Research on Corporate Social Responsibility Evaluation Based on Improved CRITIC-TOPSIS—A Case Study of Listed Companies in China's Pharmaceutical Distribution Industry

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Abstract

Corporate social responsibility (CSR) has garnered considerable attention from countries, institutions, enterprises and social groups. However, the lack of research on CSR evaluation system for industries has impeded its development and construction across various industries. Therefore, given the close association of pharmaceutical distribution enterprises with personal health, there exists a pressing need to explore the CSR in this domain. This paper establishes a CSR evaluation index system for pharmaceutical distribution enterprises, employing a combination of documentary analysis and in-depth interviews. This index system comprises 7 CSR criterion layers (e.g., responsible governance and employee responsibility) and 56 index layers. 25 listed companies in China's pharmaceutical distribution industry are chosen as research objects, and this study also establishes an evaluation model for the CSR of pharmaceutical distribution companies through the improved Criteria Importance Though Intercrieria Correlation (CRITIC) method combined with The Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method. The empirical analysis reveals that the responsible governance criterion layer and the social development criterion layer demonstrate the best performance, while the supplier, customer and patient responsibility criterion layer exhibit the worst performance.

Keywords

Pharmaceutical Distribution Enterprises, Corporate Social Responsibility,

Evaluation System, Improved CRITIC-TOPSIS

1. Introduction

Pharmaceutical distribution enterprises include the wholesale and the retail enterprises. They are responsible for the entire supply chain of pharmaceutical products, from manufacturing to selling, addressing the challenges caused by temporal and spatial constraints. Pharmaceutical distribution enterprises, being an industry closely associated with human health and social development, exhibit a natural inclination towards safeguarding public interest. These companies should abide by laws and regulations, adhere to ethical and moral principles, prioritize public health, and promote sustainable development of enterprises and society.

Despite being introduced in 1916, CSR still has failed yet to reach a consensus on its definition. Nonetheless, this concept has gained increasing attention from various entities across countries, including institutions, enterprises, and social groups. Integrating the economic and social benefits of enterprises and achieving sustainable development has become a hot spot of concern. To address this concern, a comprehensive, scientific, suitable and standard CSR evaluation system is urgently needed for the pharmaceutical distribution industry. This system is expected to set standards, identify and solve problems timely as well as achieve the goal of CSR. The development of a comprehensive, applicable and industry-specific CSR evaluation index system can guide the long-term growth of pharmaceutical distribution enterprises.

Researches on CSR in the pharmaceutical distribution industry is rather fragmented and lacks a systematic approach. Various domestic and international organizations have their own standards and specifications, such as Global Reporting Initiative (GRI) Standards, ISO26000 and SA8000. In addition to general specifications, the GRI Standards are limited to specific sectors, such as the oil and natural gas industry, coal industry, agriculture, aquaculture and fishery industry sectors. The ISO26000 and SA8000, meanwhile, are general to the whole industries and do not contain an evaluation system designed specifically designed for any industry. The field of CSR in the pharmaceutical distribution industry has received limited scholarly attention, with only a few scattered references found in existing literature. Therefore, it is necessary to draw upon research experience and methods from the broader industry and other related fields.

The current CSR evaluation studies focus on two perspectives.

1) Researches on indicator systems

First, authoritative institutions have published some indicator systems. The International Organization for Standardization [1] guidance on social responsibility, ISO26000, proposes seven core subjects that social responsibility should encompass, such as organizational governance and human rights. Additionally, Social Accountability International (SAI) releases the SA8000 standard including

nine elements, such as Child Labor and Forced or Compulsory Labor. In China, the China Corporate Social Responsibility Reporting Guide 5.0 (CASS-ESR5.0) published by the Chinese Academy of Social Sciences suggests a "four-in-one" indicator framework of governance responsibility, environmental risk management, social risk management, and value creation.

Secondly, researchers can derive indicator systems through academic studies. Zhao *et al.* established 103 indicators organized into 30 performance issues across 11 stakeholder categories [2]. Kumar and Srivastava adopted a structural topic modeling approach to define seven dimensions of CSR, including economy, ethics, society, stakeholders, sustainability, discretionary power, and law [3]. Govindan *et al.* categorized the social responsibility practices of suppliers into six dimensions, which encompassed society, environment, employees, customers, suppliers, and shareholders [4]. Yin proposed to use a single indicator to evaluate CSR, which is the "integrated net asset creation rate" [5]. Focacci [6] integrated E (Economic performance), E (Environmental performance) and S (Social performance) factors to illustrate the company's social responsibility. Based on their research, Kang and Qiu developed a CSR evaluation indicator system for Taiwanese enterprises. This system comprises 35 indicators and encompasses three dimensions, namely labor and social care, corporate management, and environmental protection [7].

2) Researches on evaluation methods

Firstly, valuation method based on subjective weighting. Smiechowski and Lament utilized Analytic Hierarchy Process (AHP) assess CSR [8]. Michalska-Szajer *et al.* thoroughly analyzed and evaluated the three largest seaports in Poland with benchmark and case study approaches [9]. You *et al.* applied both AHP and VIKOR models to evaluate and rank suppliers' CSR [10]. Qi *et al.* proposed a new method to analyze the effectiveness of CSR performance of coal enterprises by Cluster Analysis and AHP [11].

Secondly, valuation method based on objective weighting. Chang and Yeh evaluated the social responsibility of Taiwan's Taoyuan International Airport from five aspects using the Decision-making Trial and Evaluation Laboratory (DEMATEL) method [12]. Wang *et al.* evaluated the CSR of eight airlines through Entropy Weight and Grey Relation Analysis [13]. Du applied the Entropy Weight-TOPSIS method and Factor Analysis Method to examine the fulfillment level of CSR in forestry [14].

Based on a thorough examination of the above studies, it can be asserted that existing CSR researches flawed in the following respects. Primarily, the selection of diverse viewpoints by different institutions and scholars has resulted in discrepancies in the indicators used to evaluate CSR, which fails to provide a comprehensive coverage of all industries. Secondly, the method of quantifying these indicators requires improvement. The third is that the CSR evaluation indicator system covers a broad spectrum of sectors. Thus, it becomes imperative to exercise caution while selecting appropriate weight methods.

According to the aforementioned issues, this research develops a criterion layer for evaluating the CSR of pharmaceutical distribution companies by conducting a comprehensive review of the literature, examining various standards, and referring to established evaluation indicators both domestically and abroad. In addition, we conducted in-depth interviews with management personnel of listed pharmaceutical distribution companies and other approaches. This criterion layer consists of responsible governance, employee responsibility, responsibility for drug supply assurance, supplier, customer and patient responsibility, economic responsibility, social development responsibility, and environmental responsibility. The improved CRITIC method is then employed to determine the weights of each indicator, and the TOPSIS method is combined to empirically analyze and evaluate 25 listed companies in China's pharmaceutical distribution industry. The utilization of objective data enhances the comparison between companies. It is anticipated that the findings of this evaluation will provide a reference for the development of CSR of pharmaceutical distribution enterprises. This study offers a comprehensive reference model for evaluating CSR of pharmaceutical distribution enterprises, serves as a guide for these enterprises to carry out CSR, and also provides valuable suggestions and guidance for government departments and other organizations to promote the implementation of CSR-related policies and measures.

2. Model Construction

2.1. Normalization of Data

The raw data obtained from the indicators exhibits variations in magnitudes due to the use of different fundamental units. Direct application of such data could affect on the subsequent weight process and the accuracy of the final results. Therefore, the data need to be standardized.

The formula for data normalization is as follows.

For positive indexes,

$$V_{ij} = \frac{L_{ij} - \min(L_j)}{\max(L_j) - \min(L_j)} \tag{1}$$

For reverse indexes,

$$V_{ij} = \frac{\max(L_j) - L_{ij}}{\max(L_j) - \min(L_j)} \tag{2}$$

where, L_{ij} is the original indicator data, $\max(L_j)$ and $\min(L_j)$ are the maximum and minimum values of the jth indicator data, respectively, and V_{ij} is the normalized data value for the jth indicator.

2.2. Determination of Index Weights Based on Improved CRITIC

In 1995, Diakoulaki proposed the CRITIC (Criteria Importance Though Intercrieria Correlation) method to determine the objective weights through the intensity of comparison and conflict between the corresponding data of indicators [15].

However, some scholars suggested that mean deviation has a better deconstructive function than standard deviation [16], which more accurately reflects the average degree of variation among indicators. Additionally, in cases where the absolute values of the corresponding figures of each indicator are identical, the correlation between the indicators will be the same [17]. Therefore, improvements were made to the CRITIC method by replacing the mean deviation with the standard deviation and adopting absolute values for correlation coefficients [18]. The improved CRITIC method follows a series of steps, which are outlined as follows.

1) To find the correlation coefficients between the indicators

The correlation coefficient of indicator i and indicator j is denoted as r_{ij}, which can be calculated using data statistical software.

2) To find the coefficient of standard deviation of each index

Let σ_j be the standard deviation of each index and $\overline{V_j}$ be the mean. The standard deviation coefficient is defined as the ratio of the standard deviation to the mean.

The standard deviation σ_j is calculated using the following formula.

$$\sigma_j = \sqrt{\frac{\sum_{i=1}^{n}\left(V_{ij} - \overline{V_j}\right)^2}{n-1}} \tag{3}$$

3) To calculate indicator weights

The first step is to calculate the value of K_j based on the standard deviation coefficient and correlation coefficient of the index. The calculation formula is as follows.

$$K_j = \frac{\sigma_j}{\overline{V_j}}\sum_{i=1}^{n}\left(1 - |r_{ij}|\right) \tag{4}$$

where, K_j represents the amount of information contained in the jth indicator, which is positively correlated with the indicator weights.

In the second step, the values of K_j are normalized for each corresponding indicator weight, and the calculation formula is as follows.

$$W_j = \frac{K_j}{\sum_{j=1}^{m}K_j} \tag{5}$$

where, m represents the number of indicators and W_j represents the jth index weight.

2.3. Scores Based on TOPSIS

TOPSIS is a widely used approach for multi-objective decision making. It ranks evaluated objects based on their distances from both positive-ideal and negative-ideal solutions, thereby determining their relative merits. Given its flexibility of sample size and ease of operation this method is applied to the CSR evaluation of pharmaceutical distribution enterprises. The specific steps are as follows:

1) To find positive and negative ideal solutions.

Find the positive ideal solution V_j^+ and the negative ideal solution V_j^- for each indicator.

$$V_j^+ = \left\{ \max\left(V_{ij}\right) \middle| i = 1, 2, \cdots, n \right\} \tag{6}$$

$$V_j^- = \left\{ \min\left(V_{ij}\right) \middle| i = 1, 2, \cdots, n \right\} \tag{7}$$

2) To find the Euclidean distance of each evaluated object to the ideal solutions in order.

The formula is as follows.

$$Z_i^+ = \sqrt{\sum_{j=1}^{m} W_j \left(V_{ij} - V_j^+\right)^2} \tag{8}$$

$$Z_i^- = \sqrt{\sum_{j=1}^{m} W_j \left(V_{ij} - V_j^-\right)^2} \tag{9}$$

Z_i^+ and Z_i^- are denoted as the Euclidean distance of the ith evaluation object to the positive and negative ideal solutions.

3) To calculate the composite grade

The relative nearness degree, or the composite grade, is calculated as follows.

$$S_i = \frac{Z_i^-}{Z_i^+ + Z_i^-} \tag{10}$$

S_i refers to the relative nearness degree of the ith evaluation object.

3. Empirical Analysis Based on China's Pharmaceutical Distribution Industry

3.1. Construction of Evaluation Index System

To achieve high-quality development, the pharmaceutical distribution industry needs to play an essential role in serving the medical and healthcare industry and meeting the health needs of people. Given that the pharmaceutical distribution industry is closely linked to life and health, it is necessary to continually enhance the efficiency of pharmaceutical distribution, capability of supply assurance, ability of sales terminal as well as quality and safety. Moreover, it is crucial to integrate the concept of sustainable development of the country and society into the corporate development strategy and philosophy while achieving high-quality, effective, sustainable and safe development of the enterprise itself. Corporate social responsibility in the pharmaceutical distribution industry exhibits unique characteristics that must be taken into account when constructing an evaluation indicator system. This requires consideration of both specific and general factors, as well as the internal and external environment of the enterprise. Therefore, this study aims to construct an evaluation index system that includes seven criterion layers, utilizing extensive literature review, the study of various standards, and combining in-depth interviews and other research methods.

1) The criterion layer of responsible governance

The pharmaceutical distribution industry is a highly-organizational entity that assumes various responsibilities, and requires a well-defined responsible

governance system to fulfill its CSR. This research considers the responsible department, anti-corruption compliance system, and responsibility disclosure as the indicators of the criterion layer of responsible governance.

2) The criterion layer of employee responsibility

"Human" is the foundation for the existence and development of drug distribution enterprises. Companies have an indispensable responsibility to their employees throughout the production and operation process. Consequently, employee health and safety, development and care, career path, income and welfare of employees are all included in the evaluation system.

3) The criterion layer of responsibility for drug supply assurance

Given that pharmaceutical distribution companies play a crucial role in the public health, the supply assurance of pharmaceuticals has become an important and indispensable responsibility of the companies. Accordingly, several indicators are employed to assess the responsibility of these companies towards drug supply assurance, including the geographic scope of enterprise operations, the category of pharmaceutical goods, and the efficacy of their quality management system are used to characterize the responsibility of drug supply assurance.

4) The criterion layer of supplier, customer and patient responsibility

In the pharmaceutical industry, suppliers play a crucial role as the upstream of drug distribution enterprises, while customers and patients are the downstream. The capability of enterprises to provide high-quality products and services which ensure the rights and interests of both upstream and downstream is fundamental for its development and progress. It is of great importance that pharmaceutical distribution enterprises undertake the responsibility for protecting the privacy, rights and interests, and communication mechanism of their suppliers and customers. As a result, indicators such as supplier management mechanism, privacy protection system, and communication and complaint mechanism should be included to evaluate this responsibility.

5) The criterion layer of economic responsibility

Pharmaceutical distribution enterprises requires economic support to develop, and in return, they should contribute to society by giving back from the profits they earn. As an economic entity, financial contribution gives a broader social value to corporate development. Therefore, indicators such as direct economic value, return on equity (ROE), growth rate of corporate tax and net profit growth rate must be considered in evaluating the CSR of these enterprises.

6) The criterion layer of social development responsibility

Since the development of pharmaceutical companies and the external environment where they operate in, in other words, the community environment, are interdependent and significantly influence each other, companies must engage in activities that promote development for the benefit of the community. Therefore, the criterion layer of social development responsibility should include the indicators such as social activities in pharmaceutical industry, public welfare donations, and enterprise credit.

7) The criterion layer of environmental responsibility

The environmental impact of pharmaceutical enterprises on the society cannot be ignored. The transportation of goods and energy consumption in warehouses during their operations can lead to environmental pollution. Given the various environmental dilemmas facing society, it is the social responsibility of pharmaceutical distribution companies to link their business growth to the improvement of the environment. In consequence, environmental management system, environmental training and disclosure of environmental indicator are used to evaluate the criterion layer of environmental responsibility.

In this study, an index system is developed, comprising 7 criterion layers and 98 index layers. Through analytic hierarchy process, the index system undergoes rigorous selection, refinement, and supplementation, resulting in the retention of 7 criterion layers and 56 index layers. Due to the tedious selection process, detailed elaboration of the refinement procedure has been omitted from this discourse. Figure 1 displays the final CSR evaluation index system for pharmaceutical distribution enterprises.

3.2. Sample Selection and Data Sources

The pharmaceutical distribution industry, which has a close relationship with human health, plays a pivotal role in the advancement of national healthcare. This research selects 25 pharmaceutical distribution companies listed on the Shanghai, Shenzhen, and Hong Kong Stock Exchanges as research subjects. CSR reports and annual reports of each enterprise are collected separately, and information is acquired from various sources, including official national platforms, credit websites, official media, and enterprise associations. The data collected is then subjected to a specific set of indicators for each of the 25 enterprises and scored accordingly. The process of normalization uses Equations (1) and (2). And the results of the analysis are presented in Table 1.
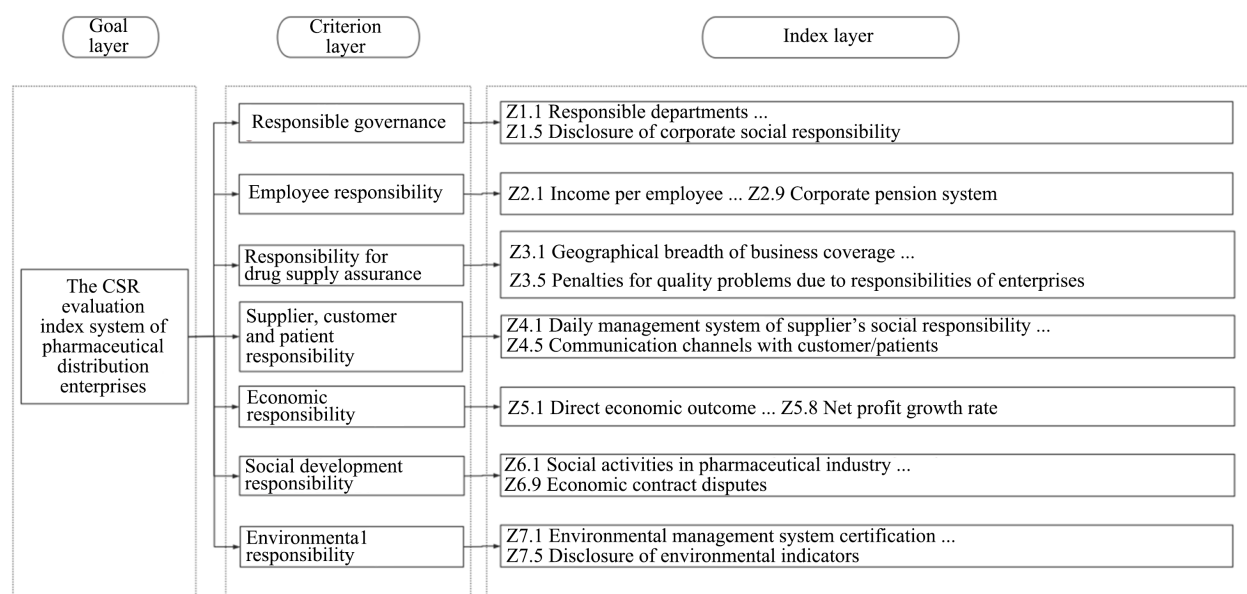

Figure 1. The CSR evaluation index system of pharmaceutical distribution enterprises.

Table 1. Raw data and standardized results.

1 Criterion Layer	2 Index Layer	Raw Data				Standardized Results			
		3 SHYY	4 GYGF	...	27 ZJZY	28 SHYY	29 GYGF	...	52 ZJZY
Z1 Responsible governance	Z1.1	1	1	...	1	0.50	0.50	...	0.50
	...	...	...	...	...	...	...	...	...
	Z1.5	0	1	...	1	0.00	1.00	...	1.00
Z2 Employee responsibility	Z2.1	132245.47	173341.70	...	111270.62	0.66	1.00	...	0.49
	...	...	...	...	...	...	...	...	...
	Z2.9	1	1	...	1	1.00	1.00	...	1.00
Z3 Responsibility for drug supply assurance	Z3.1	24	31	...	1	0.77	1.00	...	0.00
	...	...	...	...	...	...	...	...	...
	Z3.15	0	0	...	0	1.00	1.00	...	1.00
Z4 Supplier, customer and patient responsibility	Z4.1	0	1	...	0	0.00	1.00	...	0.00
	...	...	...	...	...	...	...	...	...
	Z4.5	5	4	...	3	0.60	0.40	...	0.20
Z5 Economic responsibility	Z5.1	1919.09	403.79	...	34.4	0.42	0.09	...	0.01
	...	...	...	...	...	...	...	...	...
	Z5.8	10.84%	7.69%	...	3.05%	0.21	0.20	...	0.18
Z6 Social development responsibility	Z6.1	1	1	...	1	1.00	1.00	...	1.00
	...	...	...	...	...	...	...	...	...
	Z6.9	0	0	...	1	1	1	...	0.95
Z7 Environmental responsibility	Z7.1	2	0	...	0	1.00	0.00	...	0.00
	...	...	...	...	...	...	...	...	...
	Z7.2	1	1	...	1	1.00	1.00	...	1.00

See Appendix for the meaning of shorthand notation.

3.3. Analysis of Weight Results

In evaluating the CSR of pharmaceutical distribution enterprises, the weights of each indicator need to be determined beforehand. In this context, the standardized data from Column 28 to 52 of Table 1 are applied, and the weights of each indicator are determined through the improved CRITIC method. The resulting index weights of the criterion layer are illustrated in Figure 2.

As evident from Figure 2, there is a substantial difference between the weights of the indexes in the criterion layer. Among the criterion layers for drug distribution enterprises, the "criterion layer of drug supply assurance" carries the largest weight of 0.2223, making it the most distinctive criterion layer of drug distribution enterprises. The "criterion layer of supplier, customer, and patient
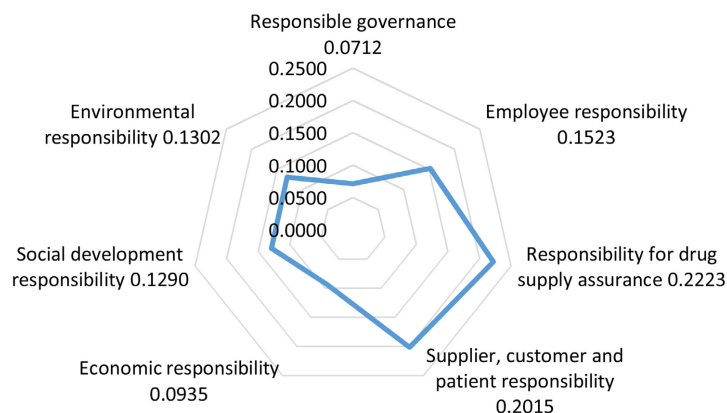
Figure 2. The index weights of the criterion layer.

responsibility" comes next with a weight of 0.2015, and together with the former criterion layer, they constitute over 40% of the CSR of pharmaceutical companies. These two criteria layers are primary concerns. The weights of "employee responsibility", "environmental responsibility", and "social development responsibility" are relatively evenly distributed and they represent a critical component of the CSR for pharmaceutical distribution companies. The weight of the "criterion layer of economic responsibility" is relatively small, while the weight of the "criterion layer of responsible governance" is the smallest at 0.0712. Despite the different effects of the above criteria on the CSR of pharmaceutical distribution enterprises, there is no hierarchy in the practice of CSR. So, enterprises should pay attention to every single aspect.

3.4. Analysis of Evaluation Results Based on the Improved CRITIC-TOPSIS

Utilizing the weights derived from the improved CRITIC method and combining Equations (6)-(10), this study calculates CSR performance level of 25 pharmaceutical distribution companies listed in China. This performance is based on 7 criterion levels, and it is determined by considering the positive and negative ideal solutions, Euclidean distance and relative nearness degree. The outcomes are presented in Table 2.

The closer the nearness degree score, which measures the performance of CSR, is considered better when closer to 1. Results presented in Table 2 illustrate that the highest CSR evaluation value among the 25 pharmaceutical distribution enterprises listed in China is only 0.5984, which is quite distant from the ideal score of 1. Furthermore, the mean value of CSR is 0.4150 with a standard deviation of 0.0893, suggesting that the overall CSR level is in the lower half of the medium level with some variations. Combined with Table 2, we observed that 11 out of 25 enterprises have a degree of nearness higher than the mean value, while 14 enterprises have a lower degree of nearness. Additionally, most of the companies scored in the range of 0.3 - 0.4, indicating a middle to low level of CSR construction and thus, indicating opportunities for improvement.

Table 2. Evaluation results and rankings based on the improved CRITIC-TOPSIS.

	Leading enterprise			Moderate level enterprise			Enterprises to be improved	
Rank	Name of the company	Relative nearness degree	Rank	Name of the company	Relative nearness degree	Rank	Name of the company	Relative nearness degree
1	GYKG	0.5984	6	SHYY	0.4867	15	NJYY	0.3838
2	HRYY	0.5746	7	CYKG	0.4799	16	JST	0.3725
3	JZT	0.5496	8	GYGF	0.4501	17	Cachet	0.3557
4	LYGF	0.5132	9	GYYZ	0.4415	18	HWSW	0.3551
5	HDYY	0.5098	10	ZGYY	0.4361	19	DSL	0.3544
			11	YTJT	0.4249	20	JZJ	0.3512
			12	ZJZY	0.4148	21	RMTT	0.3365
			13	RKYY	0.4007	22	YXT	0.3291
			14	LBX	0.3968	23	LYYY	0.3197
						24	DYYY	0.2914
						25	TJT	0.2491

See Appendix for the meaning of shorthand notation.

Besides, we analyze the 7 criterion layers and determine that the highest mean value of nearness is attributed to the criterion layer of responsible governance, with a value of 0.5675. Following this, the criterion layers of social development responsibility and drug supply assurance had mean values of 0.5042 and 0.4595, respectively. The criterion layers of employee responsibility, economic responsibility, and environmental responsibility exhibited a relatively balanced distribution. And the criterion layer of supplier, customer, and patient responsibility had the lowest mean value of 0.2486. These findings highlight the necessity of enhancing the sense of responsibility among pharmaceutical distribution companies towards their suppliers, customers and patients.

According to the findings obtained from the improved CRITIC-TOPSIS, the 25 enterprises are categorized into 3 groups using the K-means clustering method (as shown in Table 2). Among them, 5 enterprises are categorized as the leading enterprises, namely, GYKG, HRYY, JZT, LYGF, and HDYY, with an overall score greater than 0.5000. These enterprises exhibit a higher level of CSR, a better awareness of responsibility and have successfully integrated CSR awareness into the governance process, which is the key driver behind their leading position. 9 enterprises are classified as moderate level enterprises, which include SHYY, CYKG, GYGF, GYYZ, ZGYY, YTJT, ZJZY, RKYY and LBX. The remaining 11 companies require improvement. The analysis reveals that the CSR level of pharmaceutical distribution enterprises is to some extent linked to the awareness and governance of the enterprises. Among the leading enterprises and moderate level enterprises, all 13 companies, except RKYY, have released pub-

licly available CSR reports, sustainability reports and other reports reflecting CSR. Conversely, only YFYY and JST among the enterprises to be improved have published publicly available reports that reflect CSR content.

4. Conclusion and Suggestion

4.1. Conclusion

This research presents an evaluation index system of corporate social responsibility within the context of pharmaceutical distribution by an extensive review of literature, examination of various standards, and utilization of in-depth interviews, among other research methods. 7 criterion layers including responsible governance, employee responsibility and drug supply assurance responsibility are built as the foundation of the evaluation system, and 56 specific indexes such as the set-up of responsible departments, income per employee and net asset growth rate are used as the data base in this evaluation index system. To provide a robust and reliable reference model for the evaluation of CSR within pharmaceutical distribution enterprises, this research employs improved CRITIC method to assign weights to various indicators, and the TOPSIS method to rank the level of social responsibility exhibited by these organizations through the degree of nearness.

The findings show that the 25 listed companies in the pharmaceutical distribution industry exhibit a wide score gap in different criterion layers, with the average score of 0.5675 in the criterion layer of responsible governance, 0.5042 in the criterion layer of social development responsibility, and only 0.2486 in the criterion layer of supplier, customer and patient responsibility. While the industry as a whole performs well in responsible governance and social development responsibility, and performs relatively well in drug supply assurance, employee responsibility, economic responsibility and environmental responsibility, it needs to enhance its supervision of social responsibility of suppliers and the fulfillment of responsibility to consumers and patients. Overall, the level of CSR across the industry needs improvement, and significant differences exist in the CSR performance of individual enterprises. Among the 25 companies, 5 enterprises, namely GYKG, HRYY, JZT, LYGF, and HDYY, perform better than others. However, the last 11 enterprises have to strengthen their CSR level. The rest companies are positioned at the middle level of CSR performance.

4.2. Suggestion

Reasonable and effective CSR evaluation is crucial for enterprises to integrate CSR ideas into corporate culture and conduct CSR. Furthermore, it is beneficial for government departments and various organizations to promote the implementation of CSR-related policies and measures. It is also conducive for financial institutions to have a thorough consideration of investing in enterprises. To sum up, reasonable and effective CSR evaluation holds positive significance to the sustainable development of enterprises, government and society. The data of

this study using the improved CRITIC method, indicate that among 56 tertiary indicators, "Z4.3 Certification of information security management system" under the criterion layer of supplier, customer and patient responsibility has the highest weight of approximately 7.45%. This is followed by "Z3.13 Construction of pharmaceutical quality management system" and "Z2.3 Occupational health and safety certification" under the criterion layer of employee responsibility, at 4.14% and 4.02%, respectively. Taking into consideration the evaluation results, this research proposes several recommendations for the construction of CSR in pharmaceutical distribution enterprises.

1) It is imperative to establish the daily management system of supplier social responsibility and conduct regular reviews. The enterprise should improve the formulation and implementation of policies related to data privacy and data protection for suppliers, customers and patients. A well-organized information security management system should be established to safeguard various types of information materials, along with privacy and security. Moreover, to enhance communication and problem-solving with customers and patients, the company should establish effective communication channels using multiple methods. Furthermore, a compliance sales system for pharmaceutical products should be established and strictly adhered to. In doing so, the companies can guarantee the implementation of enhanced supplier, customer, and patient responsibilities.

2) Enterprises should enhance the level of responsibility for drug supply assurance. To achieve that, it is necessary to implement measures aimed at improving drug accessibility, strengthening quality assurance and developing supply guarantee system. Enterprises must take proactive steps to broaden their business scope and reach a wider consumer market, diversify their product portfolio, engage in drug reserves, bolster the development of drug quality management systems, and improve their comprehensive logistics and retail service capabilities.

3) Proactively guaranteeing the enforcement of fundamental employee rights. Employees are essential assets of an organization, and enterprises are responsible for safeguarding their basic rights and interests. To fulfill this responsibility, companies must provide affirmative protection for the basic rights and interests of their employees, establish a safe and healthy work environment, and offer developmental opportunities and care.

4) The evaluation results of 25 listed companies in China reveal that the industry, as a whole, performs well in the criterion layers of responsible governance and social development responsibility, but exhibits poor performance in supplier, customer, and patient responsibility. Responsible governance assists companies in incorporating social responsibility into their corporate governance practices. Social development responsibility enables companies to establish a positive ethical image, which requires companies to enhance their implementation of supplier, customer, and patient responsibility and establish a solid upstream and downstream foundation.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix: Definitions

Shorthand notation	Company name
TJT	XIN JIANG READY HEALTH INDUSTRY Co., Ltd.
DSL	DaShenLin Pharmaceutical Group Co., Ltd
DYYY	SHANGHAI NO.1 PHARMACY CO., LTD.
GYGF	China National Medicines Corporation Ltd.
GYKG	Sinopharm Group Co. Ltd
GYYZ	China National Accord Medicines Corporation Ltd.
HWSW	Shenzhen Neptunus Bioengineering Co., Ltd
HDYY	HUADONG MEDICINE CO., LTD
HRYY	China Resources Pharmaceutical Group Limited
JST	Cachet Pharmaceutical Co., Ltd.
JZJ	Yunnan Jianzhijia Health-Chain Co., Ltd.
JZT	Jointown Pharmaceutical Group Co., Ltd
LBX	LBX Pharmacy Chain Joint Stock Company
LYGF	Guangxi Liuzhou Pharmaceutical Co., Ltd.
LYYY	LUYAN PHARMA CO., LTD.
NJYY	NanJing Pharmaceutical Company Limited
RMTT	HPGC Renmintongtai Pharmaceutical Corporation
RKYY	REALCAN PHARMACEUTICAL GROUP CO., LTD.
SHYY	Shanghai Pharmaceuticals Holding Co., Ltd
YXT	Yixintang Pharmaceutical Co., Ltd.
YFYF	Yifeng Pharmacy Chain Co., Ltd.
YTJT	ZHEJIANG INT'L GROUP CO., LTD.
ZJZY	ZHEJIANG ZHENYUAN SHARE CO., LTD.
ZGYY	China Meheco Group Co., Ltd.
CYKG	C. Q. Pharmaceutical Holding Co., Ltd.