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A Study on the Impact of Digital Economic Development on Labor Market Structure and Skill Demand

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Abstract: This study aims to explore the impact mechanisms of digital economic development on labor market structure and skill demand transformation, revealing their coordinated evolutionary pathways. By systematically reviewing existing literature, the paper summarizes the role of the digital economy in reshaping industrial chains and employment models, and analyzes the interactive relationship between labor market structural adjustments and the structural changes in skill demand within a theoretical framework. The findings indicate that the digital economy, by promoting industrial digital transformation and diversifying employment forms, drives a restructuring trend in the labor market characterized by "high-end expansion and low-end contraction" of job positions, while simultaneously intensifying the coexistence of "high-end, digitalized, and composite skill demands" with skill polarization. There exists a bidirectional dynamic relationship between labor market structural adjustments and skill demand transformations, where skill mismatches and structural imbalances in human capital become key constraints to labor market optimization. This paper concludes that improving skill training systems, optimizing human capital allocation mechanisms, and innovating employment matching mechanisms are essential to achieving the coordinated upgrading of labor market structures and skill structures, thereby fostering high-quality employment development in the context of the digital economy.

Keywords: Digital Economy; Labor Market Structure; Skill Demand; Skill Mismatch; Structural Transformation

1. Introduction

With the rapid advancement of information technology, the digital economy has become a key force in restructuring global resource allocation and reshaping industrial ecosystems. The widespread application of digital technologies has not only transformed enterprise production methods and business models but also profoundly impacted the structural changes in the labor market. On the one hand, the digital economy promotes industrial digital transformation, driving the emergence of new industries and employment forms, thereby creating a large number of new job opportunities [1]. On the other hand, the accelerated penetration of automation and artificial intelligence technologies exerts a substitutive impact on traditional jobs, leading to a complex situation where structural imbalances in job positions and skill mismatches coexist in the labor market [2].

Against this backdrop, the dynamic changes in skill demand have become a core issue for the labor market to adapt to digital economic development. The advancement of digital technologies not only increases the demand for high-skilled and multi-disciplinary talents but also intensifies the employment pressure on low-skilled labor, resulting in an increasingly prominent trend of "skill polarization" [3]. This structural transformation of skill demand poses new challenges to the employment matching mechanisms, talent cultivation systems, and social security policies of the labor market, and calls for a more systematic analysis of relevant theoretical research and practical policies.

However, existing studies often treat employment quantity or skill demand as isolated variables when examining the impact of the digital economy on the labor market, lacking systematic analysis of the interactive relationship between market structural adjustments and skill demand transformations. Additionally, there is a lack of in-depth exploration of the differentiated characteristics

across industries and regions in the process of digital economic development. Therefore, it is necessary to analyze the internal mechanisms and influence pathways from the perspective of the coordinated evolution of labor market structure and skill demand under the development of the digital economy.

2. Literature Review

The development of the digital economy has not only reshaped the global economic landscape but has also profoundly transformed the demand structure and employment patterns of the labor market. Existing studies generally agree that the widespread application of digital technologies exerts a dual impact on labor market structures. On the one hand, the digital economy drives the continuous emergence of new industries and digital professions, creating numerous new employment positions related to big data, artificial intelligence, cloud computing, and the Internet of Things. These new jobs place higher demands on workers' digital skills and cross-disciplinary integration capabilities, leading to rapid growth in high-skilled and high-value-added positions [4]. On the other hand, automation and intelligent technologies exert a significant substitution effect on low-skilled and highly repetitive jobs, causing the employment scale of traditional manufacturing and low-end service sectors to shrink gradually, thereby exposing certain segments of the workforce to the risks of "forced transformation" or "employment loss" [5].

In terms of employment forms, the digital economy has spawned new employment models such as the platform economy, sharing economy, and remote work, making labor market organization more flexible and decentralized. Studies have shown that although the platform economy has broadened employment channels to a certain extent, it has also brought about issues such as rising employment instability and weak labor rights protection, further exacerbating structural contradictions in the labor market [6].

From the perspective of skill demand, the digital economy accelerates the dynamic restructuring of skill requirements. Enterprises are increasingly demanding high-level Research and Development talents and professionals skilled in digital management and data analysis, fostering trends of skill upgrading and multi-disciplinary integration [7]. Simultaneously, the deep integration of digital technologies with traditional job roles has made digital literacy a fundamental requirement for middle- and low-skilled positions, turning "basic digital skills" into a universal threshold in the labor market [8]. Furthermore, some scholars have pointed out that with the progression of the digital economy, the phenomenon of "skill polarization" has become more prominent, making skill mismatches and structural imbalances in human capital key challenges faced by the labor market [9].

On the supply side of skills, the current education and vocational training systems exhibit significant lag in responding to the evolving skill demands brought about by the digital economy. Some studies argue that the traditional education system places excessive emphasis on academic qualifications and theoretical knowledge, lacking practical and forward-looking skill training aligned with industrial digital transformation. This has exacerbated the structural mismatch problem where "high-skilled positions remain vacant while low-skilled workers struggle to find employment" [10].

Although existing literature has achieved considerable theoretical progress in studying the impact of the digital economy on the labor market and skill demand, several limitations and areas for improvement remain. Firstly, most studies focus on macro-level descriptive analyses, lacking systematic exploration of the interactive mechanisms between labor market structural adjustments and the dynamic evolution of skill demand. Secondly, there is limited attention to the heterogeneous impacts across different industries and regions during the digital economy’s development process, making it difficult to comprehensively reveal the differentiated characteristics of labor market and skill demand transformations. Additionally, regarding the issue of skill mismatches under the digital economy, current research tends to remain at the level of phenomenon description, lacking targeted mechanism analysis and empirical validation. Therefore, it is essential to analyze the logic

of labor market restructuring and the pathways of skill demand transformation under the digital economy from the perspective of the coordinated evolution of "labor market structure — skill demand."

3. Theoretical Analysis

3.1 Mechanisms of Labor Market Structural Adjustment Driven by the Digital Economy

The digital economy accelerates structural adjustments in the labor market through technological advancement and industrial chain restructuring. On the one hand, the widespread application of digital technologies has reshaped enterprise production processes and organizational structures, leading to a rapid increase in demand for high-skilled and innovative talents in upstream R&D and design segments, while standardized and repetitive positions in midstream and downstream sectors are gradually replaced by automation and intelligent technologies. This results in a job structure shift characterized by “high-end expansion and low-end contraction.”

On the other hand, new business models such as the platform economy and sharing economy have dismantled traditional fixed employment relationships, promoting a shift toward flexible employment and non-standard jobs. Consequently, the organizational approach of the labor market transitions from “employment relationship-oriented” to “task-oriented” and “platform-matching” models, enhancing the flexibility and decentralization of the labor market. Furthermore, the digital economy has led to the diversification of enterprise organizational forms, where traditional large-scale vertical integration structures are gradually giving way to modular, networked, and project-based collaboration models. This enables enterprises to achieve more agile human resource allocation and task coordination across regional and industry boundaries.

Additionally, digital technologies have redefined regional employment patterns by decoupling the spatial dependency between job locations and labor supply. Remote work and digital outsourcing allow talent in non-core urban areas to participate in high-value-added digital labor markets, reshaping the geographical distribution of employment opportunities. This cross-regional employment integration, while expanding labor market inclusivity, also imposes new challenges on regional labor market governance and employment service systems.

3.2 Pathways of Structural Transformation in Skill Demand Induced by the Digital Economy

Under the development of the digital economy, skill demand is undergoing structural and multi-layered transformations. On the one hand, enterprises have significantly increased their demand for high-level digital skills and cross-disciplinary composite abilities. Digital competencies such as data analytics, AI algorithm development, and cloud platform management have become “core competitive skills” in the labor market, driving trends of skill upgrading and integration. On the other hand, the universal requirement for basic digital skills in traditional industry positions continues to rise, making digital literacy a foundational skill for all workers, even for entry-level service roles.

Additionally, as low-skilled jobs are replaced by automation, the remaining positions tend to shift towards “service-oriented skills” and “emotional labor,” such as customer relationship management and personalized services. This results in a skill demand structure characterized by the coexistence of “high-end, digitalized, and composite skills” and “enhanced basic service skills.”

Beyond technical competencies, the digital economy also intensifies the demand for soft skills such as problem-solving, communication, and adaptability, as the complex, fast-evolving digital work environment requires employees to collaborate across functional and geographical boundaries. Moreover, with the rise of platform-based gig work and remote freelance employment, self-management skills, digital entrepreneurship awareness, and personal brand building capabilities are emerging as critical skill dimensions in the new labor ecosystem. Thus, skill demand transformation is no longer limited to technical upgrading but has evolved into a comprehensive capability restructuring process, reshaping the entire profile of workforce competencies.

3.3 Interactive Relationship between Labor Market Structural Adjustments and Skill

Demand Transformation

There exists a bidirectional and dynamic interactive relationship between labor market structural adjustments and skill demand transformations. On the one hand, the optimization of labor market structures drives the iterative upgrading of skill demands, as the emergence of new industries and digital positions imposes higher standards and adaptability requirements on workforce skills. On the other hand, the lag in skill supply capacity and the prevalence of structural mismatches, in turn, constrain the quality and pace of labor market structural adjustments. Skill mismatches not only exacerbate the "structural contradictions in employment" within the labor market but also undermine the digital economy's capacity to expand employment scale and improve job quality, resulting in a cyclical contradiction of "job structure adjustment — insufficient skill supply — intensified employment mismatch."

Furthermore, the continuous restructuring of job content driven by technological innovation accelerates the obsolescence of certain skills, shortening the effective career lifespan of specific occupational competencies. Without timely reskilling and upskilling mechanisms, workers are at risk of being marginalized in the labor market, thereby intensifying employment instability and inequality. Conversely, the availability of agile and responsive skill development systems can serve as a positive feedback loop that enhances labor market adaptability and supports smoother structural transitions.

Thus, achieving the coordinated evolution of labor market structures and skill ecosystems requires an integrated policy framework that simultaneously addresses supply-side skill development and demand-side employment restructuring. In addition to improving education and training systems, proactive labor market interventions, such as real-time labor information platforms and dynamic employment matching services, are essential to enhance the alignment between workforce capabilities and market demand, ensuring inclusive and sustainable employment growth in the digital economy era.

4. Conclusion

As a key driving force of a new wave of technological revolution and industrial transformation, the digital economy is profoundly reshaping the structure of the labor market and the pattern of skill demand. This paper, from the perspective of digital economic development, systematically analyzes the internal mechanisms of labor market structural adjustments and skill demand transformations, leading to the following main conclusions:

Firstly, the digital economy, through technological advancement and industrial chain reconstruction, accelerates the dynamic adjustment of labor market structures. On the one hand, the rise of emerging digital industries and digital professions has driven the rapid expansion of high-skilled and high-value-added positions. On the other hand, automation and intelligent technologies have significantly substituted low-skilled and repetitive jobs, prompting a restructuring trend within the labor market characterized by "high-end expansion and low-end contraction" in job structures.

Secondly, the digital economy has profoundly altered the structure of skill demand in the labor market, exhibiting a dual characteristic of "high-end, digitalized, and composite skills" coexisting with the "enhancement of basic service skills." Enterprises' demand for multi-disciplinary talents with high-level digital competencies continues to grow, while the universal requirement for "basic digital skills" across traditional industry positions has steadily increased. Simultaneously, there is a more evident shift in low-skilled positions toward service-oriented and operational skills, intensifying the structural polarization of skill demands.

Thirdly, there is a dynamic interactive relationship between labor market structural adjustments and skill demand transformations. The optimization of labor market structures imposes new adaptive requirements on skill demand, whereas the lag in skill supply capacity and the prevalence of skill mismatches, in turn, constrain the speed and quality of labor market structural adjustments. This leads to a cyclical contradiction of "job structure adjustment — insufficient skill supply — intensified employment mismatches."

This study highlights that addressing the structural challenges of the labor market in the digital economy era requires a coordinated approach that integrates skill supply-side reforms with labor market demand-side

optimization. Policymakers should accelerate the modernization of vocational education systems, promote industry-academia collaboration to align talent cultivation with evolving market demands, and establish flexible, lifelong learning mechanisms to enhance the adaptability of the workforce. Simultaneously, the development of intelligent labor market information platforms should be prioritized to improve job matching efficiency and dynamically adjust skill training resources based on real-time demand. Only through the synergistic upgrading of labor market structures and skill ecosystems can the employment-driven potential of the digital economy be fully realized, fostering sustainable and high-quality employment growth.

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