The Dilemma of Farmers' Digital Literacy Enhancement in Digital Rural Construction and Path Analysis

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Abstract. In May 2022, the General Office of the Central Committee of the Communist Party of China (CPC) and the General Office of the State Council of the People's Republic of China (State Council) issued the "Rural Construction Action Implementation Programme", which re-emphasised the need to "implement the project of building and developing the digital countryside". As the direct participants and beneficiaries of digital village construction, rural residents' digital literacy is the key to promoting the endogenous development of digital villages. Due to the unfavourable impacts of education, living environment and information access, the digital literacy level of farmers is low, and their participation in and benefit from the construction of digital villages are limited. The article analyses the real-life dilemma of farmers' digital literacy in the construction of digital villages, and then puts forward digital literacy enhancement strategies in the hope that it can provide reference for policy makers, and that farmers' digital literacy can be enhanced so as to better assist the construction of digital villages.

Keywords: digital rural development; farmer literacy; farmer groups.

1   Introduction

In May 2019, China clarified the objectives and tasks of digital village construction, proposing to take digitalisation as the basis, use informatisation as a means to realise the transformation and upgrading of rural industrial development, rural construction and rural governance, and to inject brand new kinetic energy into the revitalisation of the countryside and the modernisation of agriculture and rural areas. In March 2021, the Informatisation Research Centre of the Chinese Academy of Social Sciences released the "China's Rural Digital Literacy in the Context of the Rural Revitalisation Strategy Survey and Analysis Report" for the first time, which investigated the current situation of digital literacy among urban and rural residents in China, revealing that the digital literacy gap between urban and rural residents reaches 37.5%, the digital literacy scores of farmers are significantly lower than those of other occupational groups, and the digital gap between urban and rural areas has shifted from a lack of infrastructure to an unequal digital literacy situation [1]. In this context, it is particularly urgent to improve the digital literacy of rural residents, which is related to the overall progress of

rural economy and social transformation. The in-depth promotion of rural digital construction and the optimisation of the governance system will inevitably depend on an in-depth analysis of the mechanism of digital literacy.

2   The concept of digital literacy

With regard to digital literacy, a unified conceptual definition has yet to be formed by academics at home and abroad. Overseas, UNESCO is more authoritative in the definition of digital literacy, which is the ability of individuals to access, manage, integrate, present, evaluate and create information through the safe and reasonable use of digital technology [2]. This ability not only covers the mastery of information technology, but also extends to employment, entrepreneurship and other aspects of the ability to cultivate. In China, scholars' interpretation of digital literacy is also diversified. For example, scholars such as Zheng Yunxiang have proposed that digital literacy is the legal norms, ethical codes, and behavioural values that citizens should follow when they learn, work, and live in the digital era using a variety of digital technologies. Xiao Junhong further emphasises that digital literacy covers not only technical knowledge and skills, but also cognitive skills, emotional skills, social skills and other comprehensive qualities [3]. It also includes cognitive skills, emotional skills, and social skills. From this, it can be seen that the definition of digital literacy is in the process of continuous evolution and improvement, and its connotation involves a variety of fields and levels. In November 2021, the Central Internet Information Office (CIIO) for the first time gave a more official definition of digital literacy, emphasising that digital literacy and skills are the sum of a series of qualities and competencies indispensable to citizens' learning, work, and life in the digital society. These abilities cover the acquisition, production, use and evaluation of digital information, as well as digital interaction, sharing and innovation, while also focusing on digital safety and security and compliance with ethical and moral norms. These competences cover the acquisition, production, use and evaluation of digital information as well as digital interaction, sharing and innovation[4].

3   Farmers' digital literacy empowers digital village building the inner logic of the

Digital village construction is a comprehensive process, which adheres to the concept of digital economy and the use of modern information technology, aiming to improve the economic efficiency and social and ecological quality of rural areas, and the cultivation of a new type of farmers with a high level of digital literacy is the key meaning of digital village construction[5]. The cultivation of new farmers with high digital literacy is the key to the construction of digital villages. Digital literacy can be divided into four aspects: digital learning literacy, digital work literacy, digital social literacy and digital security literacy. Farmers' digital learning literacy refers to farmers' digital thinking, cognitive use of digital tools and risk safety awareness, which can help farmers use modern information technology and resources to participate in all kinds of rural affairs,

and is conducive to the continuous improvement of the rural government governance system. Farmers' digital work literacy is mainly reflected in farmers' income-generating work, which is manifested in the process of farmers applying modern information technology work methods and approaches to their work, and transforming mobile phones and Internet platforms into "new tools" and "new markets", which is conducive to improving rural economic efficiency in the practice of digital countryside construction. The process of transforming mobile phones and Internet platforms into "new tools" and "new bazaars" is conducive to improving rural economic efficiency in the practice of digital village construction. Farmers' digital social literacy refers to farmers' use of various digital devices and the Internet to acquire material and spiritual wealth, and can be divided into farmers' e-commerce literacy and farmers' digital entertainment literacy. The cultivation and development of digital social literacy will enable the efficient allocation of resources for digital village construction, enrich the spiritual and cultural life of farmers, and improve cultural confidence [6]. The following is a summary of the development of digital social literacy. Farmers' digital security literacy refers to farmers' conscious prevention of known or potential risks during the use of digital devices, and can be divided into digital information protection literacy, digital risk identification literacy and digital health literacy. Improving digital security literacy is conducive to reducing the various economic risks that farmers may suffer in the construction of the digital countryside, and is conducive to maintaining the physical and mental health of farmers and creating a harmonious and beautiful production and living environment in the countryside.

4 The dilemma of improving farmers' digital literacy in digital village development

4.1 Inadequate rural digital network infrastructure support

Digital infrastructure, as the basis for the cultivation of farmers' digital literacy, is an essential production factor in the construction of digital villages. The 52nd Statistical Report on Internet Development in China shows that as of June 2023, the Internet penetration rate in rural areas was 60.5 per cent, a gap of 24.6 percentage points compared with urban areas. However, it should not be overlooked that in some rural areas, especially in geographically remote areas, digital upgrading and transformation in these areas will face greater challenges in the short term due to the difficulty of building modern information infrastructure and the high cost of launching and maintaining network services. As a result of the inadequacy of the digital infrastructure in rural areas and the lack of systematic maintenance and management of the existing digital infrastructure, it is difficult for farmers to come into contact with, learn from, and use a variety of informatisation facilities and tools in a stable digital environment, which to a certain extent objectively hinders the cultivation and enhancement of farmers' digital literacy, and impedes the process of digital science and technology-led rural revitalisation actions.

4.2   Inadequate system for fostering digital literacy among farmers

At present, China's digital development has not yet formed a unified, systematic and open digital pattern, and the digital literacy training system is still not perfect.In 2012, the concept of "new type of professional farmers" appeared for the first time in the central documents, and introduced the concept of "profession"[7].Since the concept of "high-quality farmers" was put forward in 2019, the central and local governments have issued policy guidance documents on how to cultivate high-quality farmers, such as "Farming can also be assessed as a professional title" and the 2023 Work Programme for Cultivation of High-Quality Farmers. However, on the whole, most of China's inquiry into the cultivation of digital literacy of high-quality farmers is still concentrated at the academic level, and there is no unified basis for implementation and enforcement at the policy level. On the other hand, one of the significant problems in the cultivation of digital literacy of farmers in China is the lack of active participation of multiple social actors. Agricultural-related universities and research institutes are absent in the development of programmes to participate in the cultivation of high-quality farmers' digital literacy, and the public is generally prejudiced against farmers, ignoring the importance of improving the digital literacy of high-quality farmers. In addition, promotional and training activities for digital technical talents to the countryside appear to be limited in scale and number, and these training activities focus mainly on the popularisation of rural e-commerce economy and agricultural technical knowledge, while training in digital intelligence technology, information product use and digital security awareness enhancement is particularly insufficient. This lack of a systematic system to cultivate farmers' digital thinking makes the real improvement of farmers' digital literacy still face a big challenge and a broad space for development.

4.3   Insufficient internal motivation of farmers to improve digital literacy

Since ancient times, China's traditional villages have maintained a relatively independent state of life, and farmers have inevitably been influenced by traditional conservative and closed thinking in their production and life, and have fears and concerns about the unfamiliar concept of digital village construction, and lack the intrinsic driving force to participate in digital village construction. This makes it difficult for digital facilities to enter the rural society, and also makes it difficult for farmers to learn and master these facilities, thus hindering the empowering effect of digital technology on rural construction. According to data released by the National Bureau of Statistics (NBS), by the end of 2020, the elderly population in rural areas accounted for 44.5 per cent of the population, reaching 111 million people. A large number of young and middle-aged farmers have migrated from rural to urban areas, making the population left behind in rural areas mostly elderly people, who have a low level of education and find it difficult to cross the threshold of using modern information technology, resulting in a lack of self-drive to improve their digital literacy and skills. As a result, it is difficult for them to adapt to the needs of digital rural construction. In recent years, as digitalisation has empowered the development of rural industries, digital information has become "new agricultural resources", digital equipment has become "new agricultural tools", and

online sales have become "new agricultural activities", and some developed rural areas have seen their traditional mode of operation gradually being reduced. The traditional mode of operation in rural areas has gradually been replaced by high-tech operation. However, in the vast rural areas of China, especially those remote areas, farmers still follow the traditional farming mode of "working at sunrise and resting at sunset", and this mode of labour of "facing the yellow soil and facing the sky" is still in use. This "face to the soil, back to the sky" mode of labour is still dominant [8]. Therefore, it is difficult for farmers in these areas to get on the high-speed train of digital technology to increase production and generate income, and therefore it is difficult for them to have a strong internal drive to improve their digital literacy.

5   Farmers' digital literacy in the digital village construction practice pathway

5.1   Optimising resource allocation, Strengthening rural digital infrastructures

In the process of building a "digital countryside", various types of digital resources should be effectively distributed, taking into account local geographical, human and economic conditions. It is necessary to increase the reconstruction and updating of rural communication networks, broadband networks and cable television networks, so as to make the information system in rural areas more complete, and to make the concept of "digital countryside" truly accessible to every family. On this basis, in view of the different characteristics of urban, rural and rural areas, various types of digital resources will be integrated to build a digital service platform that meets the needs of rural residents at different levels [9]. When constructing the digital platform, attention should be paid to practicality, reasonably simplifying applications, reducing operational difficulties, and ensuring farmers' interest in and willingness to digitise their villages. Strengthening data management, data resource management, data resource management, application scenario construction, and improving the level of farmers' use of digital technology, from "hardware facilities" to "software platform". This will not only help accelerate the construction of digital villages, but also inject new impetus for rural revitalisation. For example, Pujiang County, Jinhua, Zhejiang Province, continues to promote the integration of digital technology and the local grape industry, through big data, the Internet, cloud computing and other technologies, timely access to data needed for the development of the grape industry, so that the grape production, processing and sales processes are closely integrated. In this context, Jinhua Pujiang County organises farmers' field schools to train farmers in grape cultivation and vigorously cultivate high-quality farmers in the grape industry. The digital literacy of high-quality farmers has also been improved in the process of continuous upgrading of the digital grape industry.

5.2   Strengthen co-ordination and improve the system of cultivating farmers' digital literacy

Building digital villages needs to be based on the quality and literacy of farmers. Relevant departments should strengthen coordination, introduce new technologies and learn new ideas, and improve the system of cultivating farmers' digital literacy, so that digital intelligence and technology can truly become a powerful pillar for revitalising the countryside and promoting people's livelihoods. All levels of local governments at all levels should pay attention to creative thinking in the process of digital literacy development, and make the cultivation of a new digital rural population the focus of their work, with the improvement of farmers' willingness to use digital infrastructure and their interest in learning as their main purpose. At the same time, attention should also be paid to improving the digital quality of the rural population, and in the process of building "digital villages", the external and internal motivation of rural residents towards digital technology should be continuously explored [10]. In the process of building a "digital village", we should continue to explore the external and internal motivations of rural residents towards digital technology. In order to provide a diversified digital literacy cultivation system that better meets the needs of rural residents, we should focus on the cultivation of digital talents, and provide rural residents with digital literacy training courses and resources that better meet their needs. We also need to strengthen the popularisation and application of digital technology, and improve the digital skills and quality of life of rural residents. At the same time, agricultural-related universities, research institutes, and social organisations should actively participate in the formulation of policies to improve the quality of farmers' literacy, and contribute to improving the digital literacy of Chinese farmers, vigorously developing the rural economy, and creating a harmonious and beautiful rural society. The public should pay more attention to the cultivation of quality literacy, create a social environment of "high digital literacy for all", and pay attention to learning and applying all kinds of networked and informationised digital devices and technologies in personal daily life, family education and employment. Under the influence of a positive and active digital environment, farmers' digital awareness will be enhanced, promoting the realisation of digitally-enabled rural revitalisation.

5.3   Leveraging Economic Efficiency to Strengthen Capabilities to Enhance Digital Literacy Drivers

In the construction of digital villages, it is necessary to reveal to the majority of farmers that the digital economy is the fulcrum of traditional industries, transform, innovate and develop farmers' agricultural business methods and modes of operation, actively utilise the efficacy of the digital economy, and lead the rural population to strengthen their ability to enhance their digital literacy drive. Since 2021, Xiaolan Town, Zhongshan, as a fishery town with the reputation of "China's Crispy Grass Carp Hometown", has made full use of cutting-edge technologies such as 5G, Internet and Internet of Things, and is committed to promoting the development of smart fishery projects in the Crispy Grass Carp Industrial Park. Closely following the historical opportunity of the digital

countryside development pilot, Xiaolan Town has implemented in-depth technological innovation and industrial upgrading for all aspects of the production of crispy grass carp products to improve industrial management efficiency and reduce labour and operating costs, with annual output reaching 35,000 tonnes, and the total value of output reaching 1.05 billion yuan, accounting for about 80.04% of the town's total agricultural output value. Yongfeng County, Ji'an City, Shima Town, Meitian Village, in recent years, the use of digital intelligence empowerment and other means, to explore the "digital intelligence + rural revitalisation" of the development of new paths, the use of intelligent monitoring of temperature and humidity in the shed, real-time early warning reminders and other functions, to achieve the wisdom of planting and breeding. 2022, Meitian Village, the collective economic income of 245,000 yuan. In the practice of digital technology-enabled rural industrial revitalisation, farmers actually feel the inherent tension of digital technology to help rural common prosperity, helping farmers have more energy and stronger willingness to join the cultivation of high-quality farmers in the action to promote the process of achieving the modernisation of China's agriculture and rural areas.

6   Conclusions

The purpose of this article is to reveal the important role of digital literacy in the rural revitalisation strategy in a more detailed way by deeply analysing the internal logic of farmers' digital literacy in promoting the construction of digital villages and exploring the dilemmas it faces in real practice. The core contribution of the article is that it comprehensively analyses the various factors affecting the improvement of farmers' digital literacy, which provides a valuable reference basis for relevant departments and policy makers. During the research process, the author also realised that although this article has explored the plight of farmers' digital literacy enhancement from the theoretical level, specific and feasible solution strategies are still insufficient. Therefore, future research should further deepen the understanding of the influence mechanism between farmers' digital literacy and the construction of digital villages, optimise the strategies to enhance farmers' digital literacy, and explore the application of this research framework to other related fields to expand its scope of application and influence.

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