

# Analysis of Agricultural Product Marketing Channels Based on Diversity under the Background of Big Data

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**Abstract.** The emergence of big data technology has brought about a breakthrough change in agricultural product marketing concepts. Through analysis of agricultural product marketing channels, it has been found that the traditional single agricultural product marketing channel has hindered the development of the agricultural product market, and there are still intermediate links in the diverse marketing channels. There are many problems, such as lack of brand awareness. Therefore, the Internet, big data technology and artificial intelligence technology are needed to promote the diversified development of agricultural product marketing subjects, agricultural product wholesale markets, agricultural product transaction methods, agricultural product logistics and agricultural product brand building.

**Keywords:** Big ata Technology, Agricultural products, Marketing channels

## 1. Introduction

Agricultural product marketing channel is to use appropriate marketing channels to sell agricultural products, through the market circulation, and finally reach the hands of consumers <sup>[1]</sup>. In this marketing process, the producer of agricultural products is the beginning of the entire channel, and the consumer is the terminal. There are operators, agents, and sales personnel in the middle to realize the entire process of agricultural products from production to final sale. (Bruce, 2011) The level of social development determines the optimization of agricultural product marketing channels, which is the main point of view of marketing channel theory scholars <sup>[2]</sup>. At present, there is still a big gap between China's agricultural product marketing environment and marketing methods and developed countries <sup>[3]</sup>. With the rapid development of the market economy, the traditional single agricultural product marketing channel is diversifying toward the agricultural product marketing channel, but some problems have gradually emerged. Therefore, it is necessary to analyze the problems in the marketing channels of diversified agricultural products, and put forward measures to promote the improvement of the marketing channels of diverse agricultural products by using big data technology.

## 2. The types of marketing channels commonly used in Chinese agricultural products

### 2.1. Producers sell themselves

The object of this sales model is mainly the farmer's market in towns and counties, and usually the



producers of agricultural products conduct direct face-to-face transactions with consumers [4]. The mode of operation is that the producers of agricultural products transport the agricultural products themselves, and then sell them to consumers in the farmers' market. The participants are farmers and consumers. This sales model enables direct contact between producers of agricultural products and consumers. Without intermediaries, the producers of agricultural products can not only obtain more economic benefits, but consumers also spend less. However, this sales model has a small radiation radius and high risks. It requires agricultural product producers to spend more time and energy costs, and cannot ensure transaction efficiency, which is prone to supply and demand imbalances.

### *2.2. Multi-level intermediary participation*

The distribution of various types of agricultural products is regionally dispersed, and the uneven distribution of product types is the basic situation of the distribution of agricultural products in China [5]. The emergence of the agricultural wholesale market is to purchase agricultural products from farmers and gather them to form an agricultural product procurement market. There are mainly two types of wholesale markets: sales and production areas, to reduce the impact of the decentralization of China's agricultural production and sales process. This model originated in the 1980s, when China began to implement a market economy policy, which greatly promoted the emergence of this marketing model and realized the communication between the large social market and the small production of farmers. In this model, the producer only needs to sell the agricultural products to the middleman, and does not participate in the sales process. The middleman then circulates the agricultural products to the market. This model has become the main method of China's current agricultural product sales channels. Although it can save the economic, time and energy costs of agricultural product producers, promote the professional division of labor in the agricultural product market, and realize the cross-regional sales of agricultural products, some problems have gradually become apparent. For example, the synergy between producers and intermediaries is poor, and because there are many intermediaries, it is impossible to provide consumers with timely feedback on the market demand for agricultural products, resulting in asymmetric information between buyers and sellers, and prices are gradually rising, damage the interests of consumers and hinder the production and sale of agricultural products.

### *2.3. Docking between producers and enterprises*

Participants in this sales model include production enterprises such as processing enterprises, cooperatives and sales companies. The combination mode usually generated is: farmers + leading enterprises, farmers + cooperatives + leading enterprises, farmers + online sales platform, farmers + suppliers + supermarkets, etc. Among them, the mode of participation between farmers and leading enterprises is the order-based model. Farmers can produce agricultural products according to the orders signed by the enterprises, and then when the agricultural products are harvested, the enterprises purchase, process, and sell agricultural products according to the contract [6]. This model has certain advantages, which can effectively protect the interests of farmers and promote the development of the agricultural economy; the three-way cooperation method of farmers, cooperatives and leading enterprises is different from the former. The agricultural product circulation cooperatives organized by farmers in agricultural product acquisition are among them. Through matchmaking, enterprises directly sign contracts with cooperatives; while the model of farmers and online sales platforms is essentially the transformation of traditional wholesalers into Internet sales platforms. E-commerce companies and farmers sign production agreements and become transactions between farmers and online shoppers. Has the advantage of cross-region and time; cooperation between farmers, suppliers, and supermarkets, supermarkets through direct contact with consumers to understand the actual needs of consumers, help farmers actively improve the variety of agricultural products, improve the quality of agricultural products, but also Assist farmers in production, transportation, and sales to achieve a seamless connection between the two, speed up the circulation of agricultural products, stabilize the market price of agricultural products, and improve the efficiency of production and operation.

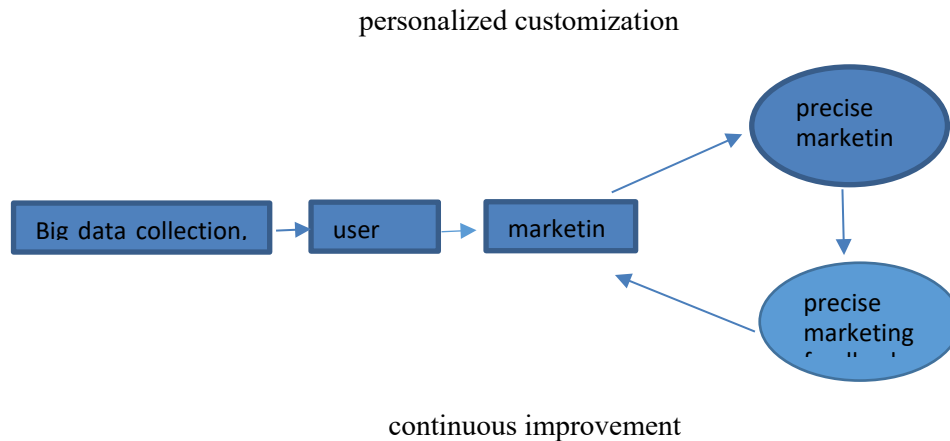
In general, the self-sales marketing channel model of agricultural producers is relatively backward, with low channel costs, unstable relations, and underdeveloped circulation technology. The marketing channel model involving multi-level intermediaries and the marketing channel model where producers and enterprises are connected have higher efficiency in the circulation of agricultural products from production to sales, but there are more links, long marketing channels and high marketing costs. Therefore, it is necessary to further optimize the agricultural product marketing channel model and improve the efficiency of agricultural product marketing channels. The specific analysis is shown in Table 1 below:

**Table 1.** Analysis table of marketing channel model of agricultural products

Agricultural product marketing model	Channel relationship	Channel distance	Channel cost	Degree of organization	Circulation efficiency	Channel dominance	Added value
producer self-sale	no middleman extremely unstable	minimal	low	low	low	producer	low
multi-level middleman participation	not stable	long	high	relatively high	normal	middleman	relatively high
producer-enterprise docking	relatively stable	long	high	high	high	enterprise	relatively high

**3. Game analysis of agricultural products using big data technology for precision marketing**

Big data is the implementation tool and technical foundation of precision marketing. It can extract knowledge from large-scale heterogeneous and complex data and convert it into business intelligence. It is well received in real-time capturing user needs, tracking market trends, personalized push, etc. Due to the four characteristics of "big data" (ie 4V): large data volume (Volume), many data types (Variety), high processing speed requirements (Velocity), low data value density (Value), also for data analysis and The use brings difficulty. Philip Kotler pointed out that precision marketing refers to the company's need for more accurate, measurable and high return on investment marketing communications, marketing communications plans that focus more on results and actions, and investments in direct sales communications. Agricultural products are the basic products of people's living consumption and by-product processing, which requires the development and application of precision marketing models with the help of big data technology. With the vigorous development of technologies such as the Internet of things, mobile Internet, and cloud computing, the "precision marketing model based on big data" can accurately predict customer needs and target customers to provide personality through the collection, processing and analysis of consumer data, combined with user portraits customized and customized products and services to increase the market share and penetration of agricultural products (see Figure 1).



**Figure 1.** Precision marketing model based on big data

*3.1. Game model assumption*

In order to prove the effectiveness of the big data-based precision marketing model, we can assume that there are only two agricultural product marketing entities A and B on the market, both of which are rational economists, seek to maximize profits, and at the same time, choose big data technology to carry out the main body of precision marketing can operate better and get more profits; the two have the same basic strength and sell the same kind of agricultural products; the game between them is a complete information static game, that is, the market information is completely open to them. No one knows the other party’s choices before making a decision.

*3.2. Game model establishment and analysis*

Assuming that the profit obtained by the market entity is  $\Pi$ , the sales volume of the product is  $Q$ , the sales price of the product is  $P$ , and the unit cost is  $C$ . Due to the precise marketing of big data technology, the changing sales volume of the enterprise is  $\Delta Q$  ( $\Delta Q > 0$ ). The cost of data technology precision marketing changes is  $\Delta C$  ( $\Delta C > 0$ ). When they all choose to use big data technology for precision marketing, the increase in market capacity is  $2\Delta Q^*$ , of which  $\Delta Q^*$  is for both of them using big data technology for precision marketing Under the circumstances, the sales volume of an agricultural marketing subject. When they all choose to use big data technology for precise marketing, their profits are  $\Pi_1 = (P - C - \Delta C) (Q + \Delta Q^*)$ ; when one of them chooses to adopt and the other refuses, the former's profit is  $\Pi_2 = (P - C - \Delta C) (Q + \Delta Q)$ , the latter's profit is  $\Pi_3 = (P - C) (Q - \Delta Q)$ ; when they both choose to refuse, the profit of both is  $\Pi = (P - C) Q$ . It can be seen from the analysis that the use of big data technology for precision marketing of agricultural products can effectively promote sales and increase the overall welfare of the society, and precision marketing of agricultural products based on big data analysis is the main development trend of agricultural marketing. The specific analysis is shown in Table 2 below:

**Table 2.** Static game analysis table of the two parties of agricultural product marketing

Category	B adopted	B not adopted
A adopted	[ $(P - C - \Delta C) (Q + \Delta Q^*)$ , $(P - C - \Delta C) (Q + \Delta Q^*)$ ]	[ $(P - C - \Delta C) (Q + \Delta Q)$ , $(P - C) (Q - \Delta Q)$ ]
A not adopted	[ $(P - C) (Q - \Delta Q)$ , $(P - C - \Delta C) (Q + \Delta Q)$ ]	[ $(P - C) Q$ , $(P - C) Q$ ]

**4. Diversified agricultural product marketing channel development strategy based on big data technology**

*4.1. Promote the diversification of agricultural product marketing subjects*

Traditional agricultural product marketing is dominated by farmers. Due to the low degree of digitalization, informatization and internetization of agricultural production, the information of high-quality agricultural products is difficult to be effectively communicated to consumers in a timely manner, resulting in the inability of high-quality products to achieve good prices and “bad money to expel good money Phenomenon, and the circulation process is too long, the circulation cost is high, and the product waste is serious, which seriously affects the marketing level of agricultural products. In the diversified agricultural product marketing channels, the traditional single subject should be transformed to promote the diversified development of agricultural product marketing subjects, improve marketing capabilities, accelerate product circulation, and make agricultural product marketing move toward organization, scale and specialization [8]. Create a leading enterprise, give full play to its leading role in the industrialization of agricultural products, use the Internet, big data, artificial intelligence technology to be able to innovate the existing agricultural production and sales model, can circumvent the existing problems of the existing model, and at the same time cultivate farmers to carry out large-scale production, reduce production costs, promote the processing and sales of agricultural products, promote deep cooperation between farmers and leading enterprises, promote communication between farmers and enterprises, form a stable cooperative relationship, and achieve mutual benefit and win-win results.

#### *4.2. Promote the diversification of agricultural wholesale markets*

Agricultural production has a natural periodicity. The main bodies of agricultural production are very scattered. Decentralized production bodies are faced with numerous market information and incomplete information to make production decisions. It is difficult to be objective and accurate. Decentralized farmers generally produce blindly according to the current prices of agricultural products, which leads to fluctuations in the output and prices of agricultural products. Therefore, the Internet, big data, and artificial intelligence should be used to solve the problems of agricultural product demand forecasting and to avoid fluctuations in agricultural production. At present, the types of markets for agricultural products in China include: farmers' markets, government-led wholesale markets, and enterprise-led wholesale markets. Only by extensive application of technical means to strengthen the links between agricultural products and the market, can marketing efficiency be improved; the wholesale market should strengthen the diversification of information-based investment and management, and improve the level and standardization of scientific and technological management; data, artificial intelligence, aggregate big data in agricultural production, consumption, etc., can dynamically track and analyze the situation of agricultural production, form big data for agricultural product marketing, prevent frequent market fluctuations in wholesale, and prevent and control the risks that exist in it .

#### *4.3. Promote the diversification of agricultural products trading methods*

In the context of economic globalization, the trading of agricultural products has risen to the international level, and foreign products are also impacting the domestic market, hindering the smooth sale of agricultural products. Therefore, strengthening the diversification of trading methods is an effective way to maintain the competitiveness of agricultural products market. This includes: conducting auction transactions on agricultural products, and open and transparent auction methods, which can save the link of information collection by the transaction subject and speed up the circulation of agricultural products. Under the influence of the mainstream trend of Internet + agriculture, network marketing is carried out to broaden agricultural product sales channels. This Internet-based sales model integrates e-commerce platforms, logistics resources, and agricultural product resources, which can significantly improve marketing efficiency. China's well-known e-commerce platforms such as JD.com and Tmall have already set up fresh food sections, and use their own procurement systems and logistics systems to purchase agricultural products from their origins. Based on the orders, they use efficient logistics systems to distribute agricultural products. To complete the marketing process.



#### 4.4. Promote the diversification of agricultural logistics

Agricultural product sales require a long cycle and limited circulation. You should use the Internet of Things, big data, artificial intelligence and blockchain technology to build a agricultural product traceability system to achieve planting and breeding traceability and transparent process files. Realize agricultural product information sharing. Through this method, each agricultural product is established from the birth to create a unique file data, which can continuously observe the crop conditions for 24 hours, ensure that the monitoring of various links such as breeding, planting, processing, distribution, sales, etc. can be traced back, from the farm to the table Seamless docking. The agricultural product traceability system integrates all links of the entire supply chain, establishes a professional distribution center in the marketing chain, guarantees the integrated system of agricultural products from production to sales, and then to consumers, realizes integrated dynamic real-time monitoring, and truly achieves mutual supervision and promotion allows consumers to witness the whole process of agricultural production, processing and transportation through live video. In addition, it can strengthen the management of inventory, avoid or reduce the loss of agricultural products during transportation, and improve the efficiency of logistics distribution.

#### 4.5. Promote the diversification of agricultural product brand building

Taking the regional brand of agricultural products as the core will be the main development direction of agricultural products [9]. In modern society, consumers gradually increase the quality requirements of agricultural products, and the use of big data technology to carry out precision marketing is conducive to the cultivation and construction of agricultural product brands, the establishment of an agricultural brand catalog system and brand evaluation system, and the cultivation of a batch of high market reputation and influence regional brands, corporate brands and product brands can effectively promote the quality of agricultural products. When agricultural producers choose types, they can use big data technology to grasp the market feedback information, compare with multiple markets, pay attention to market demand, and ensure the superiority of the selected varieties; strengthen the emphasis on the brand of agricultural products, enrich the brand types of agricultural products, and ensure Agricultural product quality and economic and social benefits.

### 5. Conclusion

The Internet, big data, and artificial intelligence are conducive to promoting the intelligentization of agricultural production and sales. Only scientific, advanced, efficient, safe, and diverse agricultural product marketing channels can ensure the orderly and healthy development of the agricultural product market. The agricultural product intelligent marketing model based on big data is mainly through the use of big data technology and artificial intelligence methods to correlate customer data with product needs and social benefits, to achieve marketing model upgrades and establish intelligent service models. As the main body of the agricultural product market, no matter from the perspective of its own interests or the overall welfare of society, it is necessary to implement big data precision marketing [10]. In building diversified marketing channels, we must pay attention to the role of big data, block chain, artificial intelligence and other new-generation technologies [11]. Promote the diversified development of agricultural product marketing entities, agricultural product wholesale markets, agricultural product trading methods, agricultural product logistics and agricultural product brand building through technological innovation, and at the same time promote structural reforms on the agricultural supply side, improve the quality and safety of agricultural products, and ensure agricultural product producers' and consumers' rights of the person.

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