The Stability and Promotion Strategy of Virtual Logistics Alliance in Xi’an International Trade and Logistics Park Based on Computer Application

Chunxiao Mu¹, Xiaoqing Wang²
¹ Management, Xi’an JiaoTong University City College, Xi’an, Shaanxi, 710018, China
² Management, Xi’an JiaoTong University City College, Xi’an, Shaanxi, 710018, China

Corresponding author’s e-mail: muchunxiao812@163.com

Abstract: With the development of e-commerce, online trading market has been growing rapidly. So the virtual market, virtual transactions, virtual logistics and other emerging industries have also developed rapidly. Virtual logistics alliance starts from the supplier's value chain, which is directly distributed to the buyers through the virtual processing of logistics enterprises, and the traditional way of transport, storage and other intermediate links are eliminated. In this paper, taking the virtual logistics alliance of Xi’an International Trade and Logistics Park as an example, the structural equation modeling method was adopted, and then, the influencing factors of the stability of the alliance and the five influencing factors studied by the promotion strategy in this research were analyzed deeply. The influence of the degree of continuous cooperation on the stability is relatively large, which is the key factor to determine whether the virtual logistics alliance is stable. And the stability of the virtual logistics alliance makes the members keep a small fluctuation in a period of time.

1. Introduction
At present, the world economy is about to usher in a major turning point, countries are carrying out a new round of economic restructuring, the technological development and the formation of large multinational companies play a vital role, which is also the main trend of the current economy (Zhang W, et al. 2016) [1]. In this process of continuous development, some emerging technologies and emerging industries also came into being, and the modern virtual logistics is born in this context. As the world's most advanced organization and management way, the virtual logistics has been adopted by the vast majority of enterprises, which has become the pillar of major companies. As a result, virtual logistics is increasingly critical in the world economy, and the impact on the world economy is growing. Moreover, its degree of development has been recognized as the primary criterion for measuring the national modernization and comprehensive national strength (Hu M, et al. 2014) [2].

Driven by the rapid development of science and technology, the major companies launched a battle for the third profit source. According to statistics, the annual output value of the logistics industry in China can reach more than 100 million yuan, furthermore, the output value increases year by year, and the growth rate is also increasing. It can be seen that the logistics industry prospects are good, the development space is huge. Therefore, in recent years, the country has paid more attention to the logistics industry, which has become the current country's main research object, moreover, the
specialized, scientific and technological world-class logistics enterprises have emerged constantly (Bingyuan L U, et al. 2015) [3]. In addition, with the development of e-commerce, the online trading market is also growing rapidly, so the virtual market, virtual transactions, virtual logistics and other emerging industries have been rapid development. With the fierce competition in logistics, the logistics enterprises are often large-scale, professional (Wang Q , et al. 2015) [4]. More logistics enterprises (especially small and medium-sized logistics enterprises) begin to cooperate with each other, so as to enhance the strategic competitiveness. In the non-equity logistics alliance, with the change of business and the complex relationship between the members of the alliance, the reorganization of the alliance is often characterized by cooperative relations, long-term and virtualized dynamics. Under normal circumstances, the specific logistics business needs is the driving force for the establishment of logistics alliance. Once the task is completed, the league will be fired and the members will return to the network organization.

2. State of the art

Virtual logistics (Virtual Logistics) is to use the modern logistics technology and e-commerce platform to achieve its flexible function. Different logistics companies join the same virtual alliance, however, their competitive relationship can’t be changed, which is determined by the essential characteristics of the market economy, and the cooperation also has a fixed scope of cooperation (Ai Y , et al. 2015) [5]. Although all of the people create the overall efficiency of the alliance together, the logistics companies still take to maximize the individual interests as the goal, the cooperation is a measure, and the competition is the goal. Realizing the importance of the individual interests of the members of the virtual logistics enterprise alliance optimal allocation benefits makes the interests of the whole alliance transform into the personal interests of the logistics enterprises, which becomes the most important link in the profit distribution of the alliance (Gao CY , et al. 2016) [6].

Recently, some scholars have built an assessment system that includes qualitative and quantitative indicators. Qualitative indicators include corporate image, culture and management compatibility, team cooperation and development space. Quantitative indicators include the size of regulatory costs, the improvement of service capabilities, the development of corporate technology, financial performance and information levels (Jiang X, et al. 2016) [7]. On the basis of the advanced algorithm of cloud center of gravity, a complete evaluation model is established, and the purpose is to conduct the comprehensive assessment on the partner evaluation in the virtual logistics alliance. This method is based on the evaluation index system of the cooperative partners. The decision matrix is formed according to the evaluation state values given by the experts, and the allocation is carried out by synthesizing the integration power data, besides, each index weight, the cloud model of cloud index are calculated by cloud theory. Then, good or bad potential partners are informed through the weighted deviation under the ideal assessment conditions, and an example for verifying the feasibility and availability is given (Wu X, et al. 2015) [8]. Based on the research on the interrelated technology of MAS and virtual logistics enterprise alliance (VLEA), combined with the characteristics of logistics activities, firstly, the feasibility and advantages of MAS theory applied to VLEA are analyzed, and the operation model of VLEA system based on MAS is put forward. Then, each logistics company is described as an agent (Wang Q, et al. 2015) [9]. The exchange and cooperation between agents are achieved through the MAS. The model can solve the requirements for loose coupling and dynamic logistics characteristics, and moreover, it can also better achieve the logistics and information technology.

3. METHODOLOGY

3.1 The concept of virtual logistics alliance

Logistics is the services field that involves a wide range, the link is multiple, the business volume is scattered and the logistics business activities occur at any time. Logistics services enterprises have their limitations to provide services objects and scope, the logistics needs are large, which is difficult
to find logistics services, resulting in idle and waste of a lot of resources. In this case, the virtual logistics enterprise alliance is established. The purpose of virtual logistics is to further integrate and use resources, improve efficiency through the organization, trade, service and virtual management network, and provide more convenient and efficient logistics network services for the production and circulation enterprises, so as to achieve convenient and efficient logistics network business activities, high-speed logistics operation, high security, high reliability and low cost (Liu F, et al. 2016) [10]. Compared with the operation of a single logistics enterprise, virtual logistics enterprise alliance often leads to unfair profit distribution, so it’s necessary to maintain the stability of virtual logistics enterprise alliance, so as to find a more reliable strategy for long-term cooperation and development. Today's virtual logistics enterprise alliance uses its own advantages to gather all information, strengthen the supervision of the network system, which gradually develops into a very advanced logistics model.

Virtual logistics is a new type of logistics organization model, which can achieve the purpose of high-speed logistics operations, high security, high reliability and low cost through the organization, communication, services and other virtual network logistics measures. Many logistics alliances fail to achieve the desired results. Usually, this is due to unfair distribution of profits. This paper takes the analysis of the virtual enterprise alliance of stakeholders under the rational conditions as the basis, on the basis of the multi-person cooperative strategy theory, the profit distribution model of the virtual logistics enterprise alliance is established, then, various cooperative countermeasures and methods are adopted and the solution is found in practice (Castaldi L, et al. 2015) [11].

3.2 The formation mechanism of virtual logistics alliance

The formation of the logistics alliance is not a natural selection process but the cooperative action adopted according to the expectations of companies to the future logistics market. Partners have the opportunity to create new value through inventory synergies in time and space repositioning. Study on the formation motivation of logistics alliance at home and abroad can be summed up in two categories: increasing the corporate profits and enhancing the competitiveness. According to the existing literature, there are three kinds of logic behind the value behind business cooperation. In this way, the partners may undertake the hidden purpose under open cooperation goals. In most cases, bad motions can arouse the contradiction between partners. Therefore, the impact on the logistics enterprises that whether the partners can increase the value and reach the consensus can’t be ignored (Wang X, et al. 2013) [12]. However, there are few empirical studies on the formation mechanism of China's logistics alliance. Therefore, this paper uses the questionnaire survey method to study the motive of forming logistics alliance, and the purpose is to provide theoretical support for the practice of China's logistics alliance.

According to the statistical analysis of 158 valid samples, the top nine motivations for the formation of the logistics alliance of enterprises include: increasing the resource utilization (89%), creating new business opportunities for the resource supplement (80%), expanding the existing market share (73%), opening up new market products/services (71%), in a long period of time, it is impossible to develop or replicate the unique contribution of a partner (41%). As a result, most of them are in line with the domestic and foreign scholars' research on the strategic alliance motive. However, there are differences in the order of importance of factors. For example, two factors that describe the competitiveness of core firms are the unimportant investigations "impossible to buy partners' contribution (17%), the contribution of the partners is irreplaceable (15%)." This indicates that respondents do not like the multinational companies to weigh the two motives, and they lack the understanding on the core competitiveness. According to the survey, in three important motives, domestic enterprises first tend to pursue the scale effect and fully use the resources, while the internalization skills and the desire to develop differentiated capabilities are relatively weak (Yang X, et al. 2016) [13].
Negative motivation is the cause of the conflict between the partners of the logistics alliance, which may lead to the instability of the alliance. The motivation for the enterprise to establish the logistics alliance is to realize the scale effect and make full use of resources and internalize the partner skills.

### 3.3 The nature of virtual logistics alliance

Virtual logistics alliance is a dynamic alliance of logistics industry. And the virtual logistics enterprise transaction process is virtualized. Members of the virtual logistics business are scattered in different regions. During the project, they do not belong to any organization. This makes it difficult to apply the traditional performance evaluation methods to the new organizational structures. Therefore, the performance evaluation of virtual logistics enterprises is mainly focused on assessing project participants and member business. The formation of virtual logistics enterprises is based on the reality of logistics activities. Therefore, the link between each member in the project implementation process is very important. Internet of Things application technology provides a big space for realizing the modern large and complex logistics activities. Meanwhile, the Internet of Things technology provides a specific technical and security application for completing the virtual logistics enterprise project. Internet of Things technology can achieve the integrity performance evaluation of enterprise members. Virtual logistics enterprises can achieve multi-level, multi-angle performance evaluation (Yang X, et al. 2016) [14].

Virtual logistics enterprise alliance is a virtual value chain alliance. In the modern development situation, enterprises are gradually transformed into a virtual transaction that spans time and space. Therefore, the logistics enterprises have to get more resources through the virtual market, so as to make the vast number of consumers and businesses enjoy the rich sense of science and technology logistics services, and this change promotes the formation of virtual logistics alliance. In fact, the virtual logistics alliance starts from the supplier's value chain, which is directly distributed to the buyers through the virtual processing of logistics enterprises, and the traditional way of transport, storage and other intermediate links are omitted, this can not only save a lot of manpower and resources, but also make the logistics delivery more efficient and high quality.

Virtual logistics alliance is cyclical. Because the virtual logistics alliance includes many sub-links, in which each link needs to be negotiated to form a complete logistics chain, so the time in this process also determines the entire virtual logistics alliance cycle. In addition, the virtual logistics alliance also needs to continue to run and grow, and the time required by this process is usually called the growth period. During the period of growth, all the links and members cooperate with each other and cooperate well with the organization, so as to give full play to the advantages of the virtual logistics alliance and complete the accurate information transmission (Mao X, et al. 2015) [15]. The last is the
mature period, after entering into the mature period, customers and a variety of business will continue to grow, and the virtual logistics alliance can get long-term and steady development, at this time, members in the virtual logistics alliance are able to operate very efficiently, and the profit obtained is also very significant.

3.4 The necessity of virtual logistics alliance

Virtual logistics alliance is a dynamic alliance of the logistics industry, which is directly distributed to the buyers through the virtual processing of logistics enterprises, and furthermore, the traditional way of transport, storage and other intermediate links are omitted. Members in the virtual logistics alliance are changing at any time, and they will change with the change of logistics business.

3.5 The establishment of virtual logistics alliance stability model

After establishing the virtual logistics alliance model, because the alliance has a high attraction, many companies that have not joined the alliance before want to join the alliance organization, and the virtual logistics alliance team will continue to grow. Of course, with the constant development and change, there is a small fluctuation between alliance members and interest relationship within a certain range, and this is also one of the natures of virtual logistics alliance.
The following is the significance test result of the path coefficient:

![Diagram showing the final calculation of the model](image)

**Fig. 4 The final calculation of the model**

### 4. Result analysis and discussion

At present, there are about 1,500 logistics enterprises in Xi'an, but the scale of these logistics companies is mostly small, the function is not complete and the service ability is uneven, which is not the full sense of the "logistics enterprise", and this causes that the market development of the logistics industry in Xi'an International Trade and Logistics Park ceases to advance, the professional compound talents are lacking and enterprise transaction costs are high. With the increasingly fierce competition in the market today, the requirements proposed for the service of logistics enterprises are higher, which are becoming more and more personalized, thus, the emergence and development of virtual logistics alliance are promoted.

![Diagram showing the structural equation model](image)

**Fig. 5 Structural equation model**

In this paper, the structural equation modeling method was adopted, and one or some linear combinations were retrieved out within the explanatory variable space. Assuming that there was a certain logical relationship between each explanatory variable and the response variable, the thinking structure is shown in Figure. The proposed model mainly included two measurement equations and three variables, and then, a linear regression model between the explanatory variables and the observed variables was established to reflect the relationship between the explanatory variables and the response variables.
According to the results, it can be seen that at the aspect of resource trust, the size that was in line with the reliability was 0.865343, the average size was 0.621938, the reliability coefficient size was 0.823569; at the aspect of members, the size that was in line with the reliability was 0.882635, the average size was 0.674583, and the reliability coefficient size was 0.853021; then, at the aspect of the information system level, the size that was in line with the reliability was 0.870023, the average size was 0.631778, the reliability coefficient size was 0.865020; in terms of stability, the size that was in line with the reliability was 0.834789, the average size was 0.701277, the reliability coefficient size was 0.813256; and at the aspect of the continuous cooperation commitment, the size that was in line with the reliability was 0.917068, the average size was 0.744520, the reliability coefficient size was 0.844421. Integrating the above data information, it can be concluded that in five influencing factors studied in this paper, the influence of the degree of continuous cooperation on the stability is relatively large, which is the key factor to determine whether the virtual logistics alliance is stable. The stability of the virtual logistics alliance makes members of each group maintain a small fluctuation in a certain period of time, and then conduct the mutual cooperation and get profits commonly.

5. CONCLUSIONS
In this paper, the virtual logistics alliance in Xi’an International Trade and Logistics Park was taken as an example, and the structural equation modeling method was adopted; then, the influencing factors of the alliance stability and five influencing factors studied by the promotion strategy in this study were analyzed deeply; moreover, the impact of the degree of continuous cooperation on the stability was relatively big. In terms of internal consistency, at the aspect of the resource trust, the size that was in line with the reliability was 0.865343, the average size was 0.621938, the reliability coefficient size was 0.823569; at the aspect of members, the size that was in line with the reliability was 0.882635, the average size was 0.674583, and the reliability coefficient size was 0.853021; then, at the aspect of the information system level, the size that was in line with the reliability was 0.870023, the average size was 0.631778, the reliability coefficient size was 0.865020; in terms of stability, the size that was in line with the reliability was 0.834789, the average size was 0.701277, the reliability coefficient size was 0.813256; and at the aspect of the continuous cooperation commitment, the size that was in line with the reliability was 0.917068, the average size was 0.744520, the reliability coefficient size was 0.844421. The results show that the greater the comprehensive reliability is, the better the internal consistency of the measurement model is. In five influencing factors studied in this study, the impact of the degree of continuous cooperation on the stability is relatively large, which is the key factor to determine whether the virtual logistics alliance is stable. Then, the stability of the virtual logistics alliance can make members of each group maintain a small fluctuation in a certain period of time.

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