

Research on the impact of artificial intelligence on the labor market

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Abstract. The rapid development and application of artificial intelligence technology has brought new power to the social development, optimized the production link and management process, and improved the productivity level of manufacturing enterprises. At the same time, it has also triggered concerns in the job market about the "machine replacement". Literature analysis shows that AI applications will not bring about the "leisure era" described by Keynes, and that AI will change the labor market by replacing old jobs with new jobs, leading to the fear of unemployment and the need to learn new skills. Therefore, we should correctly understand the substitution effect of AI, seize the opportunity of talent training brought by AI, and reasonably grasp the application scope and degree of AI for enterprises in different regions and sizes.

Keywords: artificial intelligence; labour market; unemployment crisis; technological progress.

1. Introduction

In recent years, with the super-rapid development of science and technology, the society has rapidly entered a new round of scientific and technological revolution and industrial transformation led by artificial intelligence. In order to grasp the new round of scientific and technological revolution and industrial transformation, governments around the world have issued a series of relevant policies to guide the development of high-tech industries and research and innovation. Therefore, artificial intelligence is the key technology leading the new round of scientific and technological revolution and industrial transformation, and is the commanding heights of global scientific and technological competition. It was the best of times, it was the worst of times. The world is full of opportunities and challenges for development due to changing geopolitical relations. The constant iteration and advancement of Artificial Intelligence (AI) is deconstructing and reconstructing every aspect of the world. The age of leisure, as envisioned by Keynes, is not coming. In the process of the leapfrog development of intelligent manufacturing, the public is worried about the employment in the labor market. What impact will AI have on the labor market? This paper will discuss the changes in the labour market brought about by AI, the challenges that need to be addressed in the development of AI, prove that Keynes's age of leisure will not come, and summarise and highlight the problems faced in the development of AI. In the face of irreversible scientific and technological revolution and industrial transformation, only with a correct understanding of the role mechanism of artificial intelligence on manufacturing employment can people no longer fall into the panic of "machine replacement" for no reason.

2. The impact of AI on wage income

At present, the study of the impact of AI on wage income mainly presents three views.

The first is that as low-skilled labor is squeezed out of the market, the complementary effect of AI and highly skilled workers dominates, thus making the impact of AI on income a clear growth effect. Yang Xiaofeng (2018) found that artificial intelligence is beneficial to improving the level of human capital in manufacturing industry, optimizing the distribution structure of manufacturing human capital, and boosting the average wage effect of employed employees through the intermediary effect of human capital; Peng Yingying and Wang Xinyu (2020) found that the income of employees increases significantly; Cheng Hong et al. (2020) examined individuals from the micro perspective, the results showed that artificial intelligence promotes labor income. The second view is that because

AI has an alternative effect on labor force, enterprises will reduce the input of labor force and further reduce the income of workers. Benzell et al. (2015) found through two-stage generation overlapping model that with the introduction of high productivity AI, the share of labor factors and labor wage income were declining; Meng Yuanyuan and Chen Jin (2019) analyzed the panel data of 31 provinces in China from 2009 to 2017, and weakened the positive influence of artificial intelligence technology on wage level and labor quality. The third view is that the overall impact of AI on wages is not obvious. Wang Yongqin and Dong Wen (2020) analyzed the microscopic data of listed companies and found that the application of artificial intelligence has no obvious impact on the wage level; CAI Yuezhou and Chen Nan (2019) found that the process of AI is essentially a structural change, which is the process of wage transfer from low-skilled workers to high-skilled workers, and the total amount will remain basically stable. This paper holds that the application of artificial intelligence is still in the initial stage. At this stage, artificial intelligence is mainly used in front-line manufacturing positions, and the substitution effect can reduce the input scale of enterprises in labor, and reduce the production cost of enterprises. At the same time, the large-scale investment of artificial intelligence can effectively improve labor productivity, and the price of production factors is relatively reduced. Therefore, manufacturing enterprises will choose to further increase the investment range of artificial intelligence, and the number of labor force being replaced will also increase. The price of their workers is also reduced with the substitution effect, unless they learn higher skills. That is, the adoption of AI technology will have a negative impact on the number of employees, that is, the higher the adoption of AI, the more the number of employees being replaced, the number of employees will decrease.

3. A negative view of the impact of AI on employment

John Maynard Keynes once envisioned that technological advancements would increase productivity and efficiency, resulting in more leisure time (Magness & Harrigan, 2020). This seems to be the common expectation of many economists. Daniel Susskind is a fellow in economics at Balliol College, Oxford. In his book "A World Without Work," Susskind argues that advances in automation and artificial intelligence will lead to a future where most people will not work full-time jobs. He predicts that, like Keynes, society will shift values as people have more time to pursue their interests and passions (Susskind, 2020). AI seems to be able to help people realise such aspirations. More recently, the accelerated development of generative AI, with its advanced natural language capabilities, has extended the possibilities for automation to a much more comprehensive set of occupations (McKinsey & Company, 2023). However, amid this wave, workers changed jobs remarkably—and a subset made more enormous leaps and moved into entirely different occupations. Some 8.6 million occupational shifts occurred from 2019 through 2022 (McKinsey & Company, 2023). Now, even more, change is in store. For the most part, existing theoretical models suggest that AI will play two roles in the labour market: first, a complementary role, in which AI can leverage its strengths to increase the productivity of certain types of labour skills. Secondly, there is a substitution role in which AI replaces jobs once performed by the labour force. However, either way, the age of leisure is not coming. Although specific human labour will become more efficient and faster with the help of AI, it does not mean they can enjoy the extra time. First of all, the development of artificial intelligence is high-speed. To master and apply artificial intelligence technology to current life production, you must spend a lot of time and money learning (Handelman et al., 2019). In addition, there is now widespread concern about whether AI will replace people in specific jobs, creating a massive unemployment crisis. One study, on the other hand, applied a probabilistic classification model based on the O*NET database and estimated that 702 occupations out of all occupations in the United States have a significant likelihood of being replaced by AI, which is a ratio of about 47% of the number of all occupations (McFerren & Delavega, 2018). This does not mean that there will be fewer job opportunities in the future. This is because, through a model of basic tasks, assuming an elastic labour supply. However, it will reduce the number of jobs in traditional tasks and increase the

number of new jobs (Acemoglu & Restrepo, 2018). Due to the addition of AI, about 30% of industries will be automated, and the employment mix to change significantly through 2030, with more healthcare, STEM, and managerial positions and fewer jobs in customer service, office support, and food services (see Figure 1 and 2) (McKinsey & Company, 2023). Overall, AI will change the labor market by replacing old jobs with new ones, causing fear of job loss and the need to learn new skills. So the age of leisure will not be here.

With generative AI added to the picture, 30 percent of hours worked today could be automated by 2030.

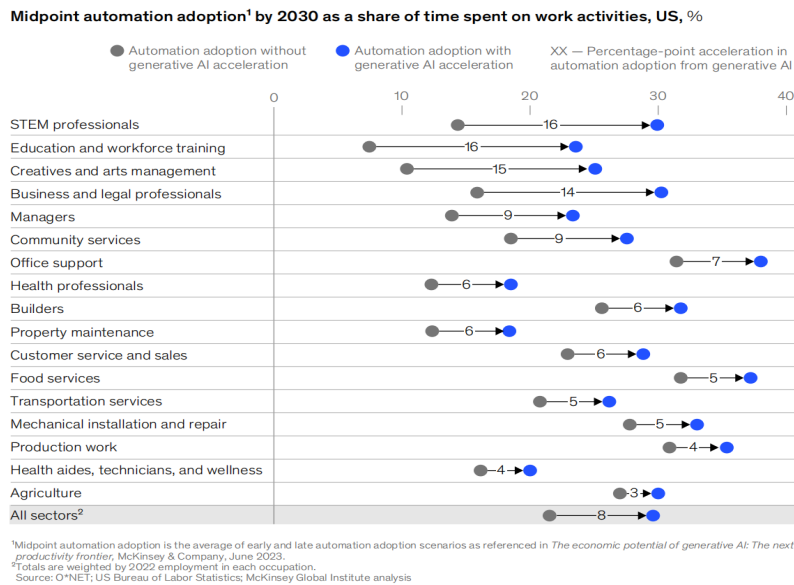


Fig. 1

Generative AI accelerates automation adoption in all scenarios.

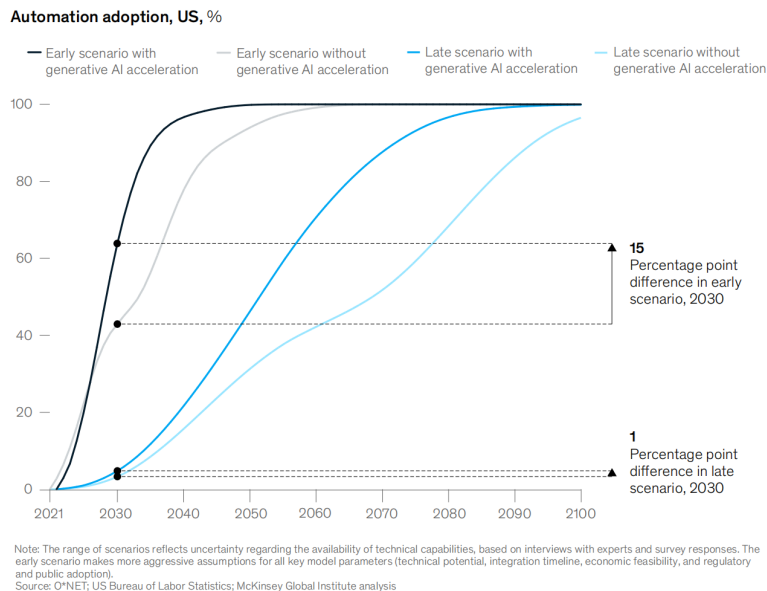


Fig. 2

In addition, AI is like Pandora's box, and we cannot predict what problems we will face after opening it. Currently, it seems that due to the generative nature of AI, when people give instructions to AI, the answers given by AI may not necessarily fulfil their needs; instead, it is likely to be accompanied by some potentially risky problems. For example, the question of copyright ownership

of literary or artistic works generated by AI (Hema, 2023). This also means that we will spend more time and cost on the governance issues of AI. Additionally, AI can bring about the problem of polarisation in society. In real society, the distribution of capital is more uneven than the distribution of labour. Most capital tends to be concentrated in the hands of a small number of people. In contrast, the development of AI will promote a higher share of the capital factor in the production process and an increase in the remuneration of capital, thus increasing income inequality. One study used the Houthakker model, which includes labour, machines and ordinary capital, to analyse the impact of the widespread use of AI on wages, and found that not only does AI not increase the income of the majority of people, but on the contrary, the incomes of the primary workers will show a downward trend (DeCanio, 2016). Moreover, it was found that based on the self-replicating nature of AI, the group with AI can create more capital if AI replaces more types of labour. This means that cheap labour and ordinary capital will not have an advantage and will be gradually squeezed by AI. Wealth will flow to those with AI technology. The income distribution among these innovative groups takes the form of a power law. Only a few people get high returns (Brynjolfsson et al., 2018). This means that future developments in AI may reduce basic labour wages, which will increase inequality and social polarisation, making the already impoverished classes even poorer. Unless, of course, the technology of AI can be equitably mastered by everyone with proficiency and precision, which is only an airy fantasy. Moreover, AI imitates human beings, and it has been pointed out that most of the current technological achievements are made by Western, educated, industrialised, rich and democratic (WEIRD) societies, so there are some hidden biases in AI (Septiandri et al., 2023). For example, one study noted that an AI used for crime identification was twice as likely to identify black people as "high risk" as white people (Larson & Angwin, 2016). This suggests that Keynes spoke of the age of leisure will not come unless we can solve the above dilemma.

4. Conclusion

This paper argues that AI applications will not bring about the "age of leisure" as Keynes described, and that AI will change the labour market by replacing old jobs with new jobs, leading to the fear of unemployment and the need to learn new skills. The higher the adoption of AI, the more employees are replaced, and the number of employees will decrease. Heraclitus said, "You can never step into the same river twice, for new waters always flow in". The emergence of Artificial Intelligence and its change in the world is already a foregone conclusion. The reconfiguration of the labour market is just one aspect, and we need to learn to embrace this dynamic era with the proper posture. Although this article argues that AI will not bring about an era of leisure, this is not an unfavourable view. This paper puts forward the following policy suggestions: First, correctly understand the substitution effect of artificial intelligence. In the context of the rapid development of artificial intelligence technology, the intelligent replacement of some positions will become normal in the short term, and this substitution effect will inevitably bring a certain risk of unemployment. Manufacturing enterprises should carry out targeted training for each position, enhance the coordination degree between workers and artificial intelligence, and achieve the working mode of "man-machine collaboration" as soon as possible. The government should quickly make emergency response plans and early warning mechanisms, and promptly introduce the corresponding employment compensation mechanism and social security system. Second, we should seize the opportunities of talent training brought about by artificial intelligence. In the short term, the salary growth will produce a strong incentive mechanism, and the increase of the salary level can encourage employees to continuously improve their skills, and through the combination of professional education and practical education, they will become compound talents in the era of artificial intelligence. Third, a reasonable grasp of the application scope and degree of artificial intelligence. Companies in different regions and sizes have different impacts on their employment. The government should also grasp the unbalanced development of different enterprises, adapt measures to local conditions according to their development conditions,

operating characteristics and affordability, and at the same time, it should correctly guide and support small and medium-sized enterprises to introduce and apply artificial intelligence technology.

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