

Research on the Development of Elderly Human Resources in China in the Age of Digital Economy

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Abstract. Thanks to the rapid advances in science and technology, the digital economy is booming globally, becoming an essential driving force for social progress and economic growth. As a new type of economic form, the digital economy profoundly affects people's lifestyles, work styles, and social and economic structures. However, at the same time, China is facing the severe problem of aging its population. Under this dual background, developing human resources for the elderly is particularly urgent and essential. As an essential part of society, the elderly have rich experience, wisdom and skills, and are valuable human resources. In the era of the digital economy, the development of elderly manpower resources not only helps to alleviate the labor shortage but also injects new vitality into the development of the economy and society. This paper applies the creative destruction theory to analyze the opportunities and challenges of the development of human resources for the elderly in China in the era of the digital economy through the literature analysis method. In order to seize these opportunities and meet the challenges, a series of countermeasures are proposed to give full play to the potential and value of the elderly in the era of the digital economy and contribute to the sustainable development of society.

Keywords. Digital economy; population aging; the development of human resources for the elderly

1. Introduction

Elderly workforce resources refer to the group of older people who have reached a specific age limit, still have a particular working ability and willingness to work, and can be utilized by organizations to participate in social and economic activities and create labor value[1]. As China's population aging continues to deepen, the number of China's elderly human resources is also climbing. The data of the seventh national population census in 2021 show that over the past ten years, the degree of population aging in China has further deepened, with the population aged 60 years and above reaching 264 million, accounting for 18.7% of the total population. According to relevant predictions, during the "14th Five-Year Plan" period, the national elderly population will exceed 300 million[2]. The increasing degree of aging has brought about social problems that cannot be ignored, such as a shortage in the labor market, tension in medical and pension

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resources, and an increasing social burden. Actively developing and utilizing the human resources of the elderly not only helps to alleviate the current pressure of population aging in China but also effectively alleviates the burden of old-age pensions on society, thus further optimizing the overall utilization level of human resources.

The rapid development of information technology has laid a solid foundation for the rise of the digital economy. The widespread application of new-generation information technologies, such as artificial intelligence, big data, and cloud computing, has not only changed people's way of production and life but also provided new possibilities for developing resources for the elderly. In the era of the digital economy, the wide application and continuous upgrading of mathematical technology not only breaks the traditional employment mode but also gives rise to a series of flexible and diversified new employment forms. At the same time, this also brings more employment opportunities for the elderly group; through the digital technology and network platform, the elderly can more conveniently obtain information and resources, and then improve their skills and abilities, and can continue to play after retirement, to realize self-worth[2].

Against the backdrop of the coexistence of population aging and the era of the digital economy, the development of the human resources of the elderly in China is of great significance. The elderly population has rich experience and skills and is a valuable intellectual resource for society. Effectively developing and utilizing this resource is not only related to the quality of life and social status of the elderly but also of great significance to the sustainable development of the economy and society.

2. Domestic and international research status

2.1. Relevant studies on the impact of the digital economy on labor and employment

Milojko Arsić (2020) argues that there are two types of technological innovations; one type leads to the fact that some jobs done by people are now replaced by machines, again leading to a decline in employment. The other type creates new jobs that did not exist before, creating many jobs[4]. Xia Tian, Pei Jingsong (2021) argued that the digital economy is irreplaceable in improving employment methods, creating employment opportunities, and adjusting the employment structure[5]. Zhang Zhuo (2023) proposed that the AI industry in the era of the digital economy promotes the "upgrading" and "polarization" of high-skilled labor and low-skilled labor and ultimately promotes the excellent development trend of the overall economy by starting from the structure of the AI industry, the theoretical study of the digital economy, the mechanism of the digital economy to promote the economic growth, and the panel data analysis of the impact of the digital economy on the economic growth of the region[6]. Wu Yunxia, Hao Neng, and Ma Yechi (2023) found that the job creation effects of digital economic development were attributed to scale expansion and productivity effects, while the substitution of low-skilled labor by digital technology did not significantly impede employment[7]. Yun Cai, Shuqing Liu, Xia Zhang (2024) used a multilevel regression model with 13,969 valid samples from the China Family Panel Study (CFPS) data to examine the impact of the level of urban digital economy development on individual employment quality from a micro perspective. They proposed that the level of urban digital economy development contributes to individual employment quality[8].

Zhang Yingqiang, Zhang Jin (2017) argued that the accelerating pace of technological innovation development has given rise to numerous novel business models and formats, profoundly breaking the original industrial pattern. While creating a large number of new jobs, technological progress has also inevitably triggered the problems of technical unemployment and structural unemployment[9]. Hao Jianbin (2018) argued that the development of China's digital economy is strong, and the Internet and platform economy have had a positive and far-reaching impact on various industries, becoming a new power source to promote employment growth[10]. An empirical analysis by Zhang Shiwei and Wang Jie (2023) found that the development of the digital economy not only helps to enhance the employment level of the elderly but also enables them to shorten their working hours. However, it is worth noting that with the continuous development of the digital economy, the impact of Internet use on the labor supply of the elderly is gradually weakening[11]. Through empirical research, Gao Zining (2024) deeply explored the impact of the digital economy on the re-employment of the retired elderly and its mechanism of action and proposed that the development of the digital economy significantly increased the probability of the re-employment of the retired elderly, especially the positive effect on the re-employment of urban, middle-income, and high-social security of the retired elderly is more pronounced. It is mainly through the mechanism of the job creation effect, the information transmission effect, and the threshold access effect[12].

2.2. A study related to the proposed countermeasures on labor and employment in the digital economy

Chenhui Ding (2023) puts forward relevant countermeasure suggestions by studying the bilateral effects of the digital economy on manufacturing employment: first, governments at all levels should actively deepen the reform of vocational education to improve the skill level and technical ability of the labor force; second, promote the matching of supply and demand in the labor market to expand the job creation effect of the digital economy; third, formulate targeted industrial development plans to promote the upgrading of the manufacturing industry[13]. Yantong Zhao (2023) puts forward relevant countermeasure suggestions by studying the impact of the digital economy on China's employment structure: firstly, the government utilizes new industries and technologies to increase the training of employment skills in the modern service industry; secondly, it is necessary to improve the basic research and development capacity of digital technologies while strengthening the research of key core technologies[14].

Liu Qiang (2006) believes that China should take action as early as possible through the appropriate way to integrate information technology into the process of comprehensive optimization of the employment environment the help information technology means China's demographic pressure demographic advantages and resource advantages, and to promote economic development at the same time, effectively solve the problem of employment in China[15]. Xiao Zhouyan, Zhang Yafei (2023) found through their analysis that human capital enhancement and industrial upgrading are important channels for the development of digital economy to promote the upgrading of employment structure in the context of aging[16].

2.3. Literature Review

In general, through a combination of the literature, it is found that scholars have conducted more in-depth research on the impact of the digital economy on labor employments. However, less attention has been paid to the research on the impact of the

digital economy on the re-employment of the elderly, as well as the research on the development of China's elderly manpower resources in the era of the digital economy. In addition, in terms of the impact of the digital economy on labor employment, most of the literature focuses on the fact that the digital economy can significantly promote the employment of workers and improve the quality of employment. However, less attention is paid to the fact that the digital economy can also harm labor employment. This paper applies the theory of creative destruction proposed by Schumpeterian, analyzes the opportunities and challenges faced by the development of elderly human resources in China in the era of the digital economy using literature analysis, and puts forward corresponding countermeasures in order to maximize the use of elderly human resources and to promote the harmony and progress of the society.

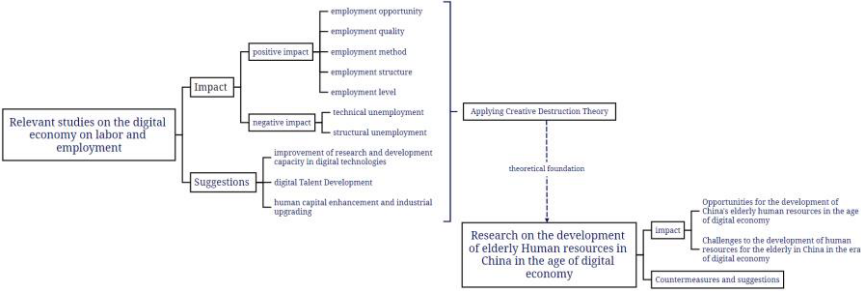


Figure 1 : Research Framework Chart

3. Theoretical foundation

The theory of creative destruction was developed by the brilliant economist Schumpeter[17], who had the insight that this theory is a central feature of capitalism. He argued that capitalism is not driven by price competition alone but relies on innovation competition, which creates a new economic structure and subsequently destroys it. Under the theory of creative destruction, whenever an entrepreneur introduces an innovation or eliminates some of his competitors, the firm's prosperity will rise, and productivity will increase. However, once it becomes profitable, more competitors are attracted to the market, leading to another depression in the industry. The result of technological innovation often heralds the next recession, and this cycle is the essence of the theory of creative destruction[18].

The theory of creative destruction emphasizes that innovation and competition are the core drivers of capitalist development. In the era of digital economy, such innovation and competition are not only reflected in technology and products, but also in the reconfiguration and utilization of resources[19]. Elderly human resources, as a special kind of resources, are also facing the problem of being reconfigured and utilized in the era of digital economy. Creative destruction theory emphasizes that innovation is the key to promoting economic and social development. In the era of digital economy, the development of elderly human resources also requires innovative methods and thinking. Through the introduction of new educational concepts, training methods, and online learning and remote working modes, the potential of older talent can be better explored and utilized. The term "disruption" in the theory of creative destruction can be understood as challenging and changing traditional concepts and models. In the development of human resources for the elderly, it is necessary to break the traditional

notion that the elderly are not suited to work in modern society, and to actively encourage them to participate in digital economic activities. At the same time, "creating" means establishing a new system or model. In the context of the digital economy, specific job markets and entrepreneurial platforms can be developed for older persons, providing job opportunities that match their abilities and interests. The theory of creative destruction provides us with a unique perspective to understand and promote the development of the human resources of the elderly in China in the digital economy. Through innovation, the combination of technology and market demand, and the promotion of policies, we can better explore and utilize the potential of older talent and make greater contributions to economic and social development.

From the history of human development, technological progress is mainly due to upgrading and improving technology and quality. For example, the development of the digital economy has benefited from the rapid advancement of science and technology, which has led to significant changes in society. The digital economy, as a kind of technological progress, is a double-edged sword that promotes social progress and economic growth but also brings a certain degree of impact on society. The digital economy has caused many traditional industry jobs to be replaced by artificial intelligence, forcing some workers engaged in traditional industries to face the dilemma of unemployment. In contrast, for those workers with higher skills, there is a mismatch between supply and demand[20]. In the era of the digital economy, the development of elderly human resources in China is also facing a double-edged effect. Therefore, to study the creative and destructive impacts of the development of the digital economy on the development of human resources for the elderly in China, we should not only seize the opportunities but also pay attention to the negative impacts.

4. Opportunities for the development of China's elderly human resources in the age of digital economy

4.1. The rise of the digital economy provides more employment opportunities for seniors

In the era of the digital economy, a large number of industries have realized large-scale digital transformation, and this change has not only promoted industrial upgrading and innovation but also given rise to a large number of high-level jobs. Compared with young talent, older people have richer experience and more mature expertise and may have an advantage in the digital economy. Therefore, the digital economy provides opportunities for older people with knowledge and skills to rejoin the workforce, effectively preventing the waste of a large number of high-level knowledge-based older people's human resources and enabling them to maximize the realization of their personal and social values. In addition, the digital economy has given rise to many new forms and modes of business, such as short-video live broadcasting, online car drivers, and other new occupations, which have contributed to the realization of an "incremental" number of jobs for older persons and provided them with more employment opportunities.

4.2. The digital economy provides easy access to employment for older people through efficient information transfer

In the context of the digital economy, older persons can easily access employment information through the Internet, mobile devices, and other channels. In addition, the digital economy promotes accurate matching in developing human resources for the elderly. Through big data, cloud computing and other digital technologies, it is possible to accurately analyze older persons' knowledge, skills and other characteristics, to match them with appropriate employment positions and promote more convenient and efficient employment for older persons.

4.3. The digital economy lowers the threshold for geriatric resource development

In traditional employment and entrepreneurial environments, older persons may face many limitations due to age, skills, or geography. However, in the context of the digital economy, many jobs and businesses can be conducted over the Internet, which breaks down geographical and time constraints and allows older persons to participate in human resources development more flexibly. At the same time, digital technology also reduces physical strength and fitness requirements, enabling more older persons to perform some jobs, and also helps to promote equity and inclusiveness in human resource development for older persons. Through the popularization and application of digital technology, older persons can have more equal access to information and resources, reducing the disparities caused by geography and age.

5. Challenges to the development of human resources for the elderly in China in the era of digital economy

5.1. Regional digital divide issues

There is a regional imbalance in the development of digital technology in China, which leads to the further expansion of the "digital divide" between regions[21]. Some provinces or regions with a more developed economy have a more active digital economy, and the application and development of digital technology in these places are more extensive and in-depth. On the other hand, in some economically more backward regions, due to factors such as insufficient infrastructure construction and limited capital investment, the development of digital technology is lagging behind and faces more challenges and difficulties.

5.2. Limited technology acceptance and adaptability

With the rapid development of the digital economy, the pace of technological updating and iteration is becoming more and more rapid, and older persons have limited capacity to accept and apply new technologies, which makes them face many obstacles in using digital tools, accessing digital information and participating in digital economic activities. New technologies and applications continue to emerge, placing greater demands on older person's ability to learn and adapt. However, many older persons may face difficulties learning new technologies due to age, physical conditions, and other factors, which can be a great challenge for them.

5.3. Inadequate education and training

With technology's rapid development, the labor market's demand for skills is also changing. Many emerging industries and jobs require skills such as digitization and informatization, whereas traditionally, older persons may have significant knowledge gaps in this area. Inadequate education and training have resulted in a mismatch between the literacy level and skills training of older persons and market demand, and a lack of targeted vocational education and skills training has made it difficult for older persons to adapt to new employment positions and work environments.

6. Countermeasures and suggestions for the development of elderly manpower resources in China in the era of digital economy

6.1. Emphasizing the impact and influence of the digital economy on the socio-economic participation of older persons

In the face of the increasingly serious situation of the ageing population in China, the number of older people is constantly climbing, while their overall quality is also gradually improving. This means that, with the progress of the times, more retired older people will wish to return to the labor market in the future, continue to give full play to their talents and experience and contribute to the prosperity and progress of society. Therefore, in promoting the development of the digital economy, we must pay attention to this large group of older people and commit ourselves to improving the degree of aging in the digital economy. We need to optimize the interface design of digital products and services so that they are more in line with the habits of the elderly, and also pay attention to the needs of the elderly for access to information, communication, and interaction to ensure that they can have a smooth flow in the digital economy.

6.2. Enhancing the digital literacy of the elderly and adapting to the development needs of the information society

The Government and society should increase their investment in information technology education for the elderly, and through the provision of relevant courses and training, help the elderly to enhance their digital literacy and narrow the digital divide so that they can better master digital technology and integrate into the age of digital aging. In this way, older persons will not only enjoy the convenience and efficiency brought about by the digital dividend. However, they will also be able to give full play to the advantages of their experience and wisdom in the digital economy and contribute more to social development.

6.3. Accelerating the process of digital transformation and upgrading of industries and fully utilizing the advantages of digital media in information dissemination

Actively promoting the in-depth integration of the digital economy with traditional industries, continuously expanding the scale of digital industries, and creating more jobs through the digitization of industries, to provide opportunities for older persons to return to the workplace and open up entirely new employment paths for them. At the same time, various forms of network media should be vigorously developed and utilized to increase the channels through which older persons have access to practical employment

information, thereby solving the problem of the lack of access to their employment information and enabling older persons to better integrate into the digital job market.

7. Results and Discussion

By collecting and combing the literature related to the digital economy on labor and employment, we find that the digital economy has a certain promotion effect on labor and employment, but at the same time, it also brings some negative effects. However, the past literature is less related to the research on the digital economy on the development of elderly human resources in China. The digital economy provides new opportunities and challenges for developing human resources for the elderly. By applying the theory of creative destruction, we can better grasp the internal law and driving mechanism of the development of human resources for the elderly, and put forward more scientific and practical development strategies and policy recommendations. In order to effectively develop the human resources of the elderly, the Government must introduce corresponding policies and measures to maximize the use of the human resources the elderly and promote social harmony and progress by paying attention to the impact and role of the digital economy, improving the digital literacy of the elderly and accelerating the digital transformation and upg Discussion rading of industries.

With the deepening development of the digital economy and the continuous change of social structure, the development of elderly human resources will become an even more critical research field and practical subject. We need to continue strengthening our research and practical exploration to make greater contributions to the sustainable development of human resources for the elderly in China.

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