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The Practical Logic and Optimization Paths of Enhancing Rural Digital Governance Capacity: A Case Study of Zhoukou City, Henan Province

-- Based on a Field Investigation in Zhoukou, Henan

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ABSTRACT

Rural digital governance capacity serves as a critical pillar for advancing the modernization of rural governance systems and capabilities. With the in-depth implementation of the *Strategic Outline for the Development of Digital Villages* and the rapid proliferation of digital technologies, rural digital governance has achieved notable progress in enhancing grassroots governance efficiency, optimizing public service delivery, and promoting refined rural governance. Nevertheless, constrained by uneven infrastructure development, insufficient digital literacy among grassroots officials, imperfect data-sharing mechanisms, and low levels of villagers' participation, the enhancement of rural digital governance capacity continues to face considerable practical challenges. Drawing on a field investigation in Zhoukou City, Henan Province, this article analyzes the intrinsic logic and real-world constraints of improving rural digital governance capacity. It proposes optimization pathways from four dimensions: consolidating digital infrastructure, strengthening talent development, improving data governance mechanisms, and stimulating villagers' participatory engagement. The findings are intended to offer practical references for building rural digital governance capacity in central and western regions of China.

KEYWORDS

Rural Digital Governance; Governance Capacity; Digital Village; Grassroots Governance; Zhoukou City.

1. INTRODUCTION

Rural governance is the cornerstone of national governance and the foundation of rural revitalization. With the deepening of the new round of technological and industrial transformation, digital technologies-such as artificial intelligence, cloud computing, big data, and blockchain-have provided novel approaches and tools for social governance innovation. In 2019, the General Office of the Central Committee of the Communist Party of China and the General Office of the State Council issued the *Strategic Outline for the Development of Digital Villages* which explicitly identified "advancing the modernization of rural governance capacity" as a key task [1]. Subsequently, the Cyberspace Administration of China and other ministries have successively issued annual *Key Work Points for Digital Village Development*, continuously deploying tasks related to rural digital governance. The 2025 *Key Work Points* listed "enhancing the effectiveness of rural digital governance" as one of nine major priorities, requiring sustained progress in rural "party, government,

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and financial" informatization, improving the digitalization level of rural social governance, and strengthening smart emergency management capacity in rural areas [2].

Rural digital governance capacity refers to the comprehensive capability of grassroots governments to employ digital technologies and information-based means in rural public affairs management, public service provision, and social conflict resolution. It encompasses not only the construction and maintenance capacity of digital infrastructure but also the digital literacy and data-application skills of grassroots officials, the operational efficiency of digital governance platforms, and villagers' capacity for digital participation. Enhancing rural digital governance capacity is not only an inevitable requirement for implementing the national digital village strategy but also a critical pathway for breaking through traditional rural governance dilemmas and achieving modernization of rural governance [7].

As a major agricultural and populous province, Henan faces a heavy and complex rural governance burden. The province has 46,000 administrative villages and communities, with a permanent population of 98.15 million. In recent years, Henan has made sustained efforts in digital village construction; by the end of 2025, it had built and operated 50 provincial-level digital village demonstration counties, and six counties and districts-including Linying, Qibin, Lingbao, and Xixia-had completed national-level digital village pilot projects. As an important agricultural city in Henan, Zhoukou has actively explored digital rural governance in its subordinate counties such as Shangshui and Huaiyang, accumulating useful experience, yet it also confronts common challenges faced by central and western regions in enhancing rural digital governance capacity. This article takes Zhoukou City as the research subject, examining the practical logic, realistic dilemmas, and optimization paths for improving rural digital governance capacity, with the aim of providing reference for similar regions.

2. INTRINSIC LOGIC OF ENHANCING RURAL DIGITAL GOVERNANCE CAPACITY

2.1 Policy-Driven: Sustained Guidance from National Strategies

The enhancement of rural digital governance capacity originates, first and foremost, from top-level policy design and promotion at the national level. The *Strategic Outline for the Development of Digital Villages* sets forth three-phase objectives, among which by 2025 "the rural digital governance system will be increasingly improved," and by 2035 "the rural governance system and capacity will be basically modernized" [1]. This strategic deployment provides a clear roadmap and timeline for building rural digital governance capacity.

At the policy implementation level, the Cyberspace Administration of China, the Ministry of Agriculture and Rural Affairs, and other departments have issued annual work priorities for consecutive years, making rural digital governance a key task. The 2025 work priorities further refined requirements, calling for "continuous advancement of rural 'party, government, and financial' informatization, improvement of the digitalization level of rural social governance, and enhancement of smart emergency management capacity in rural areas" [2]. These policy requirements cascade down to grassroots levels, serving as a direct driver for local governments to promote rural digital governance capacity building. In September 2025, the National On-Site Promotion Conference for Digital Village Development was held in Lankao County, Kaifeng City, Henan Province, noting that "rural digital governance has been accelerated, providing strong support for comprehensive rural revitalization." In November of the same year, the Henan Provincial On-Site Promotion Conference for Digital Village Development was convened in Luanchuan, Luoyang, emphasizing the need to "enhance rural governance effectiveness through digitalization." This policy transmission mechanism from central to local levels provides institutional guarantees for the systematic improvement of rural digital governance capacity.

2.2 Technology-Empowered: Deep Embedding of Digital Technologies

The widespread application of digital technologies constitutes the technical foundation for enhancing rural digital governance capacity. Digital technologies can effectively alleviate the challenges faced by traditional rural governance, promote the integration of information, functions, and groups from fragmentation to convergence, and help establish a precise, efficient, and smart modern rural governance system [3].

In Zhoukou City, the practice of digital technology enabling rural governance has already shown initial results. Shangshui County, as a national-level major grain-producing county, has built 1.267 million mu of high-standard farmland out of its total 1.42 million mu of cultivated land, of which the demonstration zone covers 170,000 mu. The fields are equipped with small weather stations, pest warning lamps, and soil moisture sensors, forming an integrated "sky, air, and ground" intelligent monitoring network. Through the smart agriculture platform on their mobile phones, large grain growers can monitor soil moisture, nutrient conditions, and weather conditions in real time, achieving "seedling conditions, soil moisture, and pest dynamics-all at your fingertips" [5]. This case demonstrates that the embedding of digital technologies not only enhances agricultural production efficiency but also reshapes the technical foundation of grassroots governance, enabling governance actors to master governance information and make governance decisions with greater precision and efficiency.

Furthermore, digital technologies are playing increasingly important roles in rural public security prevention and control, as well as in village affairs transparency. Puyang City took the lead in the province by establishing the "Four Discussions and Two Openings" Sunshine Decision-Making Digital Platform, covering all administrative villages in the city. How village affairs are discussed, how funds are used, and how projects are determined are all publicly operated on the platform [6]. This technologically driven governance model innovation is advancing rural governance from "passive response" to "proactive prediction."

2.3 Demand-Driven: Realistic Pressures from Grassroots Governance

Profound changes in rural society have imposed higher demands on governance capacity. Since the reform and opening-up, a large number of rural laborers have migrated outward, the traditional acquaintance society has gradually disintegrated, and the closed and stable nature of traditional villages has been disrupted. This not only increases the complexity of rural governance but also intensifies the demand for a more refined governance system. The traditional "person-to-person monitoring" and "paper ledger" style of management can no longer adapt to the governance needs of the new era [3].

From the perspective of Zhoukou City's actual situation, the area is densely populated with complex affairs; if minor issues concerning the public remain unresolved for too long, they may accumulate into larger problems. This governance pressure compels grassroots governments to seek technological empowerment, using digital means to improve governance efficiency. Relying on the "Party Building + Grid + Big Data" model, Henan Province has comprehensively strengthened the construction of grassroots governance platforms, promoting the transformation of governance data from "scattered storage" to "integrated sharing." The province's 341,000 grids have achieved "multi-purpose use per grid," with 873,000 full-time and part-time grid workers collecting over 1.1 million pieces of information through the grid system and resolving more than 770,000 conflicts and disputes [6]. This demand-driven governance capacity enhancement pathway reflects a positive interaction between technological application and governance needs.

3. PRACTICAL DILEMMAS IN ENHANCING RURAL DIGITAL GOVERNANCE CAPACITY

3.1 Uneven Development of Digital Infrastructure

Digital infrastructure is the material prerequisite for improving rural digital governance capacity. Although rural network infrastructure has improved significantly in recent years, there remain considerable imbalances in the construction of digital infrastructure in central and western rural areas. The *Strategic Outline for the Development of Digital Villages* set the goal of "deepening 4G coverage and innovatively applying 5G in rural areas" by 2025 [1], and the *2025 Key Work Points for Digital Village Development* further specified the target of "exceeding 90% 5G accessibility in administrative villages nationwide" [2]. However, in terms of actual progress, network coverage and quality in remote and economically weaker villages still leave substantial room for improvement.

In some townships of Zhoukou City, although broadband networks are basically accessible, network stability and transmission speeds remain inadequate to meet the operational needs of digital governance platforms. In some villages, digital governance equipment is outdated and lacks necessary operational maintenance funding and technical support, leading to problems such as "built but unused" and "used but inefficient." Moreover, significant disparities exist in the level of digital infrastructure development across different regions and villages. This "digital divide" constrains the overall improvement of rural digital governance capacity.

3.2 Insufficient Digital Literacy of Grassroots Officials

The core of digital governance capacity lies in the capacity of "people." At present, there is a notable shortage of interdisciplinary talent among grassroots officials who are proficient in both technology and governance. Many village cadres are older in age and have lower levels of formal education; their ability to accept and apply digital technologies is limited, making it difficult for them to adapt to the operational requirements of digital governance platforms and data management needs.

Some studies have pointed out that current rural digital governance faces dilemmas such as "digital technology floating above rural governance practices" and "insufficient digital governance capacity" [3]. Some grassroots officials simplistically interpret digital governance as "installing systems and building platforms," neglecting the deep integration of digital technologies with governance practices, exhibiting a formalism of "prioritizing construction over application." In several townships of Zhoukou, although digital governance platforms have been deployed, the operational proficiency of grassroots officials remains low, with data entry being untimely and inaccurate, and platform functions not fully utilized. This gap between "human capacity" and "technological tools" has become a key bottleneck constraining the improvement of rural digital governance capacity.

3.3 Imperfect Data-Sharing Mechanisms

Data is the core resource of digital governance. However, current data-sharing mechanisms in rural digital governance remain imperfect. On the one hand, agricultural data are scattered across multiple departments-including agriculture and rural affairs, natural resources, water resources, and meteorology-with severe data silos between departments and a lack of unified data standards and sharing platforms. On the other hand, the standardization level of data collection is insufficient; data from different sources are inconsistent in format and caliber, making effective integration and analysis difficult.

Although Henan Province has begun to promote "system services that connect provincial, municipal, county, township, and village levels and cover diverse stakeholders" [4], grassroots practice still encounters numerous obstacles to data sharing. In some townships, digital governance platforms are incompatible with data systems of higher-level government departments, requiring duplicate data

entry and increasing the workload of grassroots officials. Additionally, issues concerning data security and personal information protection have not yet received adequate attention and effective regulation. The lag in data governance mechanisms constrains the full potential of digital governance effectiveness.

3.4 Low Level of Villagers' Digital Participation

Rural digital governance is not merely a governance tool for the government; it should also serve as a convenient channel for villagers to participate in governance. However, the current level of villagers' digital participation remains generally low. On the one hand, the digital literacy of rural residents-especially the elderly population-is relatively low, and they are unfamiliar with smartphones and digital platforms, making it difficult for them to effectively participate in online village affairs and digital deliberation activities. The issue of "digital vulnerable groups" in rural areas is prominent, with the left-behind elderly population facing the risk of being "offline" in the digital era.

On the other hand, the design of some digital governance platforms lacks "user-centric thinking," featuring complex interfaces and cumbersome operations that fail to adequately consider rural residents' usage habits and cognitive levels. In some villages of Zhoukou City, although digital governance platforms are available for villagers to use, actual usage rates are low, and villagers are more accustomed to expressing their concerns and participating in village affairs through traditional channels. The phenomenon of "platforms built, but users absent" reflects the considerable distance between "building" and "effectively using" digital governance.

4. OPTIMIZATION PATHWAYS FOR ENHANCING RURAL DIGITAL GOVERNANCE CAPACITY

4.1 Consolidating Digital Infrastructure and Narrowing the Urban–Rural Digital Divide

The improvement of rural digital governance capacity first requires addressing the deficiencies in digital infrastructure. First, continue to enhance rural network infrastructure by accelerating 5G network deployment and optical fiber broadband coverage in rural areas to ensure the network conditions required for digital governance platforms. Second, promote intelligent transformation of rural infrastructure and systematically advance the integrated sharing of agricultural data resources [2]. Third, increase digital infrastructure investment in economically weaker and remote villages, utilizing mechanisms such as the Universal Telecommunications Service Compensation Program to narrow the "digital divide" between villages.

In concrete practice, the experience of Shangshui County's high-standard farmland construction can be adopted, integrating digital infrastructure development with agricultural modernization and rural governance modernization [5]. At the same time, attention should be paid to the post-construction operation and maintenance of infrastructure, establishing long-term management and protection mechanisms to ensure "good construction, effective use, and proper management."

4.2 Strengthening Talent Development and Enhancing Grassroots Officials' Digital Literacy

Grassroots officials are the direct executors of rural digital governance, and their digital literacy directly determines the actual level of governance capacity. First, incorporate digital capacity training into the regular training system for village cadres, focusing on improving practical skills such as data collection, platform operation, and information security. Second, conduct special training on digital governance capacity for grassroots officials, emphasizing policy digital interpretation, data analysis, and integrated online service coordination. Third, attract and retain digital talent through policy

incentives to encourage returning entrepreneurs, college graduates, and others to participate in rural digital governance.

Furthermore, Henan Province has dispatched 33,000 first secretaries and working team members to villages. The leading role of this team in promoting rural digital governance should be fully leveraged, with digital governance capacity incorporated into the performance assessment of village-based work, encouraging resident officials to become "leaders" and "trainers" in rural digital governance.

4.3 Improving Data Governance Mechanisms and Promoting Data Integration and Sharing

Improving data governance mechanisms is a critical step in enhancing digital governance effectiveness. First, establish unified data standards and interface specifications to facilitate data interconnection and interoperability across different departments and levels. Second, build an integrated intelligent public data platform to promote open data sharing. Third, improve data security and personal information protection regulations, ensuring data security alongside data sharing.

Henan Province has begun to promote the construction of a "Digital Platform for Rural Development" [4]. On this basis, further efforts should be made to advance the integration and utilization of data resources. Drawing on the experience of Puyang City's "Four Discussions and Two Openings" Sunshine Decision-Making Digital Platform, village affairs transparency and democratic decision-making should be integrated into digital management, enabling "how village affairs are discussed, how funds are used, and how projects are determined-all openly operated on the platform" [6]. Through data integration, sharing, and transparent disclosure, both governance efficiency and public trust can be enhanced.

4.4 Stimulating Villagers' Participatory Vitality and Building a Co-Construction, Co-Governance, and Sharing Pattern

The ultimate goal of rural digital governance is to serve and benefit villagers; therefore, villagers' participation and sense of gain serve as important yardsticks for measuring governance capacity. First, implement digital literacy improvement initiatives targeting different groups through differentiated training, with special attention to "digital vulnerable groups" such as left-behind elderly populations. Second, optimize the user experience of digital governance platforms by developing age-friendly and simplified interfaces to lower the technical barriers to participation. Third, innovate incentive mechanisms for digital governance participation, using point-based systems, online deliberation, and other methods to mobilize villagers' enthusiasm for engagement.

In concrete practice, a hybrid "online + offline" participation model can be explored, retaining traditional channels for village deliberation while expanding online participation pathways to ensure that villagers of different ages and digital literacy levels can effectively engage in rural governance. By building a new digital governance pattern based on co-construction, co-governance, and sharing, digital technology can truly become a tool for serving and facilitating villagers, rather than a "digital burden" that increases their burdens.

5. CONCLUSION

Enhancing rural digital governance capacity is an inevitable requirement for advancing the modernization of rural governance systems and capabilities, and a vital support for realizing the rural revitalization strategy. From the practice of Zhoukou City, digital technology is profoundly transforming the forms and effectiveness of rural governance. However, comprehensive improvement of governance capacity still requires sustained efforts in infrastructure, talent development, data mechanisms, and villager participation.

It should be recognized that improving rural digital governance capacity is not merely a technical issue but a systematic project involving institutional design, talent cultivation, and cultural development. The embedding of digital technologies must not be detached from the realities of rural society or ignore the genuine needs of farmers. Only by finding a balance between "technological empowerment" and "people-centeredness," and by synergizing "top-level design" with "grassroots innovation," can we truly achieve sustained improvement of rural digital governance capacity and inject lasting digital momentum into comprehensive rural revitalization.

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