

The Fuzzy Comprehensive Evaluation of the Core Competitiveness of the third Party Logistics Enterprises

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Abstract: According to the development of the third party logistics enterprises in China, According to the development of the third party logistics enterprises in China, Select the index which can focus on the management characteristics of the third party logistics enterprises to establish the index system, And it can reflect the overall operation of the company in a more comprehensive way. The fuzzy comprehensive evaluation model of core competence of third - party logistics enterprise is established by using analytic hierarchy process .

Keywords: The third party logistics enterprises; Core-competitiveness; Appraise

1. Introduction

The logistics development of our country rises in 1970s, grow in the middle of 90s. In the fierce competitive environment, the lack of necessary core competitiveness. How to achieve sustainable and healthy development in competition is a severe problem facing logistics enterprises. Cultivating our core competence as soon as possible is an effective way for our logistics enterprises to develop healthily. This requires logistics enterprises to have a better comprehensive understanding of the core competitiveness, But at present, there is not much research on competitiveness. Therefore, the core competitiveness of logistics enterprises is analyzed. It is of great significance to improve the competitiveness of enterprises, optimize logistics structure and promote economic development.[1]

2. Definition and Characteristics of third Party Logistics

2.1. Definition of third-party logistics

Third party logistics is a logistics service model that provides special or comprehensive logistics system design or system operation for customers.

The generalized third party logistics refers to the existence form of the self operated logistics of the enterprise. The form of logistics services outside the buyer and seller is called the third party logistics.[2]

The narrow sense of third party logistics refers to the specific third party logistics activities which can provide special logistics services.

2.2. Third-party logistics is characterized

The relationship is contractual, the service is individualized, the function is specialized, the management systematized, the information network and the management systematized.[1]

3. The construction of the evaluation index system of the core competence of the third party logistics enterprise

According to the development of the third party logistics enterprises in China, based on the factors that affect the core competitiveness, the index system is established by selecting the indexes that can focus on the management characteristics of the third party logistics enterprises. And can fully reflect the overall operation of the company, this paper from the resource level, technical level, market level and management level of four indicators. Each indicator includes a number of secondary indicators. The indicators and implications are as follows:

3.1. Enterprise resources

3.1.1. Human resources

Human resource is an important intangible resource of third party logistics. Third party logistics is essentially a service enterprise. The whole operation condition and service quality of the enterprise are directly related to the number of customers, and the improvement of the operation condition and service quality of the enterprise is, in the final analysis, the improvement of the overall quality of the enterprise staff. Human resources is an important factor in evaluating the core competitiveness of enterprises[3].

3.1.2. Equipment resources

The equipment resource is the basis of the operation of the third - party logistics enterprise . The size of the enterprise scale determines the manager ' s requirements for the enterprise . The larger the scale , the higher the requirement , the higher the standardization . The higher the equipment resources of the enterprise and advanced , the cost of the operation of the company can be greatly reduced , and the efficiency can be greatly improved [4].

3.2. Enterprise management

The essential factor that affects the operation of a company is its management level. A scientific and efficient way of management directly affects the strength of the core competitiveness of an enterprise.

3.2.1. Ability to cope with market

The change of the market is the external environment that affects the core competence of the enterprise. The managers of the enterprise should pay attention to the change of the market all the time, and improve the ability to adapt to the risk change existing in the course of the enterprise management[3]

3.2.2. Physical distribution grade of service

Logistics enterprises are a service department . The quality of logistics service directly affects customer satisfaction and becomes an important source of profit for logistics enterprises . The improvement of quality of service can maintain old customers , attract new customers , bring sustainable development for enterprises , and maintain competitiveness .

3.2.3. Corporate culture

Corporate culture refers to the corporate culture which can reflect the characteristics of the enterprise with the core of enterprise values. It is a kind of intangible wealth. It includes the spirit of enterprise, corporate morality. Shaping corporate culture can give people spiritual support. The excellent corporate culture can stimulate the enthusiasm and initiative of human beings and exert a subtle influence on the development of human beings. Shaping the enterprise culture is a people-oriented management method. [8].

3.3. Information technology

3.3.1. Logistics Information System

Information technology reflects the level of modern management of logistics enterprises, which is mainly reflected in the utilization rate, ownership rate, investment return rate and investment growth rate of information technology. Logistics information management system is a logistics business and enterprise management platform based on the standardization of logistics information transfer, digitalization of storage and computeri-

zation of logistics information processing. Establishing and improving logistics information system is a necessary condition for logistics enterprises to gain competitive advantage.[5]

3.3.2. Core technology

Core technology affects the development of core competitiveness of logistics enterprises. The number of core technologies owned by third-party logistics enterprises affects the size of enterprises and the size of the market. The customer demands the service quality and level of the logistics industry more and more. In order to maintain the absolute advantage in the fierce competition, it is necessary to continuously increase the service content, improve the service quality and management level.[6]

3.3.3. Logistics technology

The application of logistics information technology mainly includes two aspects: bar code and automatic identification technology, logistics information management system. Bar code and automatic recognition technology has high speed automatic input, high reading rate, low misreading rate. Easy to operate, low equipment investment and other advantages, effectively solve logistics data acquisition, input, processing, transmission "bottleneck" tools. Mainly from the logistics technology research and development ability and logistics technology application ability two indexes to evaluate.

3.4. Market advantage

3.4.1. Market share

The market share can directly reflect the satisfaction degree of the service provided by the enterprise to the customer . The market share is about high , which indicates that the higher the customer satisfaction . The market share is the direct embodiment of the competitive advantage of the logistics enterprise .[7]

3.4.2. Type of business

The more kinds of businesses and types of services the logistics enterprises have, the greater the competitive advantage they are. Providing various services in different businesses can get more market space and attract more customers.[8]

3.4.3. Price attraction

Third party logistics enterprises mainly provide customers with special logistics services. At the same time, in the case of constant service quality, low prices can attract more customers to visit and expand market share. Improve the competitive advantage of enterprises.[7]

3.4.4. Customer satisfaction

The customer satisfaction index reflects the customer's recognition of the third party logistics enterprise's service. [9]. can only improve the quality of customers' service and get their recognition, so that they can cooperate with customers for a long time.

For example, the establishment of the evaluation index system of the core competitiveness of third-party logistics enterprises is shown in Table 1.

Table 1. The third Party Logistics Enterprise Core Competitiveness Evaluation Index System

Aim	Class indexes	Secondary indexes	
Core Competence of Third Party Logistics Enterprise	ERP	human resources	Comprehensive quality of managers
		Equipment	Comprehensive quality of staff
			Degree of automation of logistics equipment
			Logistics equipment standardization degree
	business administration	Ability to cope with market	Market acuity
		physical distribution grade of service	risk control ability
			Meet the customer 's demand rate
			Intact rate of goods
			Inventory safety rate
			Cargo tracking rate
	corporate culture	Validity of customer complaints	
	information technology	logistics information system	Enterprise culture shaping power
			Information technology investment level
		core technology	Comprehensive service capacity
			management informative level
	market superiority	logistics technology	Number of core technologies
			R & D capability of logistics technology
		market share	Logistics technology application ability
market share			
class of business	class of business		
	Price attraction	Price attraction	
customer satisfaction	customer satisfaction		

4. The Fuzzy Comprehensive Evaluation of the Core Competitiveness of the third Party Logistics Enterprises

Based on the data of the company, based on the above evaluation indicators, the fuzzy comprehensive evaluation method is applied to establish the fuzzy comprehensive evaluation model of the core competitiveness of the third party logistics enterprises.

4.1. Set up a fuzzy comprehensive evaluation model

Fuzzy comprehensive evaluation method is a comprehensive evaluation method based on fuzzy mathematics, which transforms qualitative evaluation into quantitative evaluation according to the theory of fuzzy mathematics.[10]

It has the characteristics of clear result and strong systematization, and can solve all kinds of problems which are difficult to quantify.

4.1.1. Set up evaluation index set

A set of indexes is a set consisting of a variety of indexes, represented by a set A, that is: $A = (B1, B2, B3, B4)$ in which:

$$B1=(C1, C2) \quad B2=(C1,C2, C3)$$

$$B3=(C1, C2, C3) \quad B4=(C1, C2, C3,C4)$$

The strength level of the core competence is divided into four levels, that is, very strong, strong, general and weak. As shown in Table 2.

Table 2. Core Competitive Strength Grade

Order of evaluation	Mar value	Exposure environment
very strong	4	100
Strong	3	80
same as	2	60
weaker	1	40

4.1.2. Inviting 10 experts to make a comprehensive evaluation of the factors

Set the evaluation set to be P, standard

$$P=(P1, P2, P3, P4, P5, P6, P7, P8, P9, P10),$$

The results of the evaluation are shown in Table 3. The evaluation score is filled into the table by the expert evaluation form ,As shown in Table 4.

Table 3. Expert Evaluation Table

Enterprise	Enterprise management	Information technology	Market advantage U4
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	resources U1		U2			U3						
	U11	U12	U21	U22	U23	U31	U32	U33	U41	U42	U43	U44
P1	3	1	1	4	2	1	3	3	2	4	1	1
P2	1	1	4	2	2	3	2	3	3	4	2	1
P3	4	2	3	3	2	4	1	3	4	3	3	3
P4	4	4	2	3	1	2	2	3	4	4	3	2
P5	3	1	4	3	3	4	1	2	3	2	3	2
P6	2	2	4	3	1	2	2	3	3	1	2	4
P7	4	1	2	1	4	4	1	3	3	3	2	2
P8	3	1	4	2	1	1	4	3	2	2	3	2
P9	1	1	3	1	4	4	2	4	3	3	4	4
P10	3	1	2	3	3	4	2	2	4	3	4	2

Table 4. Third-party logistics enterprise's core competitiveness index weight summary

Class indexes		Secondary indexes		Grade			
factor	weight	factor	weight	Y1	Y2	Y3	Y4
Enterprise re-sources U1	0.4	human resources	0.5	0.4	0.3	0.3	0
		Equipment	0.5	0.3	0.2	0.5	0
Enterprise management U2	0.14	Coping with market ability	0.27	0.1	0.5	0.4	0
		physical distribution grade of service	0.16	0.2	0.2	0.4	0.2
		corporate culture	0.1	0.2	0.3	0.3	0.3
Information technology U3	0.34	logistics information system	0.17	0.4	0.3	0.2	0.1
		core technology	0.28	0	0.4	0.6	0
		logistics technology	0.11	0.3	0.2	0.3	0.2
Market advantage U4	0.13	market share	0.11	0	0.3	0.4	0.3
		class of business	0.21	0.1	0.1	0.6	0.2
		Price attraction	0.07	0.3	0.1	0.4	0.2
		customer satisfaction	0.1	0.3	0.2	0.1	0.4

4.2. Fuzzy comprehensive evaluation

The fuzzy evaluation matrix of the company is constructed, and the fuzzy relation matrix Ri of the first-order index can be obtained from the table

$$R1 = \begin{bmatrix} 0 & 0.3 & 0.4 & 0.3 \\ 0.1 & 0.3 & 0.2 & 0.4 \end{bmatrix}$$

$$R2 = \begin{bmatrix} 0.2 & 0.4 & 0.2 & 0.2 \\ 0.1 & 0.3 & 0.4 & 0.2 \\ 0.1 & 0.5 & 0.1 & 0.3 \end{bmatrix}$$

$$R3 = \begin{bmatrix} 0.1 & 0.2 & 0.3 & 0.4 \\ 0.1 & 0.2 & 0.2 & 0.5 \\ 0.1 & 0.3 & 0.2 & 0.4 \end{bmatrix}$$

$$R4 = \begin{bmatrix} 0.1 & 0.3 & 0.2 & 0.3 \\ 0.1 & 0.4 & 0.4 & 0.1 \\ 0.1 & 0.3 & 0.3 & 0.3 \\ 0.1 & 0.2 & 0.3 & 0.3 \end{bmatrix}$$

Combined with the evaluation weight of the index, the comprehensive evaluation set of the index is obtained

$$U1=(0.07, 0.32, 0.28, 0.33)$$

$$U2=(0.22, 0.34, 0.24, 0.20)$$

$$U3=(0.32, 0.24, 0.26, 0.19)$$

$$U4=(0.35, 0.17, 0.30, 0.17)$$

Combined with the first class index weight set, it is concluded that the evaluation set of the third party logistics company's core competitiveness is:

$$B=(0.22, 0.29, 0.35, 0.15)$$

Evaluate the results, With Y=(strong , stronger , generally weaker) ,The maximum value in evaluation set B is 0.35,The corresponding comment is "general",Therefore, the third party logistics company's core competence fuzzy appraisal is "general".[10]

This paper makes a theoretical analysis on the evaluation of the core competitiveness of third-party logistics companies. The index includes enterprise resource, information technology, market advantage and enterprise management. The weight of each index is determined and the evaluation index system of the core competence of Yuan tong Express Company is constructed. in order to realize the scientific nature of the evaluation of the index system ,The fuzzy comprehensive evaluation method which can transform qualitative analysis into quantitative analysis is also used in the process of analysis. The method has reference for the development of third-party logistics enterprises .

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