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The Impact of AI on Labor Market and the Corresponding Countermeasures

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Abstract: Artificial intelligence (AI) has developed rapidly in recent years, bringing significant convenience to both economic and social life. AI has greatly improved labor productivity and promoted national economic growth. But at the same time, it also brought about significant changes in production and lifestyle. It has shown the most significant influences in the labor market, where the employment structure and income levels in many industries are undergoing significant changes. However, an issue that cannot be overlooked is the substantial impact AI has had on the traditional human resource market and employment models. This paper analyzes the effects of AI on the labor market, focusing on changes in employment trends, structures, unemployment, and income inequality. The study also examines the dual nature of AI and its impact on the labor market in both the short and long term, offering several policy recommendations to mitigate its negative effects. This research provides theoretical and practical insights for labor market studies towards the AI technology.

Keywords: Artificial intelligence, labor market, technology.

1. Introduction

The development of artificial intelligence is different from general technological progress. Artificial intelligence will have a more far-reaching impact on the human labor market, it will eliminate some old, unskilled jobs, but also create new industries, thus increasing some employment opportunities. Therefore, the structure of the labor market will change. In addition, the spread of AI will create structural unemployment, increase the gap of low and high salary, and reduce the cost of labor [1]. Since the introduction of artificial intelligence just over a year ago, technologies like ChatGPT have sparked widespread enthusiasm, with the potential to significantly reshape workplaces and daily life. For instance, AI can provide more systematic and professional education, helping individuals stay competitive and avoid being replaced by automation. ChatGPT, one of the most iconic AI tools, has experienced rapid growth. According to a report by Sina Finance, ChatGPT now has over 200 million active users and more than 11 million paying subscribers. It plays a crucial role in online services, chatbots, intelligent voice assistants, and knowledge quiz systems. However, its rise has also brought challenges, such as data security risks and structural unemployment [2].

The way of humans' life has significantly changed by AI technology, exerting a profound influence on the global labor market. Addressing the employment issues and labor market shifts brought about by AI will be the focus of this paper.

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2. Theoretical Basis and Literature Review

AI and automation are not only increasing the efficiency for some workers, they can also be likely to affect, to some extent, nearly all occupations [3]. The concept of creative destruction, introduced by economist Joseph A. Schumpeter, becomes the basis of the entrepreneurship theory and economic cycles. In the book of "The Theory of Economic Development", Schumpeter argues that creative destruction is the key to capitalism. How capitalism creates and destroys economic structures through price competition are not the main problems that people should focus on, rather, the competition driven by innovation is the key. Every major innovation eliminates out-date technologies and production systems while creating the up-to-date technologies. During a recession, successful innovations or the elimination of redundant competitors can lead to increased demand and productivity in an industry. However, as profitability returns, new competitors are drawn in, leading to diminished profits and eventually another recession. This process, known as short-term volatility and long-term growth, shows how every downturn holds the potential for technological innovation.

For humanity, AI represents a form of creative destruction. It eliminates some low-skilled labor while driving innovation, which significantly boosts overall productivity and efficiency. More specifically, the introduction of AI creates value for society in several ways. First, AI offers new opportunities for the labor force. The emerging industries have been boosted by new inventions and technological reforms. For example, the emergence of automobiles spurred the development of related industries like manufacturing, oil, and road infrastructure. Second, AI boosts the economy. Innovations generate numerous new jobs and technologies from emerging industries and sub-industries, such as AI itself. These advances have the potential to reshape the entire economic landscape and raise the general living standards. Whether in production or consumption, AI creates abundant opportunities for development, leading to social progress and explosive economic growth.

According to Human Capital Theory, human capital refers to knowledge, skills, attitudes, natural talents, and other acquired characteristics that contribute to production [4]. There are two components in human capital, which are complementary: natural abilities and skills acquired through education and workplace training [5]. Unlike other assets, human capital provides returns solely based on human contributions, which machines cannot replicate [6]. Additionally, human capital often determines the wages of labor. There are three main ways to enhance human capital: formal schooling, workplace training, and for-profit off-the-job training. By receiving a good education and training, workers can systematically acquire the knowledge and skills to secure a competitive advantage in the labor market. In this context, while technologies like AI can enhance productivity, they can never replace the fundamental function of human capital in driving growth of economy. Improving the educational level of the population is at the core of human capital, so investment in education is very important. The reproduction of human capital should not be seen as consumption, but rather as an investment, since its economic benefits far exceed the cost.

3. Analysis and Discussion

3.1. Labor Market Changes Due to AI

3.1.1. Employment Direction

Previous studies have found that the transition from manual to machine industries results in significant labor replacement, as artificial intelligence replaces human labor by using cheaper capital in tasks traditionally done by human labor force, thereby reducing the value creation of labor [7]. The first two industrial revolutions brought about direct labor savings through mechanized production and mass manufacturing, creating intensive labor markets, shifting labor from agriculture to manufacturing, and increasing overall labor demand [8, 9]. The third Industrial Revolution, through

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automation technology, enabled workers to perform tasks alongside machines, making labor more skill-intensive. During the fourth Industrial Revolution, artificial intelligence technology has advanced rapidly. Improvements in computing power, data collection, data storage, and algorithms have significantly increased AI's human-like capabilities, further affecting human employment [10].

Previous research has shown that the shift from human to machine-based industries has a notable labor substitution effect, with AI increasingly replacing human labor due to its cost efficiency and productivity. As a result, the introduction of AI has reduced the share of labor in value creation [7]. The first two industrial revolutions established an intensive labor market by mechanizing production and shifting labor from agriculture to manufacturing, which increased overall labor demand and boosted the need for both blue- and white-collar jobs [8, 9]. The third Industrial Revolution further increased labor's skill requirements through automation, allowing workers to collaborate with machines to perform tasks. With the development of AI during the fourth Industrial Revolution, the speed and accuracy of data collection have greatly improved [10].

The debate surrounding AI's impact on employment largely falls between two camps: techno-optimists and techno-pessimists. Techno-pessimists argue that there is no effective solution to the problem of technological unemployment yet [11]. Nevertheless, techno-optimists argue that people must work harder to enhance productivity and efficiency, thereby promoting economic growth and increasing the demand for human labor.

3.1.2. Employment Structure

AI may not directly lead to job losses, but more attention should be paid to its impact on the employment structure from the perspectives of applied research and policy analysis. The main driver of employment polarization and income inequality in recent years is the labor market's increasing shift toward high-skilled workers. As a result, the market favors high-skilled talent over low-skilled labor, breaking the equivalence of the original capital structure. Workers engaged in emotionally demanding or complex jobs have become scarcer resources, as AI cannot replace or even assist in these roles. Consequently, these workers tend to be paid more. Conversely, those in simple, repetitive jobs face a much higher risk of unemployment compared to those in more complex roles. This can ultimately result in lower pay or even job loss for these workers.

In fact, it was not only technology that advanced, but also institutions and management, even faster than technology, so that those who lost their jobs were always capable of adapting to their new positions.

3.1.3. Unemployment

The introduction of AI technology has had a significant impact on unemployment, particularly structural unemployment, which refers to unemployment caused by mismatches between the want and need of the labor force. While technological progress can increase economic efficiency, the fear of "technological unemployment" has persisted since the first industrial revolution. AI is expected to lead to job losses for the human labor force in three main sectors [1]. The first is simple and repetitive jobs, where ordinary information technology already handles patterned and repetitive mental tasks. There is little incentive for capitalists not to use AI to replace workers in these roles, as machines are more efficient, less expensive, and less prone to error than humans. The second is complex yet repetitive work, where AI's ability to learn allows it to manage more sophisticated tasks, such as intelligent speech processing. The third sector is factory work. The number of human labour in factories has declined dramatically, with many production steps being replaced by AI, which does not require rest and can perform high-risk tasks.

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3.1.4. Income Inequality

The use of AI is likely to increase income inequality, particularly for workers with lower levels of education, as they are more easily replaced by AI due to the simple and repetitive nature of their jobs. A White House report found that among those with only a high school degree and no college education, 14 percent are replaced by AI technology. By contrast, only 6 percent of workers with a bachelor's degree fall into this high-risk group. AI technology may contribute to income distribution bias by increasing the relative demand for highly educated workers in higher-paying occupations. It also suggests that AI displaces employment in low-wage jobs while complementing higher-wage jobs, potentially exacerbating overall income inequality. The capital-biased characteristics of AI are likely to further deepen the imbalance between the share of capital, as the introduction of AI applications is more likely to widen the gap between returns on capital investment and labor [12, 13].

3.2. AI's Double Sides

Artificial intelligence is undoubtedly a double-edged sword for humanity, with its impacts varying depending on perspective. Take digital devices, for example: digital learning has become a crucial tool in education, offering both positive and negative effects. Digital platforms such as Khan Academy and Google Classroom, which are non-profit organizations, aim to provide a range of online tools to help students grasp concepts or principles more easily and quickly. Moreover, digital technology enhances students' self-learning skills, enabling them to access online resources, read materials, and even assess conclusions. This improves their efficiency and productivity. Additionally, digital technologies foster critical thinking skills, which are the foundation for developing analytical reasoning. However, constant reliance on digital devices like laptops and cell phones for accessing information and completing assignments can be harmful. Students often become addicted to these devices, which negatively affects their health, particularly their eyesight, and can contribute to obesity.

Furthermore, digital technology reduces face-to-face interaction. While it appears to shorten distances between people, it does not necessarily lead to more meaningful interactions; instead, it can make individuals less attentive to those around them. There is no doubt that the digitization of education is essential for adapting to the current global educational environment [14]. However, it is equally important to analyze how to implement this system in a way that minimizes the negative effects of over-reliance on digital technologies, particularly for adolescents, and to protect them from behavioral and psychological imbalances.

3.3. Long-term and Short-term Effect

There is no disagreement that labor market will be changed by AI technology, especially in the long run. For instance, AI can allow for more flexible working hours and methods. By automating tedious tasks, AI enables humans to focus on more meaningful work. Additionally, AI technology can facilitate remote work, meaning that in certain circumstances, workers do not need to be physically present and can perform their tasks from other locations using AI tools. In the long run, AI can drive economic growth by generating more job opportunities, as workers will still be needed to operate and maintain AI systems. These workers will likely earn higher salaries, which in turn may cause the raise of consumption and investment.

In the short term, however, AI technology may polarize the labor market. High-income workers with complex, skilled jobs will not be replaced by AI and may even see salary increases. Conversely, employees in simple, repetitive roles will be easily replaced by AI, resulting in job loss and reduced wages. Consequently, the difference between the rich and the poor will continue to widen. Additionally, AI may contribute to government deficits. As AI leads to job displacement, governments will need to spend significant amounts on education and training to help the unemployed

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reenter the workforce and stabilize society, which will increase fiscal pressure. On the other hand, those who lose their jobs due to AI will no longer receive wages, limiting their ability to cover daily expenses and reducing consumption and investment. This decline in economic activity will, in turn, reduce government tax revenues, further increasing financial strain and contributing to deficits.

3.4. Policy Recommendation

There are several solutions and policies that can help eliminate the influence of AI on the labor market.

First, education and reskilling can play a significant role in reducing the impact of AI on jobs. These initiatives can promote economic growth by increasing productivity and fostering innovation. When workers attain higher levels of education, they may earn higher salaries, making them more likely to consume more goods and services or invest further. Additionally, as they become more educated and skilled, they may be able to innovate new technologies, further increasing productivity. Workers can also gain a comparative advantage by specializing in specific skills through reskilling, allowing them to use fewer resources to produce the same amount of output. Education and reskilling are long-term efforts, as technology evolves rapidly. To keep pace with these changes, continuous and long-term training programs must be provided. The cost of such education and reskilling is high, and the government has limited financial resources. It is unrealistic for the government to allocate all of its budget to education and reskilling alone.

Second, the Government should make efforts to support the labor market and establish a compensation system. The Government should provide various subsidies to the unemployed, but not simply direct cash payments. This is because it will make those laborers who have lost their jobs lose the incentive to look for work again. The government can provide basic necessities to workers who have lost their jobs due to AI to support their basic needs. This would help stabilize the society and stimulate consumption. The government can also provide them with up-to-date training to equip them with the latest technology, which will improve their chances of finding a new job.

Third, it is essential to study and establish relevant regulations to define the scope and authority of AI use. Whether or not AI is to be treated as a “human being,” it is crucial to design a set of rules governing its use and to ensure it operates with a “positive” nature. This is not only a technical issue but also an ethical one.

4. Conclusion

With the advancement of information technology, it is inevitable that AI will enter the labor market. New technologies always bring significant changes, and people must adapt to these shifts and embrace technological progress rather than avoid it. Ultimately, the anticipated outcome is that AI will change the labor market by automating routine tasks, allowing humans to focus primarily on more complex and emotional work. This shift is expected to lead to economic growth and higher productivity in long-term. Additionally, AI will likely reduce labor costs and wages to some extent.

Although this paper provides a comprehensive analysis of the impact of artificial intelligence on the labor market, discussing both long-term and short-term implications, it lacks substantial data to fully support its conclusions. The analysis would be more convincing with the inclusion of real case studies or meta-analyses of existing data. As further research and data collection methods are refined, studies on the relationship between AI and the job market will become more robust, offering better scientific guidance for practical application.

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