Research on the Evaluation of Corporate Social Responsibility under the Background of Low Carbon Economy

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Abstract

Low carbon economy is the inevitable trend of the development of the world economy, the development of low carbon economy is closely related to the fulfillment of corporate social responsibility. The evaluation of corporate social responsibility not only can let people understand the level of corporate social responsibility and promote the realization of the objectives of corporate social responsibility effectively, but also can improve the level of the development of low carbon economy. Based on the background of low carbon economy, this paper puts forward the idea of corporate social responsibility evaluation, constructs the indicator system of corporate social responsibility evaluation, analyzes the application of fuzzy analytic hierarchy process in the evaluation of corporate social responsibility.

Keywords: corporate social responsibility, low carbon economy, evaluation of social responsibility

1. Introduction

In order to deal with the reality of global warming and realize the survival and development of human beings, the development of low-carbon economy is an inevitable choice. With the rapid development of China's industrialization, carbon emissions will inevitably increase, enterprises and the country face a huge challenge to the ecological change and the development of the global low-carbon economy. The development of low carbon economy cannot be separated from the fulfillment of corporate social responsibility which can effectively promote the development of low carbon economy. Thus, the study of corporate social responsibility is very important. Under the premise of the sustainable development of society, enterprises must adopt the strategy of corporate social responsibility to meet the social needs. Scholars in western developed countries have carried out deep research on corporate social responsibility from different subject areas, the same is true of Chinese scholars. The research of scholars at home and abroad mainly includes the research on the definition of corporate social responsibility, the formation mechanism and the driving force of corporate social responsibility, the realization path and the performance evaluation of corporate social responsibility, and the review of research literature on corporate social responsibility, etc. Although many scholars have conducted in-depth study on corporate social responsibility, but those who combined the corporate social responsibility with the low carbon economy are very little. In order to understand the performance of corporate social responsibility, we need a method to evaluate it. Under the background of low carbon economy, the evaluation of corporate social responsibility is different from the traditional corporate social responsibility evaluation (Ji, T., 2010). Therefore, in order to promote the development of low carbon economy, it is necessary to study the evaluation of corporate social responsibility under the background of low carbon economy. Under the background of low carbon economy, the selection of evaluation indicators of corporate social responsibility is more inclined to reflect the development of low carbon economy. How to set up an effective evaluation indicator system of corporate social responsibility has an important role in promoting the development of low carbon economy.

2. The Principles and Thinking of Corporate Social Responsibility Evaluation

2.1 The Principles of Corporate Social Responsibility Evaluation

The evaluation of corporate social responsibility is based on a series of principles. Only under the guidance of

scientific and reasonable principles can we make an objective and fair evaluation. We need to adhere to the following principles:

2.1.1 Authenticity Principle

The authenticity principle which based on objective facts requires the real data to evaluate. The most important thing of the evaluation of corporate social responsibility is to build a reasonable indicator system. Although China has divided the indicator system of corporate social responsibility evaluation in "China Industrial Enterprises Social Responsibility Evaluation Indicator System (Trial)", but it does not fully meet the requirements of low carbon economic development. Therefore, we should choose the core indicators which can truly reflect the level of corporate social responsibility evaluation according to the actual situation.

2.1.2 Scientific Principle

The scientific principle requires the guidance of scientific theory. When designing the evaluation indicator system of corporate social responsibility, we should ensure that the level is clear, the structure is reasonable, the indicators are appropriate through comprehensive consideration, thus reflect the level of the fulfillment of corporate social responsibility objectively.

2.1.3 Systematic and Comprehensive Principle

The systematic and comprehensive principle requires the guidance of the system thought. When designing the system of evaluation indicator of corporate social responsibility, we should stand in the angle of the system and select the core indicators that can reflect the true level from numerous indicators. The core evaluation indicators cannot be too much and cannot be too little.

2.1.4 Operational Principle

The operational principle requires practical operation and measurement. When designing the system of evaluation indicator of corporate social responsibility, we should guarantee that the selected indicators are rational and the date can be collected and calculated. The calculation method of the indicator should be standard and regular and the selection of evaluation method should be operable.

2.2 The Thinking of the Evaluation of Corporate Social Responsibility

Under the background of low carbon economy, the thinking of the evaluation of corporate social responsibility is shown in Figure 1.
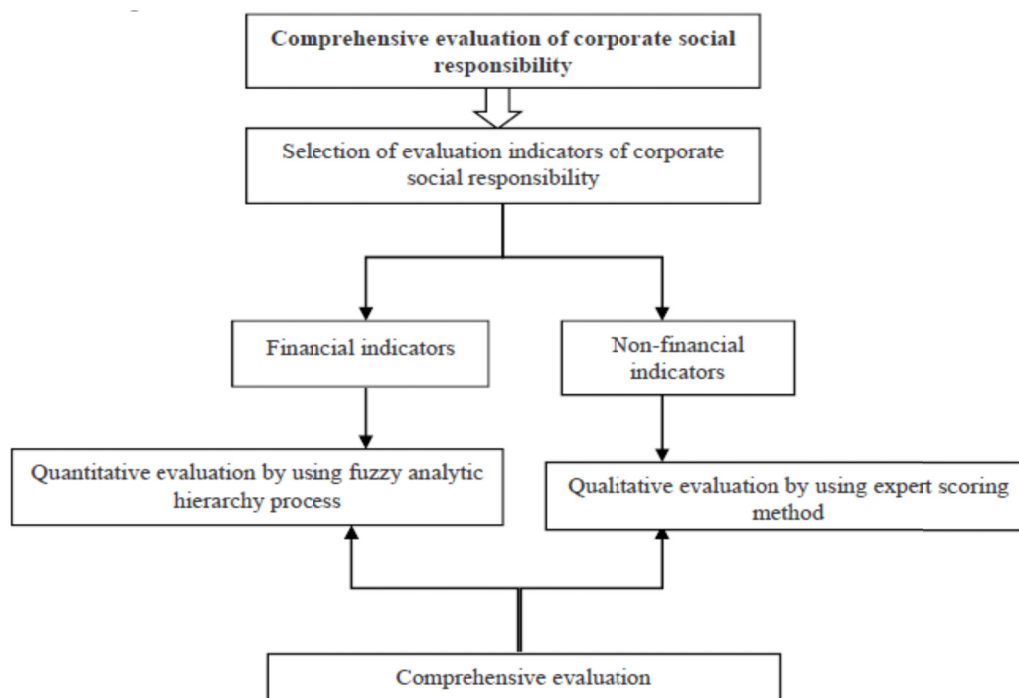

Figure 1. The thinking of the evaluation of corporate social responsibility

First, select the evaluation indicators of corporate social responsibility. Evaluation indicators can be divided into financial indicators and non-financial indicators. Some indicators which are quantitative value can be collected from the enterprise, but some indicators which are qualitative value are difficult to use specific data to measure, such as corporate social responsibility planning, corporate social responsibility crisis management mechanism, etc. Therefore, we should use different methods to evaluate the financial indicators and non-financial indicators.

Second, use the fuzzy analytic hierarchy process to evaluate the financial indicators and use the expert scoring method and others to evaluate the non- financial indicators.

Third, use the evaluation results of financial indicators and non-financial indicators to evaluate the fulfillment of corporate social responsibility comprehensively.

3. The Selection of Evaluation Indicators of Corporate Social Responsibility and the Construction of Indicator System under the Background of Low Carbon Economy

3.1 The Selection of Evaluation Indicators of Corporate Social Responsibility

According to the theory of corporate social responsibility, this paper divides corporate social responsibility into economic responsibility, legal responsibility, moral and charitable responsibility and environmental responsibility (Liu, P., & Guo, H., 2009). Under the background of low carbon economy, environmental responsibility is heavier than other responsibilities. For different types of social responsibility, the selection of evaluation indicators is different.

3.1.1 Indicators Related to Corporate Social Responsibility Evaluation

3.1.1.1 The Relevant Evaluation Indicators of Economic Responsibility

The evaluation indicators of corporate economic responsibility are not only the financial indicators but also the non-financial indicators. The main financial indicators that measure the corporate economic responsibility are the asset-liability ratio, the current ratio, the asset contribution rate, the total profit, the sales value, the GDP growth rate, the turnover of current assets, the product sales rate, the gross industrial output value above Designated Size, the industrial sales output value above designated size, the cost profit margin, the per capita economic value added, the return on net assets, the R & D investment accounting ratio, the dividend payout ratio, the earnings per share, the net interest rate of sales, etc. The main non-financial indicators that measure the corporate economic responsibility are the corporate social responsibility disclosure, the corporate social responsibility crisis management mechanism, the comprehensive risk management system, the internal control management system, the corporate governance, the scientific and technological innovation capacity, the promotion of industrial development, etc.

3.1.1.2 The Relevant Evaluation Indicators of Legal Responsibility

The evaluation indicators of corporate legal responsibility also include financial indicators and non-financial indicators .The main financial indicators to measure the legal responsibility of enterprises are the average wages of employees, the operating cost rate, the tax revenue, the registered urban unemployment rate, the asset tax rate, the tax turnover rate, the pay rate, the employee casualty rate, the product qualification rate, the product return rate, the operating cost rate, etc. The main non-financial indicators to measure the legal responsibility of enterprises are the payment of social security and provident fund, the safety production management system, the labor disputes, the occupational health, etc.

3.1.1.3 The Relevant Evaluation Indicators of Moral and Charitable Responsibility

The evaluation indicators of corporate moral and charitable responsibility also include financial indicators and non-financial indicators. The main financial indicators to measure the moral and charitable responsibility of enterprises are the employment rate, the mortality rate of 1000 people, the employment contribution rate, the employee wage growth rate, the employee education funds rate, the social accumulation rate, the social contribution rate, the charitable donations, etc. The main non-financial indicators to measure the moral and charitable responsibility of enterprises are the product quality, the customer satisfaction, the supplier satisfaction, the product safety issues, etc.

3.1.1.4 The Relevant Evaluation Indicators of Environmental Responsibility

The evaluation indicators of corporate environmental responsibility also include financial indicators and non-financial indicators. The main financial indicators to measure the environmental responsibility of enterprises are the energy saving and environmental protection budget expenditure, the environmental protection investment rate, the environmental protection funds rate, the growth rate of environmental protection funds, the energy consumption

per unit output value, the waste rate per unit output value, the environmental fines spending, the pollution control projects completed investment amount, the reduction rate of carbon emission intensity, the industrial wastewater treatment, the industrial waste gas emission, the utilization of industrial solid waste, the industrial water consumption, the landscaping area, the comprehensive energy consumption, etc. The main non-financial indicators to measure the environmental responsibility of enterprises are the construction of environmental management system, the environmental emergency response mechanism, the production of environmentally friendly products, the backward production capacity, the equipment and process out of the situation, etc.

3.1.2 The Problems That Should Be Considered in the Selection of Evaluation Indicators of Corporate Social Responsibility under the Background of Low Carbon Economy

When selecting the evaluation indicators of corporate social responsibility, the following points should be considered:

First, the evaluation of corporate social responsibility of a region should be based on financial indicators. The indicators of corporate social responsibility evaluation include both financial indicators and non-financial indicators. In the study of the evaluation of corporate social responsibility in a region, we should stand on a whole point of view and carry out a comprehensive evaluation. But there are too many enterprises in a region and the disclosure of non-financial indicators is limited, this makes the collection of non-financial indicators is difficult. Therefore, the research on the evaluation of corporate social responsibility in a region is mainly based on the financial indicators. Of course, when evaluating the fulfillment of the social responsibility of a single enterprise whose non-financial information collection is relatively easy, comprehensive evaluation should be carried out from financial indicators and non-financial indicators. This paper mainly studies the evaluation of corporate social responsibility in a region, so it mainly discusses how to evaluate it with financial indicators.

Second, we should select the key financial indicators whose data is easy to obtain to evaluate. Among the numerous financial evaluation indicators, some indicators have a greater impact on the evaluation of corporate social responsibility than the others**.** If we evaluate with all the indicators without selection, it does not only affect the quality of the evaluation, but also increase the workload of data collection, thus reducing the efficiency of the evaluation. Therefore, we should select the representative key indicators to evaluate and ensure that the data can be acquired.

3.1.3 Selection of Key Financial Indicators of Corporate Social Responsibility Evaluation

Based on the above two points, the content of the key evaluation indicators of corporate social responsibility is shown in the Indicator layer in Table 1; I will no longer repeat them here.

3.2 The Construction of Evaluation Indicator System of Corporate Social Responsibility

3.2.1 The Determination of Indicator Layer

When designing the system of corporate social responsibility evaluation, this paper selects three levels of indicators:

3.2.1.1 Target Layer

The target layer mainly reflects the fulfillment of the corporate social responsibility of a region, city or industry. Usually, the target layer of evaluation indicator system of corporate social responsibility is "corporate social responsibility evaluation".

3.2.1.2 Criterion Layer

The criterion layer is developed around the target layer which is the further refinement of the target layer. To reflect the fulfillment of corporate social responsibility, this paper mainly constructs the criteria layer of corporate social responsibility evaluation from the corporate economic responsibility, legal responsibility, moral and charitable responsibility, environmental responsibility four aspects.

3.2.1.3 Indicator Layer

The indicator layer is developed around the criterion layer which is the further refinement of the criterion layer. How to choice the specific indicators has been discussed above.

3.2.2 Construction of Indicator System

According to the content discussed above, the evaluation indicator system of corporate social responsibility that constructed is shown in Table 1.

Table 1. Evaluation indicator system of corporate social responsibility

Target layer	Criterion layer	Indicator layer
Corporate Social Responsibility Evaluation	Economic responsibility	The asset-liability ratio (%)
		The current ratio (%)
		The total profit (million yuan)
		The industrial sales output value (million yuan)
		The growth rate of GDP (%)
		The turnover of current assets (times / year)
		The product sales rate (%)
		The cost profit margin (%)
		The total asset contribution rate (%)
	Legal responsibility	The average wages of employees (yuan)
		The operating cost rate (%)
		The tax revenue (million yuan)
		The registered unemployment rate (%)
		product qualification rate (%)
		The asset tax rate (%)
	Moral and charitable responsibility	The employment rate (%)
		The employee wage growth rate (%)
		The public welfare donations (Billion yuan)
		The social contribution rate (%)
		The average number of employees (person)
		The value of the asset value (%)
		The social accumulation rate (%)
	Environmental responsibility	The energy saving and environmental protection budget expenditure (million yuan)
		The comprehensive energy consumption (million tons/ standard coal)
		The discharge of industrial waste water (million tons)
		The industrial waste gas emission (Billion cubic meters)
		The industrial solid waste utilization (million tons)
		The carbon emission intensity (Million tons / billion)
		The landscaping area (hectare)
		The wastewater discharge standard rate (%)

4. Evaluation of Corporate Social Responsibility Based on Fuzzy Analytic Hierarchy Process

After the construction of the indicator system of corporate social responsibility evaluation, it needs to be evaluated by a certain method. In this paper, the fuzzy analytic hierarchy process is used to make a comprehensive evaluation of corporate social responsibility. The fuzzy analytic hierarchy process has mainly introduced the principle of fuzzy logic into the analytic hierarchy process. It overcomes the shortcomings of the original method to a certain extent and broadens its scope of application. The application of fuzzy analytic hierarchy process in the evaluation of corporate

social responsibility is as follows:

4.1 Acquisition of Standardized Data

We must obtain the data of each indicator in the indicator system first when using the fuzzy analytic hierarchy process to evaluate the corporate social responsibility. The data acquisition is carried out from the following two aspects:

4.1.1 Data Sources

The Fuzzy comprehensive evaluation needs to collect representative indicator data which can reflect the evaluation goals.

4.1.2 Standardized Treatment of Indicators

Due to the difference of selection method and dimension of each indicator data, we cannot evaluate directly, so the data must be processed by forward and non-dimensional treatment.

4.2 The Construction of Fuzzy Matrix and the Determination of the Weight (Yang, L., 2010).

The weight of evaluation indicator is a quantitative representation of the relative importance of each evaluation indicator in the evaluation indicator system. Whether the setting of its value is correct and reasonable or not has a very important influence on whether the corporate social responsibility of the area can be reflected accurately and objectively. The specific steps to construct the fuzzy matrix and determine the weight by using three scales fuzzy analytic hierarchy process are as follows:

First, establish the judgment matrix (priority matrix) F=(f$_{ij}$)m×n:

$$f_{ij} = \begin{cases} 1 & c(i) > c(j) \\ 0.5 & c(i) = c(j) \\ 0 & c(i) < c(j) \end{cases}$$

In the formula, $c(i)$ and $c(j)$ are expressed as the relative importance of scale $f(i)$ and $f(j)$.

Second, the priority judgment matrix F=(f$_{ij}$)m×n is transformed into consistent fuzzy matrix P=(p$_{ij}$)m×n, specific calculations are as follows:

$$p_i = \sum_{j=1}^{m} f_{ij} \quad i = 1, 2, \cdots, m$$

$$p_{ij} = \frac{p_i - p_j}{2m} + 0.5$$

Third, using the line normalization to get the weight w_i of each indicator, specific calculation formulas are as follows:

$$I_i = \sum_{j=1}^{m} p_{ij} - 0.5 \qquad i = 1, 2, \cdots, m$$

$$\sum_i I_i = \frac{m(m-1)}{2}$$

$$w_i = \frac{I_i}{\sum_i I_i} = \frac{2 I_i}{m(m-1)}$$

By using the above calculation formulas to calculate the weight of each indicator, we can form the indicator weight table, as shown in Table 2.

Table 2. Indicator weight distribution table

Target layer	weight	Criterion layer	weight	Indicator layer	weight
A	1	B1	W1	C11	w11
				C12	w12
				C13	w13
				……	……
		B2	W2	C21	w21
				C22	w22
				C23	w23
				…….	…….
		B3	W3	C31	w31
				C32	w32
				C33	w33
				…….	…….
		B4	W4	C41	w41
				C42	w42
				C43	w43
				……..	……..

It's should be noted that we need to consult some authoritative experts to determine the relative importance of evaluation indicator and its ranking based on expert opinion in determining the weight of the indicator. Then, use the method of fuzzy analytic hierarchy process to calculate the weight of each indicator in the indicator system with the help of Excel. Under the background of low carbon economy development, there is no doubt that the weight of environmental responsibility should be greater than or equal to the others when determining the weight of the social responsibility of the criterion layer.

4.3 The Calculation of the Comprehensive Evaluation Score of Financial Indicator

When using the fuzzy analytic method to carry on comprehensive appraisal, standardized data of each indicator is multiplied by their respective weights and then totaled, thus can calculate the comprehensive evaluation score Z. Specific calculation formula is as follows:

$$Z = \sum[\text{Criterion layer weight} \times (\sum \text{indicator layer weight} \times \text{Standardized data})] = \left[W_i \times \left(W_{ij} \times C_{ij} \right) \right]$$

After calculating the comprehensive score of the financial indicator evaluation by using the above formula, we can carry out a comprehensive evaluation around the evaluation goal.

4.4 Comprehensive Evaluation of Financial Indicators and Non-financial Indicators

The fulfillment of corporate social responsibility is reflected by the financial indicators and non-financial indicators, this paper focuses on the evaluation methods of financial indicators of corporate social responsibility, did not introduce the non-financial indicator evaluation concretely. Although this article has not specifically introduced the non-financial indicator appraisal method, the influence on the evaluation results of corporate social responsibility cannot be neglected. When evaluating the corporate social responsibility of an area, we can choose the representative non-financial indicators and evaluate it by using an expert scoring method. Then, combine the evaluation results of financial indicators and non-financial indicators to make a more objective and accurate evaluation.

5. The Conclusion

Low carbon economy is the inevitable choice for the development of the global economy. The development of low-carbon economy is closely related to the promotion of corporate social responsibility, and the promotion of corporate social responsibility can effectively promote the development of low carbon economy. This paper mainly studies the evaluation of corporate social responsibility. The paper analyzes the selection criteria and method of

evaluation indicators and constructs the evaluation indicator system, and discusses the application of corporate social responsibility evaluation method by using fuzzy analytic hierarchy process. By using this method, we can know more objectively and accurately the performance of corporate social responsibility in a certain region or country in a specific time. The study of this paper can not only play a guiding role in the practice of corporate social responsibility, but also can enrich the theory of corporate social responsibility. However, China has not yet introduced a set of effective corporate social responsibility evaluation standard system, the index selection of the corporate social responsibility evaluation, the determination of the weight, evaluation criteria and so on has not yet been made uniform provisions. This makes the evaluation of corporate social responsibility in our country is still in the exploratory stage, which is the direction of my further research in the future.

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