

Construction of Logistics Statistics Index System

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Abstract—In this paper, with the rapid development of logistics industry, I analyze the relevant research at home and abroad. Construct the logistics statistics index system in the way of statistics to describe the development status of China's logistics industry. Define specific index to the practical application of index system.

Keywords—construct, logistics industry, logistics statistics, index system

I. BACKGROUND and SIGNIFICANCE

Modern logistics has become the leading industry of the economic development, which occupy an important position in measuring the comprehensive competitiveness of a region. As a "third profit source", logistics industry plays an important role of stimulating consumption and absorbing employment, which makes great contribution to the national economy. More importantly, logistics industry has a broad development space which generates an important opportunity for development to developing countries. In recent years, China's logistics industry develop rapidly and show a vigorous vitality. But due to a later start, it's still in the initial stage compared with developed countries. Especially data of logistics statistics in our country is still not systematic and comprehensive, leading to the problem of low efficiency, high operation cost, unstandardized competition and incomprehensive management in the actual operation link.

Data of logistics statistics is an important basis to describe the development status of logistics industry and formulate relevant policies, which guides development of logistics industry. Without a set of complete logistics statistical data, there will be a problem in supervising and planning by the administrative department and communicating

and coordinating between units and enterprises. That seriously inhibits the developing speed of logistics industry [1]. Therefore, the construction of logistics statistical index system of our country, providing a uniform standard of logistics statistics to accelerate the formation of China's logistics database, is the urgent problem to be solved.

II. RESEARCH SUMMARIES

In recent years, to measure of logistics industry's development level, more and more research institutes and scholars make in-depth research on it and get some preliminary results.

Internationally, the "British Transport Policy White Paper" issued by British government put forward a series of statistical indexes. It was designed to ease the problems of traffic congestion and air pollution. USA determined the statistical indexes according to the transport system and business logistics respectively. The former one is committed to traffic safety and government surveillance, the latter one mainly serve to corporate and government decision-making. The Japanese government's "Integrated Logistics Policy Framework" proposed nine quantitative indicators to examine the effect of logistics reform, and built an analytical framework aimed at environmental protection, traffic safety and other social issues. Australia's social logistics evaluation framework is a comprehensive evaluation system with a goal-oriented classified method, which is very direct and effective.

In China, Wang Wanwei tried to construct the statistics index system of logistics enterprises firstly, but stopped at the basic framework and the logic structure without specific indexes. The framework of logistics statistics system constructed by Liu Kaiming included five aspects: the scale of logistics, the

process of logistics activities, labor productivity and labor remuneration, fixed assets and the economic benefits of logistics. The index system constructed by Sun Minwei and Shao Jianli in 2004 was accounted in three dimensions of the third party logistics enterprises, national economy logistics and green logistics [2]. In 2006, Li Weidong put forward the total social logistics system with more complete tri-dimension, which reflected the development situation of logistics industry more comprehensively. In 2014, index system constructed by Shen Si was considered the system should be able to measure the logistics industry's situation of input-output, industrial scale, specialized technology and equipment, economic benefit and logistics enterprises especially the third-party logistics enterprises simultaneously.

Through the domestic and foreign research results, we can sum up their commonalities. Foreign index systems pay attention to quantization, and emphasis on environmental protection and traffic safety. Chinese index systems mostly stop at qualitative analysis, which just describe the development situation but don't reflect existing problems. Put forward the logistics statistics index system based on that.

III. CONSTRUCTION of INDEX SYSTEM

A. Construction Principle

Logistics statistics index system should meet the all aspects' needs for information of logistics statistics, so as to monitoring and reflecting the panorama of the development of logistics industry. The design process should abide by the following principles.

1) Combined with the Comprehensiveness and Logicality: In order to docking with the national economic accounting, index system should not only reflect the contribution of the logistics industry to national economy, but also meter the running situation of logistics activities' various sectors. At the same time, the internal structure of index system should comply with the logic instead of pursuing of large system blindly. The index system should have clear levels and reduce the relevance among indexes.

2) Comparability: This may include two aspects. One is aligning with foreign logistics statistics. The research of foreign logistics statistics is more mature, we should learn their design ideas, statistical methods and calculating methods. This is also conducive to the comparing the logistics industry's development situation between China and foreign country. The other one is to the aim of regional horizontal and vertical comparison among logistics level [3]. Horizontal comparison can find the gap, while the longitudinal comparison is aimed to development.

3) Operability: The significance of constructing index system is application. To realize the operability of index system, on the one hand, we should define the connotation and calculation formula of specific indexes, on the other hand, Chinese research on accounting of statistics logistics is still at the starting stage with limited available data. At the same time, if there is too much data obtained by special survey, the reliability of calculated results is also difficult to guarantee. Therefore, we should use existing data as far as possible and select the quantifiable, data-available index.

4) Development: Logistics industry in China is developing rapidly. Accordingly, measurement of its development status should be improved and adjusted constantly. Inheritance and innovation based on the existing research results and statistical data, revising and supplement in practical application, is the only route to construct the logistics statistics index system.

B. Basic Framework

1) Logistical Scale: Logistics scale index is based on a macroscopic angle, which make statistics on coverage area and scale of logistics industry [4]. This category includes logistical output, number and scale of the logistics node, number and scale of the logistics enterprise, freight volume, freight transport etc.

The statistical scope of the logistics node includes logistics (distribution) center, logistics park and distribution site. The statistical scope of logistics enterprise includes economic type of logistics industry's corporate enterprises registered in China's

economic territories.

2) Logistical Input: Logistics input index measures the amount of investment of logistical financial resources and manpower. It contains three aspects: first, fixed assets, which include the value and updating degree of the fixed assets; second, human resources, which include the full-time equivalent of professional in logistics industry, the average wages of employees and the number of trained employees; thirdly, the level of informatization [5], which includes two indexes: construction of basic environment and number of logistics public information platform.

Among them, updating degree of the fixed assets = $\frac{\text{increased total amount of fixed assets in this period (original value)}}{\text{(total amount of fixed assets at the beginning of the period (original value))}} \times 100\%$; the full-time equivalent of professional in logistics industry refers to the number of full-time staffs and the number of non full-time staffs converted into full-time staffs according to the workload. For example, there are two full-time staffs and one non full time staff which works in 20% time, then the full-time equivalent is 2 plus 0.2 person-years; the index of the average wages of employees includes all full time and part-time staffs, measured in unit of per-hour wage; the index of the number of trained employees counts the number of full-time staffs of logistics personnel whose degree is above bachelor and majoring in logistics and related professional; index of construction of basic environment among the level of informatization is integrated weighted by logistics informatization planning, infrastructures construction such as communication and network, research and development of the key technology of logistics.

3) Process of Logistics Operation: This type of index is a measure of the operation status of logistics activities' entire process, which is core of the whole index system. According to the links of logistics activities and needs of logistics statistics, this index can be divided into four aspects: first, transportation, which includes ownership of transportation equipment and transportation route; second, storage, which

includes storage capacity, utilization rate of warehouse storage and loss rate of the storage of goods; third, the circulation processing, which includes cargo handling capacity, turnover speed of goods in storage and packaging value; fourth, distribution, which includes average mileage of distribution of distribution center, average number of the days of distribution, average number of the days of inspection and signal equipment.

Among them, the transportation route includes all the railway, highway, waterway and route involved by material transport process; utilization rate of warehouse storage = $\frac{\text{effective stacking area of warehouse}}{\text{total area of fixed warehouse building}}$; signal equipment means for all input device in order to contacting the consignee.

4) Logistical Efficiency: Index of logistics efficiency index is a kind of index which measure the logistics operating results by logistics costs, profits and their proportional relation. It includes the indexes of inventory costs, transportation costs, management fee, the output rate of fixed assets, the turnover rate of current assets, the logistics industry's contribution rate to GDP, total profit, profit growth, tax rate of asset and labor productivity [6].

Among them, the inventory cost includes not only expenses to maintaining and managing inventory goods but also the interest loss of funds occupied by inventory; the output rate of fixed assets = $\frac{\text{sales revenue}}{\text{average net worth of fixed assets}}$, average net worth of fixed assets = $\frac{\text{(initial net + final net)}}{2}$; the turnover rate of current assets = $\frac{\text{main business net income}}{\text{total rated net asset value of average of fixed assets and current assets}}$; the logistics industry's contribution rate to GDP = $\frac{\text{total output value of the current logistics}}{\text{the current GDP value-added}}$; tax rate of asset = $\frac{\text{total profit}}{\text{assets balance of logistics enterprise}}$, the assets balance of logistics enterprise refers to the total balance of fixed assets and current assets among registered logistics enterprise; labor productivity = $\frac{\text{total output value of the current logistics}}{\text{the current full-time equivalent of professional in logistics industry}}$.

5) Service Level: Service is the essence of logistics. Improve the service level is an important source for the development of logistics industry [7]. The indexes of service level include on-time delivery rate, the intact rate of goods, customer satisfaction level and customer complain ratio.

The data of customer satisfaction level can be obtained through available through establishing the network after-sale reciprocal visit platform to divide different grade of satisfaction, which will be get through filling by anonymous customers.

IV. RESEARCH PROSPECT

The logistics statistics index system should be a dynamic, developing system. The development of logistics industry and the promulgating of logistics related policy system [8] both lead the changing of logistics scope of logistics statistical scope and statistical emphasis. Accordingly, it should also develop continuously along with the changing of statistical environment, in which some indexes should be added or removed and statistical caliber can be modified to adapt to the development of logistics industry.

The existing problems in the development process of logistics industry can be attributed to one point: lacking of the logistics standardization, which include the system of unified standards establishing by country, technical standards of the internal mechanical equipment and special tools, work standards among each link of logistics activities, service standards and the logistics statistical standards which is mentioned as a key in this paper. With these standards, the development of logistics industry will have pattern to imitate, have basis to rely on, and reverse the fragmented situation for a long time of logistics industry to promoting the health and rapid development of the whole logistics industry.

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