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Rookie logistics supply chain network and its characteristics —— based on social network analysis

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Abstract: With the continuous development of the network economy, and the network economy is closely linked to the express delivery industry has made unprecedented development, Rookie logistics is one of the typical representative. This article mainly to the online shopping platform 159 online shoppers in the 2016 year shopping information for the data base, build rookie logistics supply chain network, and use Ucinet and Netdraw software to analyze the relevant data and found that the current stage of rookie logistics supply chain The existing problems in the network, proposed for the future rookie logistics supply chain network development recommendations.
Keywords: Rookie logistics, Supply chain network, Social network.

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1. INTRODUCTION

At present, China's economic development has entered a new stage of seeking breakthroughs. Supply chain network is an important link between modern social production and social consumption. Under the new situation of China's current economic reform, the healthy development of supply chain network has a bearing on China's economic development. Larger impact. The Chinese government has always attached great importance to the healthy development of the logistics industry. Since the first "progressive implementation of logistics" in 2002, the term logistics has appeared in the government's work report many times. In the 2017 government work report, the development of "smart logistics" was proposed. A goal is to promote the development of the logistics industry to a new stage, and the healthy development of the logistics industry is inseparable from the continuous improvement of the supply chain management level. Therefore, how to explore the supply chain network and its characteristics under the requirements of new economic development requires us to conduct new research on the supply chain network from different angles. Although in the past social practice and theoretical research process, China's supply chain network and its characteristics of the inquiry activities have achieved many results, and made great contributions to the development of the logistics industry. However, under the new economic development situation, the uniqueness of enterprise organization is prominent, the structural change of supply chain network is more intense, the introduction and withdrawal mechanism of nodes in supply chain network organization is more

changeable, and the social relationship in supply network plays a constant role. Variety. How to ensure that the supply chain network can better play the role of transmitting goods, information and funds in China's future economic development requires us to study in detail the current supply chain network and its characteristic characteristics.

As a representative of the new logistics construction mode in the process of logistics development in China, rookie logistics is not only a new type of social network, but also one of the supply chain networks that are most closely related to the development of Internet economy in China in recent years. Since the establishment of the rookie logistics, it has had a tremendous impact on the development of China's logistics industry, reflecting the new forms and development trends of China's supply chain network in the emergence stage.

In the context of the “supply side” economic reform, this paper conducts an in-depth study of the supply chain network and its characteristics from the perspective of social networks, and provides different insights into the supply chain network and its characteristics, and combines with the rookie logistics in China to find supply. The problems existing in the chain network and the new trend of development provide suggestions for the current supply chain network management in China, which not only can expand the application space of social network analysis and supply chain network management, but also help to strengthen the supply chain network management. The theoretical basis provides a certain reference and enlightenment for the improvement of the supply chain network management level and the expansion of innovative thinking in China.

2. LITERATURE REVIEW

As an important research topic, supply chain network has been concerned by many scholars. Many scholars have applied their research results to the development of supply chain through research. Nagurney et al. [1] have in-depth research on the structure of the supply chain, and established a supply chain system with a three-tier network structure, namely manufacturers, retailers and customers; there are also complex relationships between consumers and buyers. Oke A[2] and others provide emergency measures for the occurrence of supply and demand risks by establishing a multi-party procurement emergency inventory strategy to provide consumers with promotional and incentive services.

Empirical research is the main method for Chinese scholars to study the content of supply chain network. Through the collation and refinement of foreign research results, a new research direction is proposed and the research results are obtained. Ji Min et al [3] carried out hypothesis and test by studying the relationship between innovation willingness, cluster supply chain network and innovation performance, and constructed an innovation model based on the relationship between the three, and concluded that the factor of influence on the innovation performance mechanism of cluster enterprises is The core network of the cluster supply chain and the supporting network, the relationship between the two has a mediating effect on the enterprise; Xu Naru [4] et al. use the method of induction and summarization to conduct a special study on the behavioral characteristics and operational phenomena of the supply chain network, and The topology model is constructed by using complex network theory, and the new characteristics of the supply chain network model are proposed. The characteristics of complex supply chains are widely concerned in the academic world.

Wang Changfeng [5], starting from its openness and emergence, combines supply chain entities with specific environments and studies their mutual transfer phenomena in combination with corporate innovation behaviors.

From the theory of the above research, we can easily find that scholars and experts on the supply chain network are deeply involved in the empirical research, both internationally and domestically. However, domestic and foreign research focuses differently, foreign research is more focused on the whole, while domestic is based on a part of the supply chain network. This paper studies the supply chain network from the perspective of social network, and it is the inheritance of past related theories in light of the actual situation in China at this stage.

3. RESEARCH METHODS

The sociological theory holds that society is not composed of individuals, but consists of a complex social network relationship, which includes “points” and “edges”. The network relationship is reflected by the relationship between “points” and “edges” [6]. This paper uses the social network analysis method to analyze the rookie logistics supply chain network from the centrality and aggregation coefficient respectively, constructs the rookie logistics supply chain network model, studies its social network characteristics, and explores the information through the analysis of the individual and overall attributes of the network. The characteristics of the network formed by logistics companies and online shoppers in the technical environment [7, 8].

4. ANALYSIS OF THE ROOKIE LOGISTICS SUPPLY CHAIN NETWORK

4.1 Construction of rookie logistics supply chain network

a. Data source and processing

This article collected a total of 2,046 online shopping information of 159 consumers in 2016, including 1664 shopping information using SF, Yuantong, Shentong, Zhongtong and Yunda, and then summarized the data, established a database based on the extracted fields, and exported The total number of transportations of each logistics company, and finally the delegation matrix of online shoppers and logistics companies.

b. Determine the network node

In the research of this paper, the logistics company involved in the rookie logistics supply chain network and 159 online shoppers as network nodes, each logistics company and online shopper correspond to a node in the rookie logistics supply chain network. The size of the node also represents the importance of the node. The larger the node, the larger the node, the greater the influence, and the higher authority, and the easiest to attract other nodes. Cooperation is the node that produces the new edge.

c. Determine network relationships

Network relationship refers to the entrusted relationship between various logistics companies and online shoppers in the rookie logistics network. The representation in the rookie logistics supply network is the connection or the side of the node. In the selected data, a shopper is in Taobao or Tian. When a cat goes shopping and uses a logistics company of rookie logistics, the relationship between the shopper and the logistics company is called a network relationship. In the network, it is

represented as the line connecting the nodes. The more complicated the line, the more frequent the logistics company and the more shoppers are entrusted to transport.

d. Building a network

This paper selects the online shopping information of 159 online shoppers who used the rookie logistics in 2016, and extracted the logistics information, which involves the logistics information of the five express delivery companies of SF, Yuantong, Shentong, Zhongtong and Yunda in the rookie logistics. The basis of this paper. This paper is based on the following considerations: First, when constructing the rookie logistics supply chain network, the data is selected from the daily shopping information of the consumers to ensure the authenticity and accuracy of the data source. Second, the focus of this paper is on the rookie logistics supply chain. The network and its network characteristics; third, the data is selected for a full year, ensuring the integrity of the data.

4.2 Rookie logistics supply chain network topology

a. The overall size and intensity of the rookie logistics supply chain network

The total number of orders counted in this paper is 2046, involving 16 logistics companies, of which 5 logistics companies in the rookie logistics have a single order of 1664. According to calculations, the logistics companies under the rookie logistics supply chain network accounted for 81% of the total number of logistics orders, indicating that the logistics companies involved in the rookie logistics supply chain network have an absolute dominance in express delivery.

Table 1 Table of rookie logistics and transportation

Logistics company	Number of logistics	Average number of pieces per person
SF	62	1.05
Yuantong	457	7.75
STO	407	6.90
Zhongtong	392	6.64
Rhyme	346	5.86
total	1 664	28.20

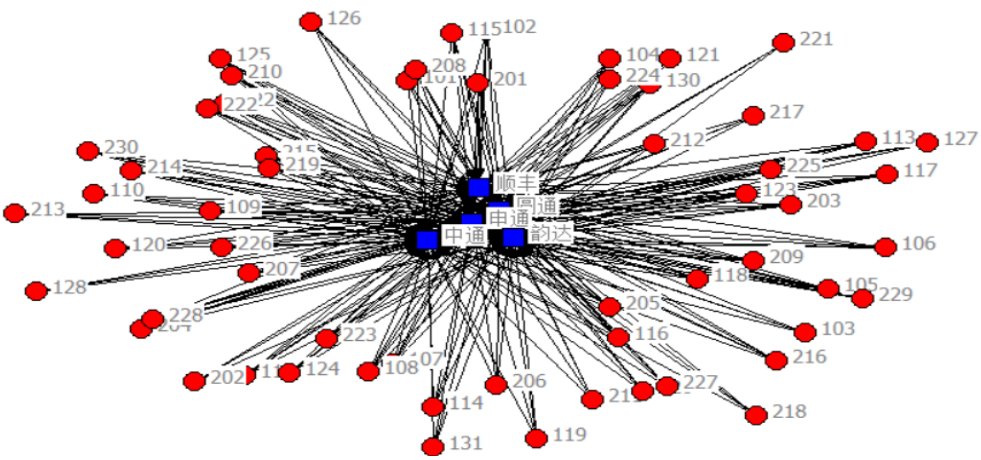

Figure 1 rookie logistics supply chain network diagram

b. Overall network analysis

Through the statistics of online shopping information of 159 online shoppers on the online shopping platform, and generating a database, the information is picked up according to the keywords, and finally the delegation relationship matrix is formed. Import the delegation relationship matrix into Ucinet software to generate the corresponding file, and then use Netdraw software to generate the rookie logistics supply chain network, as shown in Figure 1:

The rookie logistics supply chain network reflected in this article is the node of the 159 online shoppers involved in Taobao and Tmall online shopping activities and the logistics company included in the rookie logistics responsible for transportation during 2016. Each connection of the network represents shoppers and logistics. The entrustment relationship between companies, but can not reflect the number of commissions between shoppers and logistics companies, which will mean that all connections in the rookie logistics supply chain network map are equal in weight. Figure 1 is based on the logistics information of 159 online shoppers online shopping, using Netdraw to draw a rookie logistics supply chain network map, the higher the degree of aggregation, indicating that logistics companies and more online shoppers have commissioned logistics, and vice versa, Sparse is the number of commissions. In Figure 1, it can be seen that there is no edge between some shoppers and a certain logistics company. This means that during 2016, the online shopper and the logistics company did not have a logistics commission, so there was no entrusted relationship. Each logistics company included in the logistics supply chain network should pay attention to this problem in the future development process, and enhance the connection between the online shopper and the company, that is, the logistics commission.

c. Analysis of the characteristics of the rookie logistics supply chain network

1) Central analysis

① Center degree

This paper uses Ucinet to analyze the data. The main path of the analysis is: Network → Centrality→Degree, as shown in Table 2:

Table 2 rookie logistics supply chain network point degree

	1	2	3	4
	OutDegree	InDegree	NrmOutDeg	NrmInDeg
4 Rhyme	36.000	21.000	75.000	43.750
1 Yuantong	35.000	29.000	72.917	60.417
3 Zhongtong	31.000	29.000	64.583	60.417
2 STO	31.000	31.000	64.583	64.583
5 SF	5.000	28.000	10.417	58.333
DESCRIPTIVE STATISTICS				
	1	2	3	4
	OutDegree	InDegree	NrmOutDeg	NrmInDeg
1 Mean	27.600	27.600	57.500	57.500
2 Std Dev	11.482	3.441	23.921	7.169
3 Sum	138.000	138.000	287.500	287.500

4 Variance	131.840	11.840	572.222	51.389
5 SSQ	4 468.000	3 868.000	19 392.361	16 788.195
6 MCSSQ	659.200 0	59.200	2 861.111	256.944
7 Euc Norm	66.843	62.193	139.256	129.569
8 Minimum	5.000	21.000	10.417	43.750
9 Maximum	36.000	31.000	75.000	64.583
Network Centralization(Outdegree)=21.875%				
Network Centralization(Indegree)=8.854%				

Due to software limitations, this paper selected the top 5 online shopper logistics information and rookie logistics 5 logistics companies to form a 5 × 5 square matrix for analysis, from Table 2 Yunda, Yuantong, Zhongtong, Shentong, SF5 express company The analyzed data shows that the number of introductions and outputs of absolute point center degree and relative center degree are different. This is mainly because each online shopper has different commission times for each logistics company. The main research in this paper is Referring to the number of logistics, it is important to consider the introduction of degrees. The more the number of introductions shown in Table 2, the more logistics companies have more commissions in express logistics and transportation, and they are more trusted by online shoppers, generating more entrusted relationships and serving rookie logistics. The development of the chain network makes more contributions.

② intermediate center

The intermediate center degree of the rookie logistics supply chain network is analyzed. The menu path analyzed in Ucinet is Network → Centrality→Nodes Betweenness. The results show that the absolute intermediate center and relative intermediate center of the five logistics companies are both 0. Mainly because there is no cooperation between online shoppers and online shoppers, transportation companies and transportation companies in the rookie logistics supply chain network. At the same time, there is no entrusted relationship between online shoppers and online shoppers, and relative logistics companies. There is also no entrustment relationship with the logistics company through the online shopper, which is an important issue in the development of the rookie logistics supply chain network.

d. aggregation coefficient

This paper mainly analyzes the overall aggregation coefficient and weighted aggregation coefficient in the aggregation coefficient, and compares the aggregation coefficients of the five logistics companies in 2016 with the number of logistics orders, as shown in Table 3. This paper analyzes the aggregation coefficient of the scientific cooperation network through Ucinet software. The menu path of the analysis is Network→Cohesion→Chestering Coeffcient. The partial results are shown in Table 3:

Table 3 Rapeseed logistics supply chain network aggregation coefficient

Overall graph clustering coefficient:6.900		
Weighted Overall graph clustering coefficient:6.900		
Node Clustering Coefficients		
	1	2

	Clus Coef	nPairs
1 Yuantong	6.167	6.000
2 STO	6.333	6.000
3 Zhongtong	6.500	6.000
4 Rhyme	6.750	6.000
5 SF	8.750	6.000

It can be seen from Table 3 that the aggregation coefficient in the rookie logistics supply chain network decreases from SF to Yuantong once, the overall aggregation coefficient decreases from 8.75 to 6.167, and the weighted aggregation coefficient is all 6. From these two indicators, it can be seen that each The aggregation coefficient of the logistics organization carried by the logistics company is different, and the aggregation coefficient of the entire network organization is 6.9.

4.3 Problems and reasons for the rookie logistics supply chain network

a. Problems

1) The network nodes are obviously separated. In the rookie logistics supply network diagram constructed in this paper, the logistics company and the online shopper are obviously two parts, but there is a simple entrusting relationship between the logistics company and the online shopper. There is no entrusted relationship between online shoppers and online shoppers, logistics companies and logistics companies. This is the most significant unilateral commission.

2) The node center is not high, and there is no obvious center point. In the network structure, the logistics companies are located in the inner circle, while the online shoppers are scattered and split at the edge of the figure, without forming an absolute center point. At the same time, no small group is formed by the logistics company or the online shopper.

b. Cause

1) The first five logistics companies are SF Logistics. The other four are separated or imitated from SF Logistics. Most of them provide homogenized services, so they are difficult to compete and form themselves. The absolute competitive advantage becomes the absolute center of the network or forms its own small group.

2) The commissioning relationship of logistics companies in the rookie logistics supply chain network mainly comes from different online shoppers in the network. There is no communication between them, and it is difficult to achieve absolute trust. Therefore, the entrusted relationship is only left at the simplest level.

3) The main service of rookie logistics is Taobao and Tmall, while the logistics company is responsible for the commissioning tasks of the various online shopping platform network, so there are certain difficulties in information exchange and cooperation.

4.4 Development proposals

a. Logistics company in the rookie logistics supply chain network

1) Expand the logistics alliance and expand the cooperation scope of the whole rookie logistics. At this stage, the rookie alliance launched by the rookie logistics has a development trend in this respect, but only the increase in weight and the quality requirements are not high. Most of the logistics

companies are members of the rookie alliance, but these logistics companies simply add rookie logistics, and there is no in-depth cooperation.

2) According to the cooperation relationship that some logistics companies have already produced at this stage, the single information exchange in the entrusted relationship is changing, and it has begun to involve the cooperation of express transportation. This cooperation includes the use of a transportation vehicle, transportation express relay, etc., using these means to optimize the allocation and integration of resources to avoid unnecessary competition.

b. Online shopper

1) The shift in thinking from the client to the trustee. Online shoppers need to change the unilateral purchase of goods in the past. In the end, they only need to participate in the concept of signing, and actively participate in the entire logistics process, especially before and during the transportation.

2) Take a certain role in the last bar of the transfer process. Many logistics companies have already made many attempts in the past. In the future development, logistics companies in the rookie logistics supply chain network will certainly learn from this, and online shoppers should actively participate in it and use the action to promote the rookie logistics supply chain network. development of.

5. CONCLUSION

At present, the cooperation between logistics companies and logistics companies in the rookie logistics supply chain network is still a very shallow cooperative relationship, and cannot involve the deepening of their respective business. At the same time, the entrusted relationship in the rookie logistics supply chain network is a random entrusted relationship. Most online shoppers do not have the meaning that they can actively choose their own transportation company. This kind of entrustment relationship is not profound. In the rookie logistics supply chain network, no logistics company can form its own network small group, which means that each logistics company provides homogenized logistics services, which cannot allow online shoppers to choose one of them. The company's own logistics commissioning has led to the frequent occurrence of entrusted relationships between online shoppers and logistics companies in the rookie logistics supply chain network, which is unstable. In the future rookie logistics supply chain network, there is a trend of two-way interaction between logistics companies and online shoppers. Although this feature is not shown in the current statistics, this trend is extremely obvious in the overall development situation, such as The mutual information and cooperation between each other has been greatly incorporated into some small and medium-sized logistics companies and some personal logistics agents.

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