Research on Supply Chain Forward Integration Strategy of Pixian Douban Based on Supply Chain Collaboration Theory

Juan Chen[a], Xingwang Wang[*]

Sichuan University of Science and Technology, Chengdu, 611745, China

[a]124537977@qq.com, *504629529@qq.com

Abstract. With the update of information technology, supply chain integration in the field of food processing industry has achieved certain results from the model, optimization strategy and implementation path from the theoretical to practical use. This paper utilizes the questionnaire research method, statistically analyzes the contradiction between raw material supply and procurement, the poor cooperation among chain members, the difficulty of sharing and complementing resources, and the insufficiency of information sharing in the forward supply chain of the Pixian Douban industry. Based on the theory of supply chain collaboration, a forward integration model is designed, and the integration model is applied to the four dimensions of supply and procurement planning collaboration, supply and procurement process integration, supply and procurement information integration, supply and procurement logistics integration, etc. It is hoped that through the study of Pixian Douban industry's supply chain forward integration strategy, the practice and application of supply chain integration theory in the food processing industry will be expanded.

Keywords: Supply chain forward integration, Supply and purchase, Supply chain collaboration.

1 Introduction

Accompanied by the continuous progress of information technology and the deepening of global economic integration, modern enterprises operate in an increasingly complex environment, and the competition between enterprises has gradually evolved from the traditional competition to the competition between supply chains, and the efficiency of supply chain operations plays a crucial role in enhancing the key competitiveness. Unknown factors included in the forward supply chain centered on food processing companies such as: geographical and environmental factors, forward supply chain, etc., can lead to unstable supply and demand, cost and quality of downstream products. Therefore, as a food company, the integration of its forward supply chain stability, efficiency, and timely response rate has become the focus of research and management.

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2 Theoretical Basis and Research Status

On the basis of supply chain integration theory, based on the perspective of upstream and downstream division of the supply chain, and combined with the "core enterprise-centered" in the supply chain theory, starting from the two important links of enterprise procurement and sales, In this paper, relevant elements involving activities and links such as production planning, raw material supply, raw material procurement, and raw material supply logistics are defined as forward supply chains, and activities and links involving distribution, retailing, and sales logistics as well as relevant elements are defined as backward supply chains.

(1) Supply Chain Collaboration, SCC.

Supply chain collaboration, as a management concept, is committed to improving the overall operational efficiency of the supply chain. It emphasizes the common collaboration among the cooperative members of each node and abandons the traditional isolated management mode among enterprises. Supply chain collaborative management emphasizes the spirit of cooperation and synergy mechanism among the participating members to maximize the overall interests of the supply chain by optimizing information flow, process synergy and risk management. The theory of supply chain synergy is also the core theoretical foundation of this paper on the case study of Pixian Douban industry. This paper investigates and analyzes the status quo and problems of Pixian Douban industry, and combines the theory of supply chain synergy with the problems and causes, and designs the forward supply chain integration model from the four dimensions of supply and purchasing plan synergy, supply and purchasing process, supply and purchasing information, and supply and purchasing logistics, as shown in Figure 1.

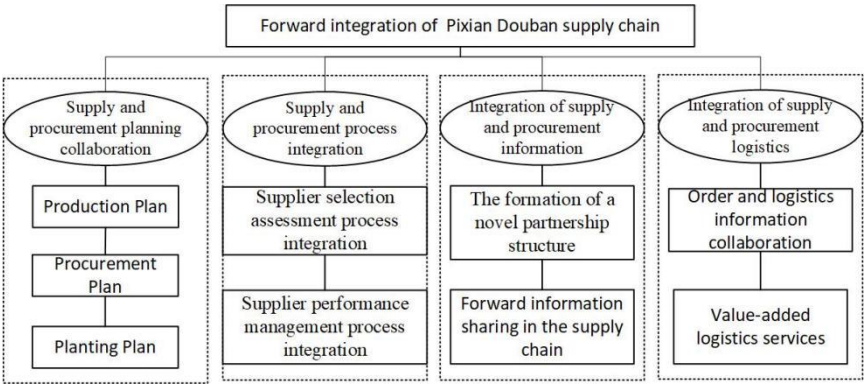

Fig. 1. Forward Integration Model of Supply Chain in Pixian Douban industry.

(2) Research status of forward integration in supply chain.

Scholars have conducted relevant studies on supply chain integration in the supply chain integration dimension perspective, supply chain internal and external integration perspectives, respectively. In the field of supply chain forward integration dimension perspective, Wiengarten (2014) considered supply chain external integration as a process of supply chain process management in which the supplier and the customer work

together to manage the control [1]. Wu (2015) gives different coordination and integration strategies based on different rights structures of distributor dominance, TPL dominance and vertical Nash game[2]. Zhang Suqin (2016) constructed a new model of agricultural supply chain with cloud service as the link and service integration body as the core from the perspective of "four streams of agricultural supply chain" [3].Kumarl (2017) through an empirical study of the UK food industry, suggested that supply chain integration can achieve a positive impact of overall improvement in supply chain performance [4].In the research on the effectiveness of supply chain forward integration strategy, Li Ting (2018) proposed a hierarchical management of raw materials for raw material procurement in forward supply chain [5]. Stranieri (2019) and others in the field of food supply chains have demonstrated that it is possible to make CSR a strategic tool to improve supply chain partnerships by strengthening vertical coordination and conducting integrated environmental policies at the same time [6]. Yu Kangkang (2020) demonstrated the role of vertically integrated integration strategy of agricultural supply chain on quality certification by researching and analyzing 116 domestic agricultural and food enterprises [7]. Ramirez (2021) proposed a vertical integration strategy for production, distribution, information, and logistics in the supply chain of a food company from the perspective of the relationship between integration and performance improvement in the agricultural supply chain [8]. Zhao Xiaofei (2022) used an omni-channel model strategy to integrate organizational processes, information flows, and resources to achieve optimization of internal and external supply chain processes, behaviors, and resources based on the sharing and collaboration of the first three elements [9].

Comprehensive literature research analysis, scholars from the supply chain forward integration and other areas have recognized the practical value of supply chain integration, in the manufacturing industry, distribution industry and other areas based on the perspective of supply chain resource integration research, has achieved a large number of valuable research results. However, there are still the following shortcomings: although the integration of raw material suppliers is involved in the field of supply chain integration, and the necessity and effect of supplier integration is also argued from the perspective of external integration and multidimensional integration, the relevant research on forward integration in the supply chain of food production enterprises is relatively weak.

3 Analysis of the Current Situation and Problems

Pixian Douban is one of China's large-scale seasoning industry, is the key seasoning in Sichuan cuisine, the main raw materials are fresh red chili peppers, broad bean cloves, wheat flour, auxiliary seasonings and so on.

3.1 Supplier Types and Distribution

Pixian Douban products of the supply chain forward mainly to the production and processing links before the production of red pepper, broad beans and other raw materials

production, procurement and supply links as the object of study.The main types of suppliers are: farmers, agricultural cooperatives, and production sites.

Farmers. Farmers have the characteristics of decentralized production, small production scale, low production technology level, weak product quality assurance ability, and weak bargaining power.

(2) Agricultural cooperatives. Agricultural cooperatives are economic cooperative organizations formed on the basis of agricultural production by individual farmers. In the forward supply chain of Pixian Douban, agricultural cooperatives play a key role as a bridge, the actual implementation of the raw material transactions, the information flow road for communication, management and coordination between the company and farmers, as well as the capital flow road for raw material transactions.

(3) Planting bases. Planting base refers to a place with specific types of agricultural products and production methods, which is an advanced mode of production integration of agricultural products. Pixian Douban's main raw material planting base has two forms: self-built base, co-built base.Self-built base is through the land transfer and lease of their own investment in the establishment of directly under the pepper planting farms, self-built base of the degree of organization, scale are relatively high, the company carries out specialized planting technology guidance and vertical production management.Co-built bases, mainly through agricultural cooperatives or village collective farms and other subjects for escrow or co-management mode of operation.

3.2 Analysis of the Problems and Causes of Raw Material Procurement and Supply Management of Pixian Douban

3.2.1 Questionnaire Survey.

(1) Questionnaire design and distribution. In order to make an objective and in-depth analysis of the problems existing in the procurement and supply management of the Pixian Douban industry, this paper adopts the questionnaire method to carry out the status quo investigation. The questionnaire uses a Likert scale to measure the questions, mainly divided into four dimensions: raw material supply, raw material procurement, logistics and supply chain forward synergy, and the corresponding answer to each question contains "1 = not at all, 2 = not in line, 3 = in line with the comparison, 4 = in line with". Preliminary screening of the questionnaire distribution target, respectively, in the company's top management, procurement department, production department, finance department, information department, marketing department, sales department and other small-scale questionnaire distribution. The research samples were mainly internal employees of the Pixian Douban industry, who need to have relevant assessment skills such as judgment, judging and decision-making, etc. A total of 450 questionnaires were sent out and distributed through both online and offline channels, and finally 420 questionnaires were successfully received.

(2) Questionnaire sample description. The questionnaire survey is mainly in the Pixian Douban industry, participating in the questionnaire to fill out a total of 450 people, retrieved 420 copies. Among them, there were 21 questionnaires due to the presence of too many blank question items and answers showing obvious arbitrariness, such as all choosing the same option answer, these questionnaires were eliminated in the

preliminary collation, and the final valid questionnaires were 399. The return rate of the questionnaires was 93.33%, and the validity rate was 86.67%. In the valid questionnaires, the research sample data in terms of education level, position level, job content relevance and working age structure are shown in Tables 1.

Table 1. Questionnaire Survey Sample Description Table.

Statistical items	Item content	Sample size	Percentage
Educational Background	College	100	25%
	Bachelor's Degree	260	65%
	Master's Degree or above	39	10%
Positions	Senior Management	63	16%
	Middle Management	101	25%
	Grassroots Management	200	50%
	Others	35	9%
Departments	Production Department	160	40%
	Purchasing Department	103	26%
	Financial Department	20	5%
	Sales Department	40	10%
	Information Technology	12	3%
	Others	64	16%
Working Experience	Less than 3 years	211	53%
	4-6 years	100	25%
	7-12 years	54	14%
	More than 12 years	34	9%

3.2.2 Reliability Analysis.

Reliability analysis is designed to explore the reliability and precision of answers to quantitative data (especially attitude test questions), the first task is to assess the alpha coefficient, if this value is more than 0.8, it indicates a high level of reliability; if this value is between 0.7 and 0.8, then it indicates a good level of reliability; when it is located between 0.6 and 0.7, it indicates that the reliability can be admitted; if it is less than 0.6, it indicates that the reliability is is not good. In this study, the four dimensions of the questionnaire were tested for reliability and validity by using spss.25 for statistical analysis, and the results of the specific reliability analysis are shown in Tables 2.

Table 2. Reliability Analysis.

Dimensions	Problem item	Corrected Item-Total Correlation (CITC)	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	Standardized Cronbach's coefficient
Raw Material Supply	Q1 Raw material suppliers can maintain stable supply quantity	0.581	0.821	0.837	0.842
	Q2 Raw material cultivation process does not require company intervention	0.668	0.797		
	Q3 Raw material suppliers share the raw material planting program with us	0.711	0.783		

Raw Material Procurement	Q4 Raw material suppliers supply orders with good product qualification rate	0.687	0.796	0.859	0.865
	Q5 Low default rate of orders from raw material suppliers	0.584	0.82		
	Q6 Company share purchasing plans in advance to raw material suppliers	0.781	0.808		
	Q7 Company uses pay-as-you-go pricing	0.521	0.866		
	Q8 The company's current procurement settlement method is reasonable	0.672	0.831		
	Q9 The company's purchasing organization is able to communicate in real time from production, supply, purchasing, inventory, etc.	0.698	0.832		
Logistic	Q10 The company's safety stock level is low	0.764	0.807	0.882	0.886
	Q11 Company control logistics costs through third-party logistics	0.677	0.87		
	Q12 Third-party logistics can fulfill transportation tasks during the peak raw material harvesting season	0.665	0.871		
	Q13 Third party logistics can help companies provide cost control solutions for transportation of bulk raw materials	0.811	0.834		
	Q14 Third party logistics can provide one-stop total packaging service for companies	0.719	0.858		
	Q15 Third-party logistics can help companies improve operational efficiency	0.754	0.849		
Forward Supply Chain Collaboration	Q16 The company has a strong relationship with forward suppliers	0.513	0.824	0.826	0.826
	Q17 Equal status of cooperation between the company's forward-looking supplier entities and the company	0.566	0.807		
	Q18 Adequate information sharing between companies and forward-looking suppliers	0.767	0.745		
	Q19 Equivalence of resource dependence between firms and forward suppliers	0.645	0.785		
	Q20 The company distributes benefits from working with forward suppliers in a reasonable manner	0.63	0.79		

As can be seen from Tables 2, the reliability coefficients of the four dimensions of raw material supply, raw material procurement, logistics and forward synergy of the supply chain are 0.837, 0.859, 0.882, 0.826, respectively, which are all greater than 0.8, and thus indicate that the research data have high reliability quality. For the "Cronbach's Alpha if Item Deleted", when a topic has been deleted, the "Cronbach's Alpha if Item Deleted" increases the reliability index to 0.842, 0.865, 0.886, 0.826, but none of them are significantly increased, which means that that these options do not need to be removed or disposed of. As far as the CITC value is concerned, this index exceeded 0.4 for all the analyzed items, which indicates a good correlation between the analyzed items and also proves that they are highly reliable. Overall, the research data from the questionnaire showed high reliability indices, with all reliability coefficient values

above 0.8, thus indicating that the data reliability is of high quality and can be used for further analysis.

3.2.3 Validity Tests.

The assessment of validity focuses on quantitative data, especially on the measurement of attitudes. We begin by focusing on the KMO index, which, when it exceeds 0.8, means that our data are able to provide information effectively, reflecting good validity. If the value falls between 0.7 and 0.8, it indicates that the data still provides valid information but is slightly less effective. And when it falls between 0.6 and 0.7, it indicates that the data may be less suitable for extracting information, but can still be used in some situations. If this number is below 0.6, it means that the data cannot be used effectively.

(1) KMO and Bartlett tests.

After KMO and Bartlett's sphere test, the test questionnaires for raw material supply dimension, raw material procurement dimension, logistics dimension, and forward supply chain collaboration dimension were examined, and the results are detailed in Tables 3. From the results, the KMO values were 0.765, 0.735, 0.778, and 0.764, respectively. The approximate chi-square values of Bartlett's sphere test were 805.363, 1116.906, 1416.490, and 822.387, which were significant at the 0.001 level and suitable for EFA.

Table 3. KMO and Bartlett tests.

		Raw Material Supply	Raw Material Procurement	Logistic	Forward Supply Chain Collaboration
Measure of Sampling Adequacy		.765	.735	.778	.764
Bartlett's sphere test	Approx. Chi-Square	805.363	1116.906	1416.490	822.387

(2) Validity factor analysis.

In the factor analysis in the validity analysis, the absolute value of the four dimensions of raw material supply dimension, raw material procurement dimension, logistics dimension, and supply chain forward synergy dimension was set to 0.4, and the fixed number of factors was set to 2. The common degree values corresponding to all the research items were higher than 0.4, which indicated that the information of the research items could be effectively extracted. In addition, in the rotated component matrix, the factor loading of each item of the raw material supply dimension are not lower than 0.711, the factor loading of each item of the raw material procurement dimension are higher than 0.686, and the factor loading of each item of the logistics dimension are higher than 0.786, which proves that there are no cases where there are items that can represent both Factor 1 and Factor 2, and so all the items of this scale can be retained. In the supply chain forward synergy dimension, the factor loading of the four items Q17, Q18, Q19, and Q20 are all higher than 0.708, and there is a situation in which item Q16 has a comparable performance in Factor 1 and Factor 2 loadings, which is considered to be adjusted or deleted at a later stage, so that all four measures in the

scale can be retained. Finally, the cumulative percentages of the sum of squares of the extracted loadings for the four dimensions were74.866%, 81.631%, 87.102%, and 76.933%, respectively.

3.2.4 Problem Summary and Cause Analysis.

By organizing and analyzing the data from the questionnaire survey, combined with the field research on the Pixian Douban industry, the following will be from the supply of raw materials, raw material procurement, logistics, and supply chain forward collaboration of four dimensions, to analyze the problems and causes of its supply chain forward.

(1) Raw material supply dimension.

First, the supply and demand side order contract default problem. In Pixian Douban industry in the forward supply chain, Douban core production enterprises have a stronger market influence, information accessibility and market foresight capabilities, etc., when there is a better quality of goods, the core production enterprises will improve the inspection standards, so that the occurrence of refusal to accept or pressure on the price of the disguised breach of contract behavior.In addition to defaults due to force majeure factors, farmers may disregard the risk of contractual defaults in order to obtain a higher purchase price.Secondly, the over-involvement of core producers in the production process of raw material supply in order to ensure the stability and efficiency of each link in the forward supply chain has led to huge investment in management costs.

(2) Raw material procurement dimension.

The settlement of payment for raw materials is unreasonable, and the settlement process is to first settle the payment to the cooperative, from which the cooperative deducts a certain amount of the purchase cost of production materials, management costs, commissions, etc., and then distributes the payment to farmers, thus generating a price difference, which ranges from as high as 52.2% to 150%. The high level of price difference will discourage farmers from planting, and at the same time, it will also lead to this part of the cost eventually passed on to the company's production costs.

(3) Logistics dimension.

Pixian Douban manufacturers not only need to be responsible for logistics operations tasks such as raw materials, semi-finished products and finished products that are necessary within the enterprise, but also need to participate in raw material picking, demixing circulation processing and other related raw material circulation logistics activities. As a result, they need to consume limited resources in a multitude of operational aspects including logistics support operations.

(4) Supply chain forward synergy dimension.

First, the problem of low information sharing. The cooperative relationship between core manufacturers and forward members of the supply chain is characterized by a lack of mutual benefit and low information sharing. The formation of supply chain "information isolated island" leads to the members of the production plan, demand plan, procurement price, inventory and other information sharing enthusiasm is not high, which in turn causes the blindness of the production plan in the supply chain and the instability

of the supply of raw materials. Second, there is the problem of inefficient capital circulation. In order to facilitate management and improve operational efficiency, the core enterprise's payment for goods is settled directly with the intermediary represented by the cooperative, which then distributes it to farmers in accordance with the corresponding recorded data, which can lead to the cooperative taking up the farmers' funds or delaying payment. Farmers, as weak nodes, may face the risk of shortage of funds and interruption of funds due to their lack of ability to compete with strong nodes; therefore, an excessively long fund settlement chain will directly affect the fund efficiency of the entire supply chain.

4 Supply Chain Forward Integration Model Applications

4.1 Forward Integration Planning

Integration and optimization strategy from the traditional loose transaction to close collaboration, from the traditional supplier selection to scale intermediary organizations to introduce the process, from the third-party logistics part of the business resources complementary to the overall one-stop service provision. The implementation path is from internal to external, from low-level to high-level, sequential replacement, upgrading of the three-step advancement path, as shown in Figure 2.

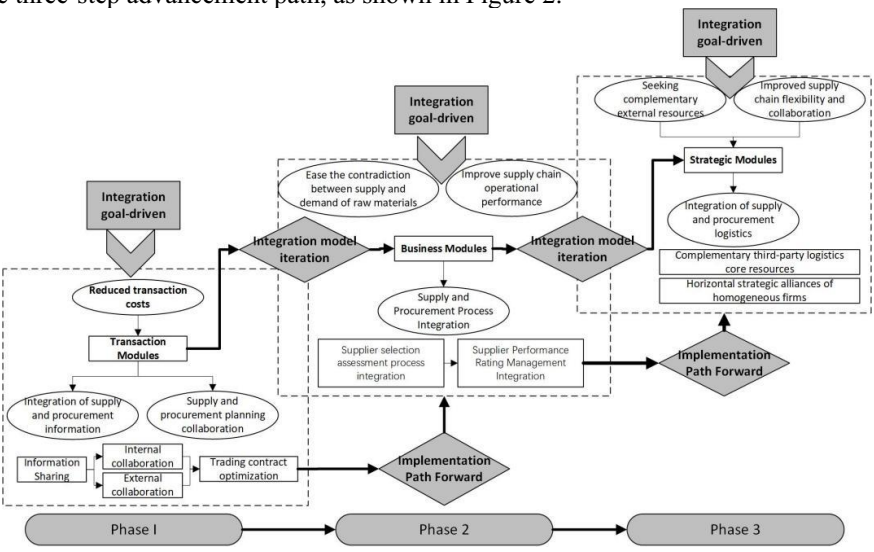

Fig. 2. Supply Chain Forward Integration Implementation Path.

In the first stage, supply and procurement information integration and plan collaboration is implemented. With the key industrial chain main body company as the core, establish an information collaboration platform, collaboration with the head of pepper planting bases, agricultural cooperatives full-time staff, etc., to realize the information sharing of the internal and external production plan, procurement plan and inventory

plan of the enterprise. The second stage, professional driven procurement process integration. Introducing professional intermediary organizations to integrate the loose farmers in the upstream, empowering professional intermediaries with the capital resources and management resources of the leading supply chain enterprises, increasing the risk-resistant ability and communication costs of the forward supply chain, and realizing the integration of business processes across organizational boundaries. The third stage is to implement the integration of supply and procurement logistics of enterprises outside the chain and overall flexible collaboration. Realize the strategic alliance between homogeneous enterprises in the raw material procurement process, and alleviate the vicious competition behavior in the raw material procurement process. In addition, with the existing cooperation of third-party logistics companies to further expand the cooperation business, and further explore the company's fresh red pepper picking, removal of impurities, cleaning and other circulation and processing processes and transportation to the warehouse process to implement one-stop service outsourcing, the company's external heterogeneous enterprises under the guidance of the strategic integration model advantageous resources integration.

Pixian douban core enterprises to give full play to the core of the enterprise in the supply chain leading role, and gradually formed a Pixian douban manufacturer as the core of the supply chain network, as shown in Figure 3, covering from the supply chain forward to the procurement of raw materials, supplier management to the processing and production of the product to the supply chain backward to the sales of the product as well as the logistics support and other functions.

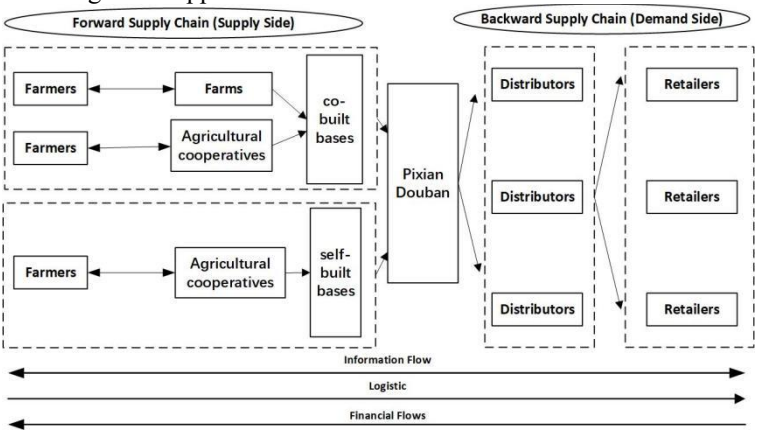

Fig. 3. Pixian douban Supply Chain Network Structure.

4.2 Supply and Procurement Planning Collaboration

Pixian Douban core manufacturer procurement of the main raw materials for the bulk raw materials fresh red pepper and dry beans, upstream suppliers are mainly composed of farmers, co-built base, self-built base of three categories, the supply chain forward belongs to a single manufacturer, multi-supplier two-level supply chain. This paper proposes that the supply chain forward integration strategy of the first strategy is the

supply and procurement plan collaboration, the procurement department first with the production department to collaborate with the production plan, through the production plan to develop a material demand plan, procurement plan, and then with the suppliers to collaborate with the procurement plan to sign the procurement order contract, the specific collaboration strategy shown in Figure 4.

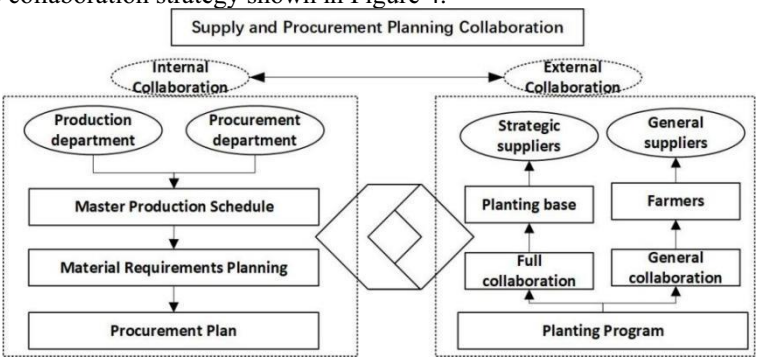

Fig. 4. Supply and procurement planning collaboration.

(1) Intra-enterprise sourcing program collaboration. Figure 4 in the Purchasing Department and the Production Department through the joint development of production plans for internal collaboration, material requirements plan through the production plan to obtain synchronized with the upstream strategic supplier planting base through information sharing full collaboration to determine the raw material planting plan.

(2) Supplier-Manufacturer Cultivation Program Collaboration. The collaboration of raw material cultivation programs from suppliers to their downstream manufacturers in Figure 4 is a two-way collaborative cultivation program between upstream suppliers and manufacturers, and is a key step in establishing a strategic partnership between supply and demand.

4.3 Supply and Procurement Process Integration

(1) Supplier selection assessment process integration. In the optimization of the supplier selection process this paper proposes to include scale efficiency, risk control ability and other aspects of the assessment, the manufacturer in order to achieve the scale effect of the number of raw material supply, can consider the introduction of professional intermediary organizations to increase the scale of the number of supply at the same time to reduce the manufacturer's purchasing process of raw materials planting the production process of over-involvement in the issue of, as shown in Figure 5. Combined with the company's procurement process cost control, procurement effect control, the introduction of professional intermediary organizations, on the one hand, to help farmers standardize the planting process, the quality of chili output to provide technical protection; on the other hand, the intermediary packaged integration of farmers supplier groups anti-risk capacity has been significantly improved.

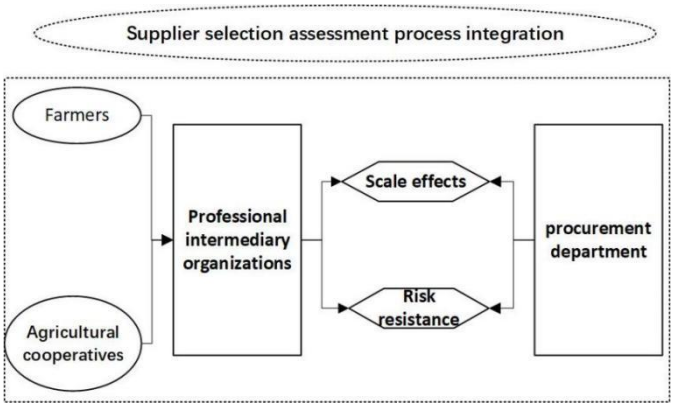

Fig. 5. Supply and procurement process integration.

(2) Supplier Performance Rating Management Integration. Combined with the content of the preceding sequence of process integration, this paper integrates the supplier performance level management accordingly, as shown in Table 4.

Table 4. Supplier Performance Management Scale

Composite Score	Level	Partnership	Outcome	Measure
>90	A	strategically	Strategic suppliers	Establish a strategic partnership, increase the order quantity or optimize the supply, and optimize the profit distribution method between both parties.
80-90	B	growth-oriented	Growing suppliers	Introducing professional intermediary organizations to increase the effect of scale.
70-80	C	normal type	Qualified suppliers	Continue to work together as a supplemental source of goods to assist in improvements.
<70	D	phased out	Unqualified suppliers	Terminate the cooperation, disqualify the qualified supplier and choose a new supplier instead.

4.4 Integration of Supply and Procurement Information

Supply chain information integration is a process of collaboration and cooperation, which realizes the sharing of key information such as orders, production, procurement, inventory and so on through the cooperation agreement among members. In order to avoid the "bullwhip effect" caused by insufficient information sharing among supply chain members and reduce the risk of the company's overall supply chain operation. This paper proposes the following integration of supply and purchasing information in the forward direction of the Pixian Douban supply chain:

(1)The formation of a novel partnership structure. Industrial supply chain members have common interests and internal games, and lack of contractual spirit. Therefore,

supply chain information integration must break the original supply chain game situation, use the professional intermediary organizations introduced in the previous integration measures, packaged cooperation agreements, coordinate the interests of supply chain members, and establish a new type of mutually beneficial cooperation and win-win partnership.

(2)Forward information sharing in the supply chain. The content shared by the supply chain is the most concerned part of the supply chain members, and it needs to integrate a series of information such as raw material production plan, production level, management level, supply scale, risk resistance and so on of all kinds of suppliers upstream in the front of the supply chain. Conversely, the upstream suppliers also need to integrate the manufacturer's raw material procurement quantity, procurement price, procurement quality standards and other information.

4.5 Supply Chain Forward Integration Implementation Assurance

(1)Collaboration platform construction to ensure information sharing. In promoting the construction of the platform, the first step is to gain an in-depth understanding of the needs and trends of the target market to ensure that the forward collaboration platform invested in can meet the actual needs of the market. At the same time, we integrate internal and external resources of enterprises, and jointly promote the development and application of forward collaboration platform with leading enterprises as the core. At the same time, we increase investment in technological innovation, introduce and cultivate a team of talents with professional skills and innovation ability, and select a mature, stable and expandable technological architecture to ensure that the platform can support future business development and technological innovation.

(2)Collaboration on system development. The first is to formulate norms and standards for information sharing, safeguard the security and accuracy of information, and ensure timely and accurate access to key information such as product demand, inventory conditions, production plans and so on between upstream and downstream enterprises. The second is to encourage enterprises in the industry chain to carry out technical exchanges and cooperation, jointly research and develop new technologies and products, and enhance the technical level of the whole industry chain. Third, to develop business processes and operation norms for industry chain collaboration, ensure smooth connection between various links, and promote business collaboration and process optimization. Fourth, benefit distribution and risk sharing, establish a reasonable benefit distribution mechanism to ensure that the interests of each enterprise in the industry chain are protected.

(3)Supervisory feedback. Chili planting, primary processing, and supply link can be regarded as the core link in the forward supply chain of leading enterprises, in which real-time supervision and control are carried out on the planting quantity, methods, field management, technical training of planting farmers, and insurance of agricultural insurance for farmers and bases, etc., and reward and punishment mechanisms are set up in this link to improve the stability of the quantity and quality of chili planting, as well as the level of collaboration in the industrial chain.

5 Conclusion

In this paper, the Pixian Douban industry supply chain forward as an example, field visits and questionnaires, using a combination of quantitative and qualitative methods, the supply chain of Pixian Douban forward to the supply chain up to the current situation of supply and procurement and issues related to statistics and analysis. Using literature analysis combined with the theory of supply chain collaboration, the design of the Pixian Douban supply chain forward integration model, and finally proposed the application of the integration program and the implementation path. The research in this paper mainly focuses on the forward integration of the supply chain itself, for how to extend its influence to the backward sales level, is still a problem to be solved. Later on, it is also necessary to study how to form a complete value transfer chain from the supplier of the supplier to the customer of the customer from the perspective of the whole value chain, and to explore how forward integration of the supply chain can play its role in this process.

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