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Evolutionary Logic Analysis of Rural E-commerce in China

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Abstract This paper systematically reviews the development trajectory of rural e-commerce in China from the late 1990s to the present, categorizing it into three distinct phases: the embryonic stage, the growth stage, and the boom stage. It elaborates on the evolutionary process through which rural e-commerce, propelled by strong policy support, driven by market demand, and facilitated by infrastructure improvements, has progressed from providing information services to becoming a pivotal force in advancing rural revitalization. The paper summarizes governmental support measures encompassing policies, training, and logistics, while also conducting an in-depth analysis of the current challenges and opportunities, including infrastructure limitations, market competition, the digital divide, and the application of AI technologies.

Key words Rural areas, E-commerce, Evolution

0 Introduction

The history of rural e-commerce development in China can be traced back to the late 1990s. At that time, the proliferation of the Internet and advancements in information technology spurred some farmers to begin experimenting with selling agricultural products online, giving rise to rural e-commerce. However, constrained by factors such as inadequate infrastructure, low levels of informatization, and inefficient logistics and distribution, the development of rural e-commerce progressed slowly.

With the steady increase in income levels for both urban and rural residents, and the rapid expansion of network coverage in rural areas, the countryside also began to benefit from the conveniences brought by the Internet. The exchange of goods and services between urban and rural areas broke through geographical limitations, leading to profound transformations in rural commercial structures and consumption patterns. As consumer demand for the quality, safety, and convenience of agricultural products gradually increased, rural e-commerce emerged to meet this market need, opening up new channels for agricultural product sales. Against the dual backdrop of empowerment by Internet technology and the upgrading market demand for agricultural products, the government has introduced a series of supportive policies, leading to the gradual rise of rural e-commerce as a significant force driving rural economic development.

1 Development history of rural e-commerce

The development history of rural e-commerce can be divided into three stages: the embryonic stage, the growth stage, and the boom stage.

1.1 Embryonic stage (late 1990s - 2008) During this stage, rural e-commerce began to take its first steps, with the emergence of agricultural websites and information service portals providing information to farmers. In 1996 and 1997, the China Agricultural Information Network and the China Agricultural Science and Technology Information Network were successively launched, marking the initial phase of agricultural product informatization in China. Rural e-commerce at this stage was primarily focused on information services and online sales of agricultural products, and had not yet formed a complete industrial chain or ecosystem. In 2004, the *Opinions of the General Office of the State Council on Transmitting the Ministry of Commerce and Other Departments' Suggestions on Further Improving the Circulation of Rural Commodities* proposed that, in accordance with the requirements for coordinating urban and rural economic development, efforts should be made to accelerate the development of rural commodity circulation by improving laws and regulations, refining market mechanisms, cultivating market entities, and standardizing market order, thereby promoting farmers' income growth and the comprehensive development of the rural economy. It emphasized strengthening the construction of agricultural product wholesale markets, specifically calling for the development and innovation of new trading methods such as agricultural product auctions, broker agency, and online transactions, and promoting the standardized construction of agricultural wholesale markets. In 2005, the term "e-commerce" was first mentioned in the Central Document No. 1, *Opinions of the Central Committee of the Communist Party of China and the State Council on Further Strengthening Rural Work and Enhancing Comprehensive Agricultural Production Capacity*. For approximately the next decade, the state primarily deployed the development of rural e-commerce from the perspectives of circulation methods, transaction methods, and platform construction.

Taking Shandong Province as an example, in 2000, the Shandong Agricultural Information Network was launched and put into operation, providing agricultural information services to farmers. In 2002, the Shandong E-commerce Association was established, initiating efforts to promote the development of rural e-commerce. Although rural e-commerce developed relatively slowly during this stage, it laid the foundation for subsequent

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growth.

1.2 Growth stage (2009 – 2014) Entering the 21st century, as the state placed increasing emphasis on rural e-commerce, it gradually became an important force driving rural economic development. During this stage, the state began to vigorously support the development of rural e-commerce, issuing a series of policy documents and funding support measures to encourage e-commerce enterprises to enter the rural market. Rural e-commerce gradually became an investment hotspot during this period, attracting significant participation from enterprises and individuals, which propelled its development.

The 2012 Central Document No. 1, *Opinions on Accelerating Agricultural Science and Technology Innovation and Continuously Enhancing the Capacity to Ensure Agricultural Product Supply*, proposed fully utilizing modern information technology to develop modern transaction methods such as agricultural product e-commerce. It advocated exploring the establishment of flexible and diverse production-marketing models for agricultural products that effectively connect production with consumption, aiming to reduce circulation links and lower distribution costs. The 2014 Central Document No. 1, *Opinions on Comprehensively Deepening Rural Reform and Accelerating Agricultural Modernization*, proposed launching projects to enhance the informatization of rural circulation facilities and agricultural wholesale markets, and strengthening the construction of agricultural product e-commerce platforms.

During this stage, propelled by both policy and market forces, China's rural e-commerce developed rapidly. Taking Dayang Town in Jiande City, Hangzhou, Zhejiang Province as an example: in 2011, Dayang Town began developing rural e-commerce. Through government guidance and enterprise participation, it established a rural e-commerce public service system, providing farmers with services such as e-commerce training, technical support, and logistics distribution. In 2014, the transaction volume of rural e-commerce in Dayang Town reached 50 million yuan, representing a year-on-year increase of 30%.

1.3 Boom stage (2015-present) In this stage, supported by policies, funding, technology, and other resources, rural e-commerce experienced rapid development, entering a phase of scaled and specialized growth, solidifying its role as a crucial force driving the rural economy. The state intensified its deployment efforts for rural e-commerce, progressively setting higher requirements. The primary focus areas for rural e-commerce became: intensifying logistics infrastructure construction and improving the three-tier (county-township-village) rural logistics system; implementing the Comprehensive Demonstration of E-commerce in Rural Areas; strengthening the rural e-commerce service system; and supporting the construction of agriculture-related e-commerce carriers and the development of new models. Rural e-commerce has yielded remarkable results in promoting the flow of agricultural products to urban markets, driving the digital transformation and upgrading of agriculture, stimulating farmer employment and entrepreneurship as well as income growth, and improving the rural landscape. It has become a vital instrument for advancing poverty alleviation, rural revitalization, and the construction of digital villages.

With the implementation of the "Internet Plus" action plan, the development of rural e-commerce entered a fast track. In 2015, the General Office of the State Council issued the *Guiding Opinions on Accelerating the Development of Rural E-commerce*, which clarified the goals, key tasks, and policy measures for rural e-commerce development, providing strong support for its growth. In 2016, the *Opinions of the Central Committee of the Communist Party of China and the State Council on Implementing the New Development Concept, Accelerating Agricultural Modernization, and Achieving the Goal of a Moderately Prosperous Society in All Respects* proposed accelerating the development of rural e-commerce to form an integrated online-offline landscape and a two-way circulation pattern where agricultural products flow into cities while agricultural supplies and consumer goods flow into the countryside. In 2017, the *Opinions of the Central Committee of the Communist Party of China and the State Council on Deepening Agricultural Supply-Side Structural Reform and Accelerating the Cultivation of New Drivers for Agricultural and Rural Development* emphasized promoting comprehensive integration and collaboration between new types of agricultural business entities, processing and circulation enterprises, and e-commerce companies, fostering interactive online-offline development. The 2018 Central Document No. 1, *Opinions of the Central Committee of the Communist Party of China and the State Council on Implementing the Rural Revitalization Strategy*, pointed out the need to vigorously build inclusive infrastructure that promotes rural e-commerce development, encourage and support various market entities to innovatively develop new Internet-based agricultural industry models, deeply implement the Comprehensive Demonstration of E-commerce in Rural Areas, and accelerate the modernization of rural circulation. The 2019 Central Document No. 1, *Opinions of the Central Committee of the Communist Party of China and the State Council on Prioritizing the Development of Agriculture and Rural Areas and Doing a Good Job in Work Related to Agriculture, Rural Areas, and Farmers*, proposed continuing the Comprehensive Demonstration of E-commerce in Rural Areas and implementing the "Internet Plus" initiative to move agricultural products from villages to cities. The 2020 *Opinions of the Central Committee of the Communist Party of China and the State Council on Focusing on Key Tasks in the 'Agriculture, Rural Areas, and Farmers' Domain to Ensure the Timely Achievement of a Moderately Prosperous Society in All Respects* emphasized effectively developing the rural market, expanding the coverage of e-commerce in rural areas, supporting supply and marketing cooperatives, postal and express delivery companies, among others, in extending rural logistics service networks, strengthening the construction of village-level e-commerce service stations, and promoting the two-way circulation of agricultural products to cities and industrial goods to the countryside. In the same year, the *Notice*

on Doing a Good Job in the 2020 *Comprehensive Demonstration of E-commerce in Rural Areas* proposed vigorously developing rural e-commerce to promote the formation of a smooth flow of agricultural products to cities and industrial goods to the countryside, integrated online-offline operations, and a dual upgrade in the consumption of agriculture-related goods and services, thereby fostering a modern agricultural product circulation system and a modern rural market system, and cultivating a group of distinctive demonstration counties whose experiences can be replicated and scaled. The 2022 *Opinions of the Central Committee of the Communist Party of China and the State Council on Doing a Good Job in Key Tasks for Comprehensively Advancing Rural Revitalization in 2022* explicitly called for continuously promoting the integrated development of primary, secondary, and tertiary industries in rural areas, implementing the "Digital Commerce for Rural Revitalization" project, advancing e-commerce into villages, and promoting the standardized and healthy development of live-streaming sales for agricultural and sideline products. In July 2023, the General Offices of the Ministry of Commerce and eight other departments issued the *Three-Year Action Plan for County-Level Commerce (2023 -2025)*, setting the working objective: to establish a rural commercial system coordinated at the county level, centered on county towns, focused on townships, and based on villages. By 2025, it aims to create approximately 500 county-level commerce "leading counties" nationwide, and to build or renovate a number of county-level logistics distribution centers, township commercial centers (large and medium-sized supermarkets, marketplaces), and new types of rural convenience stores. 90% of counties should achieve at least "basic" commercial functionality, and areas meeting the necessary conditions should essentially achieve express delivery access in every village. The two-way circulation channels for industrial goods to the countryside and agricultural products to cities will be further smoothed, creating a virtuous cycle of increased farmer income and improved consumption quality, better meeting the needs for rural industrial revitalization and the production and daily life of rural residents.

According to the 56th *Statistical Report on China's Internet Development Status* released by the China Internet Network Information Center (CNNIC) in July 2025, as of June 2025, the development of county-level wealth-enhancing industries in China is progressing, with the Internet illuminating a new digital life for rural residents. The effectiveness of Internet empowerment in rural revitalization is significant, with the Internet penetration rate in rural China reaching 69.2%, an increase of 1.9 percentage points from December 2024. New models of digital culture and tourism are continuously emerging, broadening new channels for digital employment and income growth among rural residents; bookings for rural tourism products in March increased by 52% year-on-year. High-quality development of rural circulation is evident, with shipments to rural areas accounting for 30% of the national express delivery volume in the first quarter, and the volume of life service consumption orders in counties nationwide increasing by 42.1% year-on-year. On the other hand, the rural e-commerce service system is continuously improving. Over the past five years, the Comprehensive Demonstration of E-commerce in Rural Areas has been deeply implemented, cumulatively supporting 1 489 counties in establishing nearly 3 000 county-level e-commerce public service centers and logistics distribution centers, and over 158 000 village-level e-commerce service stations. The county-township-village delivery service network is rapidly being improved, with 346 000 village-level integrated delivery and logistics service stations built nationwide, playing a positive role in promoting the flow of industrial goods "down to the countryside" and agricultural products "up to the cities".

2 Government support for rural e-commerce

2.1 Policy support To promote the development of rural e-commerce, the government has increased its support by introducing relevant policies and providing financial assistance, encouraging farmers to utilize Internet platforms for agricultural product sales.

2.1.1 Financial support. This is achieved through measures such as establishing special funds and providing loan concessions to support rural e-commerce platforms and agricultural producers in obtaining financial backing.

2.1.2 Tax reductions and exemptions. Enterprises engaged in rural e-commerce are granted tax reductions or exemptions to lower their operational costs.

2.1.3 Market regulation and protection. This involves strengthening supervision over e-commerce platforms and product quality to safeguard consumer rights. Simultaneously, efforts are made to combat counterfeit and shoddy goods as well as false advertising, thereby maintaining market order.

2.2 Training and technical support The government also provides training and technical support, enhancing training for farmers and e-commerce practitioners to help farmers better operate e-commerce platforms and improve product quality and brand image.

2.2.1 Building rural logistics networks. The government strengthens the construction of rural logistics facilities, including cold chain logistics and express delivery. By improving the logistics network, agricultural products can be transported quickly from production areas to consumers, enhancing product freshness and market competitiveness.

2.2.2 Promoting rural characteristic tourism. The government encourages the development of rural tourism and integrates it with the sales of agricultural products. By creating distinctive scenic spots and organizing rural cultural activities, it aims to attract more tourists to rural areas for consumption, thereby boosting the sales of local agricultural products.

2.2.3 Strengthening agricultural science and technology innovation. The government invests funds and resources to support the

research, development, and application of agricultural science and technology. By promoting new agricultural cultivation techniques and improving agricultural product processing technologies, it seeks to increase the yield and quality of agricultural products, thereby enhancing the competitiveness of the rural economy.

2.2.4 Establishing an agricultural product quality traceability system. The government promotes the establishment of a comprehensive agricultural product quality traceability system to ensure consumer trust in the safety and quality of agricultural products. This also provides more development opportunities for the rural market and can attract more consumers to purchase agricultural products. For example, in Xunwu County, Ganzhou City, Jiangxi Province, a "Internet Plus" cold chain logistics distribution platform was built to sell local high-quality fruits nationwide. Consumers can scan the product QR code to obtain detailed information such as the growing environment and production process, increasing their trust in and desire to purchase the agricultural products. Overall, the development history of rural e-commerce in China is a narrative of continuous overcoming of difficulties and innovative development driven by the government. The government is committed to creating a favorable business environment and has played a crucial role in promoting the development of the rural market.

3 Challenges and issues facing rural e-commerce

Rural e-commerce holds significant importance in driving rural economic development and improving farmers' living standards. However, during its development, rural e-commerce faces a series of challenges and issues. With the penetration of new technologies like artificial intelligence, some traditional problems exhibit new characteristics, while entirely new challenges also emerge.

3.1 Inadequate infrastructure construction Infrastructure construction, such as network coverage and logistics distribution, remains relatively underdeveloped in some rural areas, constraining the development of rural e-commerce. Increased investment is required to enhance the level of infrastructure development.

3.2 Information asymmetry and the widening digital divide Farmers' limited understanding of the Internet and e-commerce leads to significant information asymmetry problems. More importantly, with the deep application of AI technologies (such as intelligent customer service, data analysis, and algorithmic recommendations) in the e-commerce field, a substantial "digital divide" and "technology gap" exists between farmers and large platforms. Ordinary farmers struggle to comprehend and utilize complex AI tools for market analysis, precision marketing, and user management, placing them at an even greater disadvantage in competition.

3.3 Product quality and trust issues Due to the lack of standardized production and quality supervision systems, quality issues exist for some agricultural products sold on e-commerce platforms, leading to decreased consumer trust in these products. Strengthened regulatory efforts are needed, along with the establishment of a sound product quality traceability system. Although technologies like AI image recognition can be used for product quality control, the cost and threshold for their application remain high for the vast number of smallholder farmers.

3.4 Logistics costs and delivery challenges Complex traffic conditions and long delivery routes in rural areas result in high logistics costs, and delivery services struggle to reach every village. There is a need to explore new logistics and delivery models, such as rural express delivery stations and agricultural product cooperatives. Although AI algorithms can optimize logistics routes, the scattered and fluctuating order volumes in rural areas significantly diminish the benefits of their large-scale application.

3.5 Fierce market competition and the emergence of algorithmic barriers Although the rural e-commerce market holds enormous potential, market competition has gradually intensified. Various types of e-commerce platforms and enterprises are entering the rural market, competing for market share. A deeper issue lies in the algorithm-driven core of the platform economy. Large platforms utilize AI algorithms to control traffic distribution, making it difficult for small and medium-sized farmers and rural e-commerce entrepreneurs lacking technical and financial support to gain exposure, trapping them in an "algorithmic predicament". This not only creates strong dependence on the platforms but also hinders the building of their own brands.

3.6 Insufficient funding and technical support The development of rural e-commerce relies heavily on substantial capital investment and advanced technical support. However, in practice, many rural enterprises and entrepreneurs often face bottlenecks in funding and technology, making sustainable development difficult to achieve. This dilemma is particularly acute in the AI era, as procuring or developing suitable AI tools and hiring professional data analysts require high costs, which rural e-commerce entities generally lack the capacity to bear.

3.7 Data security and privacy risks The development of rural e-commerce has accumulated vast amounts of user data, production data, and transaction data. While leveraging AI for data analysis creates value, it also introduces new challenges in data security management. Awareness and capabilities regarding data security and privacy protection in rural areas are relatively weak, posing potential risks such as data breaches, misuse, and algorithmic discrimination. How to safely and compliantly utilize data to empower rural e-commerce is a new and pressing issue requiring regulation.

3.8 Challenges in deep integration of AI technology with agricultural scenarios The effectiveness of AI models relies on high-quality, standardized data support, whereas agricultural production is characterized by its regional, seasonal, and non-standardized nature. This poses challenges to the accuracy and generalizability of AI technology in application scenarios such as agricultural product image recognition, intelligent pricing, and demand forecasting. Significant resources need to be invested in conduc-

ting targeted technical adaptations and scenario-specific development work.

4 Conclusion

The vigorous development of rural e-commerce in China represents a magnificent chapter jointly authored by policy guidance, market forces, and technological advancement. From initial Internet adoption to the deepening advancement of the "Digital Commerce for Rural Revitalization" strategy, it has not only reshaped rural industrial ecosystems and consumption patterns, but has also emerged as a pivotal force driving rural revitalization and promoting common prosperity. Looking ahead, with the deep integration of new technologies like AI and the continuous improvement of infrastructure, rural e-commerce is poised to continuously break through challenges, injecting stronger momentum into the modernization of agriculture and rural areas, and ushering in a new era of coordinated urban-rural development.

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development, it is essential to establish a long-term investment mechanism to ensure its continuous updating and upgrading. Local governments should incorporate the development of rural digital infrastructure into their budgets. By guaranteeing sufficient funding, they can achieve full 5G network coverage, support the application of cutting-edge digital technologies like cloud computing and blockchain in rural areas, and foster the digital transformation of various rural sectors and industries. For instance, the promotion of a pest monitoring platform can enable dynamic tracking of the population, density, and range of farmland pests, providing technical support for farmers to understand infestation patterns and implement preemptive control measures. Additionally, building an integrated five-level e-government service platform spanning provinces, cities, counties, townships, and villages can enhance rural governance through data sharing.

4 Conclusions

In contrast to traditional productive forces, new quality productive forces can significantly enhance agricultural efficiency and reduce production costs. Moreover, by leveraging digital and intelligent technologies, they can transform agricultural production models and modernize rural governance systems. This progress in rural digital and economic development helps narrow the urban-rural gap and promotes integrated urban-rural development. However, the process of applying new quality productive forces to advance rural digital construction faces challenges, including lagging digital infrastructure and a shortage of digital professionals. Addressing these issues requires a clear understanding of the characteristics of new quality productive forces and the needs of digital village construction. Such measures as promoting urban-rural industrial integration, implementing digital governance systems, training digital professionals, and upgrading rural infrastructure should be taken. Continuously improving the level of new quality productive forces will ensure the steady advancement of digital village construction and contribute to the smooth realization of rural revitalization goals.

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