

Research on the Digital Transformation of the Whole Industry Chain of Guangdong Supply and Marketing Cooperative

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Abstract: Guangdong Supply and Marketing Cooperative serves as an important institution for the “Three Rural Areas” in the Guangdong-Hong Kong-Macao Greater Bay Area. Its digital transformation and optimization serve as powerful supports for rural revitalization. This paper systematically reviews the main practices and effectiveness of the digital transformation within the Guangdong Supply and Marketing Cooperative. It also analyzes the current development dilemmas faced in the construction of digital supply and marketing. Additionally, it proposes targeted solutions, including building a big data resource base, optimizing the digital supply and marketing cloud platform, developing digital public-type agricultural social service applications, establishing a new model of rural e-commerce, enhancing the traceability management system for agricultural products, and strengthening the construction of the digital human resources system. These proposals aim to further promote the strategy for revitalizing the countryside.

Keywords: Guangdong supply and marketing cooperative; Digital transformation; Whole industry chain; Rural revitalization

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1. Introduction

Supply and Marketing Cooperatives are comprehensive cooperative economic organizations serving farmers, playing a crucial role in the Party and the Government’s efforts to improve the “three rural areas” and advance the development of China’s agriculture and rural regions ^[1]. As a national market entity, Supply and Marketing Cooperatives extend the industrial chain, connect the supply chain, and enhance the value chain ^[2], thereby ensuring the balanced “supply” and “sales” of the rural economy, making them indispensable for rural revitalization and providing unique advantages in this process ^[3,4]. The relationship between Supply and Marketing Cooperatives and agriculture, rural areas, and farmers is depicted in **Figure 1** ^[5].

In 2022, the No.1 document of the central government emphasized the role of “digital supply and marketing” in rural revitalization. Subsequently, in 2023, the Central Internet Information Office and other five departments jointly issued the “Key Points for the Development of Digital Rural Areas in 2023” ^[6], explicitly

highlighting the importance of accelerating the digital transformation of the entire agricultural industry chain and the construction of “digital supply and marketing” [7].

Taking advantage of the opportunities presented by the digital economy and the new historical context of rural revitalization [8], this study compiles the practical experience of the Guangdong Supply and Marketing Cooperative in digitalization. This includes restructuring the entire industrial chain of agricultural product production, circulation, consumption, and service through digitization. By further deepening the comprehensive reform of Supply and Marketing Cooperatives, the study aims to contribute to the important goal of serving the “three rural areas” and assisting in rural revitalization in Guangdong, and even in the wider Guangdong-Hong Kong-Macao Greater Bay Area.

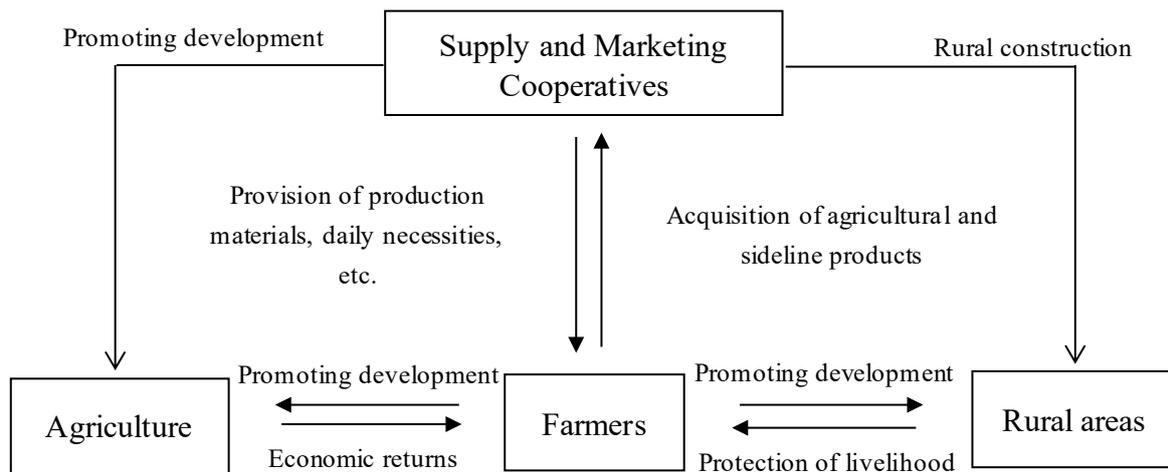


Figure 1. Relationship between supply and marketing cooperatives and agriculture, rural areas, and farmers (Source: Foresight Industry Research Institute)

2. The significance of carrying out digital transformation for the Guangdong Supply and Marketing Cooperative

2.1. An important path to comprehensive reform of Guangdong Supply and Marketing Cooperative

Digitalization serves as a pivotal tool to deepen the comprehensive reform and facilitate the transformation and upgrading of the Guangdong Supply and Marketing Cooperative. It also plays a crucial role in enhancing agricultural services [9]. The development of digital supply and marketing is conducive to integrating existing agricultural supplies, agricultural technology, cold chain logistics, and direct supply and distribution of agricultural products, thereby promoting the emergence of new industries [10].

2.2. An important guarantee for digital agriculture and rural revitalization in Guangdong

The research interest in agricultural digitalization is steadily increasing [11]. The digital development of the Guangdong Supply and Marketing Cooperative aligns with the new wave of digital rural development. Given Guangdong’s significant position in national consumption and agriculture, and its substantial role in the national agricultural production map, enhancing high-level agricultural science and technology innovation is particularly crucial for strengthening the foundation of national food security and building a sustainable green agricultural development system [12].

However, digital agriculture in Guangdong is still in its infancy, highlighting the importance of digital

construction in establishing a new development pattern in the region. Promoting the development of digital supply and marketing will significantly contribute to Guangdong's rural revitalization strategy and foster common prosperity among rural residents in the province ^[13].

3. Main practices and effectiveness of digital transformation of Guangdong Supply and Marketing Cooperative

3.1. Guangdong-Hong Kong-Macao Greater Bay Area green agriculture products production supply base

The Guangdong Provincial Supply and Marketing Bureau has designated the 1,500-acre green agricultural products production and supply base in the Guangdong-Hong Kong-Macao Greater Bay Area (Huizhou) as a cornerstone. The aim is to establish a Guangdong-Hong Kong-Macao Greater Bay Area food emergency protection center and a national agricultural products circulation and supply base to promote actions enhancing the agricultural products market.

Currently, the first phase of the base is in trial operation, focusing on building a digital, standardized, branded, integrated agricultural products industry chain green eco-complex. This initiative aims to create a modern agriculture and food industry cluster in the Guangdong-Hong Kong-Macao Greater Bay Area, serving as a bridgehead and primary position to facilitate the national supply and marketing system of agricultural products “into the Bay and out to sea.”

3.2. Supply and marketing agricultural materials and agricultural technology service network

The Guangdong Supply and Marketing Cooperative has established the Guangdong Supply and Marketing public agricultural supplies and agricultural technology service network. This network comprises 1,254 agricultural supplies and agricultural technology service centers covering the entire agricultural production process, from cultivation and planting to management and harvesting. It serves as the main service channel for moderately scaled agricultural operations. Additionally, there is a strong push for the implementation of the “green agricultural capital” program to ensure that fertilizers and pesticides supply more than 50% of the province's market share, thereby ensuring stability in agricultural capital supply and pricing.

3.3. The “Digital Supply and Marketing” operation company headquarters settled in Shanwei

As part of the “Digital Supply and Marketing” initiative, the Guangdong Supply and Marketing Cooperative has facilitated the establishment of the headquarters of the “Digital Supply and Marketing” operation company in Shanwei. This move aims to accelerate digital transformation efforts and popularize the application of “Supply and Marketing Station,” “Supply and Marketing Bazaar,” and “Supply and Marketing Management System.” Moreover, supply and marketing societies in cities and counties across Guangdong Province have actively leveraged the influence of the “Digital Supply and Marketing” headquarters, continuing their digital transformation efforts to enhance the level of digital services.

3.4. Guangdong Supply and Marketing Cold Chain Backbone Network digital platform

The Guangdong Supply and Marketing Public Cold Chain Backbone Network for Agricultural Products was fully organized and operationalized in December 2023, comprising 88 projects across the province with a planned storage capacity of 1.73 million tons. Leveraging the Guangdong Digital Supply and Marketing

Platform, digitalization is integrated throughout the entire operation and management of the cold chain backbone network ^[14].

In operational parks, cutting-edge technologies such as the Internet of Things (IoT), big data, and digital twins are utilized to monitor the storage of agricultural products in cold storage facilities in real-time, enabling visualization of the storage process. Practical results demonstrate that the platform can enhance the comprehensive cold chain circulation rate of agricultural products by 10% and reduce cold chain logistics costs by up to 30%. Additionally, it facilitates the formation of characteristic advantageous industry clusters and fosters the upgrading of rural industries.

3.5. Direct supply and distribution network for assured agricultural products

The Guangdong Supply and Marketing Cooperative, led by agricultural products companies, is accelerating the construction of a direct supply and distribution network for assured agricultural products. It has established and operated 61 sub-platforms in 21 cities and municipalities across the province, certifying 684 supply and marketing farms covering an area exceeding 383,900 acres. Through the “offline + online” approach, agricultural products are distributed to institutions, schools, hospitals, enterprises, wholesale markets, fresh food e-commerce platforms, and other units, facilitating the movement of agricultural products from villages to cities.

3.6. Inter-provincial consumption support collaboration platform

The Guangdong Supply and Marketing Cooperative, in collaboration with 20 provincial supply and marketing cooperatives including Tibet, Xinjiang, Guangxi, and Guizhou, has developed the East-West collaboration supply and marketing alliance. Together, they have established a platform for inter-provincial consumption support and collaboration.

Continuing its operations, the Guangdong Supply and Marketing Cooperative manages the “Guangdong Supply Preferred” platform and establishes channels for the “832 Platform” ^[15]. Furthermore, it strengthens the establishment of a regular production and marketing docking mechanism with the supply and marketing bureaus of four provinces and districts in Tibet, Xinjiang, Guangxi, and Guizhou.

4. Strategies for carrying out industry-wide digital transformation of Guangdong Supply and Marketing Cooperative

Currently, Guangdong Supply and Marketing Cooperative is engaged in multifaceted digital innovation practices but still faces several dilemmas, including a low degree of digital application, the urgent need to enhance the digital technology of agricultural socialized services, the underdevelopment of rural e-commerce, and a significant shortage of digital talents. This study proposes targeted countermeasures for the digital transformation of the entire industry chain.

4.1. Building the Guangdong Supply and Marketing big data resource base

Focusing on the entire industrial chain of critical agricultural products, the core data resource base of the United Farmers Organization will be established. The Guangdong Supply and Marketing Cooperative aims to automatically and dynamically collect production and operation information from farmers, agricultural business entities, and service entities involved in production, processing, storage, and marketing. This includes establishing digital farmland archives, creating big data sets on agricultural product transactions, and achieving precise alignment between farmers’ needs and agricultural socialized services. Additionally, efforts will be

made to strengthen the construction of data mining, cleaning, analysis, and application capabilities, leading to digital management across all levels of the United Farmers Organization. Finally, emphasis will be placed on fortifying the construction of the digital supply and marketing standard system, security guarantee system, and operation and maintenance management system.

4.2. Optimizing the Guangdong Digital Supply and Marketing cloud platform

The Guangdong Supply and Marketing Cooperative must expedite the construction of the Guangdong Digital Supply and Marketing cloud platform. This entails supporting grassroots societies at municipal and township levels to actively integrate with the provincial platform, facilitating digital management throughout the entire grain industry chain. Specifically, efforts will focus on achieving digital management across all stages of the grain industry chain – production, purchase, storage, processing, and marketing – in the Guangdong supply and marketing sector. At the planting end, the promotion of the “Guangdong Supply and Marketing Agricultural Service” system will enable data interconnection and sharing on a unified network. On the storage side, the establishment of a smart grain storage center will facilitate intelligent entry and exit management and operational visualization. Lastly, on the sales side, an online grain trading system will be developed, connecting with domestic mainstream grain trading platforms to offer efficient and convenient online services for grain buyers and suppliers.

4.3. Development of digital public-type agricultural socialized service applications

The Guangdong Supply and Marketing Cooperative should expedite the establishment of a digital public agricultural socialized service system covering five levels: provinces, cities, counties, towns, and villages. Firstly, there should be a focus on developing agricultural supplies and agricultural technology service applications. This involves leveraging remote sensing, IoT, and other technologies to establish a digital supply and marketing field database and an intelligent pest detection and reporting system. Additionally, efforts should be made to promote unmanned aircraft and intelligent agricultural machinery operation systems, along with enhancements to the agricultural science and technology information service platform. Secondly, there is a need to develop cold chain logistics service applications, utilizing IoT and smart distribution to upgrade warehousing facilities and achieve integrated operation of cold chain warehousing, logistics, and trading ^[16]. Lastly, the development of rural financial service applications is crucial, offering guarantee, insurance, and loan services for all types of agricultural production and management subjects ^[17], while providing data support for optimizing financial service supply.

4.4. Creating a new rural e-commerce model

With the rapid development of big data, cloud computing, artificial intelligence, and blockchain technologies, agricultural product circulation is transitioning from traditional distribution channels to new e-commerce platforms ^[18]. Therefore, the Guangdong Supply and Marketing Cooperative should leverage its channels, outlets, and intermediary advantages to expand e-commerce sales channels for high-quality agricultural products. This can be achieved through the construction of agricultural products e-commerce platforms and the establishment of e-commerce live bases, enabling one-step interoperability of supply and demand information and optimizing the entire consumption scenario chain through WeChat applets.

4.5. Improve the traceability management system for agricultural products

The Guangdong Supply and Marketing Cooperative can collaborate with quality inspection departments, scientific research institutions, and other relevant entities to establish a mechanism for the traceability

of agricultural products. This includes implementing a unified code for agricultural products, integrating information throughout the production, circulation, and sales processes of agricultural products, and establishing traceability management and risk early warning systems. These measures aim to create a comprehensive closed loop for food safety.

4.6. Strengthening the digital talent system

The Guangdong Supply and Marketing Cooperative should strengthen the construction of its digital talent pool by establishing digital management departments and appointing 1–2 digital supply and marketing specialists at all levels of supply and marketing societies. Additionally, relevant training and performance appraisal systems should be established ^[19]. Furthermore, efforts should focus on enhancing digital business capabilities by providing skills training for rural talents ^[20], including live e-commerce training. Collaborative initiatives with government departments, colleges, and institutes can be implemented to establish training bases for cultivating agricultural skills talents and new vocational farmers.

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