

Research Progress and Prospect of Chinese Labor Skill Structure

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ABSTRACT

As an important index to measure a country's economic development and social progress, the skill structure of labor force has been widely concerned. With the rapid development of China's economy and science and technology, the optimization of labor force skill structure has become one of the key factors to achieve sustainable development. However, there are still some deficiencies and limitations in the research on the skill structure of Chinese labor force. By systematically combing relevant studies, this paper clarified the evolution trend of China's labor force skill structure, deeply analyzed the influence mechanism of China's labor force skill structure around variables such as digital economy, industrial upgrading, regional development level, technological progress and urbanization, and then discussed the optimization path of labor force skill structure, and looked forward to the direction and focus of future research.

KEYWORDS

Labor force; Skill structure; Optimized path

1. INTRODUCTION

Labor force is an important driving force of social and economic development, and its structure and quality affect the level of economic development and competitiveness of a country or region. As an important measure index of talent training and talent team construction, the research significance is self-evident. At present, the academic circle has conducted extensive research on the "polarization" of the labor force skill structure and the influencing factors of the labor force skill structure, but the research on the optimization path of the labor force skill structure is still lacking in depth and breadth. This paper aims to sort out the relevant literature on the skill structure of the labor force, clarify the status quo of "polarization" of the skill structure of the labor force and the regional differences, and investigate the influencing factors of the skill structure of the labor force around the variables of digital economy, industrial upgrading, regional development level, technological progress, urbanization, etc., and further find the optimization path of the skill structure of the labor force. It provides reference for the research on the construction of skilled personnel team in our country.

2. "POLARIZATION" OF LABOR SKILL STRUCTURE

In the second half of the 20th century, the wage structure of the American labor market showed a trend of polarization, and the employment ratio of high-skilled and low-skilled labor grew faster, resulting in a U-shaped curve in the overall employment ratio. Meanwhile, the phenomenon of volatile skills premium also appeared in the labor market [1]. The "polarization" phenomenon caused

by technological change, labor supply change, system and other factors quickly swept most economies in the world, and was confirmed in Germany, Spain, Switzerland and other countries [2-3]. The labor market of some developing countries also began to show the characteristics of the "polarization" of the labor force skill structure, Colombia and Mexico in South America showed the phenomenon of "polarization" of the labor force skill structure in different time periods.

The global phenomenon of "polarization" has also aroused extensive attention of Chinese scholars and experts, and relevant studies have been carried out [4-5]. Chinese scholars have not formed a unified understanding of the changing trend of labor skill structure. Xu Shaojun and Zheng Jianghuai (2020) believe that the skill structure of China's labor force does not appear "polarized" on the whole, but shows the phenomenon of skill structure upgrading [6]. According to the study of Yang Xianming et al. (2022), the labor market generally presents a trend of increasing the number of medium and high-skilled labor and decreasing the number of low-skilled labor, and there is no "polarization" feature [7]. Xiao Zhouyan and Zhang Yafei (2023) believe that the skill structure of China's labor force has been upgraded, rather than polarized [8]. Some scholars believe that China's labor employment has shown a certain degree of "polarization" and have found evidence of "polarization" of labor employment in different industries and regions [9].

2.1. "Polarization" of Labor Skill Structure at Industry Level

Xu Shaojun and Zheng Jianghuai (2022) investigated the "polarization" phenomenon of labor skills in various industries in China and found that the "polarization" has occurred in the real estate industry, education, culture, sports and entertainment [10]. Chen Yi and Li Yanan (2023) studied the labor market based on more credible data and reasonable labor or occupation classification standards, and found that China has a trend of "polarization" in the labor market, and this trend is particularly obvious in the manufacturing industry [11]. The characteristics of biased technological progress in the job market have led to a clear divergence in the employment and income share of high, medium and low skilled labor. Compared with the high-low skilled labor force, the employment of the medium-skilled labor force shows a downward trend [5, 9, 12].

2.2. "Polarization" of Labor Skill Structure at Regional Level

The phenomenon of "polarization" not only appears in the industry, but also in different regions of our country. Based on the differences of regional development level, aging population, industrial structure, scientific and technological level and other factors in China and the reality of unbalanced national conditions, the representation of "polarization" is also different. Regions with a higher degree of financial development have a higher proportion of skilled population. The eastern region has an obvious high-skill bias, while the western region has a non-skill bias [13-14]. The demand for high-skilled labor is greater than that for low-skilled labor in areas with high-level digital economy development, while the demand for medium-skilled labor shows a downward trend [15]. Population aging also has a significant impact on the skill structure of the labor force, showing regional differences [16]. The upgrading of industrial structure affects the skill structure of the labor force by driving the employment of the labor force, but there is regional heterogeneity. The upgrading of industrial structure in the middle and lower reaches of the Yellow River Basin has a promoting effect on employment, while the effect is not significant in the middle and upper reaches of the Yellow River Basin [17]. In the regions with different levels of scientific and technological development, the forms of labor employment polarization are different. The specific situation is to promote the employment of low-skilled labor in the middle and low level science and technology development areas, and curb the employment and development of high-skilled labor in the middle level science and technology development areas and skilled labor in the low level science and technology development areas [18].

3. RESEARCH ON INFLUENCING FACTORS OF LABOR SKILL STRUCTURE

The formation of labor force skill structure is a multi-dimensional and complex process, which is influenced by multiple factors [19-21]. Current studies on the skill structure of the labor force mainly focus on the influence of single factor on the skill structure of the labor force, ignoring the influence mechanism of multi-factor "configuration" effect on the skill structure of the labor force. Therefore, it is necessary to deeply study the influence mechanism of multi-factor interaction on the skill structure of the labor force in different situations. Based on previous studies, the influence mechanism of specific variables such as digital economy, industrial upgrading, regional development level, urbanization and technological progress on labor skill structure is discussed.

3.1. Digital Economy and Workforce Skill Structure

With the vigorous development of the digital economy, the labor market has an increasing demand for digitally skilled labor. The new occupations and positions spawned by the rise of the digital economy have a huge impact on the labor market, and at the same time put forward new requirements on the skill structure of workers. The evolution of the labor market caused by the transition to high-tech and knowledge-based economy has increased the demand for high-skilled workers, while the replacement risk of low-skilled labor is constantly rising [22-25]. The development of digital economy has promoted the optimization and evolution of human capital structure [24]. Digital economy promotes the transfer of human capital from low to high level: on the one hand, the demand for high-skilled personnel increases, and the high-skilled labor force faces a mismatch between supply and demand; On the other hand, digital technology mainly affects middle-skilled jobs, leading to a decline in the employment of middle-skilled workers [26-29].

Digital economy takes different forms in different regions of our country. The development of the digital economy will increase the demand of enterprises for people with high and low education. This "polarization" trend shows a two-way trend in the coastal areas and the northeast, while in the southwest, the demand for medium-skilled labor increases and the demand for low-skilled labor decreases [15]. Compared with backward provinces, digital technology innovation plays a stronger role in promoting the optimization of employment skill structure in advanced provinces, and the highly skilled labor force in central and western regions has a higher suitability for digital transformation of enterprises [30-31].

3.2. Industrial Upgrading and Labor Skill Structure

Industrial upgrading has led to the polarization of the labor market, and the low-skilled service industry engaged in interactive work has absorbed a large number of low-skilled labor replaced by machines because it is difficult to be replaced by machines [32]. In the United Kingdom, labor employment began to gradually shift from primary employment and manufacturing to service and information economy [33]. In China, with the continuous optimization and upgrading of industrial structure, the impact of different industries on labor employment shows significant differences [34]. The analysis of deviation degree of industrial structure shows that the primary industry has a weak ability to effectively absorb employment, while the secondary and tertiary industries have a significant ability to continuously absorb employment [35]. The capital-biased technological progress caused by the entry of capital into the labor market promotes the employment of highly skilled labor, resulting in the phenomenon of employment "upgrading" and skill premium. Jiang Mengshi and Shen Qin (2022) found that in the context of China's industrial upgrading, the coupling coordination degree between high-skilled talents and industrial structure showed a trend of first rising and then decreasing. The coupling coordination level in the northeast, west, central and eastern regions is gradually enhanced [36]. In this context, the relatively backward development of the central and western regions

is difficult to attract the middle and high-end capital and technology-intensive industries in the eastern region, resulting in the highly skilled labor force is still moving to the developed regions. This trend not only directly improves the development efficiency of highly skilled talents, but also indirectly promotes the construction of highly skilled talents through local competition and social recognition [34, 37-38].

3.3. Regional Development Level and Labor Force Skill Structure

In recent years, with the staging of the "talent war" across China, attracting high-level labor to enrich the job market and strengthen the talent reserve has become an important strategy and means of urban development. The development level of some regions is restricted by various factors, such as relatively backward economy, unitary industrial structure, and insufficient investment in the training of skilled personnel, which leads to regional migration of labor force, and the high-skilled labor force tends to the coastal areas and eastern regions with relatively good development. The selection effect of developed areas and big cities in China, mainly in the eastern region, is more able to attract middle and high-end talents [34, 39]. Compared with the eastern region, the central and western regions are currently more difficult to attract high-end technology-intensive and capital-intensive industries to move in, which makes the regional mobility of highly skilled talents mainly concentrated in developed regions. Affected by regional development level, employment growth is more likely to be polarized in areas with lower population density and areas with higher initial specialization of medium and high skilled sectors. The manufacturing industry with greater technological innovation intensity is more concentrated in space, and the labor force is more affected [40-42].

3.4. Urbanization and Labor Force Skill Structure

The development of urbanization has brought about the specialization, diversification and division of labor in production, promoted the development of high-tech industries, and improved the degree of social division of labor. This spatial accumulation of human capital and physical capital, while promoting the perfection of urban functions, increases the relative demand for highly skilled labor. With the advancement of urbanization, the service industry has developed vigorously, and the living and productive job opportunities for low-skilled labor have increased, which has promoted the employment of low-skilled labor [9, 43].

3.5. Technological Progress and Labor Skill Structure

Technological progress is generally regarded as an important factor affecting the skill structure of the labor force. In terms of technological progress, Chinese enterprises show a trend of higher skill demand, resulting in increased demand for high-skilled labor, and the proportion of high-skilled labor in the labor market also rises [5, 44]. The changes in the skill structure of the labor force caused by technological progress are once again confirmed in the process of automation upgrading in the manufacturing industry. The emergence and upgrading of "industrial machines" replace some skills of workers, resulting in the disappearance of original jobs. Other skills may also be in demand, creating new jobs [45].

4. OPTIMIZATION PATH OF LABOR SKILL STRUCTURE

With the rise of the digital economy, traditional industries are gradually declining, and emerging industries are booming. It is particularly important to optimize the skill structure of the labor force, expand the supply of skilled positions, and meet the needs of employees with different skills for higher skills and income. At the macro level, Lv Rongjie and Liu Chang (2020) applied configuration thinking to integrate the four conditions of industrial upgrading, artificial intelligence, technological progress and urbanization, and found that the linkage distribution mechanism between high-level

artificial intelligence and high-level industrial upgrading can promote the optimization of labor structure in a deeper and more powerful way [19]. Liu Chang et al. (2021) investigated the configuration effects among the four conditional variables of industrial upgrading, artificial intelligence, human capital and trade openness, and found that artificial intelligence combined with industrial upgrading can effectively promote the optimization of labor skill structure [21]. Under the current background of industrial intelligence, the development path combining industrial intelligence, industrial structure upgrading and regional development level has the greatest effect on the upgrading of labor skill structure. As the core condition in the upgrading path of labor skill structure, high regional development level reflects the high level of innovation in developed regions, which can effectively promote the development of artificial intelligence. Optimize the skill structure of labor force [20]. Digital trade plays a significant role in promoting the optimization of labor skill structure. Establishing a more open and free trade environment, while maintaining market regulation at a reasonable level, and improving the level of digital trade in our country are of vital significance to promoting the optimization of our labor skills structure [46]. At the enterprise level, different factors have different effects and ways on the optimization of labor skill structure. The technology authorization of foreign-funded enterprises can affect the upgrading of labor structure in enterprises through production scale, capital deepening and independent research and development. Specifically, increasing production scale and investment in research and development play a positive role in promoting the optimization of labor skill structure, while capital deepening may have a negative impact on the optimization of labor skill structure [47]. When manufacturing enterprises implement automation upgrading, it will produce job substitution or creation effect. It is in line with the policy direction of our country to develop the skills society that enterprises taking the automation-skill preference approach focus on cultivating and improving the skills of workers while promoting automation. This practice helps to enhance the employment stability and skill level of young workers, promote the diversification of skilled jobs, increase the proportion of skilled workers, and achieve the joint upgrading of the manufacturing industry and labor force [45].

5. RESEARCH CONCLUSIONS AND PROSPECTS

It is of great significance and value to study the optimization path of labor skill structure for improving labor market competitiveness, promoting industrial upgrading, promoting economic development, increasing employment rate, promoting talent training, enhancing enterprise competitiveness, and promoting social harmony and stability. Domestic research on the skill structure of the labor force has laid a solid theoretical foundation and experience for the follow-up research on the skill structure of the labor force and the construction of the talent team. The current research mainly focuses on the "polarization" of the skill structure of the labor force and the influencing factors of the skill structure of the labor force, while the research on the optimization path of the skill structure of the labor force is still relatively limited, and the future exploration can focus on the following aspects:

- 1) Current research focuses on the "polarization" phenomenon of labor force, influencing factors of labor force skill structure and intermediary variables, and rarely sets foot on the optimization path of labor force skill structure. Future research can be based on different regions and industries to explore the optimization and upgrading path of labor force skill structure under different scenarios.
- 2) Most studies on the influencing factors of labor skill structure focus on the influence of single factor on labor skill structure, while ignoring the "configuration" effect of multi-variable linkage on labor skill structure, which is inconsistent with reality. A few scholars pay attention to the interaction of some factors, but due to the number of cases and the situation of each case, only a small number of factors affecting the skill structure of the labor force are used in the research. In the future, in-depth discussion of the internal mechanism of factors affecting the skill structure of the labor force can be considered, and multi-factor variables and their interactive effects can be added to enrich the research model.

3) The current research on the skill structure is diverse, and there is still a problem that the research entry point is relatively single, and there is a lack of research on the influence of the skill structure of the labor force in a specific context. A small number of literatures have studied the regional differences of influencing factors of skill structure, while few studies have focused on the differences of optimization paths of skill structure in different regions, which lacks practical guiding significance. In addition to enriching local data, multiple research variables can be selected to explore the differences in skill structure optimization paths in different regions according to the specific scenarios of specific regions.

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