

Research on the Transformation of China's Employment Structure under the Background of Artificial Intelligence: A Task Perspective

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Abstract

With the development and application of artificial intelligence (AI) at present, changes in technology are gradually affecting the organisation of work and the structure of employment. AI will affect some parts of a job differently than other parts of the same job. Therefore, this paper will take a task-oriented approach to study how AI is changing employment in China. Based on research on occupational task classification in China and statistical data on employment, as well as recent studies of generative AI and labour markets, this paper investigates the substitution of routine tasks, the augmentation of abstract tasks, and the relative resilience of manual tasks. The four reasons are as follows. First, routine-task employment has generally decreased as standardised and repetitive activities have become more automated. Second, with the help of AI for analysis, creativity, problem-solving and decision-making, abstract-task employment has expanded. Third, many manual operations are not easily automated because they require physical adaptability, interpersonal skills and context-aware judgment. Finally, these different effects lead to employment polarisation, with an increase in demand for high-skilled analytical work and low-skilled service work, and many middle-skilled routine positions under pressure. The paper offers some suggestions for AI education, lifelong learning, human-AI collaboration and employment protection.

Keywords

artificial intelligence, employment structure, task-biased technological change, employment polarization, labor market

1. Introduction

Nowadays, many areas of companies have begun to use generative AI technology, such as ChatGPT. ChatGPT, DeepSeek and Qwen are examples of the rapid spread of AI in production, services and management. AI is now driving productivity growth at the top and may also promote industrial upgrading. Online customer service, AI-assisted replies in restaurants, QR code ordering and robot food delivery are all examples of activities where tasks previously done by people are now supported or partially taken over by AI.

The employment effects of technological progress are debated. On the other hand, new industries, jobs and other types of work may not be created. At the same time, standardised and repetitive tasks are being increasingly automated by algorithms and software systems. Traditionally, jobs have been classified as high-skilled, middle-skilled and low-skilled; however, this division may not fully reflect the different levels of difficulty of work in the same job. Thus, a task-oriented way can offer more targeted support for research on the effects of AI on employment.

Recently, some studies have found that the impact of generative AI differs among workers. Chen et al. [1] used data from about 285,000 enterprises and 62 million employees to find that firms that introduced generative AI saw a drop of 7.7% in entry-level positions over the six quarters after implementation, and this reduction was mainly due to a decrease in hiring rather than large-scale layoffs. At the same time, demand for higher-skilled workers increased. Therefore, although there will be no large-scale unemployment, the structure of employment will change due to artificial intelligence.

China offers a typical case for the above changes. AI investment and application have been expanding rapidly, and digitalisation is changing enterprises and industries. Therefore, we need to know how different kinds of tasks will be changed by AI in terms of both economy and employment. Based on the task-oriented approach, this paper will study changes in China's employment structure and the reasons for employment polarisation due to artificial intelligence.

- (1) How has China's employment structure changed in recent years?
- (2) Which types of work tasks are mainly affected by artificial intelligence and technological progress?
- (3) Has the transformation of task structures contributed to employment polarization?

2. Literature Review

2.1 Skill-Biased Technological Change Vs. Task-Biased Technological Change

Early studies of technological change focused on the relationship between technology and worker skills. Skill-biased technological change refers to the fact that, due to new technologies, there is now a relatively higher demand for educated and skilled workers. A skill-based division of labour may group workers with the same job but different tasks together as if they were the same. Therefore, a task-oriented approach will provide more specific data on the effects of technology on employment.

Autor has studied the tasks and changes in technology to classify them as routine or non-routine. Therefore, technology will likely be used to replace tasks that are easy to specify and codify, and other tasks requiring problem-solving, communication, creativity and judgment will be complemented [2]. The task perspective is especially suitable for artificial intelligence because some of the new cognitive functions that recent AI systems have begun to show are non-routine. Therefore, the foundation of the analysis of employment transformation is task characteristics rather than occupational titles.

2.2 International Evidence on AI, Task Substitution, and Employment Polarization

Foreign studies have found that technological changes can lead to either substitution or complementation. Frey and Osborne [3] have identified the vulnerability of various kinds of work to automation and listed which occupations are more likely to be automated. At the same time, they have also begun to identify specific attributes of work that are more or less suitable for automation.

Recently, some studies have found that AI is not going to cause widespread unemployment. Acemoglu and co-authors [4] used detailed online vacancy data to find that AI-exposed enterprises reduced hiring in some non-AI positions and increased hiring for AI-related roles, but they did not find obvious aggregate employment or wage effects at the occupation or industry level. Therefore, it can be inferred that at the task-level, modifications to the division of labour and skills have occurred prior to changes in total employment.

Automation and augmentation are also different. Lei and Kim [5] have studied how AI and robots can both automate existing work and enhance workers through changes in the organisation of work. In short, the world's

research has shown that AI will change the division of labour among people and jobs, but it is not necessarily about replacing people entirely.

2.3 China-Specific Literature Gap

Although foreign studies on automation, AI exposure and task transformation have expanded rapidly, research in China is still relatively scarce in the literature cited by this paper. The structure of China's labour market, regional development, demographic changes and the speed of digitalisation are all different from those in developed countries. Therefore, the results in the United States and Europe cannot be directly applied to China without considering the local institutional and economic environment.

Wang [6] has developed a system for occupational task classification and measurement in China that can help distinguish between routine, abstract and manual tasks in the Chinese labour market conveniently. The China Statistical Yearbook [8] contains a large number of statistics on changes in employment and industrial structure. However, it is still necessary to connect these Chinese task classifications with the rapidly changing capabilities of generative AI and with recent data on hiring and labour demand. Based on the above analysis, this paper uses a task-oriented approach and recent AI labour market data to explore how substitution, augmentation and task resilience jointly affect employment polarisation in China.

3. Formation Mechanism and Application of Employment Structure Transformation in the Context of Artificial Intelligence

3.1 The Mechanism of Artificial Intelligence for Replacing Routine Tasks

According to the theory of task-biased technological change, technological progress does not affect all tasks in the same way. AI is very suitable for routine tasks that follow clear rules, are highly repetitive, and can be standardised. With the development of big data, machine learning and generative AI, many operations that were done manually in the past can now be carried out by algorithms and software systems.

An automatic system can perform daily accounting, organise documents, retrieve data and prepare standardised materials for administrative work, etc. An AI system will also answer some of the customers' questions. These applications reduce the amount of human labour required for predictable cognitive tasks and free up employees' time for judgement or interaction-based work.

Chen and others [1] have found that in the six quarters after the introduction of generative AI, enterprises that have applied this technology have reduced the number of new hires for front-line employees by approximately 7.7% due to a diminished demand for such positions. Therefore, it can be concluded that AI is gradually assuming some of the routine cognitive functions and labour-intensive work in occupations that require standardised work.

Occupations in China's labour market that are more prone to pressure include data-entry clerks, cashiers, general administrative staff and some customer-service positions, as much of their work involves repetitive and standardised tasks. Therefore, AI will not replace all jobs at once; rather, it will change how labour is organised in a company by reducing the need for some repetitive work.

3.2 The Enhancement Mechanism of Artificial Intelligence for Abstract Tasks

Abstract tasks generally require problem-solving, creativity, learning, strategic selection and the application of special knowledge. Because these activities often have vague goals and change frequently, they are not easily automated. Therefore, AI will serve as a supporting tool for people's work rather than replacing them entirely.

Software development is a typical case. ChatGPT and DeepSeek can be used to help programmers write code, debug problems and obtain information to improve efficiency. However, the system architecture, requirement analysis and other complex optimisation decisions still need to be made by humans. AI can also help researchers collect and process data, but setting research objectives and forming new theoretical systems are still mainly human endeavors.

Autor [7] thinks that AI will create new middle-class jobs by lowering the cost of training and enabling more people to do tasks that previously required deep specialisation. Therefore, there is both a substitution and an augmentation effect: technological progress reduces the demand for some routine labour and increases the productivity and employment prospects of workers engaged in abstract work.

Therefore, AI will probably increase the proportion of jobs requiring research and development, design, operation, innovation, analysis and complex decision-making. The increase in such activities may raise the proportion of employment in abstract tasks as routine employment falls.

3.3 The Impact of Artificial Intelligence on Manual Tasks

Manual work is generally less likely to be automated by AI than regular cognitive tasks because it often occurs in an irregular physical environment and requires direct contact with people. Respond to any changes in the health of the patient and meet all the customers' demands promptly. Maintenance staff will also have many irregular working conditions that are difficult to regulate.

Although robots have achieved good results, they have not yet been able to carry out all kinds of work that requires physical adaptability, social skills, empathy and flexible judgment. As a result, many service-sector jobs still require a large number of people.

Population aging also increases the demand for elderly care. AI can assist with monitoring, scheduling and administrative management, but it is not suitable for providing humanistic care and emotional support. AI and automation can be used in the catering industry to help with ordering, inventory management and some kitchen operations; however, menu development and customer communication are still mainly carried out by people.

Therefore, manual work has shown relatively strong employment resilience in the age of AI. Its continued relevance does not mean that manual labour will remain unchanged; rather, it is more likely that AI will be used to enhance some activities rather than to replace all human labour.

4. Analysis of the Formation Mechanism of Employment Polarization

Based on the above analysis, AI has different effects for different kinds of tasks. Routine operations are relatively simple to automate, and the staffing needs of some standardised positions have been reduced. AI can help complete the basic work of a company and promote the development of related industries and jobs. Due to the complexity of the physical and social environment, manual operations cannot be readily centralised. The two are not of the same kind.

Historically, the employment structure of industrial areas has often been described as 'olive-shaped', with a relatively large proportion of middle-skilled jobs. With the development of AI and digital technology, some middle-skilled routine positions have been reduced, and at the same time, the demand for both high-skilled analytical work and low-skilled service work has increased. Therefore, the employment structure may take an 'hourglass' shape and have a smaller proportion of routine middle-skilled positions.

With the continuous development of the digital economy and artificial intelligence in China, in the future, job competition will be increasingly based on creativity, complex decision-making, communication skills and the ability to work with technology. As more automation is introduced by enterprises, the proportion of simple and repetitive work will likely decline further.

5. Policy Recommendations on Employment Structure Transformation in the Context of Artificial Intelligence

5.1 Improve Artificial Intelligence Education

With the trend of employment polarisation, the education system will need to emphasise more creativity, innovation, data analysis, digital literacy and computer application skills. Students need to be able to use AI tools and understand how technology will change the tasks and skills required for work in the future. Therefore, computer education should be given more attention and not be regarded as a minor subject.

5.2 Promote the Development of a Lifelong Learning System

The speed at which AI is developing is also changing the labour market at the same time. Therefore, workers will need to be able to learn new technologies and skills continuously. Universities, enterprises and social organisations can cooperate to hold continuous education and training courses that provide easy-to-access opportunities for workers to boost their skills and adapt to changes in the work environment.

5.3 Encourage Human–AI Collaboration in Enterprises

As companies go digital, some of their regular work will likely be automated or performed by AI. Therefore, the organisation will focus more on tasks that require creativity, leadership, communication and complex judgement, and use AI to help with routine analysis and information processing. A good division of labour for people and AI can increase the efficiency of the organisation without causing disruption due to automation.

5.4 Strengthen Employment Protection for Key Groups

Build an employment-support system for workers whose work will be significantly changed by the introduction of AI. The system will help stabilise the labour-market transition and reduce the risk of structural unemployment. Possible measures include vocational education and training, retraining programmes, career counselling and targeted employment subsidies for workers at high risk of displacement.

6. Conclusion

According to the theory of task-biased technological change, this paper studies the changes in China's employment structure due to the rapid development of artificial intelligence. From the perspective of tasks, AI will not change all kinds of work uniformly. Instead, the effect will vary according to the features of the tasks in that occupation.

First, China's labour market is undergoing structural changes due to continuous expansion of research and development investment, digital technology and AI adoption. Second, the effects of technological progress vary by sector: employment in routine positions has fallen, but abstract and manual work has shown more stability or expansion prospects [6]. Third, AI can either replace some of the existing tasks or assist workers in performing complex work; thus, technological progress will simultaneously reduce some forms of employment and create or expand others [1, 7]. Finally, these asymmetric effects lead to employment polarisation; that is, both the high-skilled and low-skilled ends of the labour market are expanding, while some middle-skilled routine positions are declining.

AI has not resulted in large-scale unemployment; instead, it has changed the structure of employment and increased the demand for high-skilled labour in the labour market. Therefore, the policy response should focus on preparing workers for task transformation through AI education, lifelong learning, human-AI collaboration and targeted employment protection. The above measures will help workers and enterprises adapt to the changes in technology and promote an all-weather transition of China's labour market.

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Conflicts of Interest

The authors declare no conflict of interest.

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