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Research on the Optimization Path of Modern Rural Commerce and Trade Circulation System from the Perspective of Digital Empowerment: A Practical Exploration based on Tongliang District, Chongqing

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Abstract

This study takes Tongliang District, Chongqing as a practical sample, focusing on the optimization path of the modern rural commerce and trade circulation system from the perspective of digital empowerment. By deeply analyzing the current status of the rural commerce and trade circulation system in Tongliang District, it reveals problems in infrastructure, market system, circulation entities, and policy coordination. Leveraging the advantages of digital technology, a series of optimization paths are proposed, encompassing strengthening digital infrastructure construction, improving the digital-driven market system, cultivating digital circulation entities, integrating digital policy support, promoting the deep development of informatization, and enhancing digital talent cultivation. The aim is to provide a theoretical basis and practical guidance for building an efficient and modern rural commerce and trade circulation system, thereby supporting the in-depth implementation of the rural revitalization strategy in rural areas.

Keywords

Digital Empowerment; Rural Commerce and Trade Circulation System; Optimization Path; Rural Revitalization; Tongliang District; Chongqing.

1. Introduction

The rural revitalization strategy, as a cornerstone of China's efforts to promote comprehensive rural development and achieve agricultural modernization, holds a pivotal position in the process of socialist modernization[1]. Within this framework, the modern rural commerce and trade circulation system serves as a critical link between urban and rural economies, facilitating efficient resource allocation. It plays an irreplaceable role in driving the transformation and upgrading of rural industrial structures, increasing farmers' income levels, and narrowing the urban-rural gap[2]. However, the traditional rural commerce and trade circulation system faces numerous challenges in its development, severely limiting its effectiveness. Against the backdrop of a thriving digital economy, digital empowerment offers new opportunities and directions for optimizing and upgrading this system. Tongliang District, Chongqing, a representative rural area, has undertaken various initiatives to explore the construction of a modern rural commerce and trade circulation system. Drawing on the practical experience of Tongliang District, this study investigates the optimization paths of the modern rural commerce and trade circulation system from the perspective of digital empowerment, aiming to offer valuable insights for the effective implementation of the rural revitalization strategy.

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2. Current Status Analysis of the Rural Commerce and Trade Circulation System in Tongliang District, Chongqing

2.1. Lagging Infrastructure Construction

In terms of transportation networks, some remote rural areas in Tongliang District suffer from poor road conditions, with narrow, dilapidated roads that impede the passage of large transport vehicles. This significantly increases the time and cost of transporting agricultural products, reducing logistics efficiency[3]. Storage facilities are predominantly traditional, simple warehouses lacking modern temperature and humidity control equipment, failing to meet the storage needs of perishable goods like fresh agricultural products and resulting in high loss rates. Regarding informatization, while network coverage has been achieved in some areas, the signal remains unstable, and bandwidth is insufficient to support large-scale data transmission, hindering the efficient operation of rural e-commerce and logistics information platforms. For instance, Tongliang District governs "five streets-Bachuan, Dongcheng, Nancheng, Pulu, and Jiuxian-and 23 towns, encompassing 266 villages, 67 communities, 4,050 villager groups, and 552 resident groups." However, express service outlets have not achieved full village-level coverage. Only certain central villages have postal express service points, while others are mostly located in towns, making it highly inconvenient for villagers to send or receive packages. This severely limits the convenience of rural commerce and trade circulation and fails to meet the demands of socioeconomic development[4].

2.2. Imperfect Market System

The rural market in Tongliang District lacks scientific and rational planning and layout. Agricultural product trading markets are functionally limited, relying primarily on traditional spot trading without modern methods such as futures or auctions. Rural fairs suffer from rudimentary infrastructure, chaotic stall arrangements, and poor sanitary conditions, making it difficult to attract high-quality merchants. The development of online agricultural product trading platforms lags, with unfriendly interface designs, complex operations, and irregular product displays, leading to low online trading activity. Additionally, high outbound logistics costs persist due to a lack of scale effects. Logistics companies maintain low delivery frequencies and inefficient transportation routes in rural areas, significantly increasing the cost of transporting agricultural products to urban markets. This results in substantial price fluctuations in the agricultural market, ultimately harming farmers' interests[5].

2.3. Low Degree of Organization of Circulation Entities

The rural commerce and trade circulation entities in Tongliang District consist mainly of individual farmers and small micro-enterprises. Individual farmers operate on a small scale, lack professional commerce and trade knowledge and skills, and have limited access to market information, often passively accepting market prices and struggling to secure advantageous positions. Small micro-enterprises face significant shortcomings in capital, technology, and talent, with low management levels and an absence of unified brand-building or market promotion strategies, placing them at a competitive disadvantage. These entities lack effective cooperation and coordination mechanisms, operating independently and failing to achieve economies of scale. This leads to high circulation costs, low efficiency, and an inability to meet the demands of modern market competition[6].

2.4. Policy Support Lacks Coordination among Departments

Despite substantial policy support from national and local governments for rural commerce and trade circulation development in recent years, implementation in Tongliang District reveals numerous challenges. Policies are issued by multiple departments-including the Agriculture and Rural Affairs Commission, Transportation Bureau, Commerce Commission,

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Supply and Marketing Cooperative, and Postal Administration-but there is a lack of effective communication and coordination among them, resulting in fragmented and inconsistent policies. For example, during the pilot project for a three-tier logistics system (county, township, village) in Chongqing implemented in Tongliang District, the government established a dedicated task force. However, the newly formed entity could only access resource policy support from the Supply and Marketing Cooperative, while policies from other departments remained broadly available without targeted allocation. This dispersion of policy resources hinders concentrated efforts to accelerate the development of the rural commerce and trade circulation system[7].

3. Problems in the Modern Rural Commerce and Trade Circulation System from the Perspective of Digital Empowerment

3.1. Difficulty in Uploading Agricultural Products

The low standardization of agricultural products is a key barrier to their upward circulation. In Tongliang District, the production process lacks unified quality standards and norms, leading to significant variations in quality, specifications, and packaging among products of the same type produced by different farmers. This makes it challenging to meet market demands for standardized goods. Brand development for agricultural products is underdeveloped, with most products lacking brand awareness and failing to establish regionally distinctive, competitive brands, resulting in low added value and difficulty in securing higher market prices. Additionally, effective marketing channels are scarce. Traditional offline sales are geographically limited with narrow reach, while online channels suffer from a lack of professional e-commerce talent and marketing strategies, failing to attract consumer attention. An imperfect logistics system, characterized by few distribution points, high costs, and low timeliness, cannot meet the requirements for preserving and rapidly delivering agricultural products, impeding their entry into broader markets.

3.2. Unsmooth Downstream of Industrial Products

Rural areas exhibit relatively low consumption capacity, driven by limited farmer incomes and an imperfect social security system that suppresses consumption willingness. Demand diversity is minimal, primarily focused on daily necessities, with little interest in mid-to-high-end industrial products. Moreover, the logistics costs for downstream industrial products are high due to dispersed rural residences and challenging distribution conditions. To cut costs, logistics companies often reduce delivery frequency in rural areas, leading to untimely supplies and hindering the dissemination and promotion of industrial products in rural markets.

3.3. Low Level of Informatization

Insufficient investment in informatization for the rural commerce and trade circulation system has resulted in outdated hardware, including a lack of high-performance servers and computers, and weak network infrastructure unable to support modern technologies like big data and cloud computing. Software applications are underdeveloped, with no specialized information management systems tailored to rural commerce and trade circulation. Existing systems offer basic functions and cannot support real-time logistics tracking, market demand forecasting, or supply chain coordination. A shortage of informatization talent further complicates system maintenance, upgrades, and application promotion, constraining the system's informatization progress.

3.4. Talent Shortage

The rural commerce and trade circulation sector lacks professionals in marketing, logistics management, and e-commerce. Most current practitioners lack systematic training, possess

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limited skills, and struggle to meet the demands of modern commerce and trade circulation. Management talent is scarce, with enterprises relying on traditional models and lacking scientific management concepts and methods, often making decisions based on experience, which reduces operational efficiency[8]. The talent cultivation mechanism is inadequate, with rural areas lacking professional vocational education institutions and training resources to provide sustained support for the industry's development.

4. Optimization Paths of the Modern Rural Commerce and Trade Circulation System from the Perspective of Digital Empowerment

4.1. Strengthening Digital Infrastructure Construction and Building a "One Center, Multiple Sites, Hierarchical" Rural Three-Level Logistics Service Node Network

Increase investment in the digital transformation of rural transportation networks, utilizing technologies such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS) to optimize route planning and enhance transportation efficiency. Construct modern intelligent storage facilities with automated equipment and Internet of Things (IoT) technology for real-time monitoring and management, reducing agricultural product losses. Improve rural informatization by expanding network infrastructure, enhancing coverage and stability, and increasing bandwidth to support rural e-commerce and logistics platforms.

Leverage the advantageous locations and idle spaces of existing stations, upgrading them digitally to create comprehensive distribution centers integrating storage, delivery, and transportation. Equip these facilities with intelligent systems, such as automated sorting and smart shelving, to enable informatized and intelligent operations. Based on Tongliang District's industrial economic characteristics, transportation conditions, and logistics layout, integrate traditional passenger transport stations with supply and marketing sites, postal express points, and logistics parks. Considering professional markets, agricultural bases, parks, and population centers, adopt a "multi-station integration, resource-sharing" digital model to establish a three-tier logistics system: a district-level logistics center as the core, town-level service stations as connectors, and village-level convenience points as the foundation. Use big data analytics to determine the number, location, scale, and functions of logistics nodes, ensuring comprehensive coverage and digital operation, laying a solid foundation for a future region-wide digital logistics network.

4.2. Improving the Digital-Driven Market System

Employ big data and artificial intelligence to conduct in-depth research and analysis of Tongliang District's rural market, developing scientifically sound planning based on demand and consumption trends. Establish digital agricultural product trading markets with electronic trading and price monitoring systems to ensure transparent, informatized transactions. Digitally transform rural fairs by optimizing stall layouts and improving hygiene management, expanding trading channels through online-offline integration. Develop robust online agricultural product trading platforms using virtual reality (VR) and augmented reality (AR) for immersive product displays, boosting online trading appeal. Use big data to analyze demand, optimize logistics routes, reduce outbound costs, stabilize prices, and safeguard farmers' interests.

4.3. Cultivating Digital Circulation Entities

Promote digital transformation among new entities like farmer cooperatives and leading agricultural enterprises. Guide cooperatives to establish a digital operation system integrating "production data collection, market demand analysis, and precision marketing," using IoT for

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real-time monitoring, big data for product optimization, and e-commerce for expanded sales, enhancing organization and responsiveness. Support leading enterprises in building full-chain digital management platforms, integrating data from procurement, processing, logistics, and sales to create collaborative supply chains and enable upstream-downstream linkage. Foster professional digital service providers in areas like rural e-commerce operations, smart logistics, and supply chain fintech. Encourage third-party institutions to develop rural-specific digital solutions, offering comprehensive services from store setup to cold chain logistics. Facilitate university-enterprise research labs for innovations like blockchain traceability and smart warehousing, fostering industry-academia collaboration. Through policy and market dual drivers, build a multi-level, professional digital circulation ecosystem.

4.4. Strengthening Digital Policy Integration

Formulate and refine integrated policies supporting the digital development of rural commerce and trade circulation. Enhance interdepartmental coordination, directing subsidies, tax incentives, and land policies toward digital projects and concentrating resources on capable entities. For instance, establish special funds for digital infrastructure, system development, and talent cultivation. Intensify policy promotion through online and offline channels to ensure benefits reach farmers and enterprises, supporting the industry's digital growth[9].

4.5. Promoting Deep Informatization Development and Building a Logistics Public Information Hub Network Brain

Accelerate informatization by adopting modern technologies. Using existing vehicle-cargo matching platforms, leverage big data, cloud computing, and IoT to create a region-wide smart logistics supply chain platform as the system's information hub. First, establish a public information platform with smart equipment and professional teams, using blockchain for transparent logistics sharing and ecosystem development. Second, enhance logistics functions by integrating express, industrial, and agricultural cargo data, employing intelligent algorithms for real-time oversight and optimized routing, ensuring efficient sorting, delivery, and end-point service. Third, integrate departmental internet resources, using big data to facilitate low-cost, safe delivery of production materials to rural areas and agricultural products to cities. Fourth, create a regional online mall for specialty products, using precision marketing to boost commerce-logistics synergy and support rural revitalization.

4.6. Enhancing Digital Talent Cultivation

Establish a robust digital talent cultivation system for rural commerce and trade circulation. Collaborate with universities and vocational schools to offer specialized courses, training targeted professionals. Provide digital training for existing practitioners via online-offline programs, covering e-commerce, logistics management, and digital marketing to boost skills. Introduce incentives to attract external digital talent to rural areas, injecting vitality into the system's digital development.

5. Conclusion

Enhancing the modern rural commerce and trade circulation system is a vital component of the rural revitalization strategy. In the digital economy era, digital empowerment provides new pathways for its optimization and upgrading. Through practical exploration in Tongliang District, Chongqing, this study identifies challenges in infrastructure, market systems, circulation entities, and policy support. By implementing optimization paths-strengthening digital infrastructure, improving digital-driven markets, cultivating digital entities, integrating policies, advancing informatization, and enhancing talent cultivation-an efficient, convenient, and modern system can be achieved. Looking forward, deeper application of digital

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technologies and effective policy execution will unlock new opportunities, fostering rural economic prosperity, advancing urban-rural integration, and promoting sustainable development in rural areas.

Ackonwledgments

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