Research on Evaluation Index System of the Third Party Logistics

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Abstract—**This paper construct the evaluation index system of the third party logistics enterprises. Different from other researches, it was based on the Penrose's Firm Growing Theory. And it summed up the four elements of enterprise survival and development, which were named capital, professional skill, talent and market. Other than these general characteristics, Third party logistics enterprises also have the characteristics of timeliness, consistency and demand fluctuation. On the request of timeliness and consistency, the paper puts forward the concept of logistics speed and its calculation method.**

Keywords—Enterprise development theory; third party logistics; evaluation index; logistics speed

I. INTRODUCTION

How the foreign scholars evaluate logistics enterprises were developed from the earliest logistics service quality to comprehensive evaluation of logistics enterprise performance. The service management research organization named PZB in USA raised a gap-model in 1985 and established SERVQUAL perceived quality evaluation methods in 1988[1].In 1994, Agterberg pointed that we can carry quantitative study on logistics performance at the aspects of sales volume growth, working conditions, customer satisfaction, product utilization, cost, profit, social responsibility, timely delivery, etc.[2].Reviewing these literatures, basically its view is based on the standpoint of the enterprise, although it has a positive effect on the competition of enterprises, it ignored the evaluation of social benefits, especially the evaluation from stakeholders such as consumers and enterprise employees. Therefore, somehow it has one-sidedness.

The evaluation index system of logistics enterprise widely used in China at present is *Classification and evaluation index of logistics enterprises*(GB/T19680-2013),which is proposed and summarized by the National Logistics Standardization Technical Committee. The index system set up the evaluation index system of logistics enterprises based on statistical report. The system use financial and business scale for assessment, divided the enterprise into several levels. The level is the result of evaluation. It has the advantages of easy operation, but it is too general, does not take the enterprise operation condition, the society, the economic benefit, and the service quality and so on essential factors into account. It can't fully

reflect the operating conditions of enterprises nor fully meet the needs of enterprise evaluation[3].

As early as 2003, Chinese scholar Gan Hongyun has evaluated the performance of logistics enterprises from the way of logistics enterprises' internal and external, consumers is the main body of evaluation. The problem of it is that the classification of logistics enterprises is not clear and the evaluation subject is kind of one-sided[4].Besides, there are many scholars explored the construction of index system and the application of evaluation methods from different angles, the financial analysis, service quality, operating costs, etc. From the current research, research on evaluation index system of logistics enterprises in China is still at the stage of exploration, the construction of the system is often described from the existing one or a few angles, Which is lacks of integrity.

The establishment of scientific evaluation index system of the third party logistics enterprises is not only the requirement of the development of China's logistics industry, but also the new application of statistical indicators in different fields. Based on the existing research, this paper analyzes the commonness and characteristics of third party logistics enterprises with general enterprises in China, and based on the theory of enterprise development; construct the evaluation index system of the third party logistics enterprises.

II. THEORETICAL BASIS

The modern enterprise theory thinks that the enterprise is the way to coordinate the economic activities as well as the market. It is a kind of resource allocation mechanism. The purpose of the enterprise is more effectively allocate scarce resources, reduce the use of cost and improve the economic efficiency. The factors that determine the development of enterprises can be divided into four aspects: talent, capital, market and professional skill[5].

Modern logistics refers to the whole process of planning, implementing and controlling the flow and storage of raw materials, intermediate inventory, finished goods and related information from the start point to the end point in order to meet the needs of producers or consumers. *Social logistics statistical accounting and reporting system* determines the logistics enterprise and enterprise logistics as the object of our social logistics statistics, where the logistics enterprise is the

third party logistics enterprise(it can be abbreviated as TPL), external suppliers who provides logistics services including transportation, warehouse management, packaging and distribution to the manufacturer and the seller. It is an independent legal entity, with the purpose of profit.

As a kind of service industry, the third party logistics enterprises have the general characteristics of general enterprises. In addition, it also has the distinct characteristics of timeliness, consistency and demand fluctuation. Timeliness is mainly reflected in the time value of logistics activities. Time value refers to the value created by the difference of time between the supplier and the demand. Relative to the time management of other enterprises is often responsible for the inside, the timeliness of the logistics business is responsible for the entire customer. The consistency of logistics operation is mainly reflected in the process of production and consumption of logistics service is at the same time, the process of logistics service is the process of customer consumption. Manufacturing enterprises have complete product inspection, different from this, the logistics service is a kind of post verification of consumption risk and quality of service, its production and consumption must require logistics service fault tolerance rate is low, and the accuracy is high. Demand fluctuation is mainly reflected in China's current logistics industry has a low degree of industry concentration, less personalized service, small product heterogeneity, etc. Because of the extensive existence of enterprise self-logistics, although the logistics demand, the number of potential customers is huge, the logistics enterprise's demand still has strong volatility. Therefore, the present situation and development of the third party logistics enterprises are the same as the general enterprises, which were decide by capital, talent, the level of business, market and other external factors, it also has the characteristics of timeliness, consistency, demand fluctuation . Therefore, in order to comprehensively measure the third party logistics enterprises, these factors must be considered[6-7].

III. CONSTRUCTION OF EVALUATION INDEX SYSTEM

Based on the discussion of the character of the third party logistics enterprises, According to the principles of scientific, holistic, operational and comparability, the third party logistics enterprises can build the evaluation index system according to the four elements of capital, professional skills, talent and market. First of all, these four elements fully evaluate present situation of the enterprise, so it's in line with the principle of integrity. Second, the contents of these four elements have the exact meaning, the basic data of the measurement index is easy to collect, and has a strong operational. Third, these four factors determine the existence and development of enterprises, at the same time, they are at the same level and the correlation is weak, Conform to the principle of Science. Fourth, the four elements have a clear meaning; the size of the number of indicators can be distinguished merits, which is comparable.

A. Capital

From the financial evaluation of enterprise status, can stand in the perspective of investors and creditors to analyze the income level of the enterprise, operational capacity and solvency level. Stephen George believes the effort and improvement in the operation will be reflected in the financial performance of enterprises in the future period of time. It can be seen that there is a deep relationship between the financial indicators and the enterprise's internal revenue and operational level. Because the financial index is intuitive, so enterprises generally use financial indicators to reflect these issues.

It is worth mentioning that, compared to the manufacturing enterprises, the fixed assets of logistics business such as vehicles, warehouses, etc. has a certain universality and strong liquidity. Therefore, in the evaluation of solvency, the index of the Net realizable value of assets is also the main object for research.

B. Professional skill

Enterprise's products are the fundamental of enterprise development, which reflects the level of enterprise management and technical factors. As a service industry, the third party logistics enterprise's product is the logistics service. The evaluation of logistics service is the evaluation of the business level, enterprise management and technical level of the logistics enterprise. Evaluation of logistics services using five secondary indexes, such as logistics speed, quality of service, employee, cost and profit, etc.

1) Logistics speed

Logistics speed is an index to evaluate the efficiency of logistics, and the concept of logistics speed and its measurement method are given below.

Definition: in a certain period of time, the total amount of goods transported by a logistics enterprise is multiplied by the number of miles, then divided the time which the goods are received from the order to the customer, known as logistics speed. It is the ability to deliver goods by unit of time. The total logistics units called tons as well as the number of package. Mileage unit called km mileage. Time unit called hour or day.

The speed of logistics reflects the integrated ability of logistics enterprises from the order of goods, information delivery, coordination and management to distribution. The greater the logistics speed, the stronger the transport capacity of the enterprise. This is also related to the enterprise's software and hardware equipment, infrastructure, transport lines, personnel quality, enterprise scale, and other comprehensive strength.

The logistics speed is closely related to the transportation facilities, different traffic tools, and make different logistics speed. The logistics speed of aircraft transport will be greater; the speed of vehicles or smaller vehicles will be smaller. Logistics speed is also closely related to the traffic conditions, the better the condition of traffic, create the greater Logistics

speed. According to the definition of Logistics speed, it can be expressed by the formula as follows:

Assuming that logistics enterprises have m kinds of transportation tools, the first i kind of transport in the time interval (0, t) of the transport volume is $Q_i(t)$, the mileage number is $S_i(t)$, the average speed is $\overline{v_i}(t)$, then $\overline{v_i}(t) = \dfrac{Q_i(t)S_i(t)}{t}$. In this way, the average comprehensive speed can be like this:

$$\overline{v}(t) = \sum_i a_i(t)\overline{v_i}(t) \tag{1}$$

In the formula, the weight is expressed in the proportion of the first i transportation tool in all the transportation quantity, namely: under the condition of saturation transportation:

$$a_i(t) = \frac{Q_i(t)S_i(t)}{\sum_i Q_i(t)S_i(t)} \tag{2}$$

Under the conditions of non-saturated transportation, such as the city's distribution logistics, can be used as an express package, then, $Q(t)$ is the number of package. The Logistics speed is calculated as follows:

In a certain period of time, the first i vehicles transported n_i times, the transport volume, the mileage, the length of time as follows $(Q_1(t_1), S_1(t_1), t_1)$, $(Q_2(t_2), S_2(t_2), t_2)$,$\cdots,(Q_{n_i}(t_{n_i}), S_{n_i}(t_{n_i}), t_{n_i})$;The average speed of the first i transport tool is

$$\overline{v_i} = \frac{\sum_{j=1}^{n_i} Q_j(t_j)S_j(t_j)}{\sum_{j=1}^{n_i} t_j}$$ .The Weight is

$$a_i = \frac{\sum_{j-1}^{n_i} Q_j(t_j)S_j(t_j)}{\sum_i \sum_{j=1}^{n_i} Q_j(t_j)S_j(t_j)}$$ .Then put it into (1) can get the

logistics speed.

2) Logistics Service Quality

Logistics Service Quality is evaluated by timeliness, Consistency and the fluctuation of demands. Timeliness concentrated expression in two aspects—the fulfillment of the orders finished on time and time management. So indexes of timeliness includes order completion rate, order fulfillment rate, order feedback time, site job delivery time, transportation time, and distribution time. The feedback time includes customer demand response and processing time. Consistency reflects in the requirement to the Accuracy of logistics service, including the information accuracy and physical accuracy. The related indicators which are used are effective complaint rate, customer complaints handling rate, damage ratio, loss rate, accuracy of information transmission, account matching rate, and correct handling rate. Demand fluctuation is the evaluation of the stability of customers. This requires an evaluation of the company's consumer groups, in order to reflect the level of service. The related indicators are customer retention rate, Customer satisfaction rate and Customer acquisition rate [8-10].

3) Employee

Employee satisfaction rate, Employee acquisition rate and new stuff attraction rate just correspond to the three indicators of consumer demand fluctuation indicators, which is represents the level of enterprise management and the level of internal cohesion. Among them, new stuff attraction rate equal to the ratio of Recruitment in budget and the Recruitment in real, it shows the attraction and influence of the company.

4) Cost and profit

Cost and profit is the reflex of economic benefit. The evaluate indicators are cost (profit) weights, Unit weight cost (profit) and the Cost and profit margin.

C. Talents

Enterprise talent evaluation research is relatively mature. There still takes the use of enterprise talent evaluation index, using evaluation in all kinds of talent proportion.

D. Market

TPL enterprise market evaluation index is as well as other types of enterprises, using new market development success rate, market share and market share growth rate to evaluate the market.

E. TPL evaluation index system

The synthetic evaluation of the above four elements of evaluation index system, evaluate index system of the third party logistics.

TABLE I.   THE THIRD PARTY LOGISTICS EVALUATION INDEX SYSTEM

Capital	*Profit*		Rate of Return on Common Stockholders' Equity Return on total assets Rate of return on fixed assets Return on investment in human capital per-capita output value	
	Operational capability		Production data operation ability	Fixed asset turnover Current assets turnover Total asset turnover
			Labor resource capacity	Labor efficiency
	Debt paying ability		Short-term debt level	Quick ratio Current ratio Working capital to total assets ratio
			Long-term debt level	Long-term debt ratio Fixed assets ratio Owner equity ratio
			Net realizable value of assets	
Professional skill	*Logistics speed*			
	service	Timeliness	Order completion rate Order fulfillment rate Order feedback time Site job delivery time Transportation time Distribution time	
		Consistency	Effective complaint rate Customer complaints handling rate Damage ratio Loss rate Accuracy of information transmission Account matching rate Correct handling rate	
		Demand fluctuation	Customer retention rate Customer acquisition rate Customer satisfaction rate	
	Employee		Employee satisfaction Employee retention rate New employee attraction rate	
	cost and profit	cost	total cost Various cost proportion Cost of unit of weight per hundred kilometers Cost and profit margin	
		profit	Total profit Proportion of profits Hundreds of kilometers of unit weight profits	
Talents	*Evaluation*		Expertise vocational ability Professional quality	
	Proportion of each type of talents			
Market	*Market share Market share growth rate New market development success rate*			

IV. CONCLUSION

This paper concludes four essential factors related to enterprise's survival and development according to enterprise developing strategy theory---capital, professional skill, talents and market.

This paper analyzed the types of logistics enterprises in China, and the functions of TPL, then draw a conclusion that other than the general characteristics, TPL also has the characteristics of timeliness, consistency and demand fluctuation, It also put forward the concept of logistics speed and give out the method of logistics speed calculation. As an evaluation index of work efficiency, Logistics speed makes the evaluation index system which is on the basis of the four elements of the content become richer. What worth pointing out is that the TPL enterprise evaluation standard researches have not been found yet, especially the talent structure standard. It will be a question needs to be discussing in the future.

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