

Problems and Countermeasures of Digital Village Construction in China in the Process of Rural Revitalization

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Abstract: This paper aims to provide a thorough examination of the current state, challenges, and potential solutions related to digital village construction, while also anticipating future trends. By delving into the historical progression and current realities of digital rural development in China, the study unveils significant hurdles encountered in advancing rural digitalization. These include inadequate infrastructure, farmers' limited digital proficiency, the need for governance model innovation, and an optimal policy environment. Despite notable achievements in digital village initiatives, significant gaps remain in areas such as regional balance, farmer skill enhancement, and governance innovation. Addressing these issues, the article proposes a range of strategies, including enhancing top-level planning, bolstering infrastructure, elevating farmers' digital skills, reinventing governance models, and refining policy frameworks. Implementing these measures can effectively drive China's digital village development forward, aligning with the broader objectives of rural modernization and integrated urban-rural growth.

1. Introduction

Digital village signifies the comprehensive digitization and advancement of rural locales through contemporary information technology [1]. This encompasses the digital upgrade of rural infrastructure, the introduction of intelligent agricultural practices, the enhancement of rural lifestyles, and the modernization of governance structures [2]. The essence of this digital transformation lies in elevating rural socio-economic standards, bridging the urban-rural divide, and fostering holistic rural growth and prosperity [3].

As information technology rapidly evolves and gains traction, digitization emerges as a pivotal catalyst for societal and economic advancement [4]. Within this paradigm, the establishment of digital villages assumes significant importance as a cornerstone of rural revitalization efforts. It holds promise for bolstering rural socio-economic progress, diminishing the urban-rural digital disparity, and uplifting the quality of life for rural communities [5]. This study aims to delve into the challenges encountered in digital village development amidst rural revitalization efforts and to propose targeted solutions. Its objective is to offer theoretical underpinnings and practical guidance for shaping and executing pertinent policies.

2. Theoretical basis of digital village construction

2.1. The theoretical support of digital rural construction

The theoretical foundations for digital rural construction derive primarily from three sources: the theory of information development, the theory of agricultural and rural modernization, and the rural revitalization strategy [6].

Firstly, the theory of information development underscores the pivotal role of information technology in driving socio-economic progress, thereby offering technical underpinnings for digital village construction. Secondly, the theory of agricultural and rural modernization focuses on the holistic, balanced, and sustainable aspects of rural growth, charting a clear path for digital rural

development. Lastly, the rural revitalization strategy, a key strategic initiative in the current era, explicitly advocates for strengthening rural informatization efforts, thereby providing a policy backbone for digital rural endeavors.

2.2. The internal relationship between digital rural construction and rural revitalization

There exists a tight interconnection between digital rural development and rural revitalization [7]. Digital rural advancement forms a crucial component of rural revitalization efforts and serves as a significant pathway towards achieving rural renewal. Conversely, rural revitalization offers an expansive platform and ample opportunities for digital village construction. By investing in digital villages, we can facilitate the modernization of rural industries, enhance rural public service provision, and bolster rural social governance capabilities, thereby furthering the attainment of rural revitalization objectives [8].

2.3. Analysis of the necessity of digital rural construction

Enhancing digital countryside development holds immense importance in fostering comprehensive rural progress and attaining rural revitalization. Notably, the need for digital village advancement is predominantly manifested in the aspects depicted in Figure 1:

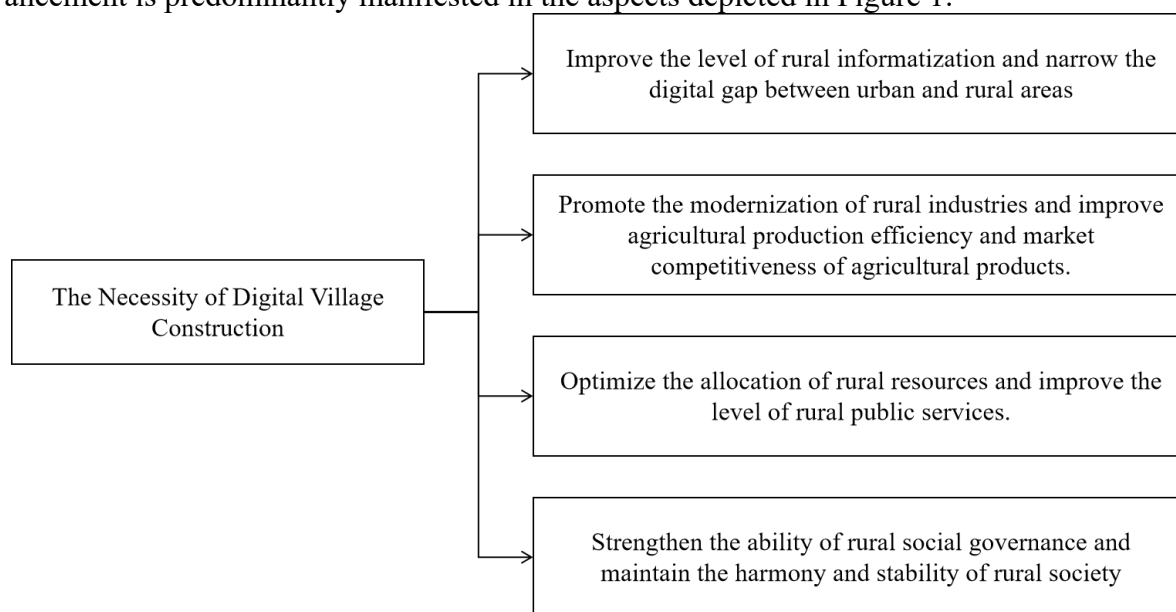


Figure 1 The necessity of digital village construction

(1) Enhance rural informatization and bridge the urban-rural digital divide.

With the swift evolution of information technology, it has emerged as a driving force for societal advancement [9]. However, in China's vast rural regions, the informatization level lags behind, creating a pronounced digital divide with urban areas. By bolstering digital countryside initiatives and widely deploying information technology, we can effectively elevate rural informatization, afford farmers easier access to convenient information services, thus bridging the urban-rural digital gap and fostering more integrated urban-rural development.

(2) Advance rural industrial modernization, boosting agricultural efficiency and market competitiveness.

Digital countryside efforts are instrumental in propelling rural industrial modernization. The integration of cutting-edge agricultural information technology can facilitate smart, precise agricultural management, thereby enhancing productivity. Simultaneously, digitalization can stimulate rural e-commerce growth, expand agricultural product sales channels, and elevate market competitiveness. This holds significant potential for augmenting farmers' incomes and spurring rural economic expansion.

(3) Optimize rural resource allocation and elevate rural public service standards.

Digital countryside construction can streamline rural resource allocation, ensuring more rational

and efficient use of available resources. Through information technology, intelligent management of rural infrastructure such as water, electricity, and roads becomes feasible, enhancing infrastructure utilization efficiency. Moreover, digitalization can promote the information technology-driven advancement of rural public services like education and healthcare, raising service standards and affording farmers access to more convenient, efficient services.

(4) Fortify rural social governance capabilities, preserving rural social harmony and stability.

Digital village endeavors play a pivotal role in strengthening rural social governance. The application of information technology enables intelligent monitoring and management of rural social security and environmental protection, elevating the efficiency and effectiveness of rural social governance. Furthermore, digital countryside construction can foster openness and democratic management in rural government affairs, fostering a stronger sense of participation and belonging among farmers, ultimately contributing to the maintenance of rural social harmony and stability.

3. The Present Situation and Problems of Digital Village Construction

3.1. The development process of digital rural construction

Since the dawn of the information age, the digitization process in rural regions has steadily gathered pace. Initially, the establishment of a digital countryside centered predominantly on the development of fundamental infrastructure, including the expansion of telecommunications networks and the integration of computer technology. However, as technological advancements persist and policies continue to encourage progress, Internet services have proliferated across rural landscapes, introducing innovations such as e-government and e-commerce into the daily lives of farming communities [10].

In more recent times, the implementation of the "internet plus" initiative alongside rural revitalization strategies has ushered in a fresh era of digital village development. Cutting-edge information technologies - including big data, cloud computing, and the Internet of Things - are now being harnessed extensively within agricultural and rural settings. This technological revolution has catalyzed the automation of agricultural practices, modernized rural governance systems, and significantly enhanced the quality of life for rural populations.

3.2. Analysis of the status quo of digital rural construction

Currently, the establishment of digital villages has yielded impressive outcomes. In the realm of infrastructure, rural network connectivity has undergone significant enhancement, with 4G networks attaining near-universal coverage and the deployment of 5G networks gathering pace. As for application services, the likes of e-government, distance education, and telemedicine have gradually gained traction, while rural e-commerce has thrived, thereby facilitating the distribution and sale of agricultural produce.

Nonetheless, amidst these accomplishments, it's crucial to acknowledge lingering challenges in digital village development. These include disparities in regional progress, a low level of digital literacy among farmers, and a need for deeper and broader digital application integration. The primary obstacles encountered in digital village construction are outlined in Figure 2 and encompass the following areas:

The aforementioned issues stem from various factors. Primarily, the relatively underdeveloped economic and social conditions in rural regions result in inadequate funding for infrastructure and sluggish progress. Secondly, the generally low educational attainment among farmers, coupled with a scarcity of informational education and training prospects, poses challenges in adapting to the swiftly evolving digital landscape. Furthermore, the dearth of IT professionals in rural areas hinders the establishment of intricate digital application and service frameworks. Lastly, insufficient policy backing and capital allocation constitute significant obstacles to digital village development.

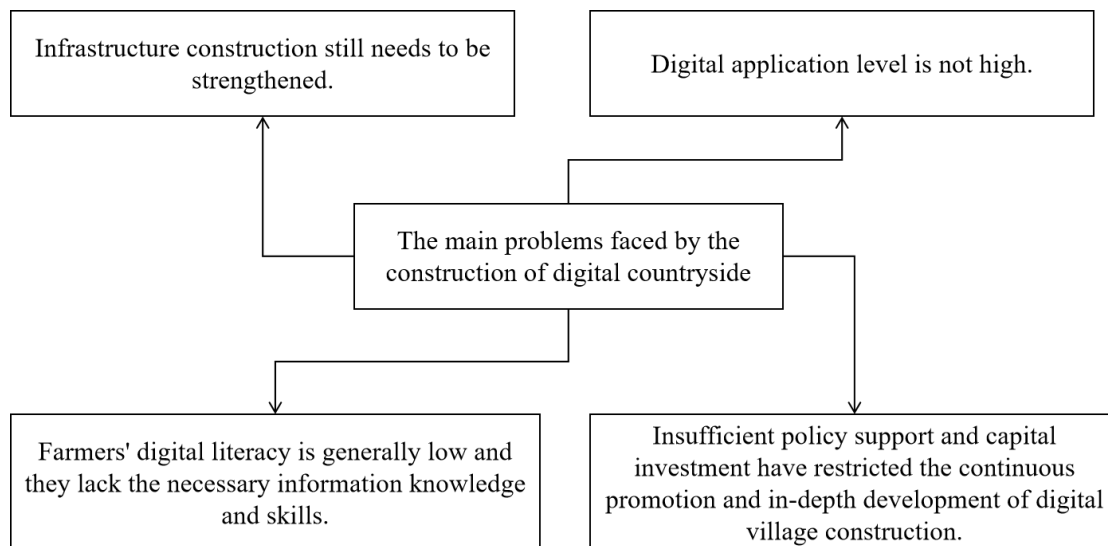


Figure 2 The main problems faced by the construction of digital countryside

4. Countermeasures and suggestions for the construction of digital villages

(1) Enhance national-level strategic planning and coordination

To build digital villages effectively, it is essential to establish a comprehensive national framework that outlines clear objectives, tasks, and a roadmap for their development. Governments at various tiers must devise detailed plans tailored to local contexts, ensuring a coordinated and efficient approach to digital rural transformation. Cross-departmental collaboration is crucial to prevent duplicative efforts and optimize resource utilization. Plans must also reflect the unique challenges and opportunities of rural communities, ensuring that digitalization efforts genuinely serve the interests of farmers.

(2) Bolster digital infrastructure investments and upgrades

Robust digital infrastructure is fundamental to the success of digital village initiatives. This requires sustained investment to expand rural network coverage, enhance service quality, and integrate cutting-edge technologies like 5G, the Internet of Things, and cloud computing. Additionally, establishing robust rural information and communication hubs is vital for improving data handling capabilities and enhancing information security. By prioritizing these infrastructure investments, we can unlock significant potential for rural economic growth and societal progress.

(3) Improve farmers' digital literacy and skills.

Farmers are the main body and beneficiaries of digital village construction. Attention should be paid to the improvement of farmers' digital literacy and skills training. Help farmers master basic information knowledge and skills by organizing various training activities, compiling easy-to-understand training materials and using online education platforms. At the same time, we should encourage and support farmers to use digital means to carry out agricultural production, management and life services, and improve their digital application ability and level.

(4) Innovate the digital rural governance paradigm

To build a digital countryside, we must reinvent governance models, seamlessly integrating government stewardship, market mechanisms, and societal synergies. Leveraging information technology is crucial for driving the digitalization and intelligent enhancement of rural public services, thereby elevating their effectiveness and quality. Simultaneously, we must harness the market's pivotal role in allocating resources, encouraging and facilitating social capital's entry into digital rural endeavors. This approach mobilizes farmers' enthusiasm, initiative, and ingenuity, positioning them as key players in shaping digital villages.

(5) Enhance the policy landscape and support frameworks

Sustaining the momentum of digital village development demands an optimized policy environment and robust support systems. Governments across tiers must introduce a comprehensive

array of supportive policies, including financial subsidies, tax incentives, and financial backing, aimed at mitigating the costs and risks associated with digital rural endeavors. Concurrently, bolstering legal and regulatory frameworks is imperative to safeguard legitimate rights, interests, and data security throughout digital village development. Establishing and refining oversight and evaluation mechanisms are equally critical for regularly assessing the impact of digital village initiatives and ensuring the effective implementation of all policies and measures.

5. The future prospect of digital village construction

5.1. The development trend of digital rural construction

As science and technology advance and society evolves, the digitalization of rural areas will exhibit several notable trends. Firstly, digitalization will progressively intensify, with information technology's applications becoming more pervasive and profound in agricultural production, rural lifestyles, and societal governance. Secondly, intelligence levels will steadily rise as cutting-edge technologies like artificial intelligence and big data propel digital rural development towards greater intelligence. Lastly, the integration of digitalization and agricultural modernization will tighten, collaboratively driving rural areas' comprehensive progress.

5.2. The potential challenges and future opportunities of digital village construction

Despite the promising outlook for digital countryside development, several challenges remain. Firstly, the rapid pace of technological advancement necessitates continuous adaptation to new technologies and applications. Secondly, enhancing farmers' digital literacy poses a challenge, necessitating increased educational and training efforts. Thirdly, the growing significance of data security and privacy protection underscores the need for strengthened legal and regulatory frameworks. Lastly, addressing regional development disparities requires tailored strategies and policy support.

Nonetheless, the construction of digital villages presents significant opportunities. National policy support is escalating, fostering a favorable policy environment. The swift progress and application of cutting-edge information technology offer robust technical backing. The rural market harbors vast potential, with digitalization poised to stimulate growth in agricultural product circulation and rural tourism. Furthermore, the escalating frequency of international collaborations and exchanges affords a wider international perspective and learning opportunities.

To ensure the sustained progress of digital village construction, a scientific and comprehensive long-term plan is imperative, as illustrated in Figure 3.

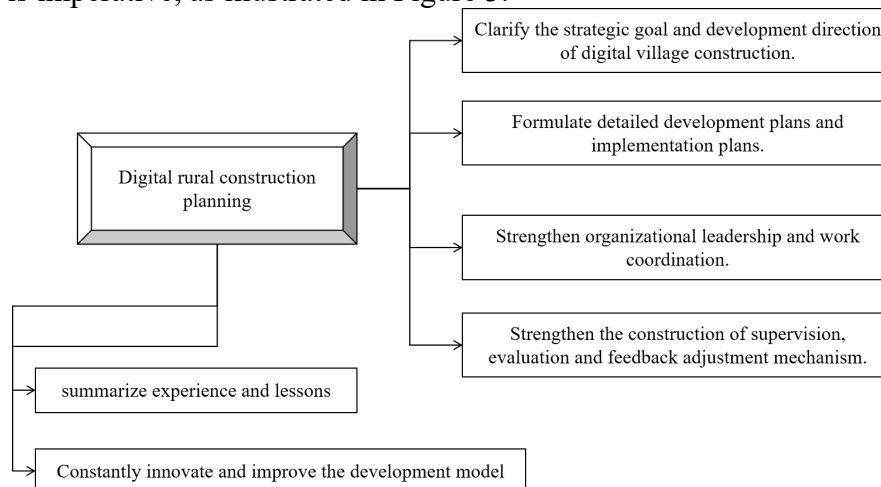


Figure 3 Digital rural construction planning

6. Conclusions

The significance of digital countryside construction lies in its potential to drive rural

modernization, elevate farmers' living standards, and foster integrated urban-rural development. By enhancing top-level design, bolstering digital infrastructure, upskilling farmers in digital literacy, innovating digital village governance models, and optimizing the policy landscape and support systems, we can effectively advance the digital village construction process. China has made notable strides in this area, but challenges remain, including regional disparities, farmers' limited digital literacy, and data security/privacy concerns. To address these, differentiated strategies, enhanced training, and strengthened legal frameworks are needed. Moreover, this undertaking is complex and requires collective effort from governments, enterprises, social organizations, and farmers alike. Through strengthened collaboration, experience sharing, and continuous innovation, we can elevate digital village construction to new heights.

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