

# Digitalization in Rural Revitalization: A Qualitative Investigation of Challenges

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**Abstract.** Digital technology is currently being used in a wide range of situations, including rural governance, agricultural production, real-time e-commerce, rural cultural tourism, etc., and has begun to take effect. However, there are still issues with the current process of creating a digital village, such as a lack of sufficient production factors, severe digital formalism, a lack of specific laws and regulations, lack of industrial development, and difficulty reconciling digital rationality and regional customs. Future digital countryside should focus on the fundamentals of demand and create a unified perception of how a digital economy empowers the countryside.

**Keywords.** Digital technology; rural construction; challenges

## 1. Introduction

A preliminary application of digital technology has been made in the areas of village administration, agricultural output, and industrial innovation with the growth of the digital economy. The integration of digitalization with rural construction, however, poses economic, technological, cognitive, and cultural challenges because of the disparities between digital technology and rural culture.

The state of digitalization in rural areas is still in its very early stages, where many uncertainties have been raised by the use of technology, changes in production, and cultural shock[1]. The administration gap is difficult to close[2], which is caused by a flawed governance system[3], outdated infrastructure[4], labor deficit[5], conflicts between digital logic and traditional rural values[6], and imperfect governance system[7], etc.

The existing literature has begun to focus on the top-level design, governance environment, and talent team problems in the process of digital village construction, but the mechanism behind the dilemmas has not been explained and analyzed. This paper intends to analyze the challenges currently faced by the construction of digital villages and the reasons for their generation from the perspectives of economic foundation,

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governance models, business development, talent demands, and humanistic contradictions, to identify the sources of resistance and provide clear references for the subsequent exploration of the path to alleviate the current dilemma.

Information of digital village construction has been collected from hundreds of villages in China, especially in Zhejiang province, which is at the forefront of digital village reform. With the application of content analysis method, the qualitative analysis has been completed through interviews with managers, conversations with villagers, and field research.

## **2. Economic Challenge of Limited Production Factors and Capital Supply**

### *2.1 Untapped Environment for Development*

The environment of development is the ground from which digital technology is borne. However, rural development environment can be a significant barrier for information technology businesses looking to locate in rural areas, which hinders the realization of the cluster effect and economies of scale.

Digital technology adoption is obviously slower in rural areas, and technology conversion rates are generally low. Rural areas do not have enough base stations, which slows down network functioning and degrades signal quality. The standard of data collection is not explicitly stated in the scenarios of agricultural production, integrated manufacturing, transportation and storage, and consumer payment, resulting in a major amount of the data being difficult to preserve and reuse, wasting data resources.

### *2.2 Insufficient Support of Digital Talents*

Even under the assumption of policy inclination and social concern, the core needs of talents have not been met due to economic, social, resource and cultural factors, such as unbalanced economic development of the countryside, a lack of educational and medical resources, homogeneous industries, and backward consciousness. As a result, the countryside has never been sufficiently enticing to talents. Rural businesses also struggle to recruit the right staff, and their existing staff can experience challenges accessing training and development opportunities.[8]

An excessive reliance on outside forces results from the conflict between the availability of skills in rural areas and the demand for output. The majority of village managers seek assistance from outside vendors represented by "village operation companies" because they lack awareness of digital information and technique skills, are unable to comprehend the direction of digitalization in rural revitalization and cannot identify the risks of the technological innovation process. To reduce expenses and increase profit, many external providers offer solutions without performing due diligence on the countryside, assessing the character of the countryside, or proving the carrying capacity of the countryside. The similar solutions offered by outside vendors result in the loss of countryside's distinctive appearance, which goes against the original intention of distributing the dividends of the digital economy to rural areas.

### *2.3 Limited Access to Capital*

Rural market integration necessitates a protracted sedimentation process. The rigorous risk management guidelines, hefty financing costs, and a dearth of product innovation may make it difficult for villages without extensive credit guarantees to attract investment from the traditional financial market.

Urban and rural areas have notably different levels of digital consumption, which has led to differences in the reasoning behind product availability, pricing positioning, and marketing strategies in each. Even in the field that has been developed for many years, investors may barely find reliable precedents for investment returns in rural markets. It is inevitable to reassess and remeasure considering the state of the rural market before joining. A significant quantity of private capital is still in a cautious posture because of the prolonged building phase and investment return cycle, which has prevented complete verification of the exit rate's positive results. The majority of everyday operations are dominated by village cadres under the traditional government paradigm, which has a long and ingrained history, while digital technology's intervention is still in its infancy. The fact that villages aggressively promote digital transformation while failing to fully comprehend and put the concept into practice is a key conundrum.

## **3. Governance Challenge of Formalism and Lack of Law**

### *3.1 Formalism Inconsistency*

Without conducting a thorough analysis of the rural reality and taking into account the social foundation, some villages blindly adopt the trend of purchasing digital applications and hardware facilities while still maintaining the traditional management.

The application of digital tools suspends on the management surface. It is irrational to regard the development of technological tools as the achievement of the digital transformation. The problem with data security is more than just the loss of money and resources. Many villagers will be exposed to the risk of telecommunication fraud due to the abrupt change in cognitive dimension brought by the rapid expansion of digitalization. The information gap makes it difficult for villagers to recognize cyber threats and determine the veracity of information. This systemic inequity runs counter to the unsustainable logic of digital empowerment.

### *3.2 Legislation Deficiency*

The absence of relevant laws and regulations renders villages lack of rigid protection in the construction process. At the beginning of the construction and transformation, village cadres have the right to dispose of the special funds invested by the government, and the government will also supervise the use of the funds. However, once completed, tracking the usage patterns and effectiveness of information technology equipment becomes difficult. The tangible benefit to the residents is hard to be clarified due to the absence of a defined foundation and standard. Additionally, the existing legal framework does not explicitly address the rights to data property, the duty to security and privacy, and the boundaries of sharing, which puts the operation process in a precarious legal situation.

#### **4. Development Challenge of Digital Transformation and Industrial Innovation**

##### *4.1 Challenges in Restructuring Agricultural Production*

Digital transformation in the agriculture industry faces challenges along the whole supply chain, from production to circulation. Farmers' awareness can be a determined factor influencing the penetration of digital technology in agricultural production. The majority of farmers are hesitant to pick up new technical gear. Farmers who are concerned about generating quick income typically refuse to shoulder the financial burden that comes with initial investment. Farmers will use digital technology less frequently if the expected short-term profits are not fulfilled, which would lead to a crisis of confidence in digitalization.

The transaction volume of China's Taobao villages on e-commerce platforms achieved 1 trillion yuan by 2020, accounting for 18% of the total circulation of agricultural products[9]. Despite the fact that online sales platforms and logistics systems for agricultural products are starting to take shape, the market has seen homogeneous competition, low-price competition, and rising logistics and sales costs due to lagging information transmission, constrained circulation areas, and logistics capacity constraints after several years of brutal growth. The oversight of secure manufacturing and quality control of agricultural goods is still in a pressing demand.

##### *4.2 Weak Emerging Business*

Digital technology's use and advancement give rise to new industries including digital agriculture, rural tourism, and rural e-commerce. Taking rural e-commerce as an example, many villages have built up a full e-commerce platform and used the network sales channel. New business in rural areas, however, lack development impetus, particularly in the process of integrating digital technology with rural regions, neglecting regional distinctions and characteristics of the industrial structure, distancing themselves from rural realities, and failing to produce reciprocal economic benefits. Only if the merger of big data, cloud computing, artificial intelligence and other advanced digital technologies with the countryside has been investigated more thoroughly, the issue of disconnect between technology and industrial demands can be resolved. In the process of branding agricultural products, the requirements of large-scale and organized operation cannot be matched with the conventional production mode that is only supported by a few farmers. More severely, contradictions in distribution of rewards affect the motivation of farmers, exerting adverse effects on the quality of agricultural products, thus lowering the brand value and operation performance.

The incomplete data governance structure makes it difficult to coordinate with developing businesses. The "information barrier" creates fierce rivalry in rural markets, which drives up building prices, wastes significant amounts of resources, and prevents the creation of a model for rural economic growth that is sustainable. This kind of rivalry is even more brutal among SMEs, which do not have cutting-edge technology, complete network facilities, or even lack of recognition about digitalization.[10]

## 5. Cultural Challenge of Digital Rationality and Rural Convention

### 5.1 Impact of "Digital Divide"

Urban and rural locations have different information infrastructure, which affects how the digital economy develops. This, in turn, affects how digitally literate a region's population are, which exacerbates the differential in digital level development between regions. The restricted learning capacity of villagers prevents them from meeting the criteria for digital literacy and conflicts with the features of digital application design, which might turn rural digital technology, digital media, and digital convenient services into an unseen burden. Villagers may suffer from travel and consumption difficulties in a fully digitalized community as a result of the popularization of technologies.

### 5.2 Rationality and Emotion Contradiction

When the awareness of information tools and self-management ability are insufficient, many villagers will be trapped into the world constructed by virtual networks, such as being addicted to short videos and mobile games, neglecting the preserve of family relationships, leading to interpersonal relationship problems.

Mr. Fei Xiaotong stated that "Advocating the foundation of language, otherwise making the countryside people more literate make countryside people 'smarter'[11]." The improvement of rural literacy cannot be pinned merely on how many words villagers know but should fundamentally think about how to change the cultural pattern of the countryside. In a similar vein, what really empowers the construction of digital countryside is not how sophisticated the information base of the countryside is, but whether digital resources are really accepted and embraced by rural residents.

In contrast to the countryside, which is a "relationship-type society" shaped by conventional experiences and somewhat at odds with "the absolute fairness," digitalization frequently deals with problems through the most equitable process. With the help of effective digital tools, the emotions of villagers and the civilization of the countryside are often overwhelmed by lines of "resolute" code, which uproots the culture and history of villages.

We must acknowledge that the digital economy is reviving rural areas and that is progressing in a way that is grounded on intelligence, harmonious ecology, and a return to humanity. However, challenges coming from the process of digitalization are still needed to be attached importance to, so that we can find accurate solutions that urban and rural residents can enjoy the dividends of digital economy development equally.

This paper focus on emerging issues, where the empirical data is still insufficient, so future research should apply quantitative analysis, including a synthesis of technical and socio-economic approaches, to provide evidence-based analysis to support digitalization in rural revitalization.

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