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Dynamic Assessment of Business Performance in Green Supply Chain based on Analytic Hierarchy Process Method

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Abstract

Traditional supply chain management is concerned about benefit maximization, although it can also involve raw materials recycling and energy conservation. According to the evaluation index system of green supply chain performance, the green degree will be composed in three layers; the first layer includes environmental impact degree, resource utilization rate, environmental benefit and reputation. In this study, we invited experts group to put forward the relative importance of the indicators, and then use the analytic hierarchy process to determine the weight of the indicators. Results show that the maximum weight is economic benefit, and the weight of the other four angles is more balanced and degree of attention was significantly lower than economic benefit. Green supply chain collaboration is the core competitiveness of enterprise development, green supply chain collaboration to better meet the user's personalized needs, but also to better enhances the competitiveness of the whole supply chain

Keywords: *Green supply chain; Performance assessment; Economic benefits; Product life cycle; AHP method*

1. Introduction

Since 1990s, most countries have adjusted their development strategies accordingly. The global industrial structure presents a trend of green strategy, green technology, green products and green industry. Therefore, green strategy is not only a process, a product, an enterprise cannot solve the problem, it relates to the activities of the whole supply chain of all enterprises, green supply chain management at this time will come into being. Traditional supply chain management is only based on the management of supply chain enterprise benefit maximization, although it can also involve raw materials, energy conservation, but this is considered to improve the cost of the enterprise and enterprise internal environment, and without sufficient consideration of the selected in the process of manufacturing or in the course of circulation scheme will impact on the surrounding environment and the personnel, and does not take into account product wastes and emissions how to deal with, recycle and reuse and so on[1]. Therefore, the on resources and the environment sustainable development are very limited. Supply chain management performance evaluation is a management means, to carry out the purpose of performance evaluation of supply chain management is to let the supply chain node enterprises know the position themselves in the whole supply chain and its effect on the entire supply chain efficiency, so as to achieve the entire flow process of the supply chain optimization and performance evaluation of the effect of the binder is of enterprises at all levels and the importance of the node enterprises of supply chain can be obtained through the incentive mechanism. At this time, the incentive mechanism breaks through the scope of the enterprise, and extends to the mutual incentive of each node in the supply chain. Incentive is based on the results of performance evaluation, through negotiations to establish unified incentive

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standards. Therefore, the implementation of effective performance evaluation is the key to promote the development of green supply chain.

In the research of green supply chain, performance evaluation is a very important field. Many studies have indicated that the development and application of high performance evaluation capability is closely related to the excellent performance. As early as 1985, Keamey pointed out that the company's comprehensive performance evaluation of the company, can improve the overall productivity of 14%-22%. To develop and apply the supply chain management performance evaluation system, the main purpose is to track the supply chain management and the performance of the ongoing work, and to combine with the incentive mechanism. Supply chain management performance evaluation is a management means, to carry out the purpose of performance evaluation of supply chain management is to let the supply chain node enterprises know the position themselves in the whole supply chain and its effect on the entire supply chain efficiency, so as to achieve the entire flow process of the supply chain optimization and performance evaluation of the effect of the binder is of enterprises at all levels and the importance of the node enterprises of supply chain can be obtained through the incentive mechanism. At this time, the incentive mechanism breaks through the scope of the enterprise, and extends to the mutual incentive of each node in the supply chain. Incentive is based on the results of performance evaluation, through negotiations to establish unified incentive standards. Therefore, the implementation of effective performance evaluation is the key to promote the development of green supply chain. This theory is precisely under such background of green supply chain performance evaluation system for the study, in the previous research results, inheritance the scientific research ideas and methods, performance evaluation research field there are still problems to improve. Science to build the green supply chain performance evaluation system, that is to build a standard and practical performance evaluation index system and operation method of performance evaluation, complete the general performance of green supply chain, scientific, effective, objective evaluation, to help the enterprise to find the problem and solve the problem, provide strong support for the decision.

2. Literature Review

2.1 Green Supply Chain

Green supply chain is a special kind of supply chain, the green supply chain management study based on supply chain management on the basis of the theories, to the deep development, it is also a fish to be determined theory system and the research direction of the new field, and Study on performance evaluation of green supply chain and improve, supplement and deepen the theory of green supply chain management, is the formation of the theory of green supply chain system is an indispensable step. Green supply chain can achieve the desired objectives, products from design, production, sales and service, to waste the whole green and need to good, green supply chain management for the protection, and establish a complete, scientific and standardized evaluation index can be comprehensive, objective view of assessment and evaluation of the overall performance of green supply chain, and promote the healthy development of green supply chain, is to achieve purpose of economic benefit and social benefit coordination and optimization of enterprise. Domestic and foreign scholars from different angles on supply chain performance evaluation index of more in-depth research, on supply chain performance evaluation index selection the study on green supply chain performance provides a very good

way, the results of these studies for green supply chain performance evaluation system research laid the good foundation.

Sarkis (2003) points out that supply chain management is a new mode of operation. Emphasize the core enterprise supply chain and other most outstanding enterprises establish distinct relations of cooperation[2], and commissioned the completed part of the business, and will focus their core strengths and resources, through business process reengineering (BPR) do the enterprise to create special value and are more specialized than the competition's key business, not only improve the core competitiveness of the enterprise, but also to benefit the other cooperative enterprises in the supply chain. Including all activities from raw material to end users, is the whole process of the whole process of the whole chain from the supplier's supplier to the user's user. The functions of it from the strategic level to grasp the needs of end users, through the effective cooperation between enterprises to obtain best results from the cost, time and flexibility, so that each enterprise in the supply chain as a whole, make the supply chain enterprises share purchasing, production, distribution and sale of become a coordinated development of the organic whole

Luo(2014) points out that the evaluation of supply chain performance should not only take into account the quantitative indicators[3], but also consider the qualitative indicators. He believes that including quantitative index and financial (cost minimization, maximization of sales and profit maximum), customer responsiveness (fill rate maximization, the production delay minimization, customer response time short); qualitative indexes including customer satisfaction, flexibility, information and material flow integration, risk management effectiveness and supplier performance. Michelsen(2006) points out green supply chain is a kind of integration of environmental protection idea of modern management model[4], starting from the point of view of product life cycle, considering the product to obtain raw materials, design and manufacturing, sales and transportation, use and recycling and reuse of the whole process, through green technology and supply chain management, product life cycle environmental negative effects of minimum, resources and energy utilization rate is highest and supply chain system optimal overall efficiency target. Mirzapour (2013) points out green supply chain refers to from the sustainable development of the society and the enterprise of introducing a new design idea[5], of products from raw materials procurement, production, consumption, recycling and reusing of waste until the entire supply chain process were ecological design, in close cooperation between chain members internal departments and various enterprises, the whole supply chain in the environmental management coordination to achieve system optimization of economy and environment.

2.2 Supply Chain Performance Evaluation

Motris points out the minimum cost as a measure of the efficiency of the supply chain. Similarly, there are some literature with the profit maximization as the ultimate goal, the use of inventory investment to minimize, maximize the return on investment, access to the target service level and other indicators to measure the operation of the enterprise. Mallidis (2014) used planned order, supply chain partnership, level of production, logistics, customer service and satisfaction, financial and other point of view to consider and gives a series of supply chain performance evaluation indicators and these indicators are divided into strategy, tactics and operation layer three grade[6].Supply chain research authority PRTM (global operations strategy consulting firm put forward measure supply chain performance of eleven indexes: delivery, order fill, the perfect order meet, supply

chain response time, production flexibility, total logistics cost management, attached with productivity, security costs, cash flow turnover time, supplies turnover days of inventory and asset turnover rate[7]. Lin(2013) considered from three aspects: internal performance measurement, external performance measurement, supply chain comprehensive performance measurement [8]. A general statistical index of supply chain performance evaluation, including four aspects of customer service, production and quality, asset management and cost, is proposed. At the same time, he also pointed out that in addition to the above general statistical indicators, the performance of the supply chain should also supplemented by some indicators, such as supply chain production efficiency, also can use some composed of qualitative index evaluation system, such as user satisfaction, the core competitiveness of enterprises, core ability to reflect. Jabbour(2014) presented in this paper can reflect the whole supply chain business process performance evaluation index, including sales rate index, average sales absolute deviation index, production and demand rate index, product supply chain production or production cycle index, supply chain overall operating cost index, supply chain core product cost index, supply chain product quality index [9].

Based on the comprehensive analysis of the existing evaluation index system of supply chain, a set of indicators for the performance evaluation of supply chain in our country is established, which is suitable for the supply chain performance evaluation in China. At the same time, the comprehensive evaluation method of supply chain performance evaluation is given, which is of great significance to correctly measure the performance of supply chain and find out the existing problems[10-11].According to the green supply chain of the connotation and standard of environmental management series design environmental management performance evaluation index system, and the supply chain process environmental impact degree, supply chain of energy consumption, recycling of resources reuse, environmental reputation four aspects as the environment of supply chain management performance evaluation of the main indicators to measure, and each index of concrete, forming a second level indicators of evaluation system, and according to the characteristics of evaluation index system, the conjoint analysis method to evaluate. Kainuma (2006) analyze the connotation of green supply chain management, from customer satisfaction, information sharing degree, logistics integration, joint enterprises and green level as the main measure of design corresponding green supply chain performance evaluation index system [12], and according to the characteristics of evaluation index system, the design of the green supply chain performance fuzzy evaluation algorithm, and has made the example analysis, provides a certain significance of reference for the management of the implementation of the green supply chain.

3. Comprehensive Performance Evaluation System

3.1 Construction Principles of Indicator System

An indicator system for performance evaluation of green supply chain establishment should include green supply chain's overall strategy of seeking between short term and long term goals, financial and non-financial performance measures, as well as internal and external performance between the equilibrium states, comprehensively reflect the whole performance of the green supply chain. And to meet the green supply chain node enterprises, as well as various aspects of information users (such as investors, creditors, operators and government departments) to evaluate and understand the overall performance of the green supply

chain requirements. In addition, the index system must have a certain comparability and comprehensive. Specific should follow the following principles

1) ***Importance principles:*** indicators should be divided into evaluation levels, in each level of indicators should be highlighted in the selection of key performance evaluation Price index analysis. The evaluation index can reflect the operation situation of the whole green supply chain, and not only reflect the operation situation of the single node enterprise.
2) ***Dynamic principles:*** it can reflect the dynamic evaluation of the business process of the green supply chain, and it is not only the evaluation of the results of the static operation. Using the method of real time evaluation and analysis, the paper expands the scope of performance evaluation to the information which can reflect the real time operation of the green supply chain, which is more valuable than the analysis of.
3) ***Comparability principles***: the selection of evaluation index system is not only comparable in time, but also in the same industry of different supply chains with the lateral comparability.
4) ***Quantitative principles:*** the proposed indicators can contain quantitative indicators, but also can contain qualitative indicators, but it is necessary to quantify the qualitative indicators in order to facilitate the comparison between different supply chains.
5) ***Economic principles:*** the size of the evaluation index system should be appropriate, too much will make the indicators to determine the categories and the important degree is more difficult, too little can not reflect the level of performance of the supply chain, and index data collection as economy.

3.2 Evaluation System Composition Analysis

According to the purpose of supply chain management and supply chain performance evaluation system can be divided into six basic components, respectively: price method of the object of performance evaluation of supply chain, supply chain performance evaluation model, the performance evaluation index system of supply chain, supply chain performance evaluation criteria, supply chain performance evaluation, performance evaluation of supply chain organization. Supply chain performance evaluation object, which involves all the members of the supply chain, is the implementation of the strategic objectives of the supply chain. This effect is more abstract, it is difficult to measure directly, it needs to be decomposed and then measured, analyzed and integrated to obtain the overall performance of the supply chain. The model of supply chain performance evaluation refers to how to form the index system of supply chain according to the goal of supply chain's performance. Supply chain performance evaluation index system is the basis of the supply chain performance evaluation through the key indicators to reflect the supply chain performance. It mainly reflects the overall operation of the supply chain and the operational relationship between nodes, rather than evaluating the operation status of a node. An ideal evaluation index system can reflect the demand of consumers, enterprises and the supply chain itself is the financial and non-financial indicators combined with; is a combination of qualitative and quantitative index; easy to understand, wide application and use cost low, more important is to to provide rapid feedback to the operator and manager, incentive performance improvement.

Supply chain performance evaluation standards, is to judge the performance of the object of evaluation of the benchmark, the standard of choice depends on the purpose of the evaluation. Separate the performance of a supply chain in a certain period of time make measurements to determine the object of evaluation of the

quality of the performance, so we should comply with the time and space scope, on the one hand, can be compared with the competitors in the same industry in performance analysis; on the other hand can on their different time performance analysis and comparison. To judge the performance of the supply chain and determine the direction of optimization and improvement. Supply chain performance evaluation method is the specific means of performance evaluation of supply chain, mainly to the evaluation value of each index through the appropriate calculation, the comprehensive evaluation value, and then based on the evaluation criteria, the results of the evaluation. No suitable evaluation method to the evaluation index scientific measure and the inability to use standard to evaluate the supply chain performance make objective evaluation, to talk about carry on the guidance and encouragement to the green supply chain operations, to improve future performance. Supply chain performance evaluation organization, is responsible for the construction of the supply chain performance evaluation system, including the selection of supply chain performance evaluation model, the establishment of evaluation index system, select the evaluation method, set the evaluation criteria of the organization. Because the cooperation among members of the supply chain is based on the common interests, there is no organization to lead the establishment of the supply chain performance evaluation system. In this paper, for green supply chain overall strategic objectives determined their performance appraisal, then to green supply chain is the core enterprise to the initiator, invite other nodes and enterprises in the supply chain to share in a common, negotiations to establish the supply chain performance evaluation system. In view of the performance evaluation of the green supply chain, it can be organized by the industry association, inviting enterprises to implement the green supply chain management in this industry, and establish the performance evaluation system of supply chain in this industry.

4. Empirical Analysis

4.1 Index selection

According to the green supply chain performance evaluation index system can be seen, the green degree evaluation of the green supply chain is composed of three layers, the first layer of top-down are green supply chain process environmental impact degree, resource utilization rate, four indicators of environmental benefit and reputation. The second layer respectively by the first layer of the four indicators of indicators constitute, and the third layer of index is composed of the second layer input costs and environmental benefit index, respectively is the cost of pollution rate, product life cycle cost, environmental protection funds rate and efficiency of environmental protection investment, product return rate. In order to determine the weight of the evaluation system of the j level of the first I factors, to employ an expert group to put forward the relative importance of each index, and then use the analytic hierarchy process to determine the weight of each index. In order to ensure the evaluation results of objectivity, the performance evaluation of supply chain teams of experts should be deep and thorough researches on enterprise or supply chain performance evaluation have been, both internal experts, including external experts.

4.2 Evaluation Index Weight

According to the principle of Delphi method and analytic hierarchy process to determine the weight of evaluation index, the first to construct the entire judgment matrix, the following is given about the green degree evaluation of the field of judgment matrix, as shown in Table 1

Table 1. Green Degree Evaluation Field

Green degree evaluation	Environmental impact	Resource utilization ratio	environmental benefit	Environmental reputation
Environmental impact	1	1/3	1	1
Resource utilization ratio	3	1	3	3
environmental benefit	1	1/3	1	1
Environmental reputation	1	1/3	1	1

$$C_{31} = \begin{bmatrix} 1 & 1/3 & 1 & 1 \\ 3 & 1 & 3 & 3 \\ 1 & 1/3 & 1 & 1 \\ 1 & 1/3 & 1 & 1 \end{bmatrix}$$

The matrix is normalized by the column, the matrix as:

$$\overline{C_{31}} = \begin{bmatrix} 1/6 & 1/6 & 1/6 & 1/6 \\ 1/2 & 1/2 & 1/2 & 1/2 \\ 1/6 & 1/6 & 1/6 & 1/6 \\ 1/6 & 1/6 & 1/2 & 1/6 \end{bmatrix}$$

On matrix by rows sum to regularization, vector $W=(1/6,1/2,1/6,1/6)^T$ that green degree evaluation of green supply chain processes of environmental impact degree, resource utilization, environmental benefits, environmental reputation on green supply chain of green degree influence weight $A_{31}=(1/6,1/2,1/6,1/6)$. In the same way, all the judgment matrixes in the field of resource utilization and environmental benefit are constructed, and the judgment matrices are shown in table 2, table 3.

Table 2. Judgment Matrix of Judgment Matrix

Utilization evaluation	Material utilization ratio	Rate of recovery	Energy utilization ratio	Re-utilization rate
Material utilization ratio	1	3	1	3
Rate of recovery	1/3	1	1/3	1
Energy utilization ratio	1	3	1	3
Re-utilization rate	1/3	1	1/3	1

Table 3. Judgment Matrix of Environmental Benefit

Environmental benefit	Input cost	Benefits
Input cost	1	1/5
benefits	5	1

Then we can get C_{23}, C_{22} matrix:

$$C_{22}=\begin{bmatrix} 1 & 3 & 1 & 3 \\ 1/3 & 1 & 1/3 & 1 \\ 1 & 3 & 1 & 3 \\ 1/3 & 1 & 1/3 & 1 \end{bmatrix}$$

$$C_{23}=\begin{bmatrix} 1 & 1/5 \\ 5 & 1 \end{bmatrix}$$

C_{22},C_{23} are consistent with the positive and inverse symmetric matrix, and the matrix of any two rows into the proportion of the matrix rank 1. In the same way, the two matrices are normalized by the column, and then by the line and the normalization, the weight of the two stage evaluation index is A_{22}= (3/8,1/8,3/8,1/8), A_{23}= (1/6,5/6).In the same way, the weight of evaluation index is A_{11}= (1/6,1/2,1/3); A_{12}= (1/2,1/2)

4.3 Index System Evaluation

In the form of questionnaire, the factors of the index system were evaluated by the experts. With four qualitative opinions, according to the unified standard in the statistics will be four qualitative opinions (very good, good, general, and poor) to quantify the value of the assessment. Four qualitative opinions of the corresponding evaluation value for 1, 0.8, 0.6, 0.4 fourth gears, the final score of each of the attributes of the evaluation for the expert evaluation values are added, the grade fuzzy evaluation model is established. The establishment of green degree evaluation of the angle of the first stage of the j factor fuzzy evaluation matrix E_{1j}, as shown in Table 4.

Table 4. Expert Evaluation of Green Degree: The First Level

Factor	Very good	Good	General	poor
Pollution cost rate	2	2.4	0.6	0
Life cycle cost	3	2.4	0	0
Environmental input	1	3.2	0.6	0
protection efficiency	1	2.4	0.6	0.4
Return rate of return	0	2.4	1.2	0.4

$$E_{11}=\begin{bmatrix} 0.40 & 0.48 & 0.12 & 0 \\ 0.56 & 0.44 & 0 & 0 \\ 0.21 & 0.67 & 0.12 & 0 \end{bmatrix}$$

$$E_{12}=\begin{bmatrix} 0.23 & 0.54 & 0.14 & 0.09 \\ 0.00 & 0.60 & 0.30 & 0.10 \end{bmatrix}$$

Design evaluation system of the first stage of the j factor evaluation vector Dlj. D11=A11∗E11=(0.42,0.52,0.06,0); D12=(0.115,0.57,0.22,0.095), and secondary fuzzy evaluation model for:

$$E_{23}=\begin{bmatrix} D_{11} \\ D_{12} \end{bmatrix}=\begin{bmatrix} 0.42 & 0.52 & 0.06 & 0.00 \\ 0.11 & 0.57 & 0.22 & 0.09 \end{bmatrix}$$

So the second level evaluation vector is:

$$\mathrm{P}=D_{23}=A_{23}\cdot E_{23}=\begin{bmatrix} 0.17 & 0.57 & 0.18 & 0.08 \end{bmatrix}$$

The establishment of the green degree evaluation of the angle of the second level of the first j factor fuzzy evaluation matrix E2j, we can get that:

Table 5. Expert evaluation of Green Degree: The Second level

Factor	Very good	Good	General	poor
Material utilization ratio	4	1.6	0	0
Rate of recovery	1	1.6	1.2	0.4
Energy utilization ratio	3	2.4	0	0
Re-utilization rate	0	2.4	1.2	0.4

$$E_{22} = \begin{bmatrix} 0.71 & 0.29 & 0.00 & 0.00 \\ 0.24 & 0.38 & 0.29 & 0.09 \\ 0.56 & 0.44 & 0.00 & 0.00 \\ 0.00 & 0.60 & 0.30 & 0.10 \end{bmatrix}$$

The secondary evaluation vector:

$$D_{22} = [0.51 \quad 0.40 \quad 0.07 \quad 0.02]$$

In order to get the first and third evaluation indexes of the second levels, the environmental impact of the green supply chain process and the evaluation vector of the environmental reputation are D_{21} and D_{24}.

$$D_{21} = [0.25 \quad 0.25 \quad 0.25 \quad 0.25]$$
$$D_{24} = [0.25 \quad 0.25 \quad 0.25 \quad 0.25]$$

Three level fuzzy evaluation models is:

$$E_{31} = \begin{bmatrix} 0.25 & 0.25 & 0.25 & 0.25 \\ 0.51 & 0.40 & 0.07 & 0.02 \\ 0.17 & 0.57 & 0.18 & 0.08 \\ 0.25 & 0.25 & 0.25 & 0.25 \end{bmatrix}$$

So the comprehensive evaluation vector is:

$$P = A_{31} \cdot E_{31} = [0.37 \quad 0.38 \quad 0.15 \quad 0.10]$$

4.4 Evaluation Results

Because the evaluation set is four grades, the score set F=(100,75,50,25), the evaluation result is:

$$G = \overline{P} \cdot F = [0.37 \quad 0.38 \quad 0.15 \quad 0.10] \cdot \begin{bmatrix} 100 \\ 75 \\ 50 \\ 25 \end{bmatrix} = 75.5$$

The evaluation results of collaborative performance are obtained:

$$G = \overline{P} \cdot F = [0.24 \quad 0.41 \quad 0.35] \cdot \begin{bmatrix} 100 \\ 75 \\ 50 \end{bmatrix} = 72.25$$

The evaluation results of Customer satisfaction as:

$$G = \overline{P} \cdot F = \begin{bmatrix} 0.31 & 0.69 \end{bmatrix} \cdot \begin{bmatrix} 100 \\ 75 \end{bmatrix} = 82.75$$

The evaluation results of economic benefit as:

$$G = \overline{P} \cdot F = \begin{bmatrix} 0.26 & 0.17 & 0.34 & 0.23 \end{bmatrix} \cdot \begin{bmatrix} 100 \\ 75 \\ 50 \\ 25 \end{bmatrix} = 61.50$$

The evaluation results of future development as:

$$G = \overline{P} \cdot F = \begin{bmatrix} 0.57 & 0.43 \end{bmatrix} \cdot \begin{bmatrix} 100 \\ 75 \end{bmatrix} = 89.25$$

According to the algorithm of this model in the evaluation of the weight coefficient of determination, using the analytic hierarchy process and Delphi method combined to determine the weighting coefficient for the comprehensive performance of green supply chain under five major categories of indicators:

Table 6. The Index Weight Set

Evaluation angle	Green degree	Collaborative performance	Customer satisfaction	Economic performance	Future development
weight	0.14	0.19	0.17	0.37	0.13

So that the weight of the largest is the economic benefits, its importance is more prominent, and the other four angles of the weight is more balanced, and the degree of attention is significantly lower than the economic benefit evaluation angle. This is to our country the green supply chain management status apt portraiture, reflects the profound differences in the degree of the importance of green supply chain in different aspects of the subject, that is, like the traditional supply chain as, still the most important economic benefits of supply chain, and on the importance of green degree, future development and other indicators also need to strengthen. According to the given index a weight, the calculation of the overall performance of the green supply chain is as follows:

$$G = \begin{bmatrix} 0.14 & 0.19 & 0.17 & 0.37 & 0.13 \end{bmatrix} \cdot \begin{bmatrix} 75.50 \\ 72.25 \\ 82.75 \\ 61.50 \\ 89.25 \end{bmatrix} = 72.7225$$

According to the above analysis, we can know that the overall performance of the green supply chain is only 72.7225, in a good and general, in the competition has not occupy the absolute advantage, to strengthen their own competitiveness. And through the scores of comprehensive performance of five kinds of indexes, we can analysis the green supply chain should be in economic benefits, collaborative performance and green degree on strengthen the operation and management, through the improvement of the performance to improve the comprehensive performance of the green supply chain. This result is consistent with the green supply chain, which shows that the comprehensive performance evaluation system of the green supply chain can be applied to the actual supply chain management. At the same time, through the multi-level fuzzy comprehensive evaluation method, we can get the effect of each link.

5. Conclusions

Index system should be built from the perspective of the overall strategy of green supply chain, seeking short-term and long-term goals, financial and non-financial performance measurement, and the internal and external performance between balance, is a comprehensive reflection of green supply chain's performance. And it can satisfy the requirements of information users to understand and evaluate the overall performance of green supply chain. So index established in this paper reflects the comprehensive performance of the green supply chain, to meet the needs of the evaluation between node enterprises in green supply chain, and by considering the combination of financial and non-financial indicators which can be compared, and mainly focuses on the study of coordination within the supply chain members corporate behavior, establish the performance evaluation of green supply chain coordination, which is the innovation of this paper. In the future research of green supply chain management, the coordination mechanism among the members will become the main research direction of the green supply chain performance evaluation. This paper mainly from the green supply chain and its management theory related knowledge analysis, for the integration of green supply chain performance measurement and evaluation of the problem. In order to maximize the overall performance of the green supply chain, taking into account the interests of all members as the target, can objectively reflect the comprehensive performance of green supply chain evaluation index was established, and can choose the practical evaluation methods, the formation of a system, more practical green supply chain performance evaluation system.

Based on this, combined with previous research results, the green degree index is based on the green supply chain is the core part of the "environmental performance" to establish the index; green supply chain evaluation of economic benefit is created from the financial value of index; and customer satisfaction evaluation is from green supply chain customer service to establish the index; the next green supply chain collaborative performance evaluation is from the green supply chain of the externality and coordination mechanisms of established indicators; and established pursuant to the long-term interests of enterprises and long-term development potential of green supply chain future development index.

Green supply chain collaborative performance evaluation index selection is based on its ability to using real-time evaluation and analysis method, the performance evaluation to expand the scope of can reflect the information of green supply chain real-time operation, which only after doing analysis is more valuable than; more because it covers every index can reflect the causal relationship with each other, reduce each other mutual conflict and conflict. This is one of the innovations in this paper, green supply chain performance evaluation study, few scholars to member enterprises in the supply chain coordination mechanism as the green supply chain performance constitutes an important factor, no use of real-time assessment of the business flow, capital flow and information flow unified metric, to reflect the influence of member enterprises in the green supply chain on the overall performance of a causal relationship. Green supply chain coordination is a new and most realistic mode of supply chain management, and it is a kind of connection mode of green supply chain business process, which is a means to utilize and manage resources more effectively. Green supply chain coordination is the core competitiveness of enterprise development, do do greatly strong demand, but also conform to the trend of the times; green supply chain synergy can better meet the needs of individual users, also can better enhance the competitiveness of the whole supply chain

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