Study on the Employment Model of Applied Vocational Education in the New Era of Digital Economy

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Abstract: For the development of digital economy technology, many new problems have arisen: Based on the labor process theory, relative surplus population theory and technological innovation theory, this paper analyzes the impact of the application of machines in the capitalist era on employment. Starting from the basic concepts of digital economy, this paper discusses the impact of technological change on employment. Then it analyzes the control of the labor process by digital economy technology, the de-skilling of labor and the changes of workers themselves. It establishes a theoretical framework of history-theory-practice and provides a new research perspective for analyzing the impact of digital economy on employment. And put forward to strengthen the digital economy application vocational education, adapt to the needs of The Times and other suggestions.

1. Introduction

As a general technical tool in the new era, digital economy technology has super permeability and integrates with traditional industries to create a new way of working in the smart industry. In the era of digital economy, labor employment shows new characteristics, the total amount of labor employment, labor supply and demand relationship, employment structure, employment mode, labor income share have changed, it is necessary to study the characteristics of employment according to relevant theories.

National policies support the implementation of major national science and technology projects related to the digital economy, and promote the deep integration of the digital economy with various industries [1]. In the era of digital economy, the production process deeply integrates digital economy technology, information physical system and big data technology to achieve a production mode that is free from human control and fully automated [2]. The demand for low - and medium-skilled workers is significantly reduced, while the demand for high-skilled workers is increased [3]. The new technological revolution with the digital economy as the core has shaped a new type of labor relations, and its labor process management mode, the establishment of labor conditions and the acquisition of labor remuneration have undergone great changes compared with the traditional labor process [4]. The flow of workers between different industries is essentially the result of matching the skills of workers with the demands of work tasks after the technological change. The digital economy drives job changes for workers [5].

Based on Marx's political economy theory, this paper analyzes the historical effects of the first three scientific and technological revolutions on labor employment, analyzes the overall effects of digital economy on employment, describes the reconstruction of global value chain by digital economy technology, and measures the impact of technological progress of digital economy on labor employment.

2. Concept Definition

2.1 Digital Economy

Digital economy refers to a new economic form of production, distribution, exchange and

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consumption activities promoted by modern information network and information technology with data resources as the key element .

The digital economy relies on data and computing power, and the core of its development is algorithm. At present, deep learning is the most widely used. On the basis of the base layer and the core layer, the middle layer is formed - professional technical services, such as speech recognition, computer perspective, image processing, etc. Finally, a vertical industry application layer such as transportation, medical care, education and finance has been formed. At the application level, the fields of digital economy application include mobile Internet, intelligent travel, service robots, intelligent agriculture, intelligent news writing, machine bionics and so on. In the future, the evolution of the digital economy will move in two directions. One is a digital economy based on big data, which can also be called "data intelligence," using machine learning technology to mine big data. The other is a digital economy based on brain science or cognitive science, which can also be called "machine intelligence", which is a general machine intelligence achieved after a more comprehensive understanding of the human brain (biological intelligence).

2.2 Labor employment

Labor employment, referred to as employment, refers to workers who have the ability to work voluntarily engaged in some kind of social labor with a certain labor remuneration or business income within the legal working age. Employment related to economic activities includes three levels of meaning: first, employment labor is a kind of paid labor, second, employment labor is a kind of social and economic labor, and third, the employee has both the ability and the willingness to work. Employment generally includes: doing some work and earning an income; Absent from work due to illness/accident/leave or other temporary reasons; Employers and individual business operators devote more than one third of their time to work within a specified period. China defines the working age as 16 to 60 years old for men and 16 to 55 years old for women, and most countries in the world generally define the working age as 16 to 65 years old.

Total employment refers to the total number of people participating in employment, and generally refers to the number of employed or employed persons in a statistical sense. According to the definition of the National Bureau of Statistics, the total employment refers to the total number of people over the age of 16 who are engaged in labor for the purpose of obtaining labor remuneration or business profits, or who are temporarily out of work due to personal leave, on-the-job study, shutdown, depression of the unit, etc.

2.3 Labor process theory

In capitalist society, in order to obtain surplus value, capitalists combine laborers, labor objects and labor means through compulsory means, which requires society to satisfy that on the one hand, laborers have nothing and cannot survive unless they sell their labor force. On the other hand, capitalists continue to purchase labor force in order to expand reproduction.

The theory of labor process should contain four main points. First, labor creates surplus value, and labor plays a core role in production, so the analysis focuses on the relationship between labor and capital and labor, and should give labor a basic position in the struggle against the capitalist system. Second, the internal demand of capital accumulation forces capital to continuously innovate the labor process, and the pressure of this innovation comes from the competition between capital and the antagonism of capitalist labor-capital relations. Third, in the process of labor, in order to ensure that capital gains profits and actually owns the purchased labor, capitalists must implement a control system over labor, which actually reflects the process of labor's transformation from formal subordination to actual subordination of capital. Fourth, capital attempts to control labor conditions and processes, exploit workers' surplus value, and maximize their interests in labor-capital relations. These behaviors stimulate the working class to engage in various forms of resistance and struggle. However, in order to promote continuous innovation in the labor process, capital must obtain innovation and cooperation from the concrete production process of workers. So some measures can be taken to make the workers from resistance to obedience to voluntary work.

2.4 Marx's theory of relative excess population

Marx believes that relative surplus population is an economic phenomenon accompanied by the improvement of the organic composition of capital and the process of capital accumulation when the social productive forces develop to a certain stage. In capitalist society, the organic composition of capital shows an upward trend. Since the demand of capital for labor actually depends on the quantity of variable capital, the increase of the organic composition of capital reduces the demand for variable capital, which means that the relative demand of capital for labor force decreases, and eventually the demand for labor force under capitalist system decreases relatively substantially, resulting in unemployment. Form a "relative surplus population".

In short, the essential feature of capital's pursuit of profit maximization determines that in the process of capital accumulation, capitalists always strive to improve productivity and increase the exploitation rate, so that the constant capital grows faster than the variable capital, which leads to the reduction of the relative or even absolute demand for labor force and the formation of the "relative surplus population" and industrial reserve army unique to the capitalist society.

2.5 Technological innovation theory

Many scholars have studied the influence of technology on economic growth and employment, and formed the theory of technological innovation. Although Marx did not explicitly use the term technological progress, he expressed technological innovation through the revolution in the means and conditions of labor and the improvement of machinery. Technological innovation is the ability to transform the world. Marx argues that entrepreneurs adopt new technologies and use new machines when producing relative surplus value, which is actually the process of changing the entire mode of production by changing the technical conditions of the production process. Technological innovation is the main source of economic growth, and the imbalance of technological change leads to changes in economic structure, resulting in periodic unemployment, which is also called "creative destruction" by Schumpeter, that is, the new technological innovation will inevitably promote the demise of old technology and destroy the old productivity.

3. The historical effect of scientific and technological revolution on employment

3.1 The first technological revolutiont

The first scientific and technological revolution, represented by the invention and use of the British steam engine, adopted a large-scale mechanized production mode, realized the major progress of replacing human muscle power with mechanical power, formed the capitalist factory system, initially established the modern industrial system, and opened the prelude to large-scale industrial production by machines. Before the outbreak of the first scientific and technological revolution, the main form of production organization in British society was the manual workshop, which gathered workers together to carry out orderly and regular labor, but at this time, the social division of labor had not yet formed, and the production scale of the manual workshop was small and the fixed capital was less. The employment situation in the United Kingdom is relatively stable, and most of the workers are engaged in one type of work for life. The management mode of workers is based on apprenticeship, which is convenient for artisans and other craftsmen to inherit their manual skills. After the outbreak of the Industrial Revolution, the development of large-scale machine industry weakened the monopoly of handicraft unions on technology, caused the resistance of handicraft workers and trade unions, and broke out large-scale labor-capital conflicts.

During the Industrial Revolution, the British government was influenced by economic liberalism, and its legislation on industrial relations was characterized by abolishing its binding nature and advocating the establishment of a new type of industrial relations based on individual labor freedom and contract freedom. In the 1850s, the Industrial Revolution had been basically completed in Britain, and product innovation was gradually decreasing, and the conflict of interest between skilled and unskilled ordinary workers caused major divisions within the British trade unions. The progress of mechanization technology reduces the skill level of workers required in the production process. In

order to maintain the control of the labor process and prevent the substitution of unskilled ordinary workers, skilled workers take the initiative to exclude and damage the interests of unskilled workers.

3.2 The second technological revolution

In the 1880s, the British economy gradually depressed, on the one hand, the cotton textile industry, iron smelting industry, railway transportation industry appeared diminishing returns to scale, on the other hand, since the 1860s and 1970s, new industries and new technologies in the United States, Germany and other countries synchronously occurred. The United States, Germany and other countries actively absorbed the technological achievements brought by the first scientific and technological revolution, and began new technological innovation, prompting the economy to achieve a leap growth, by 1880, the United States industry surpassed the United Kingdom, ranking first in the world. The technological innovation of the second scientific and technological revolution is mainly manifested in the invention and application of electricity, as well as the innovation of internal combustion engines and transportation vehicles.

Technological change has changed the requirements of the workers themselves. The Tero system in the electric age and the Ford system in the oil age have prompted the workers to develop in the direction of standardization, low-skill, consumption equality and one-way. During the second scientific and technological revolution, the society was deeply influenced by the standardization thought of the Tyro system, and the behavior of laborers was standardized and fixed, becoming a production tool like mechanical machinery and equipment. The division of labor on assembly lines erodes the demand for skills, making workers fungible, low-skilled or even unskilled. After World War II, industrial capitalist countries, especially the United States, achieved unprecedented growth in GDP and per capita consumption, including not only non-durable consumer goods, but also durable consumer goods with investment attributes such as automobiles and freezers.

3.3 The third technological revolution

The third technological revolution began in the United States in the 1940s and rapidly expanded to other countries such as Europe and Japan. Compared with the previous two scientific and technological revolutions, the cycle of the transformation of science and technology into emerging industries in this technological revolution is greatly shortened, and the time from theoretical innovation to practical application is generally no more than ten years. For example, the gap between the invention of the transistor and the application of the mobile phone was four years. The technological revolution based on microelectronics, Internet, atomic energy, space technology and bioengineering has promoted the changes in the industrial structure of capitalist countries, and promoted the world's main production organization form from the Ford system of mass production to the post-Ford system of flexible customized production. At the same time, the technological change has also profoundly affected the labor relations in the field of production labor.

From the 1970s to the present, capitalists' behavior of squeezing workers' wages to increase the marginal profits of enterprises has constantly appeared in capitalist countries, which retain the scientific management system of the Tyro system and carry out the large-scale assembly line production mode of Ford's main concept. However, post-Fordism is different from neo-Fordism in that it is a form of production organization different from Fordism. In the study of some European countries and Japan, the moderating school found that Fordism in these countries or regions is changing to post-Fordism.

4. The impact of digital economy on employment

4.1 Labor process

Since the industrial revolution, the social production mode has experienced simple machine production, mechanized assembly line production, semi-intelligent automated production, and gradually moved to the stage of fully intelligent production. In this process, human beings use technological progress to enhance the overall labor capacity of human beings, constantly break

through their own physiological limits, in order to improve labor productivity, which realizes the mechanization of labor materials and the "decentralization" of human labor, and develops in the direction of "decentralization" of human labor.

During the second scientific and technological revolution, Taylor and Ford production lines based on machine systems mechanized labor materials such as power machines, transmission machines and working machines, standardized labor tasks through division of labor, and the technical system of the bureaucratic management department determined the work content and speed that each worker needed to complete. The management in the enterprise realized the actual control of the labor process, and the workers began to lose the right to control their own labor. From the beginning of the third scientific and technological revolution, semi-intelligent automation technology began to be widely used in the specific production process, especially the automation application of machine tools in the manufacturing industry can not only achieve automatic operation according to the instructions of managers, but also adapt to flexible production needs, greatly improving the efficiency of production. Semi-intelligent automatic production is based on the mechanized production line to realize the automatic operation of machinery and equipment, which mainly relies on a programmable automation technology that can be stored in the computer to control the operation of the machine. With the development of big data production, storage and algorithm technology, the digital economy has been applied more and more widely in the production process, including industrial robots, intelligent production workshops, intelligent logistics systems and so on. Intelligent production process is based on automation, deep integration of digital economy technology, information physical system (CPS) and big data technology, in order to achieve a completely automated production mode away from human control.

4.2 Industrial structure and regional structure

The difference in the elasticity of substitution of different types of labor caused by technological progress such as digital economy leads to the unbalanced impact of digital economy on the organic composition of capital of various industries, which is reflected in the employment level and income distribution of various industries. On the basis of the different degree of organic impact of digital economy on the capital of various industries, combined with the different economic development status, the number and structure of labor force in each region, the impact of digital economy on employment in each region is also quite different.

Like previous scientific and technological revolutions, the digital economy improves labor productivity by updating machines and reforming business organizations. But the digital economy is different from previous technological revolutions in that the new machines include not only physical hardware but also virtual software. The digital economy integrates big data, machine learning and other technologies, and through repeated cycles and upgrades, the machine is becoming more and more "smart" and "intelligent", effectively reducing the defective rate of products, improving the accuracy of product production, realizing the savings of constant capital, and slowing down the speed of the organic composition of capital to varying degrees. The digital economy not only affects the production process, but also has a profound impact on the areas of circulation and consumption. In the field of circulation, the digital economy strengthens the control of the circulation field, which is specifically reflected in the retail, transportation, logistics and other industries, such as unmanned stores, intelligent supply chains, intelligent transportation systems, automatic logistics vehicles, etc. The use of these new technologies will greatly improve the production efficiency of enterprises in the circulation field, reduce the required labor force, and thus improve the capital technology composition.

4.3 Total employment

Every revolutionary technological change will make the labor market greatly changed, and now the new revolutionary technology of digital economy technology is breaking the previous balanced labor market, creating a new "ecological balance" of the labor market. Digital economy not only has negative destruction effect and substitution effect on employment, but also has positive expansion effect and creation effect. The two effects work together to form the final overall effect of digital

economy on employment.

The introduction of digital economy technology has replaced more procedural and standardized jobs, especially for routine operation and cognitive labor, such as personnel administration, accounting, customer service, logistics and transportation personnel.

Digital economy technology continues to upgrade labor tools, which may make the labor skills of workers temporarily unable to meet the needs of the corresponding positions, and then crowded out a large number of labor. At present, the digital economy in some of the work intensity, the working environment is relatively bad, the risk factor is high and the degree of mechanization is deep industry has been able to do not need the direct participation of workers, and this destructive effect will be more and more obvious with the maturity of the digital economy technology. Finally, the application of digital economy technology promotes the improvement of the organic composition of capital and changes the demand for labor force through the substitution of production factors, which not only has a huge destructive effect on the labor supply market of low-end manufacturing and service industries, but also further reduces the value of labor force and even becomes a commodity that no one wants.

4.4 Income distribution

As a representative technology of the new round of scientific and technological revolution, digital economy is comprehensively and profoundly affecting our life. From the perspective of technological application, the digital economy has similar functions to machines, which realize the physical extension of human capabilities from the perspective of intelligence and physical strength respectively. As a technology, the digital economy is neutral, and its widespread application will not lead to employment polarization, income inequality and widening of the gap between the rich and the poor, but the capitalist application of the digital economy may lead to such results.

In capitalist society, capitalists control material wealth such as the means of production, while laborers have nothing except their own labor force. Private ownership of the means of production determines this adversarial distribution relationship under capitalism, and the distribution system based on capital distribution brings absolute inequality. However, under the socialist system, although the digital economy will exacerbate the Matthew effect of income distribution and may lead to the inequality of income distribution, adhering to the distribution system with distribution according to work as the main body and multiple distribution methods coexisting will provide a fundamental guarantee for gradually realizing the relative equality of distribution.

5. Future strategies to boost employment

5.1 Reform the education system and adjust the structure of talents

The development of digital economy makes workers' skills develop in the direction of "de-skilled" and "universal". At present, there are problems in the labor market of China, such as lack of high-quality, high-skilled talents and surplus of low-end labor force. Especially, the development of digital economy requires a large number of compound talents who understand both robot R & D operation and enterprise process characteristics. For example, architecture engineers and implementation engineers, while our country is lacking of high-end technical talents and comprehensive talents in the digital economy industry. Therefore, it is necessary to reform the education system and promote the adjustment of the talent structure to better match the development of industries related to the digital economy.

Implement the autonomy of disciplines and professional Settings, attach importance to the skills needs of workers in the digital economy and related industries, and set up related majors to meet the needs of the future development of the digital economy industry. The reform of the education system should be market-oriented, combined with the technical characteristics of the digital economy and the requirements of related industries, set up special majors related to intelligent control, equipment manufacturing, robotics, electronic information, etc., and establish practice and training bases to train more high-skilled and high-quality workers who meet the needs of the technological progress of the

digital economy. To strengthen the construction of digital economy disciplines from first-class comprehensive universities to vocational and technical schools, strengthen the training of basic scientific research talents and practical comprehensive talents, it is more necessary to emphasize the important position of enterprises in personnel training, and realize the joint training of the government, universities and enterprises.

5.2 We will strengthen vocational training for workers

Although the digital economy currently replaces mostly low-skilled workers in conventional jobs, the degree of digital economy replacing high-skilled workers will gradually increase in the future. Therefore, it is wise to strengthen the vocational training of workers and improve their comprehensive literacy to cope with the changes in labor market demand.

The online education platform can be used to develop online vocational skills training, and the goal of employment information exchange and real-time training can be achieved through personal accounts.We encourage different training institutions to provide flexible and targeted training content and training methods, break the dilemma that vocational skills training content is out of line with the actual needs of emerging industries, and actively improve the quality of vocational skills training. At the same time, actively explore the "enterprise customized, government paid" employment training methods, through tax incentives, special allocations, training subsidies and other ways, to guide enterprises and training institutions to participate in a new round of technological change of labor training.New employment directions should be pointed out in advance for workers who have the potential to adapt to technological changes in the digital economy, and a comprehensive system of employment guidance, employment training and employment recommendation should be formed to reduce the cost of job transfer or job search for workers.

5.3 We will encourage the development of new manufacturing industries

We will accelerate the development of new manufacturing industries related to the digital economy to create more jobs for the future. Cultivate the emerging manufacturing industry related to the digital economy, improve the capability of independent research and development of domestic science and technology, seize the opportunity in international competition, and compete for the right to speak in the market; At the same time, promote the transformation of traditional manufacturing to the direction of automation and intelligence, and increase the subsidy policy for intelligent research and development of enterprises. Do not encourage the introduction of foreign full sets of original machinery and complete sets of technology, relatively encourage the introduction of foreign key technologies and core supporting parts, on this basis to develop new technologies with independent property rights, in order to improve the core competitiveness of China's digital economy-related manufacturing industry.

Encourage the regional flow of talents and optimize the spatial allocation of talents. In view of the different development levels of different regions of the digital economy, the government should optimize the spatial allocation of different talents according to market demand, support the development of digital economy enterprises in different regions, and encourage enterprises with advantages to establish branches in different regions, so as to provide the possibility of cross-regional flow of digital economy talents. And the country should develop a unified standard on digital economy talents and mutual recognition of talent evaluation results as soon as possible, in order to break the barriers to the cross-regional flow of relevant talents. Provide equitable educational opportunities and narrow the educational gap between regions. The combination of digital economy, big data, Internet and education contributes to the formation of equitable educational opportunities and makes it possible to narrow the educational gap between regions.

5.4 Adjust the income distribution structure based on the characteristics of the digital economy

Based on the characteristics of the digital economy, the development of the digital economy intensifies the factor bias and skill bias of income distribution, and the digital economy can also enhance the inclusive effect of income distribution under the socialist system. Since the 18th CPC

National Congress, China has gradually improved its socialist distribution system, achieved the goal of equalizing basic public services and built a moderately prosperous society in all respects, laying a solid foundation for the adjustment of the income distribution structure in the new era.

The key to the development of the socialist income distribution system is to form an olive distribution structure, which needs to constantly coordinate the primary distribution, redistribution and tertiary distribution. In the initial distribution, China needs to clarify the proportion of labor distribution according to work and production factor owners according to factor distribution, focus on protecting labor income, improve the flexibility of the salary system for technical personnel, expand the channels for increasing skill income, promote the spirit of craftsmanship, and increase the intelligent income of workers. Therefore, the focus of the primary distribution policy is to increase the wage income of front-line workers in order to increase the proportion of labor income in the primary distribution. In the redistribution, our country should speed up the construction and improvement of social security system, including pension insurance system, medical insurance system, unemployment insurance system, social relief, social welfare and social special groups system, etc. In the third distribution, the government should make every effort to develop and regulate social philanthropy, streamline and legalize charitable activities, and give appropriate tax incentives to advanced individuals, groups and enterprises in charitable donations.

5.5 Improve the regulatory system for domestic digital trade

Faced with the challenges brought by the development of digital economy to China's international trade, our government should actively improve the regulatory system of domestic digital trade in order to protect consumers' rights and maintain network security. On the one hand, platform-based small-scale trade has stimulated international investment behavior, but the high cost of trade rights protection caused by fraud or false advertising in international trade makes the rights and interests of consumers not guaranteed. Therefore, the Chinese government should gradually improve the laws and regulations to protect the rights and interests of consumers in international trade, provide a safe international trade environment for consumers, and guide consumers to actively participate in international trade and investment activities. On the other hand, the development of digital technologies such as the digital economy has led to new cyber security risks in international trade, such as the security of critical infrastructure related to international settlement. China can learn from other countries to prohibit the procurement of some infrastructure related to international trade security, or require special certification of encryption systems, so as to ensure the security of international trade information.

6. Conclusion

In the 21st century, with the outbreak of big data, as well as the development of cloud computing, embedded sensing systems and digital economy dedicated chip technology, digital economy technology has made major breakthroughs and began to enter the era of machine learning. This paper systematically summarizes the impact of scientific and technological revolution on employment by using the research method of historical induction and logical deduction, and analyzes the impact of digital economy on total employment and income distribution by combining Marx's relative surplus population theory.

The digital economy reshapes the labor process by controlling the fields of production, consumption and circulation, realizing the transformation of labor from vertical division of labor to horizontal division of labor, and developing the subordination of labor to capital.

In the long run, the development and application of the digital economy can not only create new employment space, but also put forward new requirements for the skill structure of workers, improve the employment quality of workers, and play a positive role in ensuring and creating employment.

Although the digital economy will exacerbate the Matthew effect of income distribution and may lead to inequality in income distribution, if we always adhere to the ownership structure with public ownership as the main body and multiple ownership economies developing together, and the distribution system with distribution according to work as the main body and multiple modes of

distribution coexisting, It provides a fundamental guarantee for completely getting rid of the chronic disease of capitalist distribution and gradually realizing the relative equality of distribution.

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