

Research on the Dual Impact of Female Employment and Labor Market in the Digital Economy

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Abstract. The rapid development of the digital economy is reconstructing the logic of the labor market, which brings new opportunities for female employment. At the same time, it also has a profound impact on the employment rules of the labor market's gender structure. Digital economy from six dimensions, this paper analyzes the mechanism of action of female employment and labour markets and realistic effects. The study finds that the digital economy broadens the employment channels and alleviates the labour market for women and gender inequality, but also some problems such as the digital divide and inadequate protection of the rights and interests. Based on this, this paper puts forward targeted suggestions from the aspects of skills training, institutional guarantee and platform governance to promote the deep integration of digital economy and female employment, and achieve gender equality and high-quality development of the labor market.

Keywords: Digital economy, Female employment, Labor market, Quality of employment

1. Introduction

The digital economy, which takes data as the key factor of production, has become a core force driving China's economic structure transformation and upgrading as well as its labor market evolution. According to the Research Report on the Digital Economy and Chinese Women's Employment and Entrepreneurship, the digital economy has created 57 million jobs for women in sectors including e-commerce, livestreaming, and digital trade, serving as an important carrier of the expanding female labour market participation [1]. Traditionally, women face problems such as unequal employment opportunities and limited career development due to factors like time and space constraints, family responsibilities, and gender stereotypes. The platform-based, flexible and inclusive characteristics of the digital economy provide a new way to solve these problems.

At the same time, the transformation of the labor market by the digital economy also presents complexity: it promotes the transformation of the labor market to diversification and equality; it also forms a new gender employment gap due to the difference in digital literacy and the lack of protection of the rights and interests of new forms of business. Wang's study reveals that the intensity of research and development has a threshold effect on the quality of employment in the digital economy. This characteristic also means that different female groups face differentiated development opportunities in the digital economy.

Combined with the authoritative data and empirical conclusions, this paper discusses the digital economy's dual effects on female employment and labour market to clarify its mechanism of action and real challenges. This paper further proposes operable countermeasures against the existing problems, providing reference for policy making and business practice.

2. The mechanism of action

2.1. Action mechanism at the household level

The digital economy alleviates the conflict between women's work and family through flexible employment modes, which has become the core mechanism to promote the female labor force participation rate. Chen Huashuai and Xie Keqin's studies have found that the jobs in the digital economy, such as home-based work and telecommuting models, break the spatial and temporal limits of traditional employment, allowing women to balance family responsibilities such as family care and parenting, and effectively reducing the probability that family factors cause women to withdraw from the labor market [2]. According to data from the Ali Research Institute, 70% of practitioners in the field of flexible employment in the digital economy are from the "treasure mom" group, realizing the dual goal of employment and family care at their doorsteps [1].

The digital economy's increased economic contribution has changed the structure of internal family resource allocation for women. Digital jobs with stable incomes have increased women's voice in family decisions, and the further improvement of family economic conditions has provided material support for women's career development. From the perspective of dual analysis of "dividend" and "gap", Chen et al. argue that the digital economy has expanded women's employment space and reduced employment thresholds by supporting new forms of employment. However, gender differences in digital literacy have also aggravated employment inequality [3].

2.2. Action mechanism at the social level

At the social level, digital economy promotes female employment equality by breaking gender stereotypes and optimizing the allocation of social resources. On the one hand, the digital platform of employment assessment performance is the core, to reduce the subjective gender bias in the traditional employment. Digital economy. On the other hand, by way of platform connecting fragmented female workers and the market demand, it improves the organizational level of the disadvantaged group of women, making it so that rural women with a low degree of social resources can be shared between marginal groups, such as participating in the national and global market division of labor. Focusing on rural women, Xu Lingli and Chen Yunfei found that the digital economy has changed the job characteristics of rural women, promoting their transformation from traditional agriculture to fields such as e-commerce and digital services, which effectively narrows the employment gap between urban and rural women [4]. From the perspective of information search, Qiu et al. pointed out that digital transformation reduces the information asymmetry in women's employment and raised the possibility of high quality employment [5].

In addition, the digital economy magnifies the women's advantages in soft skills and promotes society's cognition of female employment. However, Hu Yongjun and Guan Lening also pointed out that the employment substitution effect of the digital economy still has an impact on the traditional female-intensive low-skilled positions, and if there is no support for skill transformation, some women will face the risk of being eliminated from the labor market [6].

Existing research has fully confirmed the positive role of digital economy in promoting female employment, and analyzed its mechanism from multiple dimensions such as family, society and technology, laying a solid foundation for this paper. But there are still two inadequacies in existing research: first, the impact of the digital economy on the gender structure of the labor market lacks systematic analysis; it focuses more on female employment itself and lacks research on the changes in the overall operation logic of the labor market. Second, the analysis of the heterogeneous impact of threshold factors such as R&D intensity and digital literacy needs to be deepened. This paper will fill this research gap, analyze from the dual perspective of female employment and the labor market, and put forward targeted suggestions based on the characteristics of the threshold effect.

3. The impact of digital economy on female labor market

3.1. Enrichment of the labor market supply pattern

The digital economy has given rise to diversified employment forms such as flexible employment, platform employment and self-employment, which has enriched the supply structure of the labor market and improved its adaptability. According to the Research Report on Digital Economy and Chinese Women's Employment and Entrepreneurship, flexible employment accounts for 65% of female employment in the digital economy sector, covering various fields such as livestreaming e-commerce, cloud customer service and community operation, thus meeting the employment needs of different female groups [1]. For women with low educational attainment, the digital economy provides low-threshold jobs such as online store customer service and basic delivery work; for highly educated women, it offers high-end positions including digital research and development and platform operation, realizing the layered and diversified supply of the labor market.

At the same time, the inclusive nature of the digital economy has promoted the labor market, enabling a special group of women to gain employment. By the end of 2020, Alibaba's cloud customer service project had helped 110,000 women secure jobs, including a large number of disabled women, single mothers and other vulnerable groups. The remote employment model of digital platforms allows disabled women to participate in social labor, while inclusive digital skills training provides career transition opportunities for laid-off women and rural women, driving the labor market to develop in a more inclusive and diverse direction.

3.2. Upgrading of the labor market skill structure

The digital economy has promoted the transformation of skill demand in the labor market from "traditional professional skills" to "comprehensive digital skills", reshaping the core rules of employment competition. Qi et al. pointed out that the labor market under the digital economy places greater emphasis on workers' digital literacy, cross-field collaboration capabilities and innovation capabilities, and these skills have become core elements of employment competition [7]. For women, digital literacy directly determines their competitiveness in the labor market: women with higher digital literacy can enter high-end digital economy sectors, while women with low digital literacy are often confined to low-skilled, low-value-added jobs.

At the same time, the digital economy has driven the skill upgrading of traditionally female-intensive industries, forcing women to improve their level of human capital. For example, the shift from traditional housekeeping industry to digital online housekeeping requires workers to master digital skills such as intelligent equipment operation and online order management. The transformation from traditional agriculture to digital agriculture requires rural women to master

skills such as e-commerce operation and live broadcasting of agricultural products. Such skill upgrading promotes the accumulation of women's human capital, improves the overall quality of female labor, and also promotes the overall skill level of the labor market.

3.3. Formation of new market stratification

While the digital economy alleviates the overall gender employment gap, it also forms employment stratification within the female group due to the digital divide and the R&D intensity threshold. Wang Yujie et al. confirmed that there is a threshold effect of R&D intensity in the impact of digital economy on employment quality, and only when a certain threshold of R&D intensity is crossed can the employment dividend of digital economy be fully revealed [8]. In the field of digital economy, core technical positions with high R&D intensity (such as artificial intelligence R&D and big data analysis) are still dominated by men, while women are mostly concentrated in service positions with low R&D intensity (such as live broadcasting and customer service), forming an internal stratification of "male-dominated high-end and female-concentrated middle and low-end positions".

4. The digital economic impact on the quality of female employment

4.1. Positive promotion effect of employment quality

The flexible employment model of the digital economy has significantly improved women's employment satisfaction and their work–family balance. Zhang Liyun, an associate professor at the China Institute of Industrial Relations, argues that online employment based on Internet scenarios effectively lowers the employment threshold and facilitates women's ability to balance family responsibilities and employment. Flexible and atypical employment patterns have expanded employment channels, enhancing women's access to labor rights and interests at the level of employment form autonomy. Based on data, Luo et al. found that the digital economy has significantly reduced gender inequality in the labor market, and its boosting effect on women's non-agricultural employment and sideline employment is notably stronger than that on men [9].

Alibaba has established China's first "Customer Service County" in Xunwu, Jiangxi Province, by building a customer experience center that offers digital customer service positions with work-from-home arrangements as well as social insurance and housing fund benefits. Female employees account for more than 80% of the workforce, most of whom are mothers, enabling women in county areas to balance at-home employment and family care.

The digital economy has broken the "glass ceiling" of traditional workplaces and provided diversified channels for women's career advancement. Du Yongshan's empirical research also confirmed that each 1% increase in the level of digital economy development is associated with an average 0.87% increase in women's income, and this income effect is sustainable [10]. On digital platforms, women can achieve job promotion through improved performance and career development through self-employment, free from the constraints of traditional corporate bureaucracy. For example, female riders can advance to become station managers or regional managers by improving their delivery efficiency and platform performance; female broadcasters on the Douyin platform can transform into founders of Multi-Channel Network institutions by accumulating a large fan base.

4.2. Practical shortcomings of employment quality

New business forms such as flexible employment and platform employment generated by the digital economy present obvious deficiencies in rights protection, which have become the core factor restricting the quality of women's employment. By the end of 2024, 70.57 million people in flexible employment had participated in the basic endowment insurance for employees, accounting for less than 40% of all flexible workers. More than half of workers in new forms of employment were not covered by the social security system. Among these, work-related injury insurance and maternity insurance are based on standard labor relations, resulting in an even lower coverage rate among female flexible workers. Many female delivery riders and female ride-hailing drivers have to cover their own medical expenses for work-related injuries due to the lack of work-related injury insurance. In addition, platform algorithmic assessments fail to take into account women's physiological characteristics, such as changes in working capacity during menstruation and pregnancy, leading to higher assessment pressure and greater risk of pay deductions for women.

Although the digital economy has expanded the space for women's career development, women's participation in the high-end sectors of the digital economy remains low, with a clear career development ceiling. Gender imbalance in core digital economy technologies is prominent. According to a survey by the China Communications Enterprises Association, women hold only 20% of technical positions at major machine learning companies, and an even lower share, approximately 12%, of AI researcher roles. The Report by Daily Interactive shows that women account for just 19.5% of Internet and digital technology R&D positions in China.

5. Countermeasures and suggestions

First, focusing on vulnerable groups such as rural women, women with low educational attainment and elderly women, a tiered and classified digital skills training system should be established. Relying on national action plans, the government should prioritize inclusive and affordable training covering e-commerce operation, livestreaming sales, cloud customer service and other fields, enabling women from different groups to acquire the digital capabilities required for their jobs. Enterprises may provide customized training based on job demands to improve practical operational skills. In the education sector, STEM education should be introduced in primary and secondary schools to strengthen girls' digital technology foundation and logical thinking, narrowing the gender digital divide at the source.

Second, women engaged in flexible employment in the digital economy commonly face problems including insufficient social security coverage and inadequate maternity protection. Therefore, institutional safeguards must be improved first. It is suggested that platforms be encouraged to sign standardized labor contracts with female flexible workers and clarify their obligations to contribute to the five social insurances and the housing fund. Meanwhile, a flexible social security system adapted to new business forms should be constructed, with a focus on improving maternity insurance and work-related injury insurance to minimize the risks and costs associated with childbirth and occupational injuries. In addition, algorithmic assessment standards should be regulated to prevent unreasonable deductions. Rapid legal aid channels should be established through trade unions and women's federations to support women in protecting their legitimate rights and interests.

Third, the stereotype that women are unsuitable for technical jobs still persists and needs to be addressed through multi-dimensional efforts. The media and digital platforms should continuously publicize role models of female technical professionals and digital entrepreneurs to reshape career

perceptions. Laws and regulations against gender discrimination should be improved, and supervision over recruitment and promotion on digital platforms should be strengthened. Meanwhile, enterprises should be encouraged to establish gender-equal human resource systems, open and transparent promotion channels, and female talent reserve programs, providing institutional support for women to access high-end technical and management positions.

Fourth, women remain underrepresented in high R&D-intensive fields, requiring joint efforts in resource allocation and talent development. The government should set up special funds for women's digital technology research to support women's participation in the research and development of core technologies such as artificial intelligence and big data. Universities should be encouraged to expand female enrollment in digital technology-related majors and establish more research and practice bases for women. Meanwhile, the allocation of R&D resources should be promoted toward central and western regions and rural areas, enhancing the development space of digital industries in disadvantaged regions through regional cooperation, so that women can truly participate in the high-end division of labor in the digital economy.

Lastly, the most significant structural constraint on women's employment stems from family responsibilities. The government needs to increase investment in inclusive care services to reduce the cost of childcare. Enterprises should implement systems such as flexible working hours, parental leave and lactation rooms. At the social level, the equal sharing of family responsibilities should be promoted, encouraging men to take a greater part in childcare and housework. In addition, digital skills retraining and employment placement services should be provided for postpartum women to alleviate income decline and career limitations caused by employment interruptions.

6. Conclusion

The research in this paper shows that the digital economy exerts a dual impact on female employment and the labor market. It not only broadens women's employment opportunities, improves employment quality and optimizes the gender structure of the labor market, but also brings challenges including the digital divide, inadequate rights protection and internal employment stratification among women. Through multi-stakeholder coordination and the implementation of targeted countermeasures, the balanced distribution of digital dividends across gender groups can be promoted, thus achieving high-quality female employment and gender equality in the labor market.

This paper has certain limitations. The research mainly adopts qualitative analysis and literature review, lacking empirical support such as panel data analysis, and the investigation into the heterogeneity of women across different regions and age groups is insufficient. In future research, provincial panel data can be introduced for empirical testing, and differentiated analyses of different groups can be refined. Future studies may also focus on the long-term impacts of new technologies such as artificial intelligence on female employment, explore the linkage mechanism between digital skills training and the quality of female employment, and examine innovative paths for protecting female labor rights under new business forms, so as to further enrich research findings in the field of the digital economy and female employment.

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