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Vertical Coordination Development Mode and Influential Factors of Agricultural Products

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Abstract In China, the vertical coordination development mode of agricultural products can be divided into traditional market-oriented transaction mode with fluctuation according to market conditions, made-to-order on the basis of farmer organization, company leading cooperative mode, share or shareholding cooperative mode, and vertical integration mode. There are differences in coordination characteristics, advantages and disadvantages, and adaptability between different modes. Traditional vertical coordination mode is transforming and upgrading to close and high-efficient mode. In this process, it is influenced by factors such as cost-benefit balance between farmers and agricultural product processing enterprises, special use of agricultural product processing, structure of agricultural product industry chain, and action of local government.

Key words Vertical coordination, Agriculture, Development mode, Influential factors

American agricultural economists Mitchell and Jones defined the concept of vertical coordination in 1963. Vertical coordination includes all the ways that vertical stages of a marketing system are synchronized, such as market transaction, contract form, long-term strategic partnership, and vertical integration^[1,2]. Vertical coordination of agricultural products is a basic source and guarantee for agricultural product processing enterprises reducing transaction cost and improving market response ability, to obtain competitive edge of industrial chain, and also an essential approach for farmers solving the problem of difficult sales of agricultural products, stabilizing sales channel, and increasing family operational income. However, due to special feature of agricultural products in production organization and transportation radius, there are great differences in vertical coordination evolution between agricultural products and other industrial chain, and it takes on diversified development trend.

1 Analysis on diversification mode for vertical coordination development of agricultural products

Since the reform and opening-up, especially accession to the WTO, the competition of agricultural products and agriculture related industries becomes more and more intense, many vertical coordination modes spring up in agricultural product industrial chain, to raise market competitiveness and resist attack. According to development in recent years, we divided vertical coordination development mode of agricultural products into five modes: traditional market-oriented transaction mode with fluctuation according to market conditions, made-to-order on the basis of farmer organization, company leading cooperative mode, share or share-

holding cooperative mode, and vertical integration mode, as shown in Table 1. From market orientation to vertical integration, coordination of various modes is gradually strengthening. The traditional market-oriented transaction is the lowest in coordination degree, while vertical integration is a non-market arrangement and it coordinates agricultural product production and processing departments through organization and management of departments in enterprises, thus the vertical integration has the highest coordination degree.

1.1 Traditional market-oriented transaction with fluctuation according to market conditions

Traditional vertical coordination of agricultural products is actually market-oriented transaction with fluctuation according to market conditions. At agricultural product market, purchasing raw materials from farmers does not need signing any form of contract, and both parties are price acceptors and are free to conduct bargaining and spot transaction. Such traditional mode is primary form of vertical coordination development. Since farmers and enterprises determine transaction object and amount according to their willingness, to obtain maximum short-term market benefit, there is basically no organization and management cost in contract conflict and coordination. However, there are drawbacks. For example, low organization level of farmers brings high market transaction cost for vertical coordination. Besides, as suppliers of primary agricultural products, farmers have to independently bear natural risks and market risks brought about by price fluctuation. Accordingly, transaction uncertainty and income risk dampen enthusiasm of farmers for structural adjustment of agricultural products, construction of production bases is backward, and it brings serious raw material supply risk for downstream processing industries. In addition, without stable source of agricultural products, agricultural product processing enterprises have to pay huge amount of costs to search excellent agricultural products, and it is difficult to guarantee specification, quality, and safety of agricultural products purchased. Therefore, traditional market-oriented transaction has high uncer-

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tainty and transaction cost for farmers and enterprises, processing enterprises are weak in controlling industrial chain of agricultural products and their coordination relationship is extremely unstable. In practice, this mode is widespread in traditional field of agricultural products. These agricultural products can basically satisfy demands of downstream processing enterprises in special use, specification, and quality, and it is difficult to cope with increasingly intense competition of industrial chain of agricultural products. How to transform and upgrade this mode is a major problem at present.

Table 1 Types and characteristics of vertical coordination development of agricultural products

Mode type	Coordination characteristics	Applicability
Traditional market-oriented transaction with fluctuation according to market conditions	Complete market-oriented transaction	Widespread in traditional field of agricultural products
Made-to-order mode on the basis of farmer organization	Farmer organization and processing enterprises signing contracts and specifying coordination content and procedures	Agricultural product enterprises with excellent specialized production and cooperative development, and high strength
Company leading cooperative mode	Processing enterprises leading cooperatives, cooperative management	Agricultural products with strong special-sue of processing, low agricultural organization, and high enterprise strength
Share or shareholding cooperative mode	Farmers buying shares of processing enterprises, enterprise-style management	Faced with many institutional and legal obstacles
Vertical integration mode	Complete enterprise-style management	Agricultural products with high requirement of capital input and strong special-use

The made-to-order mode makes clear responsibilities and rights of enterprises and farmers through contracts, saving transaction costs in industrial chain of agricultural products, reducing transaction uncertainty, and improving coordination efficiency. Therefore, the enthusiasm of farmers for adjusting variety structure and developing processing raw materials gets protected, while enterprises also stabilize coordination relationship and strengthen control over industrial chain of agricultural products. For this, the Ministry of Agriculture fully affirmed and supported development of made-to-order agriculture through issuing *Opinions about Developing and Regulating Made-to-order Agriculture* (2002). Nevertheless, due to influence of special-use, uncertainty, and transaction frequency, incomplete contract, and limited action subjects, long-term transaction risk of vertical coordination is high; according to survey, the order fulfillment rate of "company + farmer" mode is not high, more than 80% orders are ultimately not fulfilled^[3]. Researches have shown that it is possible to take measures such as improving order terms, improving organization level of farmers, and creating favorable external environment, to increase order fulfillment rate^[4]. Among these methods, organizing decentralized farmers together through specialized cooperatives is widely accepted. In 2006, the People's Congress formulated special legislation to determine legal status of specialized farmers cooperatives. In the made-to-order mode on the basis of farmer organization, farmers join in cooperatives in the membership status, while cooperatives are responsible for combining enterprises and signing purchase and sales contracts and performing contracts. Compared with decentralized farmers, cooperatives are market entities with higher strength of negotiation and competition, and also bridges linking farmers and enterprises, so they greatly reduce

1.2 Made-to-order mode on the basis of farmer organization Made-to-order mode is also called contractual or made-to-order agriculture. It can be dated back to sugar refinery purchasing sugarcane from farmers in the period of Japan occupying Taiwan in 1885. The present made-to-order mode in China came into being along with the development of agricultural industrialization in the 1990s. It is a coordination mode with agricultural product processing enterprises and farmers signing legally valid supply and sales contract with long-term transaction price as core, so as to combine farmers and agricultural product processing enterprises.

transaction cost and fulfillment risk and increase efficiency of vertical coordination.

Made-to-order mode of vertical coordination has wide adaptability, but there are many problems urgent to be solved in practice. Firstly, enterprises follow the maximum profit principle in benefit allocation, do not assume duties of returning profit to farmers, but only provide minimum benefits to farmers, and excess profit of appreciation of agricultural product processing basically belongs to enterprises. This is highly unfair for farmers with strong dependence on the industrial chain. Secondly, farmer organizations have different functions with enterprises in rights and duties of contracts, but processing enterprises take up leading position in coordination, weak farmer organizations are still very weak in bargaining ability, and remain passive acceptance position in benefit allocation, thus it is difficult to guarantee rights and interests of farmers. Thirdly, there is lack of effective enforcement measures to make effective supervision for performance of farmer organizations and enterprises, and there is vulnerable contract restraint and difficult coordination in coordination relationship. Therefore, at present, this mode is mainly suitable for agricultural products with excellent development of specialized farmers cooperatives and high strength processing enterprises. In fact, the made-to-order mode transfers price fluctuation risk faced by farmers to agricultural product processing enterprises. If enterprise has little strength, the ability of diversification of price risk is limited, and enterprise will not provide price guarantee contract for farmers^[5].

1.3 Company leading cooperative mode According to the *Law of the People's of Republic of China on Specialized Farmers Cooperatives*, specialized farmers cooperatives can be led by citizens who have the capacity for civil conduct and enterprises, public in-

stitutions and organizations that are engaged in production and operation which are directly related to the business of a specialized farmers cooperative. Company leading cooperatives are founded by agricultural product processing enterprises, which become major contributor, actual controllers and makers of allocation rules through contributing total capitals or holding majority shares^[5]. Enterprises are leaders of cooperatives and also downstream organizations of agricultural product industrial chain. On the condition of jointly abiding by rules of cooperatives, enterprises and farmers conduct transaction inside, and set up win-win coordination mechanism at cooperative management platform, so as to restrict operation action of both parties and raise the level and efficiency of vertical coordination in agricultural product industrial chain. Especially, in the condition of buyer's market of agricultural products, company leading cooperatives is favorable for helping farmers integrate into domestic and foreign market, improving quality of agricultural products, extending industrial chain of agricultural products, and sharing income of appreciation. For example, Jinli Pig Industry Cooperative was jointly founded by Chongdu and Qionglai municipal government with capital of about 100000 yuan and Jinli Industry contributed about 400000 yuan. Annual expenditure more than one million yuan, including rental charges of office, wages for full-time workers, and training of cooperative members, is assumed by Jinlin Company^[6]. Different from the made-to-order mode, company leading cooperative mode restricts contractual parties through close cooperative rules, such as five unified and three separated requirements: unified variety, unified input, unified epidemic prevention, unified technological guidance, and unified purchasing at protective price; separate breeding, separate management, and separate accounting.

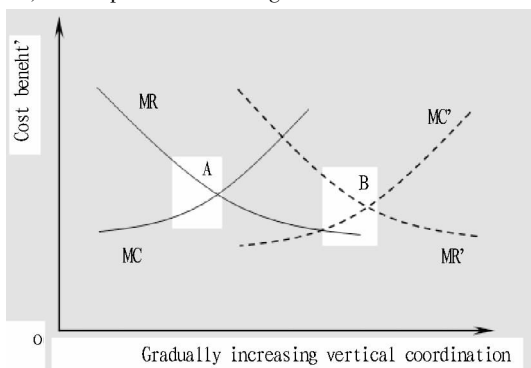


Fig. 1 Coordination cost-benefit of agricultural product processing enterprises

Such mode combines advantages of intensive operation of enterprises and separate management of farmers. It integrates agricultural production elements through management platform of cooperatives, restricts and regulates production action of farmers, to make agricultural products reach standard requirements of enterprises. Besides, it extends technology and management of enterprises to agricultural production process, increases production efficiency of farmers, and decomposes risks of farmers in fund input, technological service, and product sales. Nevertheless, the poten-

tial risk of company leading cooperative is also outstanding, which is mainly manifested in taking maximum benefit as objective and weak in safeguarding benefits of cooperative members^[7]. Legal person of enterprise easily controls the cooperative. As a weak group, farmers have no means of protecting their benefits, while enterprise can monopolize raw materials of local agricultural products through platform of cooperative, and grab state support and preferential policies to the maximum extent. Although some cooperatives return the profit to cooperative members, the proportion is relatively small, it is just like remedy, not the equal sharing of profit^[8]. This mode exists mainly in agricultural products with low organization level of farmers, strong special-use of agricultural product processing, and high strength enterprises.

1.4 Share or shareholding cooperative mode Farmers join in agricultural product processing enterprises through converting funds and labor, especially land contractual operation right, into price. Farmers and enterprises become subjects with unified benefits from interdependent benefit subjects. Through stock right and dividend, they form close agricultural product industrial chain and vertical coordination relationship, and become economic benefit community with risk and benefit sharing. Compared with the company-leading cooperative mode, farmers in this mode are shareholders of enterprises but not members of cooperatives, bear joint responsibilities for operation risk of enterprises, and are not free in withdrawing membership. Participant farmers are entitled to claim enterprise profit according to articles of association, share profit according to contribution instead of trading volume. Agricultural product processing enterprises have the right of unified operation and management for elements of farmers, implement enterprise style operation, not limited to production guidance and support for farmers through cooperative platform, thus the coordination degree is high, and it is an advanced form of vertical coordination mode in agricultural products. This mode conforms to the principle of unanimous consent of interested parties^[9], so it is favorable for realizing transformation of combination of different benefit subjects to benefit communities. However, in practice, farmers hold very few shares, and their power is little in making decisions of operation. What's worse, it is difficult to convert elements to price, farmers are not able to withdraw shares and have to transfer shares. In sum, there are many institutional and legal obstacles, as well as considerable social risk. In accordance with provisions of the Company Law of the People's Republic of China, shares can not be withdrawn but transferred. If company goes bankrupt, the debtor should pay off liabilities with existing assets in accordance with Enterprise Bankruptcy Law of the People's Republic of China. This means, as shareholders, farmers will lose their land contractual operation right^[10]. Therefore, this mode is not widely applied in practice and there is certain exploration in coastal regions.

1.5 Vertical integration mode Although government does not encourage enterprises to rent large area of farmland for a long term, the vertical integration mode is still applied in some facility agriculture or technical demonstration and extension projects. In

this mode, agricultural product processing enterprises buy out farmland of farmers and management right of affiliated production means, include operation and management of production, processing, and sales of agricultural products completely into enterprise style operation, so as to form vertical integration agricultural product industrial chain structure. The vertical integration completely breaks way from commodity buying and selling between enterprises and farmers. Enterprises take agricultural production as the first production workshop and implement integrated management and standardized operation of agricultural production and processing, some farmers become employees of enterprises. This greatly reduces external transaction costs such as raw material searching, benefit negotiating, contract signing and supervision, well solves the problems of unstable vertical coordination, increases quality and safety coefficient of agricultural products and market competitiveness, and reduces income risk of farmers. However, it is undeniable that there is also the drawback of too high supervision cost in this mode. High supervision cost leads to high internal organization and management cost. As a result, this mode is only suitable for agricultural products with high requirement of capital input and production standardization, and strong special use.

2 Factors influencing transformation and upgrade of vertical integration of agricultural products

Transformation of traditional market-oriented transaction to closer and high efficient vertical coordination and forming vertical coordination relationship with risk and benefit sharing will be favorable for improving performance of processing enterprises, increasing farmers' income, and raising overall competitiveness of industrial chain of agricultural products. However, in practice, there are still some obstacles limiting transformation and upgrade of vertical integration.

2.1 Balance of coordination cost-benefit between farmers and enterprises Agricultural product processing enterprises can obtain lower transaction costs, reduce raw material supply risk, and increase their net income (marginal return of coordination in Fig. 1) through selecting closer and higher degree of coordination. But this motivation analysis neglects cost for coordination and management. In practice, with selection of closer coordination mode and strengthening of coordination degree, the mechanism of fluctuation according to market conditions will be gradually replaced by enterprise in-house management. At the same time of obtaining coordination leading right, control right and coordination income, enterprises should also assume corresponding tasks of organization and management, so the organization and management cost (marginal cost in Fig. 1) will increase accordingly. In dual action of incentive action of drop of transaction cost and raw material supply risk and rise of organization and management cost, enterprises have difficult choice. In point A when $MR = MC$, they obtain the balance and select the corresponding vertical coordination mode. When enterprises seek closer coordination relationship in the action of external competition pressure, it is required to ob-

serve changes of MR and MC. If both move to MR' and MC' separately, the corresponding coordination mode of point B will be optimum, and it realizes transformation and upgrade. Movement of coordination cost and income curve is influenced by development degree of agricultural product market, and also depends on comprehensive factors such as enterprise strategies, strength development stage, industrial chain management means and technologies.

Willingness of farmers participating in vertical coordination of agricultural products is influenced by income of vertical coordination. However, in the power structure of coordination relationship, agricultural product processing enterprises have higher market strength and organization advantage, and also have greater control power for development and mode selection of coordination relationship compared with farmers, while farmers remain subordinate position. Therefore, the coordination cost-benefit balance of agricultural product processing enterprises plays the leading role in selection and development of vertical coordination mode.

2.2 Special use of agricultural product processing In the opinion of transaction cost economists like Klein, the lower the appropriate quasi rents, the higher the possibility of dealers depending on contractual relationship; otherwise, the higher the possibility of integration of joint or common ownership, the higher the appropriate quasi rents^[11]. If agricultural products are mainly special for processing, farmers will certainly take sharing benefit as condition; otherwise, the coordination demand of farmers and enterprises will be lower, and coordination relationship will become looser. Therefore, for staple agricultural products, the possibility will be lower for establishing the closer vertical coordination relationship between farmers and enterprises; for characteristic agricultural products with higher special use, the appropriate quasi rent will be higher; as leading party of coordination relationship, agricultural product processing enterprises must establish close coordination relationship to guide farmers to adjust agricultural production structure and strengthen quality control, so as to satisfy demand of enterprise development.

2.3 Industrial chain structure of agricultural products Different from SCP analysis of Chicago School, industrial chain structure of agricultural products at least involve production and processing of agricultural products and appreciation link. In quantity, specification, quality standard, safety, and even in supply time, there exists technical economic connection between farmers and enterprises, and also the relationship between product input and output, transaction connection, and benefit negotiation. The development of every department follows the "structure - action - performance" relationship laws and also is subject to influence of the industrial chain structure. According to theory of agricultural location, due to transportation cost and perishable feature of agricultural products, raw material source of agricultural product processing enterprise has small radius, the number of enterprises is limited in a region. As a result, downstream raw material purchasing of agricultural product industrial chain often lacks competition. On the contrary, farmers have small operation scale and very

low organizational degree, and are anxious to sell agricultural products in harvesting season, so the market competition will be more intense. In this situation, under the seriously asymmetry industrial chain structure, agricultural product processing enterprises have higher market advantage, enjoy certain agricultural product pricing power, and so as to exert major influence on mode selection and development process of agricultural product industrial chain.

2.4 Actions of local government Local government generally conducts activities for inviting outside investment in agricultural product processing projects and adjusts agricultural production structure. This promotes development of agricultural production and processing industry, but agricultural structural adjustment led by government often brings risk of greater supply-demand conflict of agricultural products due to inadequate market estimation. In particular, agricultural product processing enterprises urge farmers to expand agricultural product production scale and output for the purpose of maximizing their benefits, so as to reduce raw material purchasing price and production cost. Due to feature of increasing yield but not increasing income, inappropriate actions of local government will inflict damage on farmers' benefits, and finally reduce overall performance of vertical coordination and restrict development of vertical coordination.

3 Conclusions

There are traditional market-oriented transaction mode with fluctuation according to market conditions, made-to-order on the basis of farmer organization, company leading cooperative mode, share or shareholding cooperative mode, and vertical integration mode in the vertical coordination development mode of agricultural products in China. There are differences in coordination characteristics, advantages and disadvantages, and adaptability between different modes. Traditional vertical coordination mode is transforming and upgrading to close and high-efficient mode. In this process, it is influenced by factors such as cost-benefit balance between farmers and agricultural product processing enterprises, special use of agricultural product processing, structure of agricultural product in-

dustrial chain, and action of local government. Factors influencing transformation and upgrade of vertical integration of agricultural products include balance of coordination cost-benefit between farmers and enterprises, special use of agricultural product processing, industrial chain structure of agricultural products, and actions of local government. In view of these factors, it is recommended to take pertinent measures to realize healthy development of vertical coordination in field of agricultural products.

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