Scientific Research

Study on the Building of Performance Evaluation Index System for the Third Party Reverse Logistics Enterprise under Low-carbon Economy

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Abstract：As the earth environment is deteriorated seriously and resources are consumed too much，low-carbon economy has become a trend，but also it is an inevitable choice for the sustainable development of China. The use of low-carbon economy theory for the third party reverse logistics enterprises to evaluate performance can guide the logistics enterprise to develop low-carbon economy reverse logistics and improve the efficiency of reverse logistics. Firstly，the paper introduces the basic theories of low-carbon economy and third party reverse logistics , then analyses the role of the performance evaluation of the third party reverse logistics enterprises under low-carbon economy．Finally，according to the principles of low-carbon economy and the features of third party reverse logistics enterprise , the paper presents the logistics performance evaluation system, which includes five aspects： economic benefit，customer service，environment，business operation and innovation．

Key words：Low-carbon Economy，Third Party Reverse Logistics Enterprise， Performance Evaluation.

1 Introduction

With the further development of the world economy, the demand for energy will continue to increase, carbon dioxide emissions will continue to increase, greenhouse gas emissions and climate warming may further exacerbate. Facing the threats of energy and environment, the time of exploring new energy has come. At present, the development of low- carbon economy has become a global agreement, governments have attached great importance to the development of low-carbon economy . As the low-carbon economy covers almost all industries, some scholars have called it "the fifth global industrial wave" or "green revolution" [1]. As the second largest energy superpower and the third largest energy producers in the word, China needs to start from the internal laws of saving energy, reducing emissions and low- carbon development, creative thinking, change the idea as possible as to realize energy conversion and promote low -carbon economy development.

The scholars at home and abroad have studied the performance evaluation for the third party reverse logis- tics enterprise . Louwers D,Kip B J, Peters E [7] and Fleischmann M , Bloemhof-Ruward J M , Dekker R [8] studied reverse logistics. Yue Hui[9] evaluated third party reverse logistics provider by analytic hierarchy process （AHP）, Chen Chunxia [10] choosed third party reverse logistics enterprise by combination evaluation method. But few scholars at home and abroad studied low-carbon economy and logistics , Dai Dingyi[4] made China's lo- gistics how to reflect low- carbon economy require- ments , which is still short of the basic and systematic study, the problems of low-carbon economy in logistics had technology level, planning and policy level . The scholars studied hardly low- carbon economy and per- formance evaluation for the third party reverse logistics enterprise. This paper combines low-carbon economy with performance evaluation of the third party reverse logistics enterprise, builds a scientific and reasonable performance evaluation index system with reference to the thoughts of the balanced score card so as to guide the reverse logistics enterprise to develop low -carbon economy, improve the efficiency of reverse logistics .

2 Low-carbon economy and third party reverse logistics

It is common problem of economic development for all countries in the world to how to change the traditional mode of economic growth , which is high energy consumption and high pollution , vigorously promote energy conservation ,emission reduction and new energy use, realize resource recycling and sustainable economic development.

2.1 Low-carbon economy

In 2003, the United Kingdom in "our energy future - creating low carbon economy," white paper was first put forward the concept "low-carbon economy". In 2007, Chinese President Hu Jintao at the Asia-Pacific Economic Cooperation (APEC) leaders meeting on 15th solemnly put forward four proposals , clearly advocated "developing low-carbon economy." In 2008 World Environment Day, the United Nations Environment Programme determines its theme "changing the traditional concepts, implementing low-carbon economy." Later, "carbon footprint", "low-carbon technologies" "low-carbon development", "low-carbon lifestyle", "low-carbon society", "low-carbon city", "low-carbon world" and so on, a series of new concepts and new policy came into being[1].

Low-carbon economy refers to ecological economic based on low energy consumption , low pollution and low emission, its essence is the energy efficiency and clean energy structure, the core is the energy technology innovation and system innovation, the goal is to mitigate climate change and promote sustainable development of human [2], and   compared to the traditional model of economic development, low-carbon economy has distinct characteristics [3] :

1. Low-carbon economy is a sustainable model of economic development. It can realize sustainable development of economic, social and ecological .

2. Technical innovation is the core measure of low carbon economy. It is low-carbon technology innovation to improve energy efficiency and realize clean production .

3. Low-carbon industry will become a new industry. Low-carbon economy development and low-carbon technology innovation will bring the readjustment of industrial structure, make the industry of low-carbon technology as the core become emerging industry .

2.2 Low-carbon economy and third party reverse logistics

Logistics in low-carbon economy has a special position , partly because the logistics itself is large energy consumption and carbon emissions. energy consumption and large carbon emissions. According to the International Meteorological Organization recently reported data , in 2005 the world's energy consumption, transportation 26%, in 2002 the world's carbon dioxide emissions ,transportation 14%. Other because the development of logistics is important measure to achieve low-carbon economy, such as integrating resources , optimizing process, informationization, standardization can achieve saving energy and reducing emission. Advanced logistics mode can support the mode of production and life under low-carbon economy, low-carbon economy needs the support of modern logistics [4].

Third party reverse logistics refers to the services provided by the middlemen in the reverse logistics channel, middle men provide all or part reverse logistics services that businesses need in the form of the contract within a certain period of time, the services include returned goods , transport of scrap materials, re-packaging, storage, maintenance, re-distribution and other business in accordance the requirements of business[5].The third party logistics enterprise is an important carrier to achieve logistics , thereby building performance evaluation index system for third party reverse logistics enterprise is conducive to promoting   effective operation of low-carbon economy.

3 Significance of performance evaluation for the third party reverse logistics enterprise under low-carbon economy

It is imperative for third party reverse logistics enterprises to develop low-carbon economy and green logistics. Building performance evaluation index system

for the third party reverse logistics enterprises under low-carbon economy has great significance.

3.1 The need of realizing sustainable development for China

China is a developing country with a large number of population, rapid growth of energy demand, while she is subject to the level of productivity, the carbon consumption is higher, compared with Japan, the United Kingdom and other developed countries, there is a certain gap, the pressure of energy security and climate change is greater, therefore, low -carbon economic development model can not only achieve sustainable development of our economy and improve people's life quality , but also promote the comprehensive competitiveness in the coming decades.

Third party reverse logistics is the channel of green producing and green consumption, if there is no development of third party reverse logistics, green revolution would become an empty word. Therefore, China will achieve sustainable development , we must develop third party reverse logistics. Performance evaluation of the third party reverse logistics enterprises under low-carbon economy is conducive to learning about the development of the region low-carbon economy for governments at all levels so as to formulate relevant macro-control policies.

3.2 The need of developing for third party reverse logistics enterprise

If the third party logistics enterprise has high level in performance evaluation of development and application , it will bring outstanding performance. In order to effectively utilize resources, energy and reduce environmental pollution, we must constantly evaluate the performance of enterprise. Use of resources ,carbon emissions and the effect of reverse logistics are compared with the true goal of logistics enterprise, and it can reflect operating results and development level of low-carbon economy and find out their advantages and disadvantages , so as to provide data for enterprise drawing up development planning and strategy, make enterprise change from pursuing short-term interests to pursuing long-term stable development, from internal

economic benefit to coordinated development of economic benefit, social benefit, environmental benefit , and better implement development mode of low-carbon economy .

4 Building performance evaluation index system for the third party reverse logistics enterprises under low-carbon economy

It is vital important for logistics companies to build an effective and objective evaluation system ,which can judge the level of their actual operations and development level of low-carbon economy, improve management level, develop green logistics , improve the overall efficiency and sustainable development ability .

4.1 Principles of constructing performance evaluation index system for the third party reverse logistics enterprises under low-carbon economy

Building performance evaluation system according to the basic principles of low-carbon economy and own characteristics of logistics enterprises should follow the following principles:

1.Systematic principle ： Enterprise performance should be concentrated expression of production and operations, cutting down the strength of any aspect is likely to affect the overall performance. Therefore, the performance evaluation index should be integrated and reflect the performance of the whole logistics enterprises.

2.Scientific principle [6]：Performance evaluation index system of the third party reverse logistics enterprises based on low-carbon economy should be based on fully understanding and scientific research. The concept of specific indexes must be clear, has certain scientific connotation, thus it can objectively reflect the development characteristics of enterprise, and better measure level of the main goals of low-carbon economy.

3.Representative principle：The characteristic of indexes is almost equivalent, the indexes exist certain alternatives. Therefore, establishing index system should choose those, which have strong representative and can comprehensively reflect the performance of logistics business, thereby logistics enterprises can reduce the

workload, reduce errors and improve efficiency.

4.Operational principle：Evaluation index system should be operational, index selection should conform to the actual situation of logistics enterprises to improve practical value of the evaluation results.

5.Dynamic principle[6]：In view of the development of low-carbon economy to go through the time course, we should fully consider dynamic characteristic, these indexes can better describe, measure the future development trend so as to forecast and make a strategic decision.

4.2 Building performance evaluation Index System for the third party reverse logistics enterprise under low-carbon economy

Due to the particularity of the third party reverse logistics and low-carbon economy, enterprises must establish a set of financial and non-financial indicators，thus we can systematically and comprehensively evalu-

ate business performance , and improve the level of long-term performance. The balanced score card is a kind of new thinking in performance management. It reflects the balance of the financial and non-financial measure method, the long-term goal and short-term goal, external and internal, result and process, management performance and operating performance and many other aspects, thus they are able to reflect comprehensive management of organization , make performance evaluation perfect, be good for long-term development of the organization. Performance evaluation for the third party reverse logistics enterprise under low-carbon economy can use the idea of the balanced score card, from the point of the enterprise financial, customer, internal business process and learn and grow, we can establish five indicators ,economic benefit ,environment, customer service, business operation, and innovation, specific indexes such as table 1.

Table 1. Performance Evaluation Index System for the Third Party Reverse Logistics Enterprises under Low-Carbon Economy

economic benefit indexes	return on total assets =(total profit+ interest)/average total assets ×100%
	turnover rate of total assets=net operating revenues／average total assets×100%
	rate of assets to liabilities=total liabilities／total assets×100%
	growth rate of operating revenues=total growing amount of operating revenues for current year/ total operating revenues for last year ×100%
	rate of accumulation=total growing amount owner's equity for current year/total owner's equity at the beginning of year×100%
customer service indexes	market share
	customer retention rate
	customers gain rate
	customer satisfaction
	profit contribution rate of customer
environment indexes	rate of energy consumption=total energy consumption/total revenues ×100%
	rate of resource consumption=total resource consumption/total revenues ×100%
	rate of clean fuel use= clean fuel use/total fuel use ×100%
	rate of waste disposal = amount of waste disposal/ total waste disposal ×100%
	rate of environmental investment=amount of environmental investment/total operating revenues×100%
	waste emissions
business operation indexes	rate of service network coverage=services coverage area of logistics enterprise／product sales area of manufacturing enterprise×100%
	information level

	utilization efficiency
	stock accuracy=accurate number of stored items /total number of stock×100%
	rate of accurate delivery =accurate number of delivery for current year/total number of delivery×100%
	recycling cycle
innovation indexes	rate of intellectual capital=(intangible assets of enterprise + human assets of enterprise)/total assets of enterprise×100%
	rate of new service revenues= new service revenues of enterprise /total revenues of enterprise×100%
	total man-hours growth rate of employee training =(total man-hours of employee training for current year － total man-hours of employee training for last year)/ total man-hours of employee training for last year×100%
	input intensity of green technological innovation

The five indicators have causal chain relationships, third party reverse logistics enterprises want to achieve good financial performance and satisfy investors, they must first satisfy customers because customers are the providers of corporate profits and also demanders of low-carbon economy. In order to meet the need of customers, enterprises must provide superior products and services and better implement low-carbon economy. These depend on the improvement of internal business process and technical innovation. Technological innovation is a vital link of business process. While these must depend on high-quality staff in good business environment to actively complete. So the indicators closely link together through the relationship of cause and effect .

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