Application of Balanced Score Card in the Evaluation of High-Quality Development of Environmental Service Industry: A Case Study of Grandblue

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Abstract: In 2016, the state proposed the “Five-sphere Integrated Plan” (a plan to promote coordinated economic, political, cultural, social and ecological advancement) and the "Four-pronged Comprehensive Strategy", which focus on environmental quality improvement, solve outstanding environmental problems and steadily promote environmental protection. The “Outline of the 13th Five-Year Plan for National Economic and Social Development” promulgated in March 2016 stated explicitly about “developing green environmental protection industries, support technical equipment and service model innovation, and promote the development and growth of energy-saving and environmental protection industries”. The “Ecological Environment Protection Planning for the 13th Five-year Period” was released and implemented in the same year. Under such backdrop, China’s environmental service industry has experienced a steady rise since 2016. The scale of the industry continues to expand, the industry concentration and spatial pattern are basically stable, the income grows steadily, the profit margin rises slightly, and the tax contribution continues to increase, which has made significant contribution to national economic growth. This article will shift from the macro industrial economy level to the micro corporate strategy level, exploit the Balanced Score Card to formulate a set of quality evaluation system in line with the business scope and business philosophy of the enterprise to accurately evaluate the quality of environmental service enterprises, which will facilitate the high-quality development of the overall environmental service industry.

1 INTRODUCTION

With the advancing of economic globalization and ecological globalization, international attention to the environmental service industry has increased simultaneously with the rapid economic development and increased pressure of environmental pollution. The environmental service industry has also become the focus of general attention of domestic and foreign scholars. Overseas scholars such as Goldman et al. (2005) used data from the past ten years to conduct empirical analysis on the trend of the US environmental service industry, and concluded that market-opening plans and government policy support can promote the development of environmental service industry (Goldman et al., 2005). Gan et al. (2009) further explored how to promote the development of environmental service industry from market development mechanism, standardization of environmental service industry, and public consumption awareness. At present, the definition of environmental service enterprise in the international community is not completely consistent. China defines environmental service industry as service trading activities related to the environment, and a branch of modern service industry. It has been occupying a large proportion in the statistical classification of China’s producer service industry, and taking an important position in the consumer service industry (Da-li G, 2009).

In our country, the development of environmental protection industry is a great option for local governments to promote the supply-side structural reforms and expand high-quality incremental supply. It is also an important support for the fight against pollution prevention and control. In the future, with the in-depth penetration of emerging technologies

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such as big data, cloud computing, and artificial intelligence, along with the guidance of the government macroeconomic policies, the market potential and development vitality of China's environmental service industry will be efficiently improved. At present, although the market capacity of the environmental service industry has expanded significantly, the service content has been improved, service capabilities enhanced, and service quality elevated, the overall levels of development of the industry is still low, with problems such as unreasonable personnel structure, and weak innovation capabilities. Therefore, it is necessary to build a new environmental service industry evaluation system to determine the service standards through relevant indicators so as to enhance the quality and efficiency of the environmental service industry, and to achieve the goal of pollutant emission reduction and fundamental improvement of environmental quality with high-quality environmental service standards.

2 DEFINITION OF RELATED CONCEPTS AND LITERATURE REVIEW

In this part, including the definition of related concepts and literature review.

2.1 Definition of Related Concepts

The definition of environmental service industry, Balanced Score Card and The Analytic Hierarchy Process.

2.1.1 Environmental Service Industry

The definition and classification of the environmental service industry abroad mainly include the following versions: The Interim Core Product Classification (CPC) issued by the United Nations in 1998 defines the environmental service industry as including sewage treatment services, waste disposal services, sanitation services and other environmental services. In 1999, the Organization for Economic Cooperation and Development (OECD) and the European Community Statistics Office (EUROSTAT) defined environmental service industry as the measurement, prevention, restriction, mitigation, and governance of environmental damages related to water, air, soil, waste, noise and ecosystems, which can be divided into pollution treatment, clean technology and clean products, and resource management. In 1991, the General Agreement on Tariffs and Trade (GATS) adopted the W/120 system to classify environmental service industry, and proposed that the environmental service industry should include sewage treatment services, waste disposal services, sanitation services and exhaust gas cleaning services, noise reduction services, nature and landscape conservation services and other environmental services. In 2000, the European Union proposed a new classification of environmental services in the World Trade Organization (WTO), dividing environmental services into core environmental services and environment-related services. The core environmental services are pure environmental services, which falls into 7 categories: human water consumption and sewage management, hazardous solid waste management, air and climate protection, soil and water restoration and cleaning, noise and vibration reduction, biodiversity and landscape protection, and other environmental services and ancillary services. Environment-related services can also be divided into 7 categories: business services, R&D services, consulting services, contracting, and engineering services, construction services, distribution services, transportation services and other services with environmental connotations. Currently, the GATS classification of environmental service industry is widely used by WTO and the United Nations until now, while the classification system of OECD and EUROSTAT for environmental service industry is more advanced and complete.

China classifies the environmental service industry by referring to the "2000 Communiqué on the National Environmental Protection-Related Industries" issued by the State Environmental Protection Administration, which for the first time, defines environmental service industry as service trade activities related to the environment, and are specifically divided into environmental technical services, environmental consulting services, operation and management of pollution control facilities, recycling and disposal of waste resources, environmental trade and financial services, environmental functions and other environmental services.

2.1.2 Balanced Score Card

The concept of Balanced Score Card (hereinafter referred to as BSC) was first published in Harvard Business Review in 1992 by Professor Robert Kaplan of Harvard University and David Norton, the Director of the Norton Institute in "The Balanced Score

Card—Measurement that Drive Performance", and this creative concept is a major breakthrough in performance evaluation theory. At present, the traditional Balanced Score Cards used in most studies to evaluate performance have four dimensions: financial dimension, customer dimension, internal process dimension, and learning and growth dimension. The four dimensions are used to transform the company's strategic goals into feasible indicators for quantitative analysis, which focus on the current performance evaluation and adjust the company's future production and operation and activities. BSC is applied to the specific activities of the company to help the company achieve its strategic goals.

2.1.3 Analytic Hierarchy Process

The Analytic Hierarchy Process (hereinafter referred to as AHP) is a decision-making method that decomposes the elements that are always related to the decision into goals, guidelines, and plans, and performs qualitative and quantitative analysis on this basis. This method is a hierarchical weighted decision analysis method proposed by the American operations researcher Professor Satie of the University of Pittsburgh in the early 1970s.

2.2 Literature Review

Judging from the existing research on the environmental service industry, currently overseas researches mainly focus on the payment for environmental service, while domestic researches look into perspectives including the status quo of the environmental service industry, the experience drawn from the development of the environmental service industry, and how to push forward the development of the environmental service industry.

Foreign scholars mainly study payment for environmental services. The research perspectives include the power and influence of payment methods of environmental services on environment protection, agricultural development, and economic development. "Payment for Environment Service" (PES) is also called "Payment for Ecosystem Service" or "Payment for Ecological Service" (collectively known as "Payment for Ecosystem Service"). Wunder (2005) believes that the significance of PES is that the environmental service beneficiaries make conditional and contractual payments to the service suppliers, so that the latter can continue to take actions to protect and restore the ecological environment system. This should involve voluntary transactions, defined ecosystem services, at least one environmental service purchaser and one environmental service provider, and the environmental service provider must provide environmental services (Wunder S, 2005). Huang (2007) proposed to define environmental services, which means that it is necessary to determine the subjects of relevant environmental services, including the suppliers, demanders and intermediaries, and establish the payment mechanisms (including payment methods, transaction costs, contract duration, and sources of payment) and relevant laws and regulations (Huang M et al., 2007).

In the recent decades, international organizations have promoted many conservation projects to resolve environmental problems worldwide. For example, institutions such as the World Bank (wb), the Food and Agriculture Organization of the United Nations (fao), the United Nations Environment Programme (unep), the Global Environment Fund (gef) and the International Development Bank (idb) have developed guidelines for public environmental policies for countries committed to environmental protection. It is worth noting that those projects have facilitated related initiatives between non-governmental organizations and some private companies (wunder et al., 2008). Generally speaking, these projects set to promote environmental protection through market mechanisms such as compensation, incentives and payments (Rodríguez et al. 2011). In particular, projects that provide incentives or compensation for environmental protection services, namely, payment for environmental services or payment for ecosystem services, are important mechanisms that promote social, economic and environmental sustainability, especially in rural areas (Maciel et al., 2014). In developing countries, governments do not have enough funds to pay for environmental service projects, and therefore the lack of available funds is another crucial limitation (Wunder et al., 2008). Sometimes, in areas where the market is missing, the opportunity cost or the willingness to pay is uncertain, the payment of environmental service fees is even found to be ineffective for environmental protection (Pattanayak et al., 2010). The above restrictions will abate the efficiency of payment for environmental service, thus hampering the goals of the environmental service payment plan. In this case, efficiency refers to the extent to which the paid environmental service programs achieve the environmental protection goals with minimal social, economic or environmental costs (Jost and Gentes, 2014).

As for domestic researches on the status of environmental service industry, Liu Xiaobing et al. (2015) studied the development status of China's environmental service industry and concluded that China's environmental service industry has seen considerable development since 2000, while the scale was still very small compared with that of the developed countries and the development was also uneven between the East and the West of China (Liu et al., 2015). Chai Weishu et al. (2017) analyzed the data from 2012 to 2016 in terms of the overall scale of environmental services, industry concentration and industry spatial pattern and the status of the industry main body, and concluded that the environmental service industry had made a significant contribution to the growth of the national economy during 2012 and 2017, and that the market potential and vitality of the environmental service industry would be further explored with the deepening of supply-side structural reforms, the upgrading of environmental protection supervision and law enforcement and policy support (Chai et al., 2017). When Wang Yanhua et al. (2018) explored the investment in environmental protection industry, they found that the distribution of China's environmental service industry was the same as that of the environmental protection industry, which was quite unbalance. China's environmental protection industry is mainly concentrated in the Bohai Rim, the Yangtze River Economic Belt and the Pearl River Delta, while the environmental service industry is mainly situated in the Beijing-Tianjin-Hebei region, the Yangtze River Delta and the Pearl River Delta (Wang et al., 2018).

Regarding the experience reference for the development of the environmental service industry, Gao Ming and Hong Chen (2014) referred to the enlightenment of the development of the US environmental protection industry and mentioned that the export of environmental protection products should be encouraged and the government's role in the international trade of environmental protection industry should be strengthened. The government must remove all the barriers for the environmental protection industry in participating in international competition, provide export information services, reduce, or exempt export tariffs, and simplify the administrative procedures. At the meantime, the government need to fight for the rights and interests of environmental protection companies in international organizations, integrate environmental diplomacy with environmental trade, and utilize government assisted project to Africa to drive the export of environmentally friendly products (Gao M, Hong C 2014). Jia Ning and Ding Shineng (2014) proposed to learn from the successful experience of Japan and South Korea in the development of environmental protection industry. Compared with European and American countries, the environmental protection technologies of Japan and South Korea are easier to transform and absorb by China. In the future, we need to make full use of the environmental protection industry cooperation platform of Japan and South Korea, increase the investment in science and technology, and explore the development path of environmental protection industry to "go global" (Jia N, Ding S 2014).

Regarding how to promote the development of the environmental service industry, Xia Jiechang and Zhang Yingxi (2010) emphasized the necessity to cultivate public awareness when discussing the development path of the industry in China. By adopting multi-level environmental education, the public's awareness of environmental protection will be strengthened, which helps to form a benign interaction between the public, government and enterprises, lays a foundation for policy formulation, and creates a favorable market and public opinion atmosphere for the development of the industry (Xia J, Zhang Y 2010). Li Ying et al. (2012) mentioned that to promote the development of China's environmental service industry, it is necessary to implement environmental services contract (ESC). The essence of ESC is the business method of paying the full costs of environmental protection projects in the form of contracts with the payment standard built upon the environmental protection performance. ESC goes in two forms: 1) polluting companies share the saved emission reduction costs with environmental service providers through the environmental service contract, which is similar to energy contract services in structure; 2) the government pays for the environmental services provided by the environmental services providers through fiscal payment in government activities (Li et al., 2012). Liu Naichao (2014) also explored the development path of China's environmental service contract, and was convinced that the "environmental contract services" model could be a new way of environmental governance integrating voluntary actions and market mechanism, and environmental service contract has become an important governance model from urban and rural waste treatment, sewage treatment to air treatment, etc., and it plays a positive part in the improvement of environmental governance. In addition, sustainable development of environmental service contract is mainly achieved through government supervision and fiscal and tax policy support which strengthens the market order (Liu N

2014). Wu Na et al. (2020) put forward several strategic suggestions when evaluating the development level of our environmental service industry, for instance expanding the scale of environmental service enterprises, and guiding small and micro enterprises to develop differentiated, specialized and refined services while focusing on the cultivation of a group of leading enterprises. In addition, improving the technological innovation capabilities of environmental service companies and introducing environmental technology talents are also crucial to the development of environmental service enterprises (Wu et al., 2020). Xin Lu et al. (2020) used the South China Cluster of the National Environmental Service Industry as an example to analyze policies that promote the innovation and entrepreneurship of environmental protection industrial parks. They mentioned that promoting environmental protection requires the establishment of environmental protection industry funds, and the innovation of environmental protection industry financing guarantee methods, etc. we need to vigorously develop environmental finance services and enhance the vitality of the industry, give full play to the government's guidance, support and positive role, establish a government-led fund for the development of environmental protection industry, and enhance the potential for industrial development (Xin et al., 2020).

3 CASE COMPANY INTRODUCTION

Grandblue is a listed company engaged in environmental protection services, headquartered in Nanhai District, Foshan. Since its listing in 2000, Grandblue has developed from a local municipal utility company to a large national comprehensive environmental service company. Its main business areas include solid waste treatment, and energy, water supply and drainage. It has evolved from a company that provides simply water supply service for certain areas of Foshan to a comprehensive environmental service company that provides integrated "waste-free city" solutions for multiple cities across the country. Jin Duo, the president of Grandblue, said in an exclusive interview with our reporter that Grandblue initially expanded the "border" of its business by acquiring a waste incineration company in 2006. This waste treatment plant was strongly resisted by the people around because of the bad smell, black smoke from chimneys, sewage and terrible noise, and it got on the black list of the Ministry of Environmental Protection. "A company engaged in environmental protection business has encountered hostility and resistance from the surrounding residents because it has never been environmental-friendly and it is not responsible for the community environment and its employees. The company was on the verge of bankruptcy and the hearts of the employees were extremely disintegrated." Jin Duo said like that when he recalls that company. It seems that he his mind has flied back to fifteen years ago, "After we took over, we began to think about how to do things right from the scratch". When the reporters come to the original site of that company, it has been completely different—a building full of artistic design stands among shady trees, chic landscape and fresh grass, and two-hundred-meter-high chimneys stand like crystal columns, beautiful and refreshing. Standing in front of this building designed by the Atkins design team, the designer of seven-star Burj Al Arab Hotel in Dubai's, one can hardly associate it with garbage incineration, and this reborn area also gets a new name—Nanhai Solid Waste Treatment and Environmental Protection Industrial Park.

4 EVALUATION AND ANALYSIS OF HIGH-QUALITY DEVELOPMENT BASED ON THE BALANCED SCORE CARD

This part is about the evaluation and analysis of high-quality development based on the Balanced Score Card.

4.1 A Five-Dimensional Balanced Score Card

The concept of Balanced Score Card (hereinafter referred to as BSC) was first published in Harvard Business Review in 1992 by Professor Robert Kaplan of Harvard University and David Norton, the Director of the Norton Institute in "The Balanced Score Card—Measurement that Drive Performance", and this creative concept is a major breakthrough in performance evaluation theory. At present, the traditional Balanced Score Cards used in most studies to evaluate performance have four dimensions: financial dimension, customer dimension, internal process dimension, and learning and growth dimension. The four dimensions are used to transform the company's strategic goals into feasible indicators for quantitative analysis, which focus on the current

performance evaluation and adjust the company's future production and operation and activities. BSC is applied to the specific activities of the company to help the company achieve its strategic goals.

When Chen Xu et al. (2020) studied the strategy-oriented combination of the BSC and key performance indicators, they took W company as an example, combined with W company's unique corporate mission "Green-technology Driven and International-Oriented" and expanded the four-dimensional BSC with another non-financial dimension—"Social Responsibility Dimension" to reflect the corporate social responsibility performance, which is consistent with the "Green-technology Driven and Sustainable Development" philosophy advocated in W company's strategy [21]. The company studied in this article, Grandblue is a social service enterprise for solid waste treatment, gas and new energy supply. It takes "building a harmonious life between man and nature" as its corporate mission and upholds "a good housekeeper for the city, a good model for the industry, and a good neighbor in the community", with the vision to become a leading eco-environmental service provider, therefore the traditional four-dimensional BSC model can no longer cover the business strategy of the company (Chen X et al., 2020). Lin Hongmei et al. (2020) studied the relationship between the tenure of executives and corporate social responsibility, and made the point that corporate social responsibility was the responsibility that enterprises would undertake beyond the interests of the company and legal requirements, including environmental responsibility, consumer rights and interests, social donations and social contribution value per share and many other aspects. The fulfillment of social responsibilities by enterprises not only propels the sustainable and balanced development of the enterprises and the society, but also shapes the company's image to a large extent (Lin et al., 2020). The 19th National Congress of the Communist Party of China also proposed to "promote the construction of integrity and institutionalization of voluntary services, and strengthen the awareness of social responsibility, rules, and dedication". Corporate responsibilities include responsibilities to the country, the society, the investors, the consumers and the public, the employees, and the environment, etc. (Liu Junhai and Chai Weiwei, 2018). Deng Mingwen and Yu Zhihong (2020) mentioned that "corporate social responsibility is not cost but competitiveness and the driving force of enterprise development" when studying the sustainable practices of Grandblue's environmental contribution to a waste-free city. It is precisely by fulfilling its social responsibilities, can Grandblue build business advantages, and improve corporate profitability while creating diversified value for the society (Deng M, Yu Z 2020).

4.2 Enterprise Strategy Map and Index Evaluation System

With the help of the five-dimensional BSC, the company's strategic goals can be subdivided into sub-goals at different levels within the five dimensions, with each level pointing out the specific problems that the company must solve in order to achieve the strategic goals and vision. Based on the reconstructed five-dimensional strategic map shown as follows, combining the characteristics of the industry and business philosophy of Grandblue, as well as its future strategic goals, the indicators that can most accurately measure the service performance of Gramdblue are selected to ensure the fairness of subsequent weight determination. There are 5 indicators in each dimension, with 25 indicators in the system in total. The strategy map and indicator evaluation system go as follows (Figure 1 & Table 1).

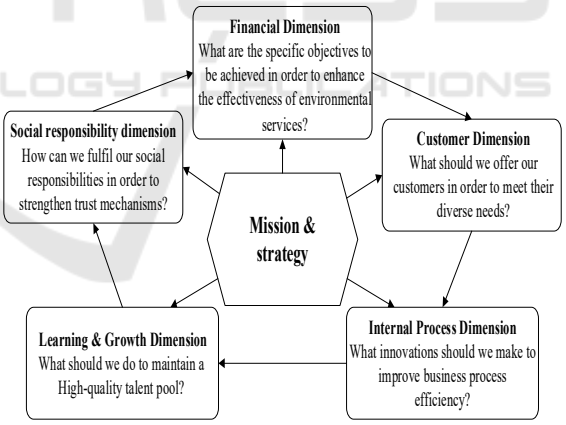

Figure 1: Strategic Map.

4.2.1 Financial Dimension

The key to realize Grandblue's strategic goal of financial dimension of is to satisfy the shareholders and maximize the shareholders' interests, and secondly, consider the preferences of external small and medium investors. The author has selected several indicators that can best reflect the interests of shareholders and are of prior concern of external

small and medium investors. The first indicator is weighted average return on equity. It is known that the rate of return on net assets is the most representative indicator for evaluating the level of remuneration acquired by a company's own capital and its accumulation, and the weighted average can better reflect the return on net assets in the entire year and avoid short-term fluctuations caused by uncertainties such as accidental events in the market, followed by basic earnings per share to evaluate the company's profitability. The cash dividend distribution ratio reflects the company's dividend policy and dividend payout rate. Those two indicators are also important indicators for shareholders and investors to decide whether to invest or not; finally, the interest coverage ratio is taken to measure the company's long-term solvency which can measure the security of corporate debenture capital, and the loan repayment rate is used to evaluate the company's credit standing and capital turnover.

4.2.2 Customer Dimension

To achieve the goal of customer dimension, Grandblue must always take customer satisfaction as a guideline for production and operation, and take customer demand as the direction for enterprise development. The rate of new customer acquisition represents a company's business capabilities and brand awareness. Due to the diversification and wide distribution of customers, as well as the differences in the standards for solid waste treatment, water and power supply and other services in different regions, Grandblue must provide diversified and customized products and services to meet the personalized requirements of different customers. Publicity and promotion expenses refer to the company's investment in brand promotion, which reflects the company's emphasis on maintaining old customers and long-term customers, and acquiring new customers. Information disclosure evaluation, project acceptance rate, and after-sales service timeliness ratio all reveal the company's transparency on its own service quality and quality assurance to increase customers' trust in its products and services.

4.2.3 Internal Process Dimension

As a service enterprise engaged in solid waste treatment and water and power supply, the internal process of Grandblue determines its production efficiency, product quality and service efficiency. To achieve the strategic goals of the internal process dimension of Grandblue, firstly, investment in safety production reflects the company's attention and control of the safety of production process. Only by keeping safety as the bottom-line can Grandblue talk about strategy and development; secondly, the company's industrial output energy consumption level and energy loss rate represent the economic benefits of enterprise energy. A reasonable proportion of R&D investment is a prerequisite to technological breakthroughs. The acceleration of the modernization process makes environmental protection more challenging. Therefore, Grandblue must increase R&D investment, accelerate the formation of core competitiveness, and achieve breakthroughs in core technologies. And the pollutant treatment capacity is the guarantee of the business capacity of a solid waste treatment company.

Table 1: Innovation Performance Index Evaluation System of Gandblue.

First-level evaluation dimension	Secondary evaluation index
Financial dimension (A)	Weighted average return on equity (A1)
	Cash dividend distribution ratio (A2)
	Loan repayment rate (A3)
	Basic earnings per share (A4)
	Interest coverage multiple (A5)
Customer dimension (B)	New customer acquisition rate (B1)
	Promotion fee ratio (B2)
	Evaluation of Information Disclosure (B3)
	Project acceptance rate (B4)
	Timeliness ratio of after-sales service (B5)
Internal process dimension (C)	Proportion of R&D investment (C1)
	Energy consumption of industrial output value (C2)
	Energy loss rate (C3)
	Safety production investment (C4)
	Pollutant treatment capacity (C5)
Learning and growth dimension (D)	Staff training coverage rate (D1)
	Proportion of highly educated employees (D2)
	Proportion of female managers (D3)
	Occupational disease incidence (D4)
	Social insurance coverage rate (D5)
Social responsibility dimension (E)	Social contribution value per share (E1)
	Hazardous waste treatment efficiency (E2)
	Charity donation (E3)
	Tax payment (E4)
	Volunteer service frequency (E5)

4.2.4 Learning and Growth Dimensions

The strategic goal of the learning and growth dimension is to develop long-term core competitiveness to provide consumers with better services. On the one hand, Grandblue needs to cultivate core technical talents, management talents and other resources that can help realize the long-term development of the company. In addition, employee training, the introduction of highly educated talents, and the proportion of female managers can all reflect the company's emphasis on high-end talents; on the other hand, it is necessary to provide better living guarantee and employee benefits to reduce brain drain. For example, employees in solid waste treatment-related positions must undergo regular occupational disease inspections to increase social insurance coverage.

Table 2: AHP 1~9 Scale Description.

Scaling	Connotation
1	Both elements are equally important
3	The former is slightly more important than the latter
5	The former is obviously more important than the latter
7	The former is more important than the latter
9	The former is extremely important than the latter
2, 4, 6, 8	The median value of the above adjacent judgment
Count backwards	If the importance ratio of element A to element B is a, then the importance ratio of element B to element A is 1/a

Table 3: Description of the score sheet.

	Index A	Index B	Index C	Index D	Index E
Index A	1	A/B	A/C	A/D	A/E
Index B	B/A	1	B/C	B/D	B/E
Index C	C/A	C/B	1	C/D	C/E
Index D	D/A	D/B	D/C	1	D/E
Index E	E/A	E/B	E/C	E/D	1

4.2.5 Social Responsibility Dimension

Grandblue adheres to the corporate mission of "building a harmonious coexistence between man and nature", which requires the company to strengthen trust mechanism by enhancing the sense of social responsibility and fulfilling the social responsibilities. First of all, it emphasizes the improvement of energy utilization efficiency, saving energy and reducing consumption, for instance improving the efficiency of hazardous waste treatment; secondly, in terms of social contribution, Grandblue should actively pay taxes to increase the social contribution value per share. The frequency of charity donations and volunteer services not only represent the company's social image, but also give back to the society in diversified forms.

4.3 Determination of Indicator Weights

This article aims to measure the performance of Grandblue's environmental service business, and adopts the analytic hierarchy process to determine the weight of each indicator in the performance evaluation system. First, combined with the 1~9 grade scoring method, develop a BSC with five dimensions, making a questionnaire that compares the relative importance of any two evaluation indicators of the five dimensions, invites ten experts to rate the relative importance of the indicators in the comprehensive performance evaluation system, and then performs data processing through software such as yaanp to obtain the quantified judgment matrix, later use the square root method to calculate the max-Eigen (hereinafter referred to as λmax) and the eigenvector (hereinafter referred to as Wi) of the matrix. The specific weight determination process goes as follows:

a. Design a questionnaire. The table is divided into two parts: 1) the scoring table for the comparison of the importance of specific indicators in the five dimensions; 2) the scoring table for the comparison of the relative importance among the five dimensions. The description of the nine-level scoring standards and scoring table goes as Table 2 & Table 3.

b. Distribute questionnaires. This time, ten enterprise experts were invited to give the score, and 6 valid scoring tables were recovered, and statistics were made based on the scoring results.

c. Construct a judgment matrix. Take the average value of the scoring results of all valid questionnaires and use it as the relative importance level scores of the five dimensions and each index to obtain the judgment matrix after aggregation.

Table 4. Average random consistency index.

n	1	2	3	4	5	6	7	8	9
RI	0	0	0.52	0.89	1.12	1.26	1.36	1.41	1.46

Table 5. Analysis results of the dimensional index weight (expert A).

Dimensions	(A)	(B)	(C)	(D)	(E)	Weight	λmax	CI	RI	CR
(A)	1	1/3	3	7	7	26.16%	5.387	0.097	1.12	0.086
(B)	3	1	6	8	8	51.71%				
(C)	1/3	1/6	1	5	7	14.34%				
(D)	1/7	1/8	1/5	1	2	4.49%				
(E)	1/7	1/8	1/7	1/2	1	3.30%				

Table 6. Analysis results of the dimensional index weights (Expert B).

Dimensions	(A)	(B)	(C)	(D)	(E)	Weight	λmax	CI	RI	CR
(A)	1	1/3	1/3	1	1	9.80%	5.295	0.074	1.12	0.066
(B)	3	1	3	3	3	41.12%				
(C)	3	1/3	1	5	5	31.04%				
(D)	1	1/3	1/5	1	1	9.02%				
(E)	1	1/3	1/5	1	1	9.02%				

Table 7. The analysis results of the dimensional index weight (Expert C).

Dimensions	(A)	(B)	(C)	(D)	(E)	Weight	λmax	CI	RI	CR
(A)	1	1/5	1/6	1/7	1/3	3.75%	5.359	0.090	1.12	0.08
(B)	5	1	1/2	1/5	3	13.93%				
(C)	6	2	1	1/5	4	20.43%				
(D)	7	5	5	1	6	54.97%				
(E)	3	1/3	1/4	1/6	1	6.92%				

Table 8. The analysis results of the dimensional index weight (Expert D).

Dimensions	(A)	(B)	(C)	(D)	(E)	Weight	λmax	CI	RI	CR
(A)	1	3	1/2	6	6	28.80%	5.366	0.092	1.12	0.082
(B)	1/3	1	1/6	4	6	14.74%				
(C)	2	6	1	6	6	46.77%				
(D)	1/6	1/4	1/6	1	2	5.60%				
(E)	1/6	1/6	1/6	1/2	1	4.09%				

Table 9. The analysis results of the dimensional index weight (Expert E).

Dimensions	(A)	(B)	(C)	(D)	(E)	Weight	λmax	CI	RI	CR
(A)	1	3	1/4	8	3	22.37%	5.343	0.086	1.12	0.077
(B)	1/3	1	1/6	6	2	11.72%				
(C)	4	6	1	8	7	55.04%				
(D)	1/8	1/6	1/8	1	1/4	3.12%				
(E)	1/3	1/2	1/7	4	1	7.75%				

Table 10. The analysis results of the dimensional index weight (Expert F).

Dimensions	(A)	(B)	(C)	(D)	(E)	Weight	λmax	CI	RI	CR
(A)	1	4	6	1/2	6	30.75%	5.418	0.106	1.12	0.093
(B)	1/4	1	4	1/6	6	13.93%				
(C)	1/6	1/4	1	1/6	2	5.50%				
(D)	2	6	6	1	6	45.79%				
(E)	1/6	1/6	1/2	1/6	1	4.04%				

Table 11. The analysis results of dimensional indicators weight after aggregation.

Dimensions	(A)	(B)	(C)	(D)	(E)	Weight
(A)	1	5/6	5/7	1	3 1/2	20.27%
(B)	1 1/5	1	6/7	1 1/5	4 1/5	24.52%
(C)	1 3/7	1 1/6	1	1 2/5	5	28.85%
(D)	1	5/6	5/7	1	3 1/2	20.50%
(E)	2/7	1/4	1/5	2/7	1	5.85%

Table 12. Innovation Performance Indicator Evaluation System of Gandblue

Primary evaluation dimensions	Weight	Secondary evaluation index	Weight
Financial dimension (A)	20.27%	Weighted average return on equity (A1)	5.25%
		Cash dividend distribution ratio (A2)	3.17%
		Loan repayment rate (A3)	3.41%
		Basic earnings per share (A4)	5.00%
		Interest coverage multiples (A5)	3.43%
Customer dimension (B)	24.52%	New customer acquisition rate (B1)	8.02%
		Promotion fee ratio (B2)	2.82%
		Evaluation of Information Disclosure (B3)	2.40%
		Project acceptance rate (B4)	6.50%
		Timeliness ratio of after-sales service (B5)	4.79%
Internal process dimension (C)	28.85%	Proportion of R&D investment (C1)	6.54%
		Energy consumption of industrial output value (C2)	5.04%
		Energy loss rate (C3)	5.03%

		Safety production investment (C4)	4.97%
		Pollutant treatment capacity (C5)	7.28%
Learning and growth dimension (D)	20.50%	Staff training coverage rate (D1)	4.84%
		Proportion of highly educated employees (D2)	4.63%
		Proportion of female managers (D3)	1.06%
		Occupational disease incidence (D4)	2.40%
		Social insurance coverage rate (D5)	7.58%
Social responsibility dimension (E)	5.85%	Social contribution value per share (E1)	1.94%
		Hazardous waste treatment efficiency (E2)	1.72%
		Charity donation (E3)	0.50%
		Tax payment (E4)	1.28%
		Volunteer service frequency (E5)	0.40%

d. Calculate the weighted value. In this paper, the geometric average method is used for calculation. And the specific steps are shown as follows:

Step 1 calculate the product of elements in each row of the judgment matrix.

$$w_i = \prod_{j=1}^{n} \alpha ij \quad i,j = 1,2,3\cdots, \text{ n, n: Order of Matrix} \tag{1}$$

Step 2 calculate the n root of w_i, the geometric mean.

$$\overline{w_i} = \sqrt[n]{w_i} \tag{2}$$

Step 3 Normalize the vector to get the required feature vector $\overline{w_i}$.

Step 4 Calculate the maximum eigenvalue λmax.

$$\lambda max = \frac{1}{n}\sum_{i=1}^{n}\frac{(A\overline{w})_i}{\overline{w_i}} \tag{3}$$

Where: $(A\overline{w})_i$is the i-th element of the vector, where A is the judgment matrix; n is the dimension of the matrix.

Step 5 Calculate the consistency index and conduct a consistency test.

Check the corresponding average random consistency index RI (RI is the average value of the consistency index of the random judgment matrix of the same order). The introduction of RI will suppress the drawbacks that the consistency judgment index of will increase significantly with the increase of n to a certain degree. See the following Table 4 for details:

Calculate the consistency index CI and the consistency ratio CR according to the maximum eigenvalue calculated in the above steps. The calculation formula is listed as follows. If the consistency ratio CR<0.1, the consistency requirement is met, and the aforementioned weight vector can be used.

$$CI = \frac{\lambda max - n}{n-1}$$

$$CR = \frac{CI}{RI} < 0.1$$

Step 6 Check the validity of expert data.

A total of 6 valid expert scoring scales have been retrieved, and the validity of expert data is tested by taking expert A's data as an example. It can be seen from Tables 1-6 that CI = (λmax-n) / (n-1), and therefore CI=0.097<0.1; CR=CI/RI, so CR=0.086<0.1; under such circumstance, this judgment satisfies the consistency test. It can be seen that the scoring result of expert A satisfies the consistency test and can be used as the source data to calculate the dimensional weight after aggregation, the same below, like the following tables 5-10.

Step 7 The Results of Analytic Hierarchy Process calculation results.

A total of 6 valid expert scoring scales have been retrieved. After data processing and calculation of the scorings, the final judgment matrix is obtained after

the aggregation of expert data, and the results of weight of each primary dimension and the weight of the secondary indicators are obtained. The details are shown in Table 11 & Table 12.

5 ANALYSIS OF SPECIFIC INDICATORS AND THE WEIGHTS

Seen from the weight of the dimension level in the above indicator weight table, it can be seen that the weight of the internal process dimension (C) is 28.85%, which takes the largest proportion of the five dimensions. As a company that provides solid waste treatment, water supply and drainage service, the realization of Grandblue's overall development strategy is directly affected by the internal process. Good and efficient internal operations are helpful for the realization of the company's long-term strategic goals. Among the five dimensions of the internal process, pollutant treatment capacity (C5) accounts for the largest proportion, this means that the business capacity of the company is always in the first place in the development of the company. Grandblue must always place the improvement of business capabilities before financial performance in its operations, rather than blindly pursue financial returns; secondly, we can evaluate the enterprise's emphasis on innovation, innovation output and innovation efficiency through the internal process dimension. The proportion of enterprise R&D investment (C1) is inseparable with service quality. The innovation capability of an enterprise can be improved through internal R&D and external integration. The case company Grandblue has achieved mixed ownership mergers and acquisitions with a number of external companies, integrated existing resources, achieved synergy between the technology and resources, and improved the input-output ratio, which is the energy consumption of industrial output value (C2), and production and operation efficiency, which is pollutant treatment capacity (C5). Therefore, when improving the internal process efficiency of environmental service enterprises, it is necessary to combine the efficiency of production lines with that of R&D and innovation to achieve coordinated development and jointly elevate the company's hard power.

The second is the customer dimension (B). The proportion of customer dimension is second only to the internal process dimension, which coincides with the state-owned background of Grandblue whose vitality is determined by the big customers, while the new customer acquisition rate (B1) bring in a steady stream of new customers so as to keep the vitality of the company. The service quality of Grandblue, such as the project acceptance rate (B4) and the timeliness rate of after-sales service (B5), are the basic guarantee for the company to acquire new customers and maintain old customers. By establishing a good image through high-quality services, the company manages to expand their market share and forge ahead towards a leading environmental service company across the country from a local state-owned enterprise.

Then there is the learning and growth dimension (D). Grandblue shall actively innovate and give full play to the core competitiveness generated by innovation in its gas and new energy supply business to seize the market share in new energy sector. The training and cultivation of advanced talents is a prerequisite for the formation of core competitiveness. On the one hand, the company must implement various supporting measures, for example expanding social insurance coverage rate (D5), maintaining steady growth of investment in employee guarantee and welfare, and upgrading the supporting system to reduce employee turnover and attract outstanding talents, and improving the proportion of highly educated employees (D2); on the other hand, it is necessary to improve the staff training coverage rate (D1) in accordance with their aptitude, allocate positions reasonably according to different job requirements and the characteristics of the talents, and improve the overall quality of employees. Through talent reserve, the company can form a stable R&D team to improve its R&D level and greatly enhance the core competitiveness of the company; moreover, the company can also form a virtuous circle with technological innovation to achieve synergy in its development by actively fulfilling its responsibilities towards the employees.

The next is the financial dimension (A). Financial performance is the foundation for the survival of the company. The weighted average return on equity (A1) and basic earnings per share (A4) of a company are indicators based on which the shareholders and investors make judgment on the company's management level. In addition to high-quality services and quality assurance, companies should strengthen the construction of internal control system and hire high-level and experienced management talents. What is more, companies should also establish a reasonable performance evaluation indicator system, and make objective judgments on the company's business achievements and strategy implementation through more accurate quantitative

and qualitative analysis, which will guide the company's business operations and improve the company's financial performance.

Finally, there is the social responsibility dimension (E). Grandblue cannot neglect its social responsibilities in order to achieve its strategic goals, for instance actively paying the taxes (E4) and improving the trust mechanism of the company. Grandblue takes "three good and three sharing and kind-hearted Grandblue people (good housekeeper in the city, good model in the industry, good neighbors in the community, and sharing of wealth, capabilities and values)" as the core values, and internalizing it social responsibilities, which has become Grandblue's unique core competitiveness and distinctive brand characteristics in the environmental service industry. The leading position of Grandblue in the industry also requires the company to perform its social responsibilities more actively, strengthen the public trust in the company and create more value for the society. In the future, the company should extend the scope of its social responsibilities, engage more in public welfare activities (E5), and strive to become a trusted and well-reputed eco-environmental service provider and a partner of the government and the public.

6 CONCLUSIONS AND ENLIGHTENS

This author has used the five-dimensional Balanced Score Card (BSC) to construct a performance evaluation indicator system for environmental service companies in our country, and revised and adjusted the evaluation indicator system of traditional Balanced Score Card to make the evaluation system more suitable for environmental service companies. The author further explores the application of the Balanced Score Card in promoting the high-quality development of environmental service enterprises by integrating the industry mission and business strategy of the environmental service company. Seem from the dimensional weights determined by the analytic hierarchy process, environmental service companies should focus on improving the relevant indicators related to the internal process dimensions in their future operations and development, for example, further increase the R&D investment in the environmental service industry, especially in water, solid waste, hazardous pollutant treatment and other fields, to ensure the efficient research and development of environmental protection technology, and enhance the market competitiveness of enterprises through the improvement of technological innovation capabilities; secondly, enterprises should pay attention to the improvement of customer dimension and learning and growth dimension, and actively expand the business scope and cultivate a group of superior talents with core competitiveness; and finally, enterprises should not forget their original aspirations and actively assume social responsibilities while focusing on the growth of corporate financial indicators, since fulfillment of social responsibilities is no longer a cost but a part of the competitiveness of the enterprises.

In a long period in the future, China's green production and lifestyles and concepts will be increasingly popularized, and the proactive fiscal and taxation policies and prudent monetary policies will be implemented continuously to promote the effective release of the market capacity of ecological environmental governance, and the market potential and vitality of the environmental service industry is expected to be further exploited. The deep penetration of emerging technologies such as big data, cloud computing, and artificial intelligence will improve the level of intelligence and efficiency of the environmental service industry, as well as the supply capacity of the entire industry.

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