Proceedings of the 4th International Conference on Global Politics and Socio-Humanities
DOI: 10.54254/2753-7048/2026.33973

Digital Economy Development and Employment Structure Transformation: Research Progress and Future Prospects

Donghao Jiang

School of Culture and Communication, Capital University of Economics and Business, Beijing, China
jiangdonghao1128@gmail.com

Abstract. The digital economy is a key driver of the new round of technological revolution and is transforming the operation of the labor market. Different from studies focusing on changes in employment quantity, this paper summarizes the mechanism and evidence of the digital economy's impact on employment structure from four dimensions: industrial structure, skill structure, regional structure and group structure. The results show that technology-task substitution, skill-job matching, industry-occupation penetration and geographic agglomeration are the main causes of employment structure changes. Empirical analyses reveal that employment opportunities brought by industrial digitalization are continuously increasing, AI-related jobs have surged, employment agglomeration and diffusion appear across regions, and new forms of employment exhibit strong employment absorption capacity and can accommodate talents at different levels. Current relevant research still has certain limitations. Future research should pay more attention to the challenges brought by new-generation artificial intelligence, strengthen micro-level tracking research, and further improve ideas for enhancing employment quality.

Keywords: digital economy, employment structure transformation, industrial structure, skill structure, regional structure

1. Introduction

The digital economy serves as a new engine leading economic development. In the current era, the proportion of China's digital economy keeps rising. Its integrated development with traditional industries has not only given birth to new business forms and models, but also reshaped the entire labor market structure. Previous studies mainly worried about rising unemployment caused by "machines replacing humans", but more and more scholars now recognize that the digital economy exerts a mainly structural impact on employment—that is, it has drastically changed the industrial composition, skill requirements, geographical distribution and demographic coverage of employment.

Specifically, in terms of industry, digital technologies have promoted intelligent manufacturing and platform-based services, shifting employment from traditional manufacturing to modern services. In terms of skills, automation replaces repetitive tasks and creates a large number of high-skill new jobs, sparking ongoing debates over "employment polarization" and "inclusive growth".

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Geographically, the rising spatial concentration of the digital economy has widened the gap in employment absorption capacity between large and medium-sized cities and small towns. Demographically, the platform economy has generated a large number of flexible workers, whose rights protection and sustainable development pose governance challenges.

Although abundant research findings have been achieved, some problems remain. First, most studies focus on a single aspect while ignoring others. Second, the chain of "mechanism analysis—empirical evidence—policy recommendations" is incomplete, leading to fragmented research. Therefore, based on the analytical framework of "employment scale—employment structure—employment quality" proposed by Xiang Guocheng et al., this paper reviews current research progress and deficiencies from three aspects and puts forward suggestions for the future [1]. Using the latest data, it depicts the changes in China's employment structure against the backdrop of the digital economy, providing a reference for further academic research.

2. Theoretical mechanisms of the digital economy's impact on employment structure

Existing studies have built a multi-disciplinary theoretical framework explaining the digital economy's impact on employment structure, which can be summarized into four core mechanisms.

First, the technology-task substitution mechanism, which is based on the task attributes of occupations, is crucial to understanding employment structure changes. Different occupational tasks vary in sensitivity to digital technologies [2]. Generally, routine and programmed tasks are easily replaced by technology, while non-routine abstract tasks (such as innovation, decision-making and interpersonal communication) complement technology. This clearly explains the divergent outcomes of workers in the digitalization process: workers engaged in abstract tasks benefit continuously, while those in routine jobs face replacement risks—the root cause of employment structure differentiation.

Second, the skill-job matching mechanism plays an important role in reshaping the labor market. Digital technologies not only alter task content but also reshape skill requirements for positions. Digital economic development helps optimize workers' skill structure and industrial distribution, thereby reducing the incidence of over-education in the labor market [3]. In other words, the digital economy promotes better matching between skill demand and educational supply, aligning workers' skills with job requirements—explaining employment structure changes from the perspective of "person-job fit".

Third, the industry-occupation penetration mechanism explains how the digital economy affects employment structure through two industrial channels: on the one hand, digital industrialization (e.g., the Internet, artificial intelligence) creates a large number of new high-skill occupations; on the other hand, industrial digitalization (integration of traditional industries and digital technologies) changes skill requirements for existing positions, reducing jobs in traditional manufacturing and increasing employment in modern services. This mechanism reveals the foundation of employment restructuring and the mutually reinforcing relationship between industrial upgrading and employment structure adjustment.

Fourth, the spatial agglomeration mechanism reveals that the digital economy's impact on employment structure is uneven and features significant spatial clustering. Using panel data of 272 cities from 2010 to 2021, scholars conclude that the digital economy has spillover effects on employment structure—digital economic development in one city affects surrounding cities and their employment structures [4]. This mechanism provides a spatial dimension for understanding employment changes and explains the regional employment pattern in the digital economy era.

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From the perspective of task-biased technological progress, research states that digital technologies substitute routine and programmed jobs but boost non-routine abstract and interpersonal jobs, which is also the fundamental cause of employment structure differentiation [5].

Based on a systematic review of the above mechanisms, scholars constructed a three-dimensional analytical framework of "employment scale—employment structure—employment quality", providing an important theoretical tool for integrated research [1].

3. Empirical evidence of employment structure transformation

Make sure there is NO Grid. (Custom Margins – Document Grid – Grid – no Grid) Numerous empirical studies have examined the actual impact of the digital economy on employment structure from four dimensions: industry, skill, region and group. Combined with the latest statistical data, a clear realistic picture has emerged.

3.1. Industrial structure: concentration in services and digital sectors

The digital economy actively redistributes employment across the three major industries, showing an obvious trend of agglomeration in services and digital industries. The digital economy contributes to "employment growth with equal emphasis on quantity and quality", increasing jobs while facilitating labor transfer from labor-intensive industries to services [6]. Research also proposes that the digital economy can enhance the tertiary industry's labor absorption capacity, optimize the internal employment structure of the primary industry, and create more opportunities for high-skill talents [7].

The latest data confirm this trend. By the end of 2024, total employment in industrial digitalization nationwide reached 61.951 million, accounting for 8.4% of the national employed population. By the end of the second quarter of 2025, this figure stood at 60.009 million, including 20.831 million in enterprise digitalization and 39.177 million in self-employed digital businesses. By sector, wholesale and retail had the largest digital employment with 25.138 million (41.1% of industrial digital employment), followed by catering and accommodation (6.621 million), manufacturing (5.685 million, up 12.3 percentage points quarter-on-quarter), and real estate and construction (4.486 million). In terms of digital penetration, culture, sports and entertainment ranked highest at 29.8%, followed by catering and accommodation (19.3%) and wholesale and retail (18.6%), while manufacturing was only 4.6%, below the industry average [8]. In addition, employment in "information transmission, software and information technology services" kept rising at the end of 2023; by the end of May 2024, the number of online ride-hailing driver licenses issued also increased, indicating a sound outlook for new occupations.

3.2. Skill structure: explosive growth of high-skill jobs and differentiated skill premiums

Skill structure differentiation is the most prominent feature of employment changes in the digital economy. Two mainstream views exist in this field: one is the "premium paradox" proposed by scholars, which argues that youth employment in the digital economy features a separation between "wage premium" and "skill premium"—the wage premium stems from industry choices and short-term dividends from the platform economy rather than skill upgrading, meaning young workers in low-skill digital labor cannot enjoy intergenerational dividends in the long run [9]. The other is "inclusive optimization" put forward by scholars, which holds that digital economic development

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helps reduce over-education, enabling workers at all education levels to find suitable jobs and resolve education-job mismatches [3].

Research shows that digital technologies compete with labor: technological progress creates new high-skill jobs but also widens skill premiums and employment polarization, leading to unequal employment returns across skill groups [10].

Mao Risheng's research further refines this logic: general digital technologies such as e-commerce and supply chain management systems significantly boost employment, while automation technologies like industrial robots exert employment substitution effects. Meanwhile, digital technology application markedly promotes job transitions among professional and technical personnel, with no significant differences across genders and education groups, reflecting inclusiveness [11].

The labor market shows clear skill demands: from January to October 2025, newly posted AI jobs surged by 543% year-on-year, with a growth rate of over 11 times in September alone; the monthly income of AI scientists exceeded 127,000 yuan; jobs containing "AI/large model/artificial intelligence" accounted for 19.18% of total postings, up sharply from 12.25% in 2024; AI product manager roles rose by 369.36% year-on-year. The share of professionals using AI tools increased from 69.99% in 2024 to over 90% in 2025 [12]. Regionally, AI-related positions are concentrated in first-tier cities: Beijing, Shanghai, Shenzhen, Hangzhou and Guangzhou rank top five in new job postings, with Chongqing in the top ten and Xi'an excluded.

3.3. Regional structure: dual pattern of concentration and diffusion

The digital economy's impact on employment structure features obvious regional heterogeneity and coexisting concentration and diffusion. Analysis of industries across city tiers finds that the digital economy strongly boosts producer services in megacities but slightly inhibits public services in small cities—a "siphon effect" where more jobs cluster in large cities and small cities face labor outflows [13]. Research further notes that the digital economy improves employment structure more effectively in innovative cities, while it may widen the "digital divide" in underdeveloped regions and exacerbate local employment imbalance, with spillover effects on neighboring cities [4].

Research shows that the digital economy has reshaped the spatial distribution of employment: high-end jobs cluster in large cities, while small and medium-sized cities mainly host platform-based employment, well explaining regional employment restructuring [14].

Regional distribution of enterprise digital employment confirms concentration: Guangdong, Jiangsu, Zhejiang, Shandong and Liaoning rank top, followed by Beijing, Hubei, Hebei, Fujian and Shanghai. Meanwhile, diffusion occurs: platform employment demand accounts for a large share in second-, third- and fourth-tier cities, indicating that the digital economy spreads job opportunities to wider areas. Huang Jinling et al. argue that urban digital economic development drives labor flow from manufacturing to services, with an obvious low-skill bias in the short term. However, high skill-based wage returns in the service sector prevent low-skill workers from fully benefiting, causing intra-regional skill stratification [15].

3.4. Group structure: rise of new employment forms and significant group differences

Groups benefit unequally from digital transformation, marked by the emergence of new employment forms and group differentiation. Research argues that highly educated workers gain more in the digital economy, while low-educated workers risk marginalization [2]. Research focusing on flexible

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workers notes that the platform economy generates a large number of workers in new employment forms, most of whom lack social insurance and effective rights protection [5].

Latest employment data show rapid growth of new employment forms: in 2025, recruitment for new forms rose by 15.1% year-on-year, and job seekers increased by 11.0%. By type, location-based new form jobs grew by 28.9% with 19.3% more applicants; online skill delivery jobs surged by 58.7% with 9.2% more cloud-based job seekers. In terms of education inclusiveness, 88.7% of location-based new form jobs had no education requirements, compared with 46.9% of cloud-based ones [16]. New occupations grew rapidly: medical escorts, pet care providers, pet companions, online doctors, game boosters and coaches emerged continuously. Demographically, flexible and freelance workers participate in new employment forms; platform jobs are dominated by post-70s, 80s and 90s generations. New occupations such as AI trainers and takeaway operation specialists have enriched the labor market's employment structure.

4. Deficiencies of existing research and future prospects

4.1. Research limitations

First, insufficient multi-dimensional integration is a major limitation of existing research. Most literature focuses on a single issue and lacks a holistic view of employment structure changes. The three-dimensional perspective proposed by scholars is underused, and research on interactions among multiple dimensions is scarce [1].

Second, the exploration of micro-level mechanisms remains weak. Most empirical work uses large-sample panel data, with little exploration of individual occupational mobility and skill changes, failing to reflect the process of employment structure shifts.

Third, the integration of theoretical outlook and practical policy is poor in current studies. Existing studies mostly discuss future trends theoretically, with little consideration of regional and group specificities, limiting their ability to solve real-world problems.

4.2. Future research directions

First, future research should focus on shocks from new-generation technologies. Future research should examine the employment impact of new technologies such as AI large models, verify existing findings, and explore new employment structure changes driven by technological progress.

Second, micro-mechanism research needs to be strengthened. More micro-level data collection on workers' occupational mobility and skill accumulation is needed to better understand employment structure changes and their determinants.

Third, future research should place greater emphasis on employment quality. Research should explore ways to improve employment structure from the perspective of employment quality—including wages, labor rights and career development—and form a closed loop of "mechanism—evidence—policy".

Fourth, regional and group disparities need to be addressed with targeted designs. Given large differences across regions, education levels and age groups, targeted research designs should be adopted to propose more tailored recommendations.

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5. Conclusion

This paper summarizes four main channels through which the digital economy affects employment structure, and analyzes the characteristics and causes of China's employment structure changes in the digital era from industrial, skill, regional and demographic perspectives. The study finds that the digital economy reshapes China's labor market comprehensively via technology substitution, skill matching, industrial penetration and spatial agglomeration, promoting employment shift to modern services and high-skill industries, with obvious regional concentration, diffusion to lower-tier areas and a surge in new occupational types.

This paper contributes a comprehensive analytical framework that overcomes the one-sidedness of existing research, enriching understanding of the digital economy-employment relationship. It also provides references for governments to formulate employment policies, enterprises to adjust employment modes and individuals to enhance competitiveness.

Constrained by data availability, this paper only conducts macro-industrial analysis without long-term individual tracking research, failing to fully reflect the heterogeneous impacts of employment structure changes. Future research can use micro-tracking data to investigate differentiated employment outcomes among groups, explore new challenges to employment posed by next-generation information technologies represented by new-generation AI, and conduct in-depth analysis from the employment quality perspective to better promote high-quality employment under digital economic development.

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DOI: 10.54254/2753-7048/2026.33973

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