

A SURVEY STUDY IN VERTICAL COOPERATION OF CHINESE FRUIT SUPPLY CHAIN

Jun Chen

SILC, Shanghai University, P.R.China

Chao Chen

School of Economics & Management, Tongji University, P.R.China

Dilin Yao

School of Economics & Management, Shanghai Maritime University, P.R.China

Abstract

Facing fierce global competition, Chinese fruit industry has to transfer its growth pattern from simple quantity expansion to quality upgrading. Vertical cooperation is one of the most helpful methods through this process. In this occasion, this paper aims to analyze the situation of vertical cooperation in the China's fruit production marketing chain under the condition of competition. With a survey study, this paper presents the willing, obstacle and effort of Chinese fruit business to form the vertical cooperation in the supply chain, and the impact of the influential factors on the result of vertical cooperation.

Keywords: Vertical cooperation; fruit industry; supply chain

JEL code: M110

1. Introduction

Fruit industry yields substantial progress with largest export volume (3446 Thousand Tons) and orchard area (21.2% of the world) in 2013 in China. However, the development of fruit industry in China is mainly expansion of amount with limited promotion of appearance and quality of the product. The future challenges of China's fruit industry mainly lie in the increasing demands of food safety, international competition and technical standards. Facing these challenges, the moderate extension of vertical cooperation can assist fruit industry to grab the competition opportunities with the integration of the large number of smaller farmers. This paper starts with the literature in vertical cooperation, the transaction cost theory, competitive advantage, the supply chain and competitive performance. Then, introducing supply chain management in Chinese Canned Fruits Industry. Finally, conducting a survey study to analyze the situation of vertical cooperation in Chinese fruit industry, and then concluding with recommendations.

2. Literature review

The researches about vertical cooperation can be traced back as early as 1950s, but it is firstly defined by Mighell and Jones (1963) as all the contact information coordinating all stages from production to marketing of certain products. Frank and Henderson (1992) believes that vertical cooperation refers to the connecting methods which coordinate all of the stages from production to sales, among which vertical cooperation integration is one extreme method. In the relationship of vertical cooperation, the factors controlled and united include price, quantity, quality, time and conditions of the transaction. Figure 1 shows the forms and their control force of vertical cooperation. Among which, market exchange and vertical cooperation integration stands as two extreme methods. This research takes sales contract, cooperative and production contract from various forms of vertical cooperation. Many theories can be used as the theoretical foundations of vertical cooperation, and this research presents the transaction cost theory, competitive advantage, the supply chain and competitive performance as follows.

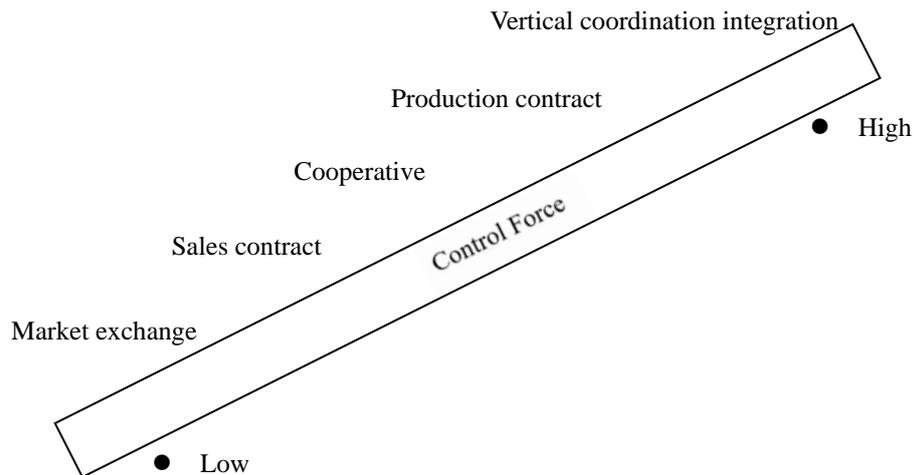


Figure 1. The forms and control force of Vertical cooperation

2.1. Transaction Cost Economics (TCE)

Transaction cost theory is firstly posed by Coase in 1937, which defines “Transaction Cost” as the costs during the process of transaction. Coase (1960) further figured out that the causes of transaction cost is the transfer of ownership, which can be divided into pricing cost, negotiations and signing of the contract cost, and supervision and inspection of contract implementation cost and so on. Williamson (1985) divided transaction cost into information cost, negotiation cost and implementation cost. In order to reduce transaction costs, closer forms of vertical cooperation can be employed in the supply chain. The exchanges with lower uncertainty levels is suitable

for market mechanism, but market mechanism lead to higher information and supervision costs with increasing uncertainty, yielding closer vertical cooperation. Asset specificity has also resulted in the presence of closer vertical cooperation. Furthermore, when the specific assets are invested by one side, it is easier to form vertical cooperation integration. And the performance of the vertical cooperation is cooperative or production contract under the mutual investment. On the other hand, transaction parties will value long term relationships under high frequency trading. When the number of transactions is reduced, transaction parties tend to establish more formal relationship in order to save transaction costs. However, if asset specificity is very high quality, even in regular trading, is more suitable for the vertical integration within the enterprise. Visible, governance mechanisms are decided by the dimensions of the transaction (Dutton, 1997)

2.2. Competitive Advantage

Competitive Advantage is firstly posed by Porter (1990). The success of dominating market lies in the triangular linkage of the company, its customers and its competitors. The source of competitive advantage, firstly, lies in the ability of the organization to differentiate itself, in the eyes of the customer, from its competition; secondly, by operating at a lower cost than its competitors so that the company is able to achieve more profit and lag behind the competitors. During the survey study, the authors mention that the selling prices of canned fruits are equal to that of its competitor's cost. As a result, such companies would have competitive advantages in the hard business environment.

To seek for and maintain a sustainable and defensive competitive core competence has become the challenge to every firm, for the fruit industry, a cost leadership strategy is concerned with how to achieve the lowest cost production or how to get your suppliers to provide product with the greatest perceived differentiated values. Furthermore, the core capability also presents the features of difficult-to-imitate capabilities that distinguishes a company from its competitors in the eyes of customers and build up the solid for further competition (Asanuma, 1992).

It is very common that customer is to buy benefits instead of products. That accounts for the reason why the consumers pay for more of the canned fruits than the fresh fruits. These benefits may be intangible. Additional service will attract the eye of the consumers than the cheaper canned fruits. Therefore, the importance of seeking to add added values will distinguish an offering from that of the competition. More marketing segmentation will call for more strategies developed from added values. Different clusters of customer within the markets pay different attention to different benefits, either in function or in appearance. There are many potential opportunities for the fruits canneries to create differentiated appeals for specific consumer segmentation (McMillan, 1990).

Service is also a powerful means of adding value. Canned fruits supply chains meet the particular challenge from the service-oriented markets. At present, most China fruits canneries deal with OEM business. It is better for canned fruits enterprises to achieve competitive advantage by using the scenario of brand and OEM combination. In practice, the authors find that the successful canned fruits companies will try to improve the productivity as well as production amount. Therefore, cost leadership and service differentiation are the major strategies. New technology will definitely provide opportunity for cost reduction; however, the same technology is also available to competitors under such circumstances. There is a scarcity of literature about China cannery industry innovative business model. The author uses the development of plastic containers fruits to test the captioned assumption.

Cost leadership strategies have traditionally been gained through sales volume (Porter, 1985). However, the volume to be gained early in the market life cycle will plan the trigger to cost leadership. This cost advantage can be used to dispel the high cost competitors from the competition. Customers in the fruits industries are looking forward to quicker response and greater reliability from suppliers; they are looking for shorter leading times, just-in-time delivery and value-added services, therefore canned fruits market has become more service-oriented. The creative business model of cannery should be designed by taking suppliers' suppliers and customers' customers into consideration. This is the application of the conception of value chain (Williamson, 1985).

2.3. The supply chain and competitive performance

The researches about supply chain welcome its prosperity after late 1980S. Beamon (1999) defined that supply chain is an integrated manufacturing process as the network of organizations involving upstream and downstream linkages in the different processes and activities to produce value in the form of products and services in the hands of the ultimate consumers. Supply chain management does not equal to vertical integration. Vertical integration implies ownership of upstream suppliers and downstream customers. This has brought about the strategic reform to canned fruits industry, i.e. to focus on the core business and outsource everything else through procurement from outside the firm (Antle, 1996).

Within the passive supply chain management, relationships with suppliers, upstream suppliers and downstream customers are negative rather than positive. Some of fruits canneries will seek to achieve cost reductions at the expenses of their supply chain partners, like the upstream vendors, farmers and logistics service providers. Most China fruits canneries do not realize that simply transferring cost upstream or down streams do not generate any relational rents. The core competitiveness can only be generated from the competitive supply chain and value chain optimization and the added value from overall level. They have realized that the real competition is not company against company but rather supply chain against supply chain.

In fact, a supply chain is not equal to the logistics. Logistics is essentially a planning orientation and framework that seeks to create a single plan for the flow of product and information through business. A supply chain management builds on the framework and seeks to achieve linkage and co-ordination between process of other entities in the pipeline, i.e. suppliers and customers, and the organization itself. Therefore, the major goal of supply chain management is to reduce the inventory in a chain through information sharing and good planning. This can be applied to Vendor Managed Inventory (VMI). VMI, especially payment to vendors after collection from customers is the typical example of SCOR model and the authors mention this kind of operation in the survey study of the canneries' production.

Supplier relationship segmentation includes arm-length, stable and strategic alliance. Porter (2005) introduces the concept of coalitions in "Competitive Advantage". A firm can pursue the benefits by entering into coalitions, such as technology licenses and franchise, long term alliance and agreements, strategic alliance and joint ventures. As strategy scholars have searched for sources of competitive advantage, two prominent views have emerged regarding the sources of supernormal returns. The first (the industry structure view) associated with Porter (1980), suggests that supernormal returns are primarily a functional of a firm's membership in an industry, such as relative bargaining power, barriers to entry, etc. The second view (the resource based view of the firm) argues that differential firm performance is fundamental due to firm differentiation rather than industry structure (Barney,1991). However, a firm's critical resources may extend beyond firm boundaries. Research of canned fruits industry in China indicate that productivity gains in the value chain are possible when trading partners are willing to make relation-specific investment and combine resources in the unique ways. In this case, any fruits canneries who can combine resources in unique ways may realize an advantage over competitors who are unwilling to do so. It is important for fruits canneries to set up vertical integration as well as horizontal alliance.

Arm's-length supplier relationships differ from supplier partnerships. Data from a sample of arm's-length supplier relationships (as selected by China canned fruits manufacture) are collected in the survey study for further illustration.

3. Supply Chain Management in Chinese Canned Fruits Industry

China has been the fastest-growing economic entity in Asia. According to the prediction of economists, by 2040, China will be the world's biggest economy at market exchange rates. Furthermore, the political regime is stable in the past twenty years since China shifted from planning economy to marketing economy. With the policy of economic reform and opening to the outside world, China has acquired more benefits from the globalization and open to the outside world with rest of the world facilitate the progress of globalization.

The Chinese fruit industry has undergone dramatic changes since China's reform and opening to the outside world. Chinese fruit production and distribution channels have been improved considerably. The newly emerged cold chain transportation system in China can ensure the fresh fruits or canned fruits with fresh flavor to arrive at the consumer in a timely fashion.

China's fruit trade has been increased tremendously in recent years either from domestic or from overseas. Therefore, with the development of trade, China has become the manufacture center for canned fruits with the transfer of appropriate technology. US view China as the big fruits production facility as well as the big market. However, most American companies prefer to set up the manufactures in China to cover the local market instead of direct exportation. Zero import duty for Taiwan Region and Thailand tropical fresh fruits has given more priorities to the entry level of tropical fruits to China continent market and also offers opportunity for the China canneries. It is impossible to set up more entry level for the cargo flow, more entry level, less bargain power. The excellent quality of imported fruit gives the overseas fruit industry a competitive edge in the entry of Chinese markets after China's entry of WTO.

China's fruit industry still has a long way to go in order to become the 1st tier of world major fruits supplier due to the limited cold storage facilities, the obsolete post-harvest technology, and poor cold chain transportation systems in major fruit processing areas. In order to keep with the competitors, China canneries need invest more in the above-mentioned facilities as well as the technology to achieve the synergy of total value chain. Under such circumstance, how to identify the potential driving factors for the core competency improvement? After semi-structured in-depth interviewing, the authors have to admit that China's fruit industry could be competitive in the future due to the diversified climate suitable for plantation and production of citrus, de-citrus and tropical fruits, cheap labor cost, and the booming fruits processing technology transfer & innovation. With the establishments of the cannery association and strategic alliances, the Chinese fruit industry has spent a lot of efforts to improve its fruit varieties, genetically modified breeding programs, organic plantation and technology transfer from foreign countries. We are confident that the quality of the preserved fruit in China should be improved dramatically in the future with the implementation and the strengthening of TQM (Total Quality Management) and GMP (General Manufacture Practice). This would give the Chinese fruit industry an additional competitiveness in the world market. Meanwhile, it is also the challenge to China TPL (Third Party Logistics) companies. TPL should treat this as the opportunity to improve logistics service as well. This can be illustrated through the case study of Company. In order to eliminate the gap between Chinese canneries and overseas canneries, the introduction of more advanced technology and leasing more up to date machinery to improve the automation level and setting up more Joint Ventures with world famous brand, are the effective means to improve the core competency of China canneries.

China is the world's major fruit-producing country besides Spain, Greece, USA and Brazil. China has the same fruits varieties like Mandarin oranges in Spain, Yellow peach in Greece and USA, pineapple and mango in South East Asia. However, China lacks the tropical fruits as grown in South America and South-Eastern Asia. The total fruit output in 1994 in China is 35 million metric tons. Many varieties of fruits can be produced in China because of China's diversified climate and superior geographic position. Citrus and de-citrus fruits grown in the northern and southern part of China. With the development of the orchard and introduction of more varieties of fruits in China, canned fruits production is increasing as fast as resource allow. Peasants have been planting fruits as the by-products industry. However, this may also cause the dramatic fluctuation of the fresh fruits cost. As a result, there is a new concept, which is the concept of Fruits Big Year and Fruits Small Year. The marketing price index has provided the guidance for farmers in selecting the most profitable fruit varieties to plant and produce. The gathering of the fresh fruits as the raw materials has become very difficult. For this reason, more and more Chinese fruit producers are increasingly spending their efforts to import the superior varieties of fruits from overseas to develop their orchards. Meanwhile because of the growing space of the orchard, the purchase cost of the fresh raw materials fluctuates each and every year. China farmers have also tried to select and develop new fruits varieties which have early or late maturity to extend the market season or by using the big plastic house plantation. The adoption of organic pesticides control seedlings and plantation for new orchards have become the new subjects and focus. However, the complicated procedure of importing fruits seedlings has turned out to be the bottleneck due to the strict control of seeds importation. There are too many regulations and procedures about the fruits seedlings importations from CIQ. Meanwhile, the stricter regulation about the pesticides and foodstuff safety control about the foods and fruits importation from overseas countries have been taken effect. These new-business restrains will offset the competitiveness of China fruits manufactures. However, good GMP application is a painstaking campaign for China canneries. China fruits canneries have to reach the balance of quality and price competitiveness. The entry level of fruits seeds is very high in China at present, however this cannot protect the high margin of the fruits, but offset the core competency of the fruits in China.

4. The analysis of vertical cooperation of Chinese fruit industry

The previous studies show that the shape of closer vertical cooperation helps the fruit business in the aspects of controlling transaction cost, improving competitive advantage and so on. In order to have the further understanding about the willing, obstacles and efforts of fruit business to take part in vertical cooperation, this research sends 110 questionnaires to the fruit business among five Chinese provinces, including Guangdong, Fujian, Guangxi, Henan and Heilongjiang. Among which, effective questionnaires are 106. The questionnaire-reclaiming efficiency is 96.36%. To have a full view about the vertical cooperation development of fruit industry, this research sends the questionnaires among 106 respondents. These interviewees are

guaranteed to be the boss of general manager of the fruit business because the decision maker's personal background may also have some impact on the willing, obstacles and efforts of joining the vertical cooperation. The influential factors are divided into personal background (gender, age and education) and business information (size, ownership and operating condition).

From the gender structure's point of view, there are 40 males and 66 females among 106 respondents which account 37.7% and 62.3%. From the perspective of respondents' age structure, four groups of interviewees (20-29, 30-39, 40-49, above 50) account 16%, 68%, 11%, and 11%. This reflects that the majority of management in China's fruit industry is relatively young. That may be because Chinese fruit industry has a shorter development period compared with the developed countries. From the perspective of educational level of respondents, middle school or below, high school, bachelor degree, master degree and above account 7%, 48%, 40% and 11%. This shows that the decision makers in Chinese fruit business have higher education nowadays.

For the business background information items, in the aspects of size, four groups of business (1 Million (RMB) or below, 1 Million to 3 Million, 3 Million to 10 Million, 10 Million and above) account 56%, 22%, 16%, and 12%. In the aspect of ownership, State-owned, collective ownership, private, joint venture, and foreign capital accounted 8%, 43%, 57%, 6% and 0%. This result shows the special circumstances of Chinese fruit industry. The collective ownership takes large percentage in the rural areas and foreign capital still has not come into the market for large scale. For operating condition, 96 enterprises choose "profit", while the others show the "loss". Besides the personal information and business background, the following table 1 shows the forms of vertical cooperation of the interviewed enterprises.

Table 1. The forms of vertical cooperation

	Items	Number	Percentage (%)
The forms of vertical cooperation	Market exchange	39	36.79
	Sale contract	26	24.53
	Cooperative	21	19.81
	Production contract	17	16.04
	Vertical cooperation integration	2	1.87
	Total	106	100

For the willing, obstacle, and effort items, 94 enterprises show that they are willing to form closer vertical cooperation with other business in the fruit production marketing chain. This shows that most of the Chinese fruit business is willing to form closer vertical cooperation. For the Obstacles of the building of vertical cooperation, 38

visitors choose “lack of trust”, 35 visitors choose “limitation of law”, 45 of them show “lack of information”, 32 of them choose “limitation of finance”, and 58 interviewees choose the item of “others”. For the effort part, 85 interviewees believe that the vertical cooperation has its positive efforts, 11 interviewees believe that it has negative efforts, and 10 interviewees choose “unknown” item. The table 2 below shows the impact of the influential factors on the result of vertical cooperation.

Table 2. Result of homogeneity test of variance

	Variable		Willing	Obstacle	Effort
Personal background	Gender	Levene-statistics	0.81	5.21	0.259
		Significance level	0.370	0.250	0.612
	Age	Levene-statistics	3.036	1.114	1.13
		Significance level	0.333	0.348	0.341
	Education	Levene-statistics	0.69	2.382	0.663
		Significance level	0.560	0.074	0.577
Business information	Size	Levene-statistics	0.553	0.588	2.224
		Significance level	0.648	0.624	0.088
	Ownership	Levene-statistics	0.381	0.318	3.758
		Significance level	0.684	0.728	0.227
	operating condition	Levene-statistics	0.233	4.16	3.286
		Significance level	0.873	0.348	0.341

The above table 2 shows the different impacts of the influential factors on the result of vertical cooperation. The interviewees of some personal background and business information have weak willing to take part in the vertical cooperation. The related government bodies should make proper policies to encourage the shape of closer the vertical cooperation in these areas.

5. Conclusion and recommendations

From the above all, this research has analyzed the situation of vertical cooperation in the China’s fruit production supply chain under the condition of competition. This research has the following conclusions:

- This paper analyzes the personal background and business information of the fruit business and shows the current situation in China’s fruit industry.
- This paper shows the willing, obstacles and efforts of Chinese fruit business of the building of the vertical cooperation in the supply chain. Such synergies have extended the border of Chinese fruits manufactures to their global suppliers as well as to their global customers by means of Balance Score Card management.
- This research shows the impact of the influential factors on the result of vertical cooperation.

The Innovative lie in that such theoretical and practical research for the vertical cooperation in the fruit production and supply chain have firstly conducted in China. The limitation of this research is the research scope and questionnaire number is not big enough to shows the whole situation of Chinese fruit industry due to the limitation of finance and time, but it can be expanded by the following researchers to conduct the future analysis. Furthermore, the authors will continue the research of canned fruits products development through technology innovation and the Ecommerce distribution channel for the new era of retail industry.

References

Antle, J. M. (1996) “Efficient Food Safety Regulation in the Food Manufacturing Sector”, *American Journal of Agricultural Economics*, vol. 78, no. 5, pp. 1242-1247.

Asanuma, B. (1992) “Manufacturer-Supplier Relationships and the Concept of Relation-Specific Skill”, *Journal of the Japanese and International Economies*, vol.3, no.1, pp. 1-30.

Barney, J. (1991) “Firm Resources and Sustained Competitive Advantage”, *Journal of Management*, vol. 17, no,1, pp. 99-120.

Beamon, B. M. (1999) “Measuring Supply Chain Performance”, *International Journal of Operations and Production Management*, vol. 19, no. 3, pp. 275-292.

Coase, R. H. (1937) “The nature of the firm”, *Economica*, vol. 4, no. 16, pp. 386-405.

Coase, R. H. (1960) “The Problem of Social Cost”, *Journal of Law and Economics*, vol. 3, no. October, pp. 1-44.

Dutton, G. (1997) “What Business Are We In? The era of the conglomerate is over. Companies are shedding acquisitions that don't revolve around their core competencies”, *Management Review*, vol. 86, no. 8, pp. 54-58.

Frank, S. D. & Henderson, D. R. (1992) “Transaction Costs as Determinants of Vertical Coordination in the U.S. Food Industries”, *American Journal of Agricultural Economics*, vol. 74, no. 4, pp. 941-950.

McMillan, J. (1990) “Managing Suppliers: Incentive Systems in Japanese and U.S. Industry”, *California Management Review*, vol. 32, no. 4, pp. 38-55.

Mighell, R. L. & Jones, L. A. (1963) “Vertical Coordination in Agriculture”, U.S. Department of Agriculture, Economic Research Service, Agricultural Economic Report No.19.

Porter, M. E. (1980) *Competitive Strategy*, New York: Free Press.

Porter, M. E. (1990) *The Competitive Advantage of Nations*, New York: Free Press.

Porter, M. E. (2005) *Competitive Strategy Techniques for Analyzing Industries and Competitors*, Beijing: Huaxia Press.

Williamson, O. E. (1985) *The Economic Institutions of Capitalism*, New York: Free Press.