0, 1) to beta distribution, set the prior distribution of the parameter in the definition domain non negative to gamma distribution, and set the standard deviation prior distribution of exogenous shocks to inverse gamma distribution. The distribution of posterior parameter samples in random simulation sampling is mostly close to normal distribution, indicating that the sampling method can effectively obtain parameter values from posterior samples.

The posterior mean of the parameters falls within a reasonable range, and the posterior mean is very close to the prior mean. From the perspective of the sustainability of structural shocks, prior assumptions overestimate the sustainability of the impact of structural shocks on agriculture and production services, indicating that structural shocks in agriculture and production services exhibit short-term effects, while the evolution path dependence of digital technology autoregressive parameters in industrial enterprises, high-tech industries, and financial industries above designated size is strong, and structural shocks exhibit strong sustainability. From the perspective of structural shock standard deviation, the exogenous shock standard deviation of industrial enterprises above designated size, high-tech industries, and the financial industry is relatively large, which is related to the widening gap in industry differentiation under the current economic structural transformation, increasing the uncertainty of exogenous shocks.

5. Simulation Analysis

This article applies different external shocks to the steady-state benchmark model, each with a positive standard deviation of one unit, and conducts numerical simulations to obtain response curves to examine the impact path of digital technology application transformation in the production and financial sectors on industrial structure transformation and economic growth.

The impact of the application and transformation of digital technology in the production sector on the transformation of industrial structure. The response diagram of the contribution of the output value of the sample production department to the one unit positive standard deviation impact of digital technology application and transformation in that production department. The contribution of agricultural output value increased by nearly 1 percentage point in the current period, and the positive response was strong in the first quarter. The positive impact response continued until the ninth quarter, when the contribution of agricultural output value at the equilibrium level increased by about 4.2 percentage points compared to the initial steady state. The contribution of industrial enterprises above designated size to their output value fluctuated positively by 24% in the current period, and continued to improve their shock response in the first quarter, with a maximum fluctuation of 37 percentage points. In the fifth quarter, they returned to the equilibrium level, at which point the equilibrium level increased by about 10% compared to the initial steady state. The contribution of the output value of the production service industry slowly declined after a positive fluctuation of 19 percentage points in the current period, and returned to the equilibrium level in the seventh quarter. At this time, the equilibrium level increased by about 3.5% compared to the initial steady state. The contribution of the output value of high-tech industries has rapidly increased by 30% in the current period, and rapidly declined in the first quarter, returning to the equilibrium level in the second quarter. At this time, the equilibrium level has increased by about 5 percentage points compared to the initial steady state.

From the analysis of impact response results, it can be seen that the improvement of digital technology's application and transformation ability in the production department can enhance the steady-state level of the production department's contribution to output value. The response of agriculture and industrial enterprises above designated size to the impact experienced a continuous upward phase in the first quarter, due to the distinct production cycle characteristics of agriculture, and technological progress will continue to be reflected in the future cycles of agricultural production. In contrast, high-tech enterprises and production service enterprises have the characteristic of "small boats are easy to turn around", which can quickly integrate digital technology with production operations and unleash their value in the current period

6. Conclusion and Inspiration

This article is based on the "creative destruction" mechanism and establishes a multi-sector Schumpeter endogenous growth theory model that introduces the development factors of digital technology. It deduces and analyzes the transmission mechanism of digital technology promoting industrial structure transformation and economic growth, focusing on two paths of digital technology empowering the transformation and development of the real economy, Conduct in-depth research on the heterogeneity of the application and transformation of digital technology in the physical and financial sectors on industrial structure transformation and macroeconomic growth. Research has shown that empowering the transformation and development of the real economy with digital technology must simultaneously enhance the dual influence of technological innovation and financial innovation. On the one hand, digital technology directly improves productivity through integration with the production and operation of physical enterprises. The application and transformation impact of digital technology in the physical industry sector, especially in industrial enterprises above designated size, can significantly promote long-term macroeconomic growth. However, compared to other industries, the integration and integration of digital technology with industrial enterprises above designated size face a longer period of adaptation. On the other hand, the integration of digital technology and the financial sector can quickly promote the growth of high-tech industry output by alleviating financing constraints, thereby effectively promoting the optimization and upgrading of industrial structure in the short term.

The research findings of this article provide the following insights for optimizing the path of digital technology empowering the transformation and development of the real economy in China:

Firstly, strengthen the research and development of digital technology and precise innovation, and build the core competitiveness of the digital economy. Digital technology is the driving force behind the digital transformation and development of the real economy. The research and development of cutting-edge digital technology is the core foundation for developing the digital economy, promoting digital industrialization, and digitizing industries. Currently, it is necessary to further increase the research and development efforts in the field of digital technology and seize the commanding heights of technological precision innovation as soon as possible. While accelerating technological innovation, it is also necessary to improve the standardization level of digital technology in China, actively explore the integration of new technologies with financial services and production management, and promote the digital transformation process of enterprises.

Secondly, promote the deep integration of digital technology and industry, and promote the transformation and upgrading of industrial structure. The optimization and adjustment of industrial structure is an important part of the transformation and development of the real economy. On the one hand, the optimization and upgrading of industrial structure is reflected in the increase in the proportion of production services and high-tech industries in the economy. On the other hand, more importantly, industrial enterprises above designated size, which account for nearly half of China's gross domestic product, must accelerate digital transformation and development. The cross integration of digital technology and enterprise production and operation activities has improved the effective labor productivity of various production departments, and has led to a greater sustained increase in output value through the scale effect of industrial enterprises above designated size. Each production department should strengthen the integration and integration of digital technology in their own production business and enterprise operations, especially improving the application and transformation capabilities of digital technology in the transformation and upgrading of industrial enterprises above designated size. Due to enterprise adaptation, the transition period between new technologies and enterprise production and operation should be shortened, in order to help optimize and adjust the industrial structure in the long term and serve the high-quality transformation and development of the real economy.

Thirdly, leverage the advantages of integrating digital technology with the financial sector to facilitate the transformation of economic growth momentum. On the one hand, the development of high-tech industries is a key source of driving force for the transformation of economic growth momentum, and on the other hand, its development is more sensitive to the alleviation of financing constraints. The financial sector should effectively leverage the advantages of digital technology, innovate financial products, allocate resources reasonably, and find a financial support model that matches the healthy start and sustainable development of high-tech enterprises, in order to promote the rapid development of high-tech industries in the short term and accelerate the transformation of economic growth momentum.

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References

[1] Li X. H., Innovative Development of Service Manufacturing Driven by Digital Technology, Reform, Issue 1, 2021.

[2] Cai Y. Z., Niu. X. X., Measurement and Structural Analysis of the Value Added of China's Digital Economy, Chinese Social Sciences, Issue 11, 2021.

[3] Li Y., Cheng B. Q., Financial Technology Development Driving China's Economic Growth: Measurement and Mechanism of Action, Guangdong Social Sciences, Issue 3, 2018。

[4] Liu P. F., Zhang W., How can digital technology empower total factor productivity in manufacturing? Science of Science Research, Issue 8, 2021.

[5] Xu H., Zhang Y. L., Cao Y. J., Digital Economy, Technology Spillovers, and Dynamic Competition Policies, Managing the World, Issue 11, 2020.

[6] Peng G., Ju. l., Chen R., Research on the Production Accounting of China's Digital Economy from the Perspective of SNA, Statistical Research, Issue 7, 2021.

[7] Zhang X. C., Exploring the Stratification of Social Reproduction under Digital Technology, Financial Science, Issue 12, 2021.

[8] Tian X. J., Li R., Yang G., The Impact of Financial Technology on the Development of the Real Economy: An Empirical Analysis Based on the Dual Paths of Financial Innovation and Technological Innovation, Guangdong Social Sciences, Issue 5, 2021.

[9] Li R., Has Financial Technology Promoted the Optimization of China's Industrial Structure: An Analysis Based on Spatial and Threshold Effects, Economics and Management, Issue 5, 2021.

[10] Yi X., Liu F. L., Financial Development, Technological Innovation, and Industrial Structure Transformation: A Theoretical Analysis Framework for Multidepartmental Endogenous Growth, Management World, 2015, Issue 10.Acemoglu, D. and Guerrieri，V., 2008, “Capital Deepening and NonBalanced Economic Growth”, Journal of political Economy, Vol.116,pp.467~498.

[11] Aghion, P. and Howitt, P., 1988, Growth and Cycles Through Creative Destruction, Mimeo, MIT.

[12] Aghion, P. and Howitt,P., 1992, “A Model of Growth Through Creative Destruction”, Econometrica, Vol.60,pp.323~351.

[13] Goldfarb, A. and Tucker, C., 2019, “Digital Economics”, Journal of Economic Literature,Vol.57(1), pp.3~43.