

On the Construction of Benefit Coordination Mechanism of Dairy Supply Chain in China

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Abstract:

There is a conflict between the maximization of supply chain interests and their own interests, which makes the dairy supply chain unable to achieve the maximum synergy and affects its market competitiveness. Therefore, scholars pay more and more attention to how to maintain the stable and efficient operation of dairy supply chain and improve its market competitiveness through more reasonable benefit distribution. This paper studies the problem of benefit distribution from the perspective of coordination. Taking the dairy supply chain as the research object, this paper constructs the relationship model between benefit distribution, risk sharing, trust, information sharing and supply chain benefit coordination. The influence of benefit distribution and risk sharing on supply chain benefit coordination is discussed, with emphasis on the influence of benefit distribution on supply chain benefit coordination; The influence of trust among supply chain members on supply chain benefit coordination is discussed; The influence of supply chain members; information sharing on supply chain benefit coordination is discussed. According to the theoretical model, empirical research, scale design and data collection are carried out. SPSS17.0 combined with reliability calculation and LISREL 8.7 statistical software are used for reliability analysis, validity analysis and structural equation model test analysis to verify whether the hypothesis relationship is tenable. According to the verification results, this paper puts forward corresponding suggestions on the construction of benefit coordination mechanism of dairy supply chain in China.

Keywords: Dairy products, Supply chain, Benefit coordination, Mechanism

I. INTRODUCTION

The loss of interest imbalance in the dairy supply chain will lead to the loss of the supply chain. If all parties in the supply chain have production enthusiasm, the safety risk of dairy products can be greatly reduced to maximize their own interests. Because the overall security level of the supply chain is low, forming a closed loop of the supply chain, it is of great significance to apply a reasonable profit distribution method to establish the coordination mechanism of China dairy supply chain. This paper discusses the dairy supply chain, discusses the impact of the distribution of interests in the supply chain on the synergy of interests in the supply chain, as well as the information sharing and risk sharing in the supply chain, as well as the relationship between the information exchange of enterprises in the value chain information exchange and suppliers under the current conditions, so as to provide information for consumers and improve the

information exchange level of dairy supply chain of enterprises in China. It also provides theoretical experience for realizing the relevant benefits of dairy supply chain.

II. THEORETICAL BASIS AND RELATED LITERATURE REVIEW

2. 1 Theoretical Basis

2.1.1 Supply chain management theory

Based on the "early" economic chain, the important difference between the management thought of "supply chain" is that supply chain management has brought new ideas for synergy, systematic method and strategic competitiveness. In recent years, with the change of social and economic conditions, supply chain management has appeared a new development direction. For example, it emphasizes the balance and synergy between the environment, the management of resources and efficiency and clean supply chain, the management concepts of supply chain strategic alliance and globalization to achieve common strategic objectives, and the informatization and demand in supply chain management. In general, the supply chain management theory can be explained from three perspectives: first, Study the transaction cost of enterprises in Supply Chain Based on economic prospect; Second, from the perspective of management, this paper discusses the complementarity of chain member resources ^[1].

2.1.2 Supply chain coordination theory

On the concept of synergy, scholars at home and abroad have expressed their understanding of different views. Ansof believes that synergy is a brief summary of the activities of enterprise groups established by a single organization. Malone and crowston understand synergy as the interdependence between jointly completing work and managing activities. Ma Shihua pointed out that under the condition of coordination, information can be transmitted timely and accurately through the supply chain, effectively reducing overproduction. Due to information distortion, the supply chain can make a consistent response to changes in market demand. Therefore, this paper regards synergy as the cooperation between enterprises, through the integration of resources and core competencies, the synergy between organizations and the interaction of business processes ^[1-4].

In the research of value chain and supply chain, there are many literatures related to the concept of collaboration. There are four similar concepts, namely communication, collaboration, collaboration and cooperation. Wu Bing distinguishes these concepts according to the degree of synergy among value chain members, as shown in Table I ^[5].

TABLE I. Comparison of collaborative classification

Collaborative degree classification	Collaborative mode	Collaborative characteristics	Collaborative hierarchy
communicate	Facing the gap of speech and interest	No clear collaborative objectives	low

coordination	Process oriented collaboration	Resolve the consistency of members' actions	in
cooperation	Transaction oriented collaboration	Members have their own goals	in
cooperation	Strategy oriented cooperation	Members have common goals	high

Table I lists some elements of synergy, connection, synergy, collaboration and collaboration, which depend on the classification of synergy degree to some extent. But collaboration is not limited to this. A more important feature of collaboration is its time synchronization and consistency in behavior decision-making. Mattessich believes that collaboration is a state of joint action of supply chain nodes under collaborative conditions, which shows more formal Enterprise relations and agreements to achieve common goals, and puts forward stricter requirements for making plans, communication channels, role allocation, etc. Cooperation means that there is a certain business relationship between the two sides, but it is not necessarily a formal relationship. If cooperation is tolerable, then collaboration is each other. responsibility. Collaboration can be regarded as higher-level and more specific cooperation. From the perspective of supply chain, by concentrating the resources and core capabilities of enterprises, we can improve the overall competitiveness of supply chain through the interaction between enterprises, synchronous interaction and effective information exchange in business processes ^[6].

2.1.3 Benefit distribution theory

The so-called division of labor refers to that each cooperative member company obtains its due share from the total income or profit. Cooperation is the reason for division of labor, and non cooperative division of labor does not belong to the scope of division of labor. A distribution of cooperative game means that for n players, there is an n-dimensional vector, $x = (x_1, X_2, \dots, X_n)$, which fully satisfies the following conditions: (1) $\Sigma = V(n)$, (2) $x(X_i) \geq V(I)$, where X_i is the interest of member enterprises, $V(n)$ represents the total interest of N players, and $V(I)$ is the interest of the ith player when he does not alliance with anyone ^[6].

2.1.4 Game theory

Game theory, also known as game theory, means that in an equal game, the parties use each other. Strategies to make decisions that are in line with their own interests to maximize. Game theory is a theory that studies the nature of struggle and competition, and has been widely used in biology, economics, military strategy, International Relations and other disciplines ^[7].

2.2 Related Literature Review

2.2.1 Research on dairy supply chain

In view of the long-standing and mature development of overseas dairy industry and the establishment of a more perfect dairy supply system, foreign scholars pay more attention to strengthening the management and quality control of milk supply chain. Jens Petter wold studied the relevant data of six Eastern European countries. They believe that globalization has led to significant changes in the current product supply chain.

International investment brought about by globalization has opened up the international market. Closer EU countries are greatly influenced by EU countries in the field of production and retail trade, and the trend of vertical integration expansion is obvious. Lin Helen and others agree with this development status and believe that the quality and safety of dairy products in the process of raw milk production and dairy products processing should be ensured, especially pasture management, because the activities of the pasture industry are not clear^[7-10]. Zeki ayag (2002) through research, the main strategy of logistics demand and supply chain (SCM) management in dairy industry has been determined. Quality function implementation (QFD) is a useful method to maximize customer satisfaction in the development of products or services^[11]. Khalili damghani (2011) proposed a hybrid method to evaluate the relative effectiveness of supply chain efficiency. Firstly, the conceptual model including supply chain and supplier rapid development capability is introduced^[12]. Leng Youbin (2008), a domestic scholar, found that the malignant milk powder incident, such as melamine and toxic *Staphylococcus aureus*, introduced the production of dairy products, so he asked China to strengthen supervision and protect consumers' rights and interests^[13]. E Zhiqiang (2012) specially explained the importance of consumer health in the dairy industry. The state needs to integrate the dairy supply chain to ensure the quality of dairy products^[14]. Zhang Xianxian and Gong Xiaoju (2017) raised the issue of how to integrate dairy products into the supply chain and improve its quality in view of the emerging safety problems of dairy products^[15]. They believed that the length and complexity of China. Dairy supply chain led to frequent safety incidents of dairy products. The study found that it was necessary to integrate the supply chain, strengthen the quality control of all links of the supply chain. Lei Jinmei (2011) suggested that imported dairy products improve the competitiveness of China. Dairy industry to a certain extent, which will have a certain impact on China. Dairy supply chain^[16]. Yu Yan (2009) it is worth noting that there are some challenges in the raw milk industry, producers and sales links in China. Dairy supply chain, so we must take appropriate preventive measures and measures to avoid these challenges^[17]. Xiao Dan and Zhou Renzhong (2009) in China's dairy industry, in order to ensure the normal operation of all links, we must pay attention to the quality of dairy products. Therefore, we must ensure that every supply chain attaches importance to safety^[18].

Firstly, the literature review of the upstream of the dairy chain.

Milk supply is the starting point of milk supply chain. The supply level directly affects the development level of China dairy industry, and the milk production efficiency will also affect the reaction of raw milk production. Cao Cambodian (2005) analyzed the factors affecting the production efficiency of raw milk and measured the economic benefits of raw milk production and supply in China by using random advanced production functions. The research shows that technical efficiency plays a very important role in raw milk, including the scale and specialization of animal husbandry. Zhang Lixia and Meng Lingjie (2006) revealed the cyclical changes in the growth of dairy industry. The production level of dairy products is affected by the purchase price of original milk, the development scale of dairy enterprises, the income level of residents, government policies and the trend of international dairy products market. Qian Guixia (2010) pointed out that the structural characteristics of dairy enterprises led to the safety market failure caused by the information asymmetry in the upstream of the dairy chain, and the source of dairy products and the profits of the dairy industry directly led to the outbreak of melamine. In China, there are bottlenecks in the healthy and

sustainable development of the dairy industry. The weak contractual relationship between dairy farmers and dairy enterprises and unreasonable benefit distribution lead to the decline of dairy farming income and low market activities. From the perspective of supply chain, comprehensive business model is the main means to ensure the sustainable and healthy development of dairy industry. Therefore, the supply chain should be optimized through the pre investment integration of "ten grasslands of the company". Qi Chunyu (2008) proposed that the safety incident was caused by the long-term squeeze of dairy farmers' interests on the basis of reflecting on the "Sanlu milk powder" incident. Therefore, based on the experience and lessons learned from American dairy products, China can consider establishing cooperatives between companies and dairy farmers to ensure the sharing of interests and avoid uncertain accidents. Hou Shuxia et al. (2008) integrated dairy farms and companies into the supply chain of dairy industry to ensure the quality of dairy products [19-23].

Secondly, the downstream literature review of dairy chain.

Wei and viney (2000) believe that affected by the traditional indicators of population nutritional intake, when the population income level decreases, the total output of dairy products also decreases, while the consumption and consumption of dairy products were not high before the reform and opening up. Xin Xian (2002) due to per capita income and lifestyle, China dairy products are relatively expensive for most residents, resulting in low per capita consumption. Fu Hao (2003) has many kinds of dairy products. People with different consumption habits have different tastes for dairy products and different demand elasticity. Chinese people have unique dairy products and consumption types, mainly liquid milk. However, Li Yueying (2014) with the rapid expansion of dairy enterprises, the self-discipline of the industry is a problem, ignoring the safety of dairy products. Liu Rui and Wang Li (2013) the melamine incident led to a sharp decline in consumption, which greatly hit consumer confidence. Hou Shuxia and Zhong min (2010) pointed out that in Chinaspupply chain, downstream dairy farmers are very scattered and small, resulting in safety problems. Therefore, it is necessary to integrate the downstream and improve guidance and supervision. Guo Yu and Gu Haiying (2008) believe that it is worth noting that with the intensification of industry competition, the downstream competition in Chinadairy supply chain is also very fierce. Therefore, it is necessary to integrate upstream, midstream and downstream supply chains to promote the distribution of dairy products. Wang Haichun (2012) the good quality assurance of dairy products in the international market is also the determinant of Chinadairy trade deficit. Song juguo and Liu Yizhuo (2010) as China, Singapore and Australia signed a series of agreements and reduced tariff levels, the dairy trade deficit may expand rapidly. Wei Xiufen (2013) believe that the domestic demand for dairy products is expanding and the change of variety structure is accelerating, but the national supply level can not meet this situation. Under the background of the great development of the world dairy industry, it is natural for dairy producing countries to become exporters of dairy trade with their unique livestock resources and advanced technical level [24-31].

2.2.2 Research on benefit coordination mechanism of dairy supply chain

Many overseas scholars and experts have studied issues related to the overall benefit distribution of enterprises in the dairy supply chain. Giannoccaro and pontrandlfo (2003) discussed how changes in contract parameters affect the distribution of benefits in the dairy supply chain among its members. When the income

sharing agreement is linked to the three-stage supply chain, the demand changes randomly. Gerchak and Wang (2001) suggested that the raw material assembly company distribute the income through income distribution in order to encourage parts suppliers and confirm the output in advance. Chauhan and PROTH (2005) proposed a cooperation model between suppliers and retailers based on revenue sharing, and analyzed the impact of risk on enterprise interests ^[32-34].

III. Research assumptions and conceptual models

3.1 Analysis on Benefit Synergy Formation Mechanism of Dairy Supply Chain in China

3.1.1 Problems of benefit coordination in China dairy supply chain

Dairy supply chain as a community of interests, member enterprises as different stakeholders, its primary goal is to maximize the use of interests, which is in line with the requirements of collective rationality and personality. At the same time, collective rational use is based on individual reasonable satisfaction, that is, collective rational use is based on individual reasonable satisfaction. In order to ensure the normal operation and development of the supply chain, how can member enterprises obtain the expected benefits from the supply chain to ensure and further improve the overall benefits of the supply chain? What is the complementary process? The main problem is to consider the interests and synergy between member companies, and regard reasonable joint action plans and results as the most effective incentive for member companies.

However, in practice, the interests of member companies are difficult to coordinate; The key factor of uncoordinated interests is information asymmetry. Member public Information asymmetry between divisions can be divided into two situations: information asymmetry from external sources before establishing cooperative relations. This information is generated by inactive factors, such as the characteristics and nature of cooperative members, such as the uniqueness and relative importance of the company core competitiveness, work quality, work quality, cost, etc. This information can be abstractly used to determine the participation rate and value of member companies in dynamic supply chain; Second, after the formation of cooperative relationship, the "immoral behavior" of member companies leads to internal information asymmetry, such as lack of cooperation, diligence, laziness, driving and so on. This is caused by. This case can be described by the principal-agent model.

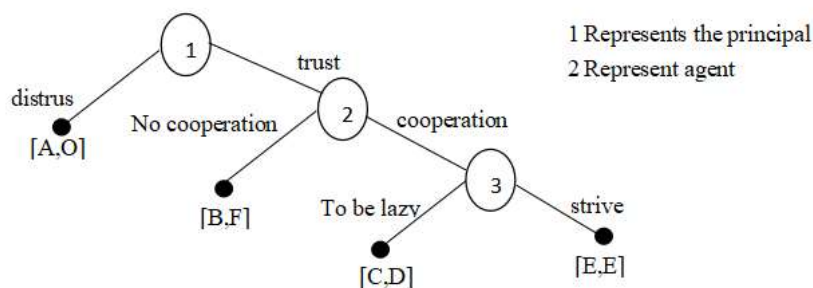


Figure 1 Principal agent model

As shown in Figure 1, the relationship between benefits is $f > e > d > C > b > a > 0$. Because the agent uses the trust of the principal to damage the interests of the principal and can obtain additional benefits, so the agent is taking (trust, non cooperation) strategy to obtain the maximum benefit. In order to pursue the maximum benefit of F, the agent will choose not to cooperate. Once the principal finds the agent non cooperation strategy, he will choose the non trust strategy again, which threatens the stability of the supply chain. The income matrix of the game between manufacturer and supplier cooperative innovation behavior can clearly describe the above problems if the expected return and average return of "cooperation" and "non cooperation" strategies are u_{1m} , u_{2m} and respectively, then:

$$U_{1M} = y(S_1 - C_1 - L_1 + f_1 a_1 S + H_1) + (1 - y)(S_1 + \sigma F - C_1 - L_1 - G_1) \quad (1)$$

$$U_{2m} = y(S_1 + i_1 - \sigma F - Y_1) + (1 - y)S_1 \quad (2)$$

$$\overline{U}_m = xU_{1m} + (1 - x)U_{2m} \quad (3)$$

The replication dynamic equation of manufacturer strategy selection is:

$$\frac{dx}{dt} = x(U_{1m} - \overline{U}_m) = x(1 - x)[(f_1 a_1 S + H_1 + Y_1 - i_1 + G_1)y + (\sigma F - C_1 - L_1 - G_1)] \quad (4)$$

If the expected return and average learning return of the supplier "provide" and "do not provide" strategies are U_{1s} , u_{2s} , and respectively, then:

$$U_{1s} = x(S_2 - C_2 - C_2'' - L_2 + f_2 a_2 S + H_2) + (1 - x)(S_2 + \sigma F - C_2'' + H_2 - G_2) \quad (5)$$

$$U_{2s} = x(S_2 + i_2 - \sigma F - Y_2 - C_2 - L_2) + (1 - x)S_2 \quad (6)$$

$$\overline{U}_s = yU_{1s} + (1 - y)U_{2s} \quad (7)$$

The replication dynamic equation of supplier strategy selection is:

$$\frac{dy}{dt} = y(U_{1s} - \overline{U}_s) = y(1 - y)[(f_2 a_2 S + Y_2 - i_2 + G_2)x + (\sigma F - C_2'' + H_2 - G_2)] \quad (8)$$

Equations (4) and (8) are combined into a set of replicated dynamic equations to form a two-dimensional dynamic system. The two-dimensional dynamic system describes the dynamic process of game between enterprises of both sides in the process of cooperation between manufacturers and suppliers. Then, what are the contents and characteristics of benefit coordination in dairy supply chain, what are the main factors that need to be referred to, and what are the main factors restricting benefit coordination will be discussed below.

3.1.2 Formation conditions of benefit synergy in China dairy supply chain

Dairy quality is the result of the synergy of dairy farmers, dairy processing enterprises and supermarkets in the dairy supply chain. However, due to the weak comprehensive quality of dairy farmers, dairy processing enterprises and supermarkets, asymmetric information, unstable relationship quality, imperfect supervision mechanism, unbalanced quality control or low coordination of dairy supply chain. Therefore, the formation and stability of interest collaborative control in dairy supply chain is not a given process, but a

complex process gradually formed under the joint action of various forces. According to the structural characteristics and operation law of dairy supply chain, to ensure the integrity, the continuity and sustainability of joint control of the interests of milk supply chain need the following four conditions: first, dairy farmers, dairy enterprises, dairy processing enterprises and supermarkets have strong joint operation ability and ability; Secondly, on the basis of mutual trust, dairy farmers, dairy enterprises and supermarkets have formed good benefit sharing and cooperation, common risks and information exchange; Third, dairy enterprises and supermarkets effectively transmit and share interest information; Fourth, strict internal control system and good external environment are the basis and guarantee, the operation and post supervision of major enterprises, reliable national control mechanism, independent third-party control institutions and fair and effective market order.

3.1.3 Mechanism framework of benefit coordination in China dairy supply chain

These four conditions are independent and interrelated in the formation process of benefit collaborative control of dairy supply chain. Due to the different functions and locations of the four conditions, the process of collaborative management of dairy supply chain interests represents one main line and two auxiliary lines, as shown in Figure 2.

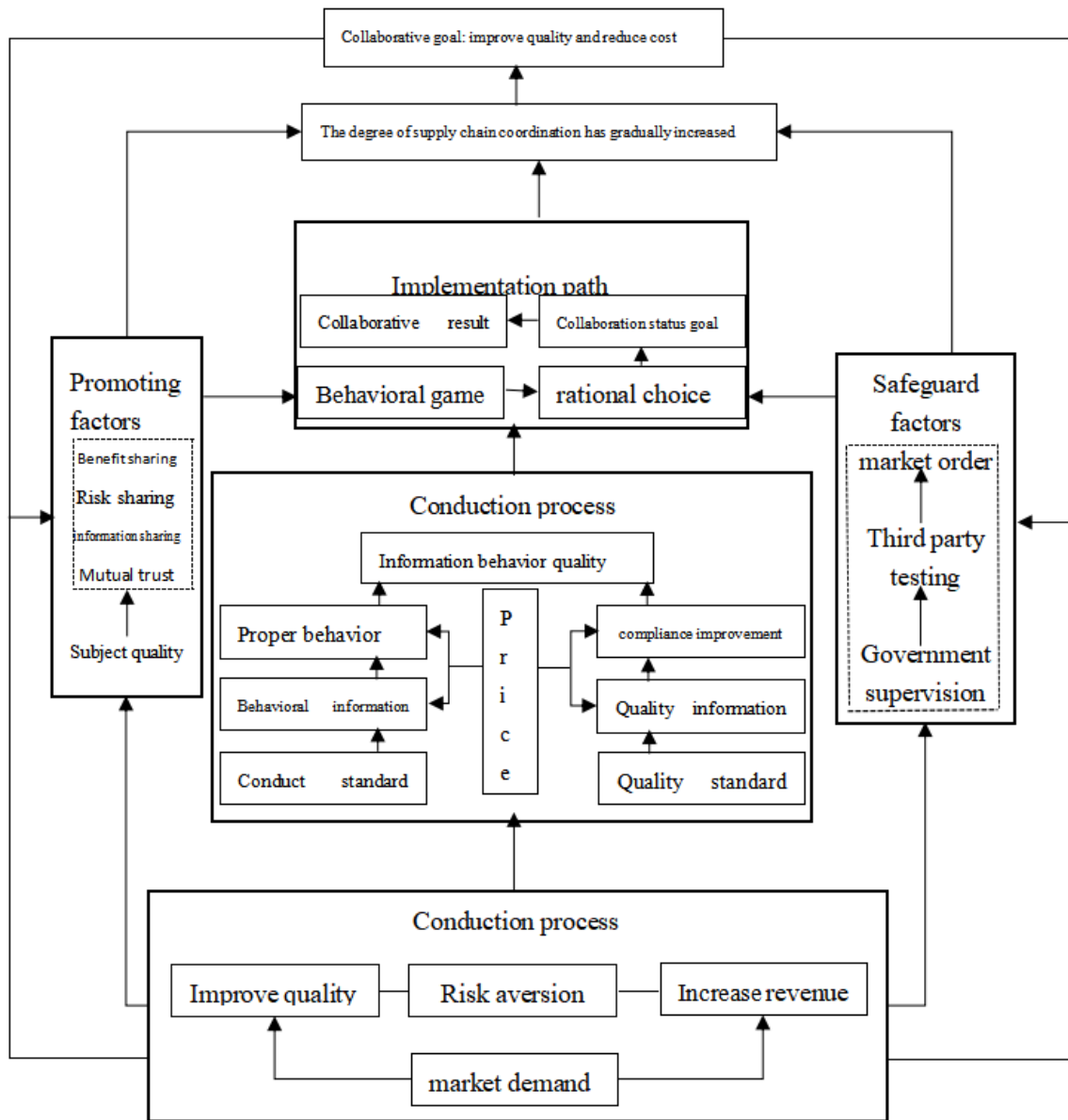


Figure 2 Mechanism framework of benefit collaborative control in dairy supply chain

As can be seen from Figure 2, the main line "dynamic factor - transmission process - realization path - synergy degree improvement - synergy target realization - dynamic factor" constitutes the internal cycle of the formation mechanism of interest synergy control; The auxiliary line "promotion factor - synergy degree improvement - synergy standard realization - promotion factor" constitutes the left cycle of the formation mechanism of interest synergy control; The auxiliary line "guarantee factor - coordination degree improvement - coordination standard realization - guarantee factor" constitutes the right cycle of the formation mechanism of interest coordination control. The dynamic factors, transmission path and realization path in the internal cycle constitute the leading mechanism for the formation of interest collaborative control, the supporting factors and guarantee factors in the left cycle constitute the leading

mechanism for the formation of interest collaborative control, and form the assistance mechanism for the formation of interest collaborative control in the correct cycle.

3.2 Variable Definition of Benefit Coordination Mechanism in China Dairy Supply Chain

3.2.1 Income distribution

From the perspective of resource-based theory, the concept of income distribution is very similar to the traditional value distribution theory. Both emphasize the value obtained through cooperative distribution. Income distribution refers to the balance between the interests of related parties and interest losses in the transaction process. Both parties belong to the same business network, which is one of the focuses. They form partnerships with each other, create relationship value and obtain benefits other than pure economic benefits. The company also hopes to obtain trust interests, social interests and special treatment interests through long-term cooperation. Specifically defined as confidence interest, which represents the low degree of trust and risk felt by enterprise customers in long-term relationships; Social interest is the emotional part of the relationship, which refers to the friendship, intimate relationship or identity between enterprise customers and trading partners, as well as the pleasant atmosphere of their interaction, which can meet some emotional needs of enterprise customers; Special treatment refers to the convenience, price discount and time saving for more profitable services that enterprises can obtain in the partnership. Therefore, in this study, based on previous studies, Inter Organizational benefit distribution is defined as realizing the maximum benefit by providing additional services in the supply chain. Establish supply chain partnerships through the sharing of resources and information and through the sharing of benefits among organizations in the trade process. Inter Organizational income distribution not only represents economic interests, but also represents the simple value distribution generated by "relationship".

3.2.2 Risk sharing

The concept of risk sharing in DAS and Tengincludes the possibility and consequences of supply chain participants' failure to cooperate as expected, and the relationship between supply chain organizations is a relationship of competition and cooperation, as well as an interactive process, so as to obtain greater benefits from cooperation. In strategic alliances, scholars define risk sharing as the possibility and consequence of inter agency members failing to achieve satisfactory cooperation or experiencing the possibility and consequence of partner opportunistic behavior.

In the context of previous studies, the inter organizational risk considered in this study involves recognized factors, factors related to the behavior and dependence of supply chain partners, namely opportunistic behavior, functional conflict and lack of power that hinder information exchange. The concept of opportunistic behavior is defined as "manipulation in pursuit of self-interest". Opportunistic behavior is a violation of one own commitments out of one own interests. The inconsistency between the private interests of enterprises and the interests of other partners in the supply chain leads to the emergence of dysfunctional conflict. Dysfunctional conflict is mainly composed of unhealthy behaviors, such as distorting information to mislead other decision makers, interacting through hostility and distrust, or creating obstacles in others' decision-making process. In the supply chain, this conflict is manifested in the control of resources required

by other members. The dependence of partners depends on the benefits that one enterprise can bring to other enterprises, especially those related to relationship resources. Inter Organizational dependence is characterized by power inequality. When the power inequality between supply chain enterprises is high, the trust between members is low, which will lead to risk sharing among members.

3.2.3 Trust

The dairy supply chain covers all aspects of the value realization process of dairy products, and the government plays an important role in the operation of the dairy supply chain. On the issue of trust, researchers in sociology, psychology, economics and management have conducted extensive research. Psychologists believe that trust with uncertain risk means that one party expects the other party to take joint actions and corresponding actions. Based on personal psychological cognition of trust, they believe that trust is an irrational expected behavior of the risk dependent party. Sociologists interpret trust as the product of social system and moral norms, and believe that the social relationship network of subjects can directly affect or even determine their trust state, which is an evaluation of interpersonal relationship or social interaction between subjects. In the view of managers, trust is a management mechanism, which can reduce the opportunistic exchange behavior of both parties and promote both parties to establish a long-term cooperative relationship. Trust, as the lubricant of interaction between enterprises, can reduce the uncertainty of competition and cooperation and enhance the cooperation ability of both sides. Economists believe that trust is a rational and evaluation based behavior, which can reduce transaction costs and improve transaction efficiency, and this is based on the assumption that we can fully obtain information about the motives and capabilities of counter parties, and its expected return is greater than the expected loss.

Based on the understanding of interdisciplinary scholars at home and abroad on trust and the particularity of dairy supply chain, the concept of trust in supply chain can be explained as: trust is an expectation and a consideration of interests, and trust is generated due to the risk of uncertainty about future events, as well as the necessary conditions for both to exist at the same time, the ability and goodwill of the other party to perform its obligations. It will not take advantage of its own shortcomings to seek benefits. Trust involves such characteristics as uncertainty, vulnerability and mutual trust. Trust is the emotional judgment and evaluation of interpersonal relationships and interpersonal relationships. It is formed by the interaction between rational and irrational emotions of social subjects. Trust cannot be explained only from the perspective of pure economy, nor from the perspective of economically disadvantaged economists. It is nothing else. It is blind and has no principle beyond its own interests. On the one hand, a person has opportunistic motives detrimental to his own interests, but he also has integrity and firm commitment. Therefore, trust can become natural under the conditions of honesty, responsibility, reciprocity and binding on both parties of the transaction; At the same time, although preventive control can inhibit opportunistic behavior, it can also lead to the establishment of a higher prevention mechanism to deal with opportunistic behavior. In this case, both sides need a lot of resources, which eventually puts the distribution of resources in an unfair situation.

Trust in the dairy supply chain is the mutual trust between core enterprises and node enterprises, which is reflected in the uncertain risks in the future. When they believe in each other sincerity, ability and goodwill

in performing contracts and commitments, and neither party can take opportunistic actions to optimize its short-term benefits by taking advantage of the other Party weaknesses. In the realistic chain of dairy supply, the node enterprise of trust exists not only in economics, but also in irrational trust in social psychology. In the dairy supply chain, the trust of major enterprises in node enterprises is largely determined by sincerity and dedication. It is believed that they can fulfill their commitments in the dairy supply chain without deviating from the current dairy supply chain cooperation track or damaging the overall interests. The trust of its node enterprises in the core enterprises is mainly determined by the contract terms and performance ability with the core enterprises. It is considered that under the condition of uncertainty, the core enterprises have the ability to establish and manage the current dairy supply chain and obtain unpredictable benefits.

Due to the scattered dairy farming, imperfect intermediate organization and small scale of core enterprises in China supply chain, they appreciated the government policy guidance and financial support in the milk supply chain. Product, technology platform and infrastructure government leadership will improve the direction and confidence of cooperation among dairy supply chain entities. Therefore, the government active participation in the dairy supply chain is conducive to the rapid integration of resources. For example, how can the regional government introduce leading companies, promote the integration of high-quality agricultural resources into the supply chain, reduce the retrieval cost among subjects, and optimize the business ecology in the dairy supply chain by creating favorable conditions for them. The active participation of the government also helps to enhance the credibility of the treaty and the trust of various actors in its implementation through the reputation mechanism. Therefore, government support and supervision can promote trust among our enterprises, which are the nodes of the dairy supply chain.

3.2.4 Information sharing

Most scientists have proposed to determine the scope of information exchange between supply chain participants and between different enterprises. The supply chain information exchange discussed in this paper refers to the information exchange between different departments of an enterprise and other members of the supply chain (such as suppliers, customers, etc.). As shown in Figure 3:

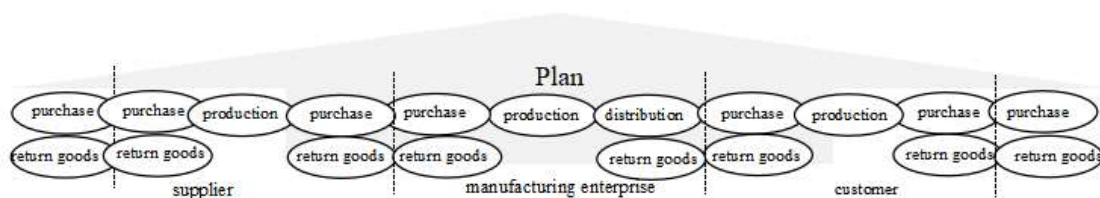


Figure 3 Scope of information sharing process of manufacturing enterprises

The SCOR model proposed by the international supply chain association is the reference model of supply chain operation. It points out that the information exchange between enterprises, with suppliers and with customers is independent but necessary. As shown in Figure 3, according to the SCOR model, information exchange within an enterprise is defined as plan, source, make, deliver and return, and the departments are more clearly divided into production enterprises. The information exchange with suppliers and customers is the information exchange between organizations. The information exchange with suppliers,

especially the procurement information exchange between manufacturers and suppliers, provides suppliers with procurement information and distributes it to manufacturers. Similarly, information exchange with customers is the exchange of customer procurement information and information distribution between production enterprises. Of course, one thing that organizations have in common is that they are all related to the return process. The impact on synergy is also different, which depends on the emphasis on the three components of the management process. Information exchange takes the form of manual communication and the establishment of information technology system, especially through daily contact, meetings, exchange visits, etc; Information technology system is mainly created in the form of electronic data interchange (EDI) and enterprise resource planning (ERP).

3.2.5 Supply chain collaboration

Supply chain collaborative management has become one of the focuses of supply chain management research. Many studies show that the synergy effect in the supply chain can have a positive impact on the effectiveness of the supply chain, such as reducing inventory, reducing cost, improving customer service quality, improving forecasting ability and timely delivery. With the deepening of the research on the synergy of supply chain management, more and more factors are taken into account when determining the relationship between supply chains. Collaborative relationship in supply chain means information sharing, resources and risks among supply chain participants to achieve common goals. According to the previous research results and considering the research needs proposed in this paper, synergy in the supply chain is defined as that all members of the supply chain make full use of the key resources of inter organizational relations, especially by strengthening strategic cooperation and establishing close partnership, improving Inter Organizational Relationship Management and risk management, and improving the level of supply chain information sharing. Efforts to improve the overall consistency of the supply chain will eventually improve the overall competitive advantage of the whole supply chain. At the same time, the synergy in the supply chain is divided into technical, management and strategic synergy, which depends on the synergy level of the supply chain. From micro to macro, the relevant synergy mechanisms include information exchange mechanism, incentive and restriction mechanism, incentive and restriction mechanism.

3.3 The Hypothesis of Benefit Coordination Mechanism in China Dairy Supply Chain is Put Forward

3.3.1 Influence of benefit distribution among organizations on supply chain information sharing

A stable and lasting partnership between supply chain partners is that they provide benefits. Supply chain partners are more willing to establish collaborative relationships in joint exchange in order to achieve common results in the larger supply chain. Partners are willing to cooperate with the company, which will give them more benefits. Generally speaking, the perception of benefits depends on many aspects, such as production capacity, efficiency, product profitability, customer satisfaction and market share. Information exchange is an important means to ensure barrier free interaction between cooperatives. The information exchange between supply chain participants is more active due to benefit sharing, and the sharing of supply chain information plays an important role in ensuring benefit sharing among supply chain participants. Through information exchange with customers, enterprises can directly control the changing needs of consumers, so that they can quickly and effectively redesign products / services, restructure resources,

restructure enterprise structure and restructure processes, so as to meet the needs of consumers to the greatest extent. Through information sharing with suppliers and internal information sharing, enterprises can cooperate with suppliers to better meet the needs of consumers. If supply chain partners realize that benefit sharing is part of a long-term partnership, it will promote the exchange of knowledge or information among organizations. This view will continue to be reflected in the exchange of information as a positive factor. Therefore, the key determinant of value chain information sharing is benefit sharing. The research points out that the exchange of supply chain information is for the benefit of inter organizational relations. According to the above description, this paper puts forward the following assumptions:

Hypothesis La: Inter Organizational benefit distribution has a significant positive impact on information sharing with suppliers (H1a).

Hypothesis 1b: Inter Organizational benefit distribution has a significant positive impact on internal information sharing (H1b).

Hypothesis LC: Inter Organizational benefit distribution has a significant positive impact on information sharing with customers (H1c).

3.3.2 Influence of benefit distribution among organizations in supply chain on risk sharing

If there is a relationship between members of an organization, commitment determines the behavior, one of the most important factors affecting the behavior is the distribution of benefits among members. Generally speaking, the benefit distribution among organizations directly affects the cooperative behavior, which is accompanied by some risks while achieving the success of relationship exchange. It can be considered that members have recognized the existence of risk behavior. The characteristics of Inter Organizational dependence are the inequality of power, the inequality of power between supply chain enterprises, the reduction of trust among members and the risk among members.

At the same time, when the interests of organization members are more closely linked, their relationship depends more on them, which effectively reduces the level of trust among members, especially due to the abuse of power, thus inhibiting the generation of risks. At the same time, if the distribution of interests among organizations is very high, members will not "play tricks in order to realize their own interests". Because the level of benefit sharing among organizations is high enough to enable them to fully fulfill their obligations without opportunistic action. Therefore, this study puts forward the following assumptions:

Hypothesis 2: Inter Organizational benefit distribution has a significant negative impact on risk sharing. (H2)

3.3.3 The impact of supply chain risk sharing on information sharing among organizations

Within the framework of strategic alliance, the negative opportunities and impacts of Inter Organizational risk exchange will be determined, which may be caused by members dissatisfaction with interaction or members opportunistic behavior. Risk may affect the risk and obligation sharing among supply chain participants, which in turn will affect the interaction in the supply chain, and the supply chain is

one of the key elements of the interaction. As the supply chain is a "competitive" relationship, this potential competitive relationship may stimulate incomplete cooperation among supply chain participants, resulting in risks. Thomas found that information distortion contradicts the structure of functional conflict, which may affect other decision makers. Cross examination may cause hostility and risk, thus weakening the risk between organizations. If enterprises believe that they can obtain private benefits, they need to coordinate with other participants in the supply chain. In enterprise internal risk allocation, inter organizational risk may affect the information affecting enterprise internal risk allocation through transmission and conversion. Although relationship transactions are difficult to measure and cannot be traded in formal contracts like economic transactions, risks related to the supply chain are characterized by such interrelated transactions, which are more subjective than objective constraints. Due to the existence of the two component modes of "formal" and "implementation" of inter organization relations. Supply chain participants are likely to change established rules for their own interests or short-term interests. Of course, they also have creative "actions" "Without violating the signed contract, it deviates from the established behavior pattern that may easily bring risks to the supply chain and cannot be properly evaluated, which hinders the risk sharing in the supply chain. In the case of supply chain risk sharing, the risk may vary according to who the target is. Combined with supplier risk and customer risk, asymmetry and the relationship between supply chain participants. The difference of preference and function conflict will inevitably lead to the difference of risk allocation. Enterprises with relatively weak rights are more willing to choose enterprises with relatively strong strength to obtain more letters and information exchange, so that they can not share information with enterprises with relatively weak rights; relationship is usually the decisive factor affecting the relationship commitment between enterprises and their customers or supply chain participants. When partnerships are weak, they may hinder risk sharing.

Hypothesis 3A: inter organizational risk sharing has a significant negative impact on supplier information sharing (h3a).

Hypothesis 3B: inter organizational risk sharing has a significant negative impact on internal information sharing (H3b).

Hypothesis 3C: inter organizational risk sharing has a significant negative impact on customer information sharing (H3c).

3.3.4 The impact of supply chain trust on Inter Organizational risk sharing

Risk aversion mechanism is not a strange mechanism. To ensure that the other party performs the current contract in the future, the purpose is often to achieve the expected purpose through margin and punitive measures. This punitive measures, such as insurance and price support, is a risk aversion mechanism. After the introduction of trust mechanism, it is also the purpose of this paper to introduce risk prevention mechanism in the process of information exchange one of the innovation points. If the output is too large, suppliers will face huge capacity loss. In order to prevent this from happening, the following two mechanisms have been born, namely, price compensation mechanism and insurance premium mechanism. Price compensation mechanism is that producers and suppliers negotiate price compensation before

information disclosure. If the difference between actual information and public information is greater than the set threshold, the price compensation mechanism the manufacturer will compensate the supplier for a certain amount of each product in the form of price compensation to compensate the supplier for the loss of production capacity. The insurance mechanism refers to the introduction of third-party insurance before the exchange of information to pay the insurance premium in a certain proportion. If the difference in information release is greater than the previously set threshold, the insurance company will pay appropriate fees to the supplier to compensate its capacity loss in volume setting.

Hypothesis 4: Inter Organizational Trust has a significant positive impact on supply chain risk sharing (H4).

3.3.5 Relationship between supply chain information sharing variables

If the internal information sharing of an enterprise reaches a high level, it becomes easier to share information with suppliers and high-level Inter Organizational Information Sharing including information sharing with customers. Especially when the enterprise has a high level of internal information sharing, the enterprise fully experiences the advantages of information sharing and high-level internal information sharing creates good internal conditions, so the enterprise. They prefer to share information with external enterprises. In this case, external enterprises mostly refer to supply chain member enterprises. Therefore, internal information sharing shows the enterprise learning ability from external partners to a certain extent. Since the supply chain runs through the whole product supply process, enterprises in the supply chain must work together to maximize the overall value of the supply chain. As a system, there are organizational boundaries among the members of the supply chain, which hinders the information sharing between organizations to some extent. Inter Organizational Information Sharing is the extension of the extroversion of internal information sharing beyond the organizational boundary. Through inter organizational information sharing, the previous organizational boundaries among the members of the supply chain disappear or break. This view reflects a fact, that is, external inaccuracy. Qualitative and the relationship between customers and suppliers must be internally integrated in the appropriate position of the company. In the general supply chain, the good internal relations of member companies enable the company to better participate in the information sharing in the supply chain. Good internal relations provide a good internal platform for external communication. On the contrary, when a company has poor internal relations and internal trust when the level of information sharing is very low or the quality of information sharing is very poor, it indicates that the company does not have the ability to transfer or exchange information with other members of the supply chain. Even if information sharing is carried out, it can not reach a high level, and the efficiency is not high and very low. In short, the smooth progress of information sharing among organizations of the supply chain is inseparable from the support of internal information sharing. Therefore, this paper puts forward the following suggestions:

Hypothesis 4A: internal information sharing has a significant positive impact on information sharing with suppliers (H4a).

Hypothesis 4B: internal information sharing has a significant positive impact on information sharing with customers (H4b).

3.3.6 The influence of information sharing on the coordination mechanism of dairy supply chain

Many previous studies have effectively reduced the principal-agent and "bullwhip effect" phenomenon of supply chain information sharing in the process of supply chain coordination, promoted the smooth cooperation and communication of supply chain partners, and maximized the overall interests through the coordination relationship between supply chain partners. Sheu showed that support from information sharing channel and information technology capability technology is needed. In the empirical study, it is found that information sharing between organizations promotes greater cooperation in reverse logistics. Transmitting information to customers can enable manufacturers to quickly and effectively understand customers needs, reduce uncertainty and significantly weaken the bullfighting effect, which is consistent with the goal of coordinating supply chain and realizing synchronous response to market demand. Information exchange with suppliers can also be described. For the organization information exchange between enterprises and senior members. It can share and transmit the inventory information, production capacity and demand information from suppliers and manufacturers in real time, make the most effective use of the information from suppliers and manufacturers, shorten the arrival time of goods and reduce the total cost of the supply chain. The decision-making power and information structure form a collaborative structure. Cross organization information sharing. They tend to keep the information structure of supply chain cooperation participants consistent and can effectively deal with a large amount of information, rather than guiding decision-makers to do so and track the amount of information, so they can only immerse themselves in the ocean of information.

Information sharing within an enterprise can help enterprises better allocate and make use of enterprise resources, reduce duplication of work, and ensure smooth and efficient information transmission within the enterprise, which will ensure the close relationship between different functional departments of the enterprise, so as to ensure the synchronization and interaction within the enterprise. What is the realization of supply when it is impossible to exchange effective information between enterprises. Talavera believes that the synergy in the supply chain includes external and internal integration, and the internal integration of the company should include the collaboration of information system.

Therefore, the main purpose of information exchange is to achieve synergy, and synergy in the supply chain is the best means to truly reflect the cost of information exchange. In the case of no information exchange in the supply chain, there is no root like a tree and no source of water; therefore, information exchange in the supply chain is one of the necessary and sufficient conditions for realizing supply chain synergy. Synergy, prior and reasonable information exchange planning is essential. Therefore, this paper puts forward the following assumptions:

Hypothesis 6A: information sharing with suppliers has a significant positive impact on Supply Chain Collaboration (H5a).

Hypothesis 6B: internal information sharing has a significant positive impact on Supply Chain Collaboration (H5B).

Hypothesis 6C: sharing information with customers has a significant positive impact on Supply Chain Collaboration (H5c).

3.4 Conceptual Model of Benefit Coordination Mechanism in China Dairy Supply Chain

Based on the hypothesis analysis mentioned above, this paper proposes the relationship model of inter organization benefit distribution, risk sharing, information sharing, supply chain information sharing (including ISS, ISI and ISC) and supply chain collaboration, as shown in Figure 4:

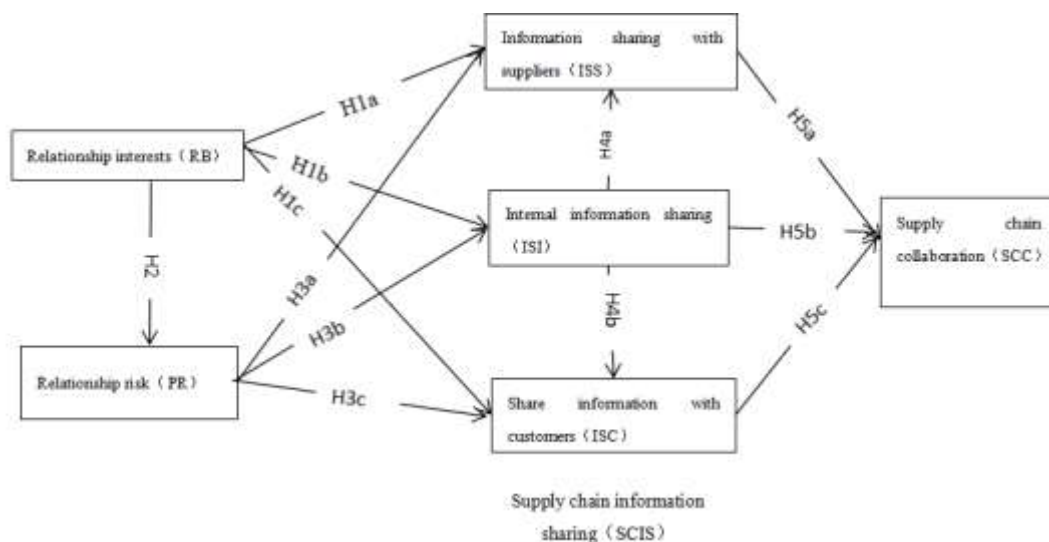


Figure 4 Conceptual model

3.5 Research and Design of Benefit Coordination Mechanism in China Dairy Supply Chain

3.5.1 Questionnaire design

The scale design in this paper comes from the existing supply chain literature. Based on the maturity criteria used in the existing research, the measurement positions of all variables come from these maturity scales. When measuring the elements of the scale quoting English literature, first translate these elements into Chinese, and then translate Chinese into English. By comparing with the original English text, it is determined that it is the main part of the Chinese scale. However, in order to facilitate understanding, the wording of the article is slightly adjusted based on the direct reference to these scales according to the specific situation of China and the research situation of this paper. These variables are measured by a similar 5-point system, expressed by numbers 1 to 5 respectively. The subjects must choose the degree of recognition or compliance of the position according to the actual situation of the company. The very important variables are displayed in turn Uneven, uneven, neutral, uniform and very uniform, or very low, slightly low, average, slightly high and very high.

The questionnaire consists of three parts; the preface is the description of the questionnaire, especially the main purpose of the questionnaire, the confidentiality obligation of data and information and the

corresponding interpretation of the questionnaire; the first part is the main part of the questionnaire, covering all variables; the second part involves the basic information of the respondents and their enterprises, namely gender, age, educational background, employment level and employment time, as well as industry Category, company nature, enterprise size and cooperation time with major supply chain partners.

3.5.1.1 Design of benefit distribution scale

According to the definition of relationship interests, this paper divides relationship interests into three categories: trust interests, social interests and special treatment interests to design the scale. The items of the scale refer to Gwinner research, in which confidence interests are measured by four items; social welfare is measured by three items; special treatment benefits are measured by three items, and a total of 10 items are used to measure relationship benefit variables. See Table II for the design description of detailed measurement items:

TABLE II. Item description of inter organizational relationship interest scale

variable		Measurement item	source
Relationship interests(RB)	confidence interest	RB1: we believe that supply chain partners have a low probability of error.	Gwinner
		RB2: we believe in supply chain partners.	
		RB3: supply chain partners make us feel safe and secure.	
	Social benefit	RB5: We feel very friendly in interacting with supply chain partners.	
		RB6: we are happy to interact with supply chain partners.	
		RB7: we maintain a certain social relationship with our supply chain partners.	
	Special treatment benefitsr	RB8: supply chain partners give our company better service than other companies.	
		RB9: supply chain partners give our company a better price discount than other companies.	
		RB10: supply chain partners can meet certain special requirements of the company.	

3.5.1.2 Design of risk sharing scale

In order to better measure risk sharing and make it more comprehensively reflect the risk management status among supply chain members. According to the situation that may lead to risk sharing, risk sharing is divided into three types: opportunistic behavior, functional conflict and power imbalance. The following scale items are described. The scale items refer to the research of Simonin, Morris, hunt and Nevin. There are 9 items, among which opportunistic behavior, dysfunctional conflict and power inequality use the detailed 3 items to measure the risk sharing among supply chain members. Table III gives the description of the specific measurement dimensions, as follows:

TABLE III. Item description of inter organization relationship risk scale

Source of variable measurement items	
Risk sharing (RR)	<p>Opportunistic behavior</p> <p>RR1: in order to achieve their goals, supply chain partners sometimes Change the facts slightly.</p> <p>RR2: in order to achieve their goals, supply chain partners sometimes Promised to do something and didn't do it in the end.</p> <p>RR3: supply chain partners will violate the formal rules for their own interests A formal or informal agreement.</p>
	<p>Dysfunctional conflict</p> <p>RR4: your company will interfere with the success of the cooperation process.</p> <p>RR5: your company will exaggerate some information or facts to influence as N much as possible Your supply chain partner.</p> <p>RR6: your company will expand your needs to affect your business as much as possible Supply chain partners.</p>
	<p>Power inequality</p> <p>RR7: your company does not respect your supply chain partners.</p> <p>RR8: your company cannot retreat from the supply chain partnership.</p> <p>RR9: your company has no decision-making power in the supply chain.</p>

3.5.1.3 Design of supply chain trust scale

Trust mechanism is the basis and key for enterprises to cooperate in supply chain management. In the cooperative relationship between the two sides, trust is the positive expectation of one party to the other. When observing the behavior of the other party, I believe that she will not take opportunistic action. Supply chain trust factor is the external manifestation of supply chain risk source. It reflects the risk characteristics of all aspects of supply chain trust and generally reveals the supply chain trust risk. Based on the analysis of supply chain risk factors, this paper systematically constructs the supply chain trust risk evaluation index system. The specific expressions are as follows: the ability risk caused by the low ability of the trustee, the goodwill risk caused by the low degree of goodwill of the trustee, the integrity risk caused by the low integrity of the trustee, and the perceived risk caused by the trustee behavior of increasing perceived risk. Table IV shows the composition of the four main risk events of supply chain trust (TR).

TABLE IV. Risk events and risk factors of supply chain trust risk

Supply chain trust risk event	Supply chain trust risk factors
Reduced capacity of the trustee (capacity risk)	Overestimate profitability, contract performance, product performance, product innovation ability, technical level related to supply chain cooperation, technical innovation ability, management innovation ability (information construction level), information collection ability, sustainable operation ability, resource investment degree, strategy implementation ability and crisis handling ability
The degree of goodwill of the trustee is reduced (bad risk)	Overestimate the possibility of cooperation intention, predictability of behavior, positive response to requests, employees' positive attitude towards cooperation, actively inform the truth, actively explain cooperation related plans, be cautious (keep cooperation information confidential), and accept the opinions of partners
The straightness of the trusted party is reduced (integrity risk)	Performance of commitments, consistency of past behavior of the enterprise, fiduciary party and The reliability of communication with other organizations, the impartiality of the trusting party, the past of the trusting party, the consistency of words and deeds, and the possibility of seriously performing the obligations undertaken
Trustee behavior of increasing perceived risk (perceived risk)	Non special fixed asset investment, special fixed asset investment. Enterprise reform, emergencies

3.5.1.4 Design of supply chain information sharing scale

Information exchange in the supply chain can be measured by information exchange or information system. Supply chain information exchange is also measured according to liker5 weight table. The number of 1-5 indicates that it is very low, insignificant, common, a little high, very high. Table V specifically describes specific problems.

(1) Design of enterprise internal information sharing scale

The enterprise internal information sharing scale refers to the research of sraunscheide and Suresh, Narasimhan and Kim. It has four items, including the integration of data and applications, and the sharing of inventory and logistics information among functional departments within the organization.

(2) Design of information sharing scale with customers

The information sharing with customers scale refers to the research of Aviv, Frohlich and Westbrook. Information sharing with customers mainly refers to the sharing of market information, final sales information, demand forecast and inventory information between manufacturers and their main customers.

(3) Design of information sharing scale with suppliers

The information sharing scale with suppliers refers to the research of Frohlich and Westbrook, Devaraj and Gavirnen. The information exchange with suppliers mainly involves the information exchange between manufacturers and suppliers on production plan, production capacity, inventory and forecast, with a total of 8 topic options.

TABLE V. Item description of supply chain information sharing scale

variable	Measurement item	source
Intra enterprise information sharing (ISI)	Isi1: data integration between internal functional departments.	Braunscheide&Suresh, Narasimhan&kim
	Isi2: enterprise application integration between internal functions.	
	Isi3: integrated inventory management.	
	Isi4: real time search of logistics related business data.	
Information sharing with customers (ISC)	Isc1: the extent to which market information is shared with our major customers.	Aviv, Frohlich and Westbrook
	Isc2: the extent to which major customers share POS information with us.	
	ISC3: the extent to which major customers share market demand forecasts with us.	
	Isc4: we share our available inventory with major customers.	
Information sharing with suppliers (ISS)	Iss1: major suppliers share their production plans with us.	Frohlich & Westbrook, devaraj and gavirnen
	ISS2: major suppliers share their production capacity with us.	
	Iss3: major suppliers share their available inventory with us.	
	Iss4: we share our production plan with major suppliers.	
	Iss5: we share our demand forecast information with major suppliers.	
	Iss6: we share our inventory levels with major suppliers.	

3.5.1.5 Design of supply chain collaboration scale

Because it is still too early to develop the collaboration matrix in the supply chain, there is no comprehensive and stable supply chain collaboration evaluation system at present. This paper gives the strategic collaboration evaluation, and realizes the management collaboration and technical collaboration through the scientific research on the concept, content and scope of supply chain collaboration. The scale refers to the research of baratt, Ma Shihua, GUI Huaming, Zhang Cuihua, etc Table VI shows the specific scale design:

TABLE VI. Item description of supply chain collaboration scale

variable		Measurement item	source
Supply chain collaboration (SCC)	strategic coordination	SCC1: there is no conflict between our strategic objectives and supply chain partners.	Barratt , Ma Shihua, GUI Huaming, Zhang Cuihua, etc.
		SCC2: we have similar value orientation with our supply chain partners.	
		SCC3: we look forward to long-term cooperation with supply chain partners.	
	Management collaboration	SCC4: we often conduct demand forecasting analysis with supply chain partners.	
		SCC5: we look forward to cooperating with supply chain partners in production planning.	
		SCC6: we are willing to adjust the logistics plan for supply chain partners.	
	Technology collaboration	SCC7: we form an electronic data exchange platform with supply chain partners.	
		SCC8: we achieve collaborative planning and scheduling with supply chain partners.	
		SCC9: we work with supply chain partners to achieve rapid production response.	

3.5.2 Data collection

In this study, there are two main reasons for collecting data through Internet questionnaires: first, the vast majority of people engaged in dairy industry have very high coverage rate of mobile phone, and basically do not have any obstacles to fill out questionnaires on the Internet. Second, the research sites are scattered. The time cost, manpower cost and financial expenditure of field research are much higher than those of air research. Officially started in June 2020, with the help of Xing Kong questionnaire platform, an electronic questionnaire was sent to the respondents through the social network micro QQ platform, and 100 questionnaires were sent to each research site, including 800. By the end of December 2020, 769 questionnaires had been collected, of which 731 had been effectively received, accounting for 91. 4%, including Beijing, Zhengzhou, Guangzhou, Harbin, Hohhot. There were 90, 80, 83, 85, 90, 87 and 81 copies in special, Yinchuan and qihar respectively.

3.5.3 Data analysis

3.5.3.1 Descriptive statistics

This study makes a descriptive statistical analysis of the valid questionnaires, including the age structure, education background, job level and other data of the respondents, the working hours and nature of the enterprise, the scale of the enterprise, and the cooperation time between the enterprise and major supply chain partners. According to several valid questionnaires, the proportion of people aged 20 to 40 in the survey is not low, which may be due to. The degree of the investigator is mainly bachelordegree and masterdegree, and the middle and low-level positions are mainly middle and low-level managers, which largely meets the requirements of the research. Table VII and Table VIII illustrate in detail:

TABLE VII. Statistical results of basic information of respondents

variable	Item	frequency	Percentage (%)
Age	20-30year	113	52. 3
	31-40year	76	35. 2
	41-50year	22	10. 2
	50Over years old	5	2. 3
education	High school, technical secondary school and below	7	3. 4
	Undergraduate and junior college	128	59. 1
	master	81	37. 5
	doctor	0	0. 0
Job level	Top management	15	6. 8
	middle managers	83	38. 6
	Grassroots managers	93	43. 2
	Ordinary staff	25	11. 4
	Less than 2 years	73	34. 1

Time of employment	2-5year	71	33.0
	5-10year	38	17.0
	10More than years	34	15.9

TABLE VIII. The investigation object level and working time distribution of respondents

	Top management	middle managers	Grassroots managers	Ordinary staff
Less than 2 years	1.1%	4.3%	17.1%	6.4%
2-5year	2.7%	11.8%	11.8%	4.3%
5-10year	1.6%	17.6%	4.8%	0%
10More than years	1.6%	9.6%	5.3%	0%

Most of the relevant companies are state-owned and state-controlled, as well as private and private companies, which meet the domestic conditions of China manufacturing industry and meet the needs of this study; more than half of the enterprises are more than 500. The larger the scale, the more standardized and mature the development of the supply chain. This data distribution is very useful for the search of this document; the cooperation time with the main partners of the supply chain accounts for 2-20Most of the year has basically met the needs of this document, as shown in Table IX:

TABLE IX. The basic information statistical results of enterprises

variable	Item	frequency	Percentage (%)
Nature	State owned and state holding enterprises	72	33.5
	Collective (cooperative) enterprise	1	0.5
	Private / private enterprises	69	32.1
	joint venture	31	14.4
	foreign enterprise	43	19.8
Enterprise scale	100Below person	27	12.3
	101-300people	53	24.6
	301-500people	23	10.7
	500More than people	113	52.4
Cooperation time	Less than 2 years	27	12.3
	2-5year	110	50.8
	5-10year	64	29.9
	10More than years	15	7.0

3.5.3.2 Reliability analysis

Reliability analysis is also called reliability analysis, the analysis results show the stability and reliability of the measurement scale. The internal consistency analysis is usually used to measure the reliability of the scale, which verifies whether the same results can be obtained when the same scale is repeatedly measured in the same scale. The higher the internal consistency, these problems show that the reliability of the project when interpreting and measuring the same concept, i. e. the same variables.

CITC and Cronbacha are used to evaluate the internal consistency of the table. Most scientists believe that Cronbachvalue of more than 0. 6 is considered acceptable, while the value of 0. 7 to 0. 8 is considered more favorable, and the value of more than 0. 8 is considered very good. The greater the CR value of the reliability combination value, the higher the overall trust of the representative. At the same time, the subclasses with CITC value of less than 0. 5 are considered not consistent with the project requirements Consistent and should be removed from the project.

Based on the data of the final questionnaire, this paper measures the effectiveness of SPSS 17. 0 questionnaire, and gives the following data: the CITC values of all reserved items are more than 0. 5, while the CITC values of all variables are more than 0. 8, while the Cronbacha value of the general questionnaire is 0. 837, and the total index of the reliability combination value is more than 0. 85. The analysis results show that the consistency is very high. Tables III to X show the values of the variables. The analysis results of effectiveness are as follows:

TABLE X. The results of reliability analysis of esch variable (n=216)

variable	Item	CTTC	After deleting the itemavalue	Cronbachavalue	Combined reliability (CR)
Relationship of interest (RB)	RB1	0. 582	0. 872	0. 881	0. 9023
	RB2	0. 675	0. 863		
	RB3	0. 578	0. 873		
	RB4	0. 787	0. 850		
	RB5	0. 550	0. 875		
	RB6	0. 731	0. 857		
	RB8	0. 607	0. 869		
	RB9	0. 660	0. 864		
Relationship risk (RR)	RR3	0. 832	0. 910	0. 929	0. 9445
	RR4	0. 903	0. 896		
	RR5	0. 912	0. 894		
	RR6	0. 707	0. 933		
	RR8	0. 724	0. 930		
Trust (TR)	TR1	0. 836	0. 951	0. 854	0. 957
	TR2	0. 857	0. 687		
	TR3	0. 925	0. 979		

	TR4	0.761	0.871		
Intra enterprise information sharing (ISI)	ISI1	0.821	0.906	0.926	0.9298
	ISI2	0.924	0.871		
	ISI3	0.739	0.932		
	ISI4	0.832	0.902		
Information sharing with customers (ISC)	ISC1	0.645	0.828	0.838	0.8515
	ISC2	0.771	0.706		
	ISC3	0.692	0.786		
Information sharing with suppliers (ISS)	ISS3	0.646	0.848	0.846	0.8599
	ISS4	0.752	0.748		
	ISS5	0.745	0.754		
Supply chain collaboration (SCC)	SCC2	0.704	0.821	0.858	0.8848
	SCC3	0.826	0.787		
	SCC4	0.593	0.849		
	SCC8	0.629	0.840		
	SCC9	0.625	0.841		

3.5.3.3 Validity analysis

(1) Exploratory factor analysis

Exploratory factor analysis mainly includes the discovery of influence observation variables (each variable item) the number of factors and the internal structure between potential variables and observed variables. It infers the structure of factors by loading factors from the collected data. This is an analysis of exploratory factors based on the collected existing data. Development factor analysis mainly tests two parts: one is the effectiveness test of convergence. It is used to investigate whether there is a certain relationship between the originally collected variables. The second is the difference test of effectiveness. It is used to check the coefficient load coefficient of each item in the corresponding coefficient, and there is no cross load. Table XI analyzes the convergence degree of each variable.

TABLE XI. Convergence validity analysis results of various variables (n = 216)

Latent variable	Item	Factor load	KMO	Barrettest of spherical p value	Cumulative contribution (%)
	RB1	0.679			
	RB2	0.769			
	RB3	0.675			

Relationship interest (RB)	RB4	0.859	0.874	0.000	55.003
	RB5	0.650			
	RB6	0.812			
	RB8	0.706			
	RB9	0.757			
Relationship interest (RR)	RR3	0.898	0.845	0.000	78.342
	RR4	0.947			
	RR5	0.952			
	RR6	0.802			
	RR8	0.815			
Trust (TR)	TR1	0.974	0.857	0.000	85.279
	TR2	0.646			
	TR3	0.752			
	TR4	0.871			
Intra enterprise information sharing (ISI)	ISI2	0.961	0.803	0.000	82.001
	ISI3	0.846			
	ISI4	0.909			
Information sharing with customers (ISC)	ISC1	0.835	0.698	0.000	75.657
	ISC2	0.907			
	ISC3	0.865			
Information sharing with suppliers (ISS)	ISS3	0.832	0.710	0.000	67.509
	ISS4	0.897			
	ISS5	0.894			
Supply chain information sharing (SCC)	SCC2	0.825	0.830	0.000	64.156
	SCC3	0.906			
	SCC4	0.735			
	SCC8	0.768			
	SCC9	0.758			

① Convergent validity test

The convergence index is used to verify the correctness of the numerical table and to analyze and measure the convergence index. The two commonly used test indexes are kmo (Kaiser Meyer Olkin) test and Bartletttest of sphericity.

Specifically, the kmo test can statistically compare the simple correlation coefficient and adjacency coefficient between variables, and its value is close to the kmo value in the range of 0 to 1, which means that the greater the correlation between variables, the better the convergence between variables, and the more suitable the initial variables are for analyzing factors, rather than the opposite. The generally accepted kmo measure is that when the kmo value is greater than 0.9, it is very suitable. If it is greater than 0.8, it means it is suitable; if it is less than 0.7, it means it is general; if it is less than 0.6, it means it is not suitable; if it is less than 0.5, it means it is extremely unsuitable. Based on the analysis of the correlation degree between the original variables and the determinant of the correlation coefficient matrix between the original variables, the relevant control statistics are calculated. If it is higher than the control value, the higher it is, the better it will reflect the corresponding probability P. if the value is less than the given significance level, the initial assumption of the coefficient matrix should be abandoned and the data related to the original variables should be. Table X gives details:

It can be inferred from Table X that most kmo values of all variables greater than 0.8 are also close to 0.7, while Barrettest of sphericity P values are close. It shows all variables applicable to factor analysis; when analyzing the principal components, the index system of all variables produces only one total factor, its eigenvalue is greater than 1, and the cumulative contribution rate is more than 60%, excluding relevant interest variables; on all issues, the multiplier burden exceeds the recommended 0.5 at home and abroad. Therefore, the questionnaire has achieved good results in convergence.

② Discriminant validity test

After verifying that all variables in the questionnaire are suitable for factor analysis, the next step is to verify the differential validity of the questionnaire, that is, to explore the internal structure of variables according to the collected data. Discriminant validity refers to the degree of difference between potential variables and other potential variables. This paper uses the main method of component analysis in SPSS, extracts factors with an external value norm of more than 1, and uses the maximum square. The difference method rotates the load matrix of factors in an orthogonal way. The analysis results are shown in Table XII. According to the analysis results, the load coefficient of all elements of each potential variable on a single factor ranges from 0.648 to 0.947, greater than 0.6, and there is no cross load between potential variables. Therefore, the potential variables in this table have good discriminant validity.

TABLE XII. Results of exploratory factor discriminant validity analysis (n = 216)

Latent variable	Item	factor					
		1	2	3	4	5	6
Relationship interest (RB)	RB1	0.695	0.145	-0.036	0.075	-0.201	-0.083
	RB2	0.754	-0.021	0.201	0.171	-0.049	0.076
	RB3	0.658	0.121	0.209	0.031	0.008	-0.146
	RB4	0.855	-0.060	-0.033	0.115	-0.050	-0.129
	RB5	0.648	-0.190	-0.213	0.026	0.260	0.029

	RB6	0.784	-0.141	0.080	0.093	0.183	-0.096
	RB8	0.662	0.016	0.217	0.124	0.301	0.077
	RB9	0.777	-0.054	-0.029	-0.041	-0.006	0.072
Relationship risk (RR)	RR3	-0.023	0.894	-0.101	0.017	0.076	0.029
	RR4	-0.060	0.943	0.004	-0.138	0.001	-0.066
	RR5	-0.066	0.947	-0.038	-0.149	-0.037	-0.036
	RR6	-0.011	0.801	-0.035	0.061	0.084	0.025
	RR8	0.044	0.802	0.022	-0.038	-0.025	0.205
Trust (TR)	TR1	0.587	-0.014	-0.875	0.254	0.514	0.074
	TR2	0.478	-0.077	-0.057	0.075	0.846	0.106
	TR3	0.246	-0.043	-0.874	0.063	0.746	0.001
	TR4	0.755	-0.057	-0.500	0.078	0.057	0.005
Intra enterprise information sharing (ISI)	ISI1	0.089	-0.026	0.847	0.174	0.233	0.072
	ISI2	0.111	-0.058	0.925	-0.006	0.168	0.103
	ISI3	-0.010	-0.019	0.862	0.030	-0.025	0.157
	ISI4	0.112	-0.064	0.870	-0.011	0.234	0.070
Information sharing with customers (ISC)	ISC1	0.216	0.019	0.159	0.092	0.775	0.181
	ISC2	0.102	-0.024	0.216	0.081	0.863	0.049
	ISC3	-0.175	0.160	0.182	0.183	0.791	0.169
Information sharing with suppliers (ISS)	ISS3	0.020	0.016	0.170	0.234	0.175	0.753
	ISS4	-0.074	0.050	0.070	0.241	0.028	0.866
	ISS5	-0.133	0.091	0.156	0.140	0.187	0.837
Supply chain collaboration (SCC)	SCC2	0.109	-0.138	-0.006	0.808	0.074	0.071
	SCC3	0.173	-0.091	0.024	0.884	0.176	0.022
	SCC4	0.005	-0.091	-0.032	0.737	-0.070	0.187
	SCC8	0.140	0.023	0.049	0.732	0.077	0.163
	SCC9	0.033	0.073	0.147	0.723	0.117	0.150
characteristic value	6.0304.350 3.8032.9631.6651.411						
Total cumulative contribution	72.218%						

(2) Confirmatory factor analysis

The relationship between the calibration coefficient (potential variable) and related research topics is in line with the theoretical relationship designed by the researchers, that is, the structural equation model is tested by lisre18.7 software.

① Convergent validity test

In this study, the maximum likelihood estimation method is used to verify the compliance of the model, as shown in Table XIII. Through the analysis of reliability factors, the overall accuracy of the model and data can be better connected. In addition, the measurement indicators, except for individual standard multiplier load values, range from 0.65 to 0.98, which is basically in line with the research requirements. In general, this research work is very effective the six potential variables in the work have higher convergence. See Fig. 3-5 for the analysis results of validation factors:

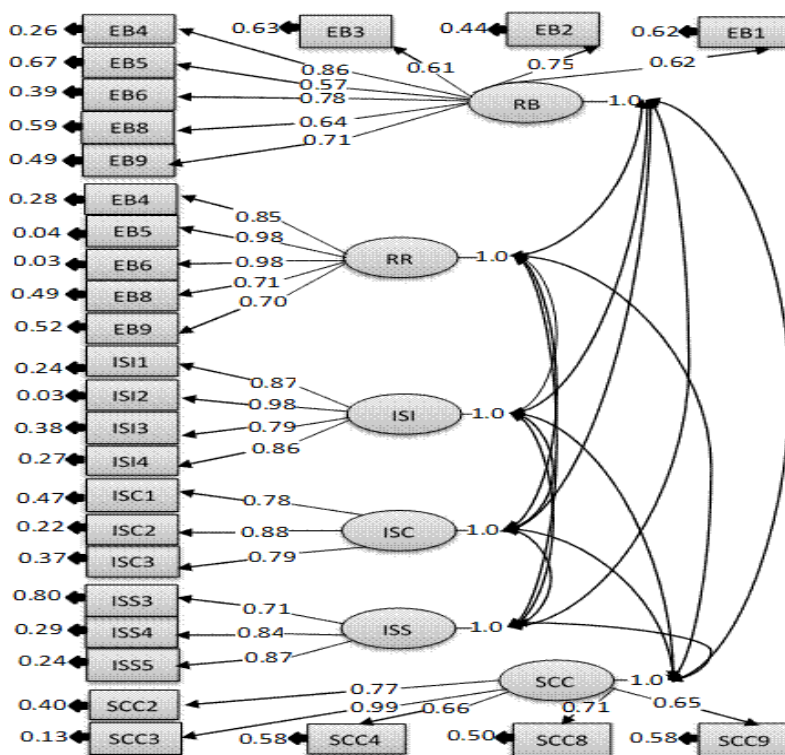


Figure 5 Confirmatory factor analysis results

TABLE XIII. Fitting indexes of confirmatory analysis model

Fitting index	Chi square / degrees of freedom	GFI	AGFI	CFI	NFI	RMR	RMSEA	P value
recommended value	<5	>0.8	>0.8	>0.9	>0.9	<0.05	<0.08	<0.05
Model situation	2.33	0.92	0.90	0.89	0.91	0.056	0.071	0.00

② Discriminant validity test

The effectiveness of potential variables is distinguished by the mean value extracted from variance value. If there are differences between variables, the average value is required to be greater than the correlation

coefficient between variables. Table XIV shows that the average value of each variable is significantly greater than the correlation coefficient between variables. The results show that the six potential variables proposed in this paper have good discriminant validity.

TABLE XIV. Analysis results of differential validity of each variable (n= 216)

Latent variable	RB	RR	ISI	ISC	ISS	SCC
RB	0.537*					
RR	0.082	0.774				
ISI	0.174*	-0.071	0.768			
ISC	0.184*	0.061	0.383**	0.657		
ISS	-0.029	0.077	0.274**	0.345**	0.673	
SCC	0.205**	-0.106	0.142	0.251**	0.373**	0.607

Note: significance level * $P < 0.05$, ** $P < 0.01$, * is ave value.

3.5.4 Hypothesis test

3.5.4.1 Structural equation model analysis

(1) Model evaluation

Structural equation model (SEM) Compared with the traditional statistical method, it has many advantages and can overcome some shortcomings of the traditional statistical method. For example, it can process multiple dependent variables at the same time, the allowable measurement error is also large, the data requirements are not strict, and the factor structure, factor relationship and the adaptability of the whole model are evaluated. Due to the relationship and path between latent variables, observed variables and latent variables. Therefore, according to the research needs, structural equation model is used to construct the relationship between potential variables.

According to the expression form of structural equation model, this study sets up seven potential variables, namely relationship interest (RB), relationship risk (RR), trust (TR), internal information sharing (ISI), information sharing with suppliers (ISS), information sharing with customers (ISC) and supply chain collaboration (SCC).

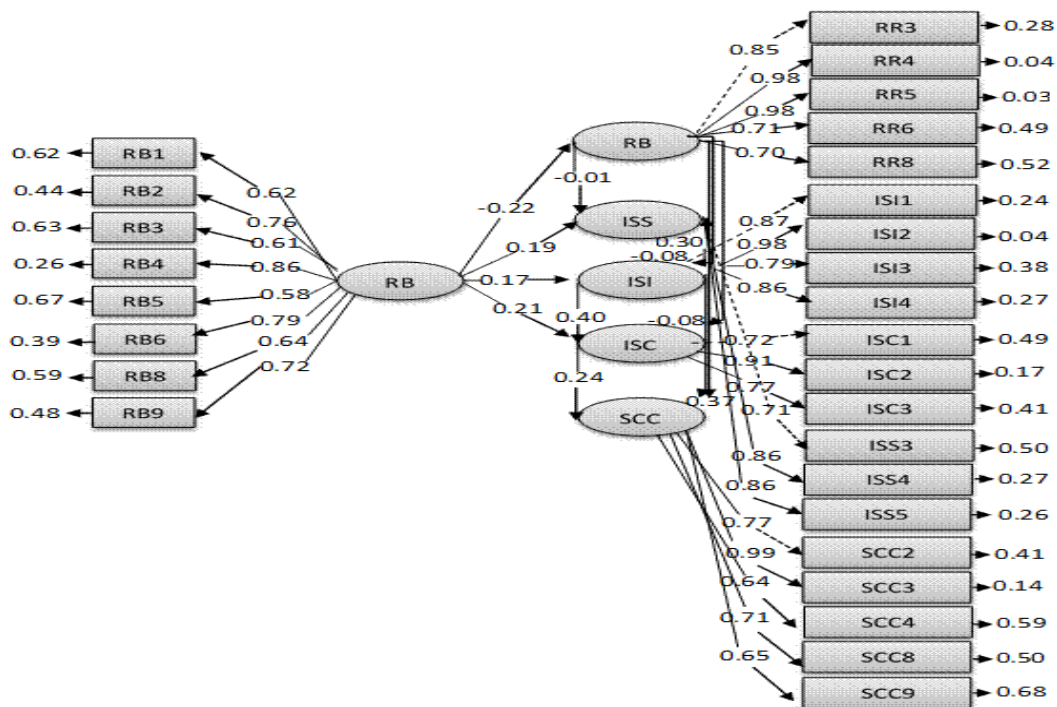


Figure 6 Structural equation model analysis results (n = 216)

The structural equation model is adopted and the analysis software lisrel8. 7 is used to verify hypothesis 1, hypothesis 2, hypothesis 3, Hypothesis 4 and Hypothesis 5. Firstly, the high-precision evaluation method of overall compliance with priority indicators is used to verify the compliance of the model, as shown in Table XV. It can be seen from Table XV that all simulated values comply with the recommended values, which indicates that the consistency between the model and data is good. Figure 5 shows that the trajectory coefficient between the theoretical variables of each model.

TABLE XV. Simulation overall goodness of fit

Fitting index	Chi square / degrees of freedom	GFI	AGFI	CFI	NFI	RMR	RMSEA	P value
recommended value	<5	>0. 8	>0. 8	>0. 9	>0. 9	<0. 05	<0. 08	<0. 05
Model fitting value	2. 79	0. 87	0. 85	0. 91	0. 92	0. 047	0. 073	0. 00

(2) Hypothesis test

According to the analysis results of the structural equation model, the value of T is greater than 1%. As the selection criteria, table XV shows the results of the hypothesis test of the study. 13 hypotheses test 9 hypotheses, such as H1a, H1B, H1C, H2, H4, h4a, H4B, H5B and h5c, and the other 3 hypotheses h3a, H3B and H3C are rejected. In other words, the income distribution in the relationship directly affects the information exchange and relationship in the supply chain. It is a risk and indirectly affects the coordination of the supply chain through the information exchange in the supply chain. The information exchange within the company directly affects the information exchange with suppliers and customers.

3.5.5 Conclusion

Realizing supply chain collaboration is the ultimate goal of supply chain cooperation. The main purpose of this study is to bring the research of inter organizational relations into the joint research of value chain from a new perspective, and deeply explore the supply chain. This document is based on the concept of interconnection, resource-based and relational value theory, based on the analysis and systematization of synergy chain and supply chain information in supply chain Exchange and Inter Organizational Relationship document is a benefit relationship model, including relationship, supply chain risk, information sharing and supply chain efficiency. It covers 800 enterprises related to dairy supply chain. It studies the impact of the benefits of Inter Organizational linkages in this kind of supply chain on supply chain information sharing and supply chain synergy. Sales chain, especially the use of Inter Organizational risk and supply chain as intermediary. Chain information exchange, and use SPSS 17. 0 and lisre18. 7 analysis software to verify the structural equation model of the conceptual model with the following conclusions:

(1) Inter Organizational relations are regarded as one of the key resources. Their positive value can promote the exchange of value chain information, which is much more important than risk, and is related to the cooperation process among organizations. From the perspective of supply chain partnership, most scholars have discussed the role of supply chain partnership in information sharing and supply chain coordination", commitment, etc. from a new point of view, this paper regards relationship as a resource, and takes into account its benefits and related risks, as well as the possible problems in the process of resource sharing. It is found that the benefits of Inter Organizational Relationship play an important role in the synergy of supply chain. They can not only promote information exchange, but also promote the synergy in supply chain Role, and allow supply chain participants to tolerate the risks brought by this relationship, especially in the risk. As long as the participants in the supply chain are not aware of this, the interests between organizations seem to be an important driving force for the long-term cooperation and information sharing of supply chain partners. It is pointed out that supply chain management should maximize the benefits and ensure the benefits through the establishment of supply chain partner alliance Long term sharing of supply chain information to ensure smooth interconnection within the supply chain.

(2) Inter Organizational Relationship risk has little impact on the supply chain information sharing behavior, which shows that the supply chain management does not pay attention to relationship risk. Although the manufacturing supply chain is a relatively mature supply chain, it still enjoys the benefits of supply chain cooperation at this stage. At present, it is in the rise period of supply chain cooperation. It is

difficult to pay attention to the unmeasured and predictable relationship risk. Even if this happens, it will choose tolerance because of interest driven or relationship inequality. To some extent, this is still because the supply chain is not mature enough. This study reminds enterprises to pay attention to relationship risk in supply chain management.

(3) The practice of information sharing within enterprises can have a positive impact on Inter Organizational Information Sharing between enterprises. Most scientists take information sharing as a whole to study its role in supply chain management, especially as Inter Organizational Information Exchange. At the same time, they do not forget that enterprise functional departments are also an important part of information exchange. This paper discusses the problem of information exchange in supply chain. This paper makes a more in-depth discussion and confirms the importance of information exchange between enterprises to information exchange between organizations. These conditions can be the "soft environment" of enterprise culture, the overall consciousness of employees, the quality of managers, etc., or create a good internal environment for information exchange between enterprises, so as to effectively promote effective external communication. This is in line with China "relationship" Culture, where the "relationship" between different functional departments, enterprises can help enterprises succeed in the production supply sales chain.

(4) Information exchange within an enterprise has a more positive impact on the synergy of the supply chain than information exchange between organizations. Now, most information exchange is understood as information exchange between organizations, and the interaction in the supply chain has a clearer meaning for information sharing between enterprises. Because internal integration is the prerequisite for external integration, such as the unity of the whole family, it is the most important. When the enterprise can not run on the basis of collaboration, better external interaction will be greatly reduced within the enterprise, and the synergy effect of supply chain will be significantly reduced.

IV. CONCLUSION

In the process of dairy supply chain assimilation, we must pay attention to maintaining the relationship between organizations. The supply chain has become a "chain", because it is an indispensable link for all node enterprises, problems will occur in any case, and can affect the cooperation of the whole supply chain. All parties involved in the supply chain should take a long-term approach, avoid opportunism and behavior, risky relationships in the short term, and pay due attention to the development and development of inter organizational relationships, as well as conscious relationships, targeted and systematic. Inter Organizational Communication is open and does not exceed the scope of existing resources. In order to maximize information sharing in the supply chain and reduce the risk of this relationship, it is mainly to ensure the further development of supply chain cooperation. First, supply chain partners must establish mutual trust, open mind and reduce combat readiness. From China "relationship culture" Starting from, the relationship between organizations still has a deep emotional color. This time requires that supply chain partners should not turn a blind eye to short-term interests or personal interests in the long run, nor support mustard, because the choice of cooperation must be open-minded, honest and trust to break the "relationship" The

development of information system in the supply chain is more difficult. Second, member enterprises must increase their contribution to the enterprise information system. Because the information exchange between enterprises is very important to promote the information exchange between enterprises, enterprises can increase their contribution to the information system and promote the information exchange between enterprises, which will enable them to develop cross organizational cooperation among enterprises. Share information and develop resources for them to share information with suppliers and customers. This is in line with China "relationship" culture, where different functional departments of "relationship" can help enterprises coordinate cross organizational information sharing under supply chain partnership. At the same time, enterprises should improve their understanding of internal participation in information exchange, set a good example and create a "soft environment" It is used for information exchange between enterprises. Finally, the development of supply chain collaboration depends on modern information sharing technology. As a valuable resource, information plays an increasingly important role in daily life and is rich to a certain extent. Therefore, enterprises should cooperate with supply chain partners to actively develop supply chain information sharing technology and make use of modern information sharing technology. Information technology plays a role in promoting supply chain assimilation.

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