

Environmental Accounting Information Disclosure Quality Evaluation of Listed Steel Companies

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Abstract. Building an environmentally friendly society is one of the important directions of China's development. The development of enterprises should follow the pace of the country, and every enterprise should do a good job in environmental accounting information disclosure. However, in China's development over the past years, the importance that enterprises attach to the environment has not improved significantly, and China's environmental accounting system is still not perfect enough. There is still a long way to go for environmental protection. Taking steel enterprises as an example, this paper analyzes the current situation of environmental accounting information disclosure, summarizes the related problems, and proposes countermeasures on how to improve the quality of environmental accounting information disclosure.

Keywords: Environmental accounting; Information disclosure; Steel industry; Listed companies.

1. Introduction

The steel manufacturing industry is an important industry in China and is also one of the industries with relatively serious environmental pollution. The environmental pollution of China's steel manufacturing industry includes the following three aspects. ① Air pollution: A large amount of gaseous pollutants, such as sulfur dioxide, nitrogen oxides, and suspended particulate matter, are emitted during the steel smelting process. These pollutants will not only directly affect air quality but may also cause environmental problems such as haze and acid rain. ② Water pollution: Steel enterprises will produce a huge amount of wastewater during steel processing and final finishing work. There are countless harmful substances in the wastewater, which will not only damage the ecological environment but also endanger human lives. ③ Solid waste: Steel manufacturing will not only produce wastewater but also a lot of solid waste, such as slag, ore slag, dust, and old equipment. If these wastes are not properly treated, soil pollution and resource waste will be caused.

2. The Importance of Environmental Accounting Information Disclosure

On the one hand, environmental accounting information disclosure can enhance enterprises' attention to environmental protection. Especially for polluting enterprises, environmental accounting information can make them realize whether the overall development direction of the enterprise deviates from the country's sustainable development direction. Environmental protection investment and resource consumption can reflect the importance that enterprises attach to sustainable development. The senior management of an enterprise should evaluate the enterprise's environmental protection achievements according to the enterprise's internal environmental protection performance assessment and promote the sustainable development of the enterprise.

On the other hand, environmental accounting information fraud has led many enterprises astray. Enterprises have neglected the importance of environmental protection and sustainable development in pursuit of higher profits and finally declined. For heavily polluting industries such as steel, enterprises that neglect environmental protection and do not attach importance to sustainable development can only go bankrupt. Heavily polluting enterprises that do not attach importance to environmental protection will cause greater harm to the environment.



3. Research Design

3.1. Sample Selection and Data Sources

By the end of 2023, the cumulative number of steel industry enterprises listed in China had reached 48. Since the enterprise labeled *ST had problems in its own operating conditions, this research excluded the enterprise of *ST Xining Special Steel. In addition, the author mainly analyzed the enterprise data from 2020 to 2023 and excluded the steel enterprises delisted after 2020, and finally determined 46 steel enterprises as the research objects. The author summarized the relevant environmental information by collecting the social responsibility reports, annual reports, environmental reports, and prospectuses published by 46 listed companies and made in-depth analysis and summary.

3.2. Disclosure Methods of Environmental Accounting Information in the Steel Industry

The author referred to the social responsibility reports, annual reports, environmental reports, and sustainable development reports of 46 steel listed companies from 2020 to 2022. After summarization, the proportion of each enterprise's annual environmental accounting information disclosure in the overall and the disclosure methods of each enterprise in each year were counted, and then the proportion of each enterprise's each disclosure method in the whole was sorted out.

Through analysis, it can be seen that most sample enterprises adopted the method of disclosing environmental accounting information in the annual report, accounting for more than 95% of all enterprises. The annual report is the content that enterprises must disclose every year. Xianglou New Materials did not publish the annual report in two of the three years, and its environmental accounting information disclosure needs to be strengthened. However, Xianglou New Materials has published the prospectus for three consecutive years, indicating that it is expanding rapidly or just starting and has no energy to disclose environmental accounting information. It may gradually start to disclose information later.

The number of enterprises disclosing environmental accounting information in the social responsibility report is increasing year by year, indicating that steel enterprises are gradually attaching importance to the disclosure of environmental accounting information and realizing the importance of disclosing environmental accounting information. However, this disclosure method is not stable. The proportion of enterprises disclosing environmental accounting information in the environmental report and prospectus is relatively low. Some enterprises will combine the social responsibility report and the environmental report, and some enterprises have never even disclosed the environmental report. Steel enterprises do not pay enough attention to the environmental report as a disclosure method and usually choose to disclose environmental accounting information in the social responsibility report. However, the environmental report is an important way to disclose environmental information. In addition, the extremely low proportion of disclosing environmental accounting information in the prospectus just shows that enterprises have not paid enough attention to the environment since their establishment.

Generally speaking, there are still many problems in the disclosure of environmental accounting information in steel enterprises, and the relevant departments should strengthen supervision to prompt steel enterprises to pay enough attention to this.

3.3. Contents of Environmental Accounting Information Disclosure in the Steel Industry

Since the environmental accounting-related information disclosed by steel industry enterprises cannot be directly presented in data, this paper combines the research results of environmental accounting in various countries in the world and divides the contents of environmental accounting information disclosure into three parts: environmental financial information, including the enterprise's environmental liabilities, environmental assets, environmental revenues, etc.; environmental performance information, including the implementation results of environmental protection tasks, the

treatment status of pollutants, etc.; environmental liability information, mainly disclosing the environmental accidents and lawsuits involved in the enterprise.

3.4. Construction of the Environmental Accounting Information Disclosure System in the Steel Industry

3.4.1. Principles to be Followed in Constructing the System

Comparability principle. Comparability is divided into horizontal comparability and vertical comparability. Horizontal comparability means that different enterprises can be compared with each other, and vertical comparability means the comparison of data of the same enterprise in different years. Data analysts should grasp the differences in the analysis, analyze the reasons for the differences, and then put forward targeted suggestions for the further development of the enterprise.

Scientific principle. Since the environmental protection problems faced by each enterprise are different, there are also many differences in the environmental accounting information that needs to be disclosed. Enterprises cannot completely apply the international standard disclosure system but need to refer to similar indicators among enterprises. The established indicators should have scientificity and universal practicability to construct a scientific evaluation system.

3.4.2. Construction of the Evaluation Index System

In order to avoid the influence of subjective factors, the author adopted the entropy weight method as the method for calculating weights. This method can avoid the influence between indicators and objectively evaluate the quality of enterprise environmental accounting information disclosure. The author divided the evaluation index system into three levels: the first level is the quality of environmental accounting information disclosure, the second level is the three parts mentioned above, and the third level is 10 indicators selected according to the environmental information indicators announced by the state and the principles of comparability and scientificity. The evaluation index system is shown in Table 1.

Table 1 Evaluation Index System of Environmental Accounting Information Disclosure Quality in the Steel Industry

First-Level Indicator	Second-Level Indicator	Third-Level Indicator
Quality of Environmental Accounting Information Disclosure in the Steel Industry A	Environmental Financial Information B1	Environmental Subsidy C1
	Environmental Performance Information B2	Environmental Protection Project C2
	Environmental Liability Information B3	Environmental Protection Tax C3
		Environmental Protection Expense C4
		Related Penalty Information C5
		Pollutant Emission C6
		Operation Status of Environmental Assets C7
		Completion Status of Environmental Protection Tasks C8
		Environmental Accident and Major Lawsuit C9
		Environmental Pollution Emergency Plan C10

The scoring criteria for the indicators in this system: For the two indicators C2 and C5, enterprises that have not disclosed get 0 points, and enterprises that have disclosed get 2 points; for the three indicators C1, C4, and C6, enterprises that have not disclosed get 0 points, enterprises that have made simple disclosure get 1 point, enterprises that have made qualitative disclosure get 2 points, and enterprises that have made quantitative disclosure get 3 points; for the five indicators C3, C7, C8, C9, and C10, enterprises that have made simple disclosure get 1 point, and enterprises that have made detailed disclosure get 2 points, and enterprises that have not disclosed get 0 points.

The author sorted out the information in the social responsibility reports, annual reports, prospectuses, and environmental reports of various steel enterprises, counted the environmental accounting information disclosure situation of various steel enterprises, and then, according to the above scoring criteria, finally obtained the scores of the environmental accounting information disclosure quality of various enterprises.

3.4.3. Analysis of the Quality of Accounting Information Disclosure of Each Enterprise in the Steel Industry

First, standardize the scoring data above. Assume that there are K indicators, then the indicator is expressed as $X_i = (X_1, X_2, \dots, X_n)$, Assume that the standardized value of the data is Y_1, Y_2, \dots, Y_k , then $Y_{ij} = (X_{ij} - \min(x_i)) / (\max(x_i) - \min(x_i))$, and then calculate the proportion of the jth indicator in the ith scheme,

$P_{ij} = Y_{ij} / \sum_{i=1}^n Y_{ij}$ ($i=1, \dots, n$; $j=1, \dots, m$), and then calculate the information entropy of each indicator, $E_j = -\ln(n)^{-1} \sum_{i=1}^n P_{ij} \ln P_{ij}$, and then calculate the information entropy of each indicator, $S_i = \sum_{j=1}^m W_j \cdot P_i$, The scores of each enterprise are shown in Table 2.

Table 2 Scores of Environmental Accounting Information Disclosure Quality of Steel Industry Enterprises

Enterprise Name	Score	Enterprise Name	Score
Vanadium and Titanium Co., Ltd	3.69	CITIC Special Steel	3.00
Xianglou New Materials	0.10	Xinxing Ductile Iron Pipes Co., Ltd.	3.19
Jinzhou Pipeline	3.44	Zhongnan Co., Ltd.	4.50
Shougang Co., Ltd.	3.69	Jiuli Special Materials Co., Ltd.	6.67
Yongjin Co., Ltd.	7.17	Guangdong Mingzhu Group Co., Ltd.	3.19
Ordos	0.27	HBIS Co., Ltd.	4.94
Guangda Special Materials	3.94	Ningxin New Materials Co., Ltd.	5.17
Hangzhou Iron and Steel Co., Ltd.	5.94	Nanjing Iron and Steel Co., Ltd.	5.94
Fangda Special Steel	6.69	Fushun Special Steel Co., Ltd.	4.94
Angang Steel Co., Ltd.	4.94	HBIS Resources Co., Ltd.	2.69
Liuzhou Iron and Steel Co., Ltd.	4.50	Jiuquan Iron and Steel (Group) Co., Ltd.	2.94
Xinyu Iron and Steel Co., Ltd.	5.75	Sanming Iron and Steel Co., Ltd.	3.17
Baotou Steel (Group) Co., Ltd.	3.94	Valin Iron and Steel Co., Ltd.	3.25
Dazhong Mining Co., Ltd.	3.94	Anyang Iron and Steel Co., Ltd.	5.19
Hainan Mining Co., Ltd.	6.19	Shandong Iron and Steel Co., Ltd.	4.94
Chongqing Iron and Steel Co., Ltd.	6.19	Shengde Xintai Special Steel Co., Ltd.	3.94
Baosteel Co., Ltd.	2.94	Jinling Mining Co., Ltd.	2.75
Fangda Carbon New Materials Co., Ltd.	5.94	TISCO Stainless Steel Co., Ltd.	4.17
Maanshan Iron and Steel Co., Ltd.	3.94	Benxi Steel Plate Co., Ltd.	4.94
Lingyuan Iron and Steel Co., Ltd.	3.19	Baodi Mining Co., Ltd.	5.94
Changbao Co., Ltd.	4.94	Bayi Iron and Steel Co., Ltd.	4.94
Shagang Group Co., Ltd.	3.69	Bwu Iron and Steel Co., Ltd.	5.94

It can be seen from Table 2 that the quality of environmental accounting information disclosure of steel enterprises is uneven. Some enterprises have disclosed ten indicators in the system, while some enterprises have only disclosed one or two indicators. But generally speaking, each enterprise has disclosed more or less environmental accounting information. Through analysis, it is found that most enterprises have better disclosed government subsidy information and simply disclosed the relevant information of environmental protection tax, but the disclosure of environmental assets is not detailed enough. This may be because the proportion of environmental assets in assets is relatively small, and enterprises usually classify environmental assets into fixed assets or current assets for the convenience of management, indicating that most enterprises have not paid enough attention to environmental assets. The disclosure of environmental assets can better reflect the importance that enterprises attach to environmental protection. Therefore, steel enterprises need to pay more attention to the disclosure of environmental assets.

4. Countermeasures for Each Enterprise in the Steel Industry to Improve the Quality of Environmental Accounting Information Disclosure

4.1. Subdivide the Regulatory Responsibilities of Environmental Accounting Information Disclosure

At present, China has not clearly divided the regulatory responsibilities of accounting information disclosure, and the phenomenon of each enterprise shirking responsibility occurs from time to time. When there are problems with the enterprise's environmental accounting information disclosure or environmental accounting treatment, the regulatory division of labor is not clear, and the relevant departments evade responsibility. If the enterprise's violation problems are not solved, it will hinder the long-term development of the enterprise. Steel enterprises should establish an ecological environment management agency to evaluate the enterprise's environmental performance, and the enterprise accounting department is responsible for disclosing environmental accounting information, cooperating with the ecological environment management agency to manage environmental financial information, and jointly urging the enterprise to rectify the emerging environmental problems.

4.2. Give Play to the Power of Public Opinion

The main contradiction in Chinese society has been transformed into the contradiction between the people's ever-growing needs for a better life and unbalanced and inadequate development. Longevity and health have become issues that people care more about. Therefore, once the enterprise's environmental problems are disclosed, the impact of public opinion cannot be ignored and will have a significant impact on the enterprise's reputation and may even lead to a sharp drop in the enterprise's stock price. Government departments can set up websites dedicated to reporting and exposing enterprise scandals, give full play to the power of public opinion, prompt enterprises to pay more attention to environmental protection, and thus standardize the disclosure of environmental accounting information.

5. Summary

The author took 46 enterprises in the steel industry as the analysis objects, summarized the environmental accounting information disclosure situation of each enterprise by collecting the annual reports, social responsibility reports, environmental reports, and prospectuses of each enterprise, constructed an environmental accounting information quality evaluation index system, and scored the enterprises. It was found that there were problems such as imperfect disclosure and lack of external supervision in the environmental accounting information disclosure of each enterprise in the steel industry. Steel enterprises should set up an ecological environment management agency within the enterprise, cooperate with the financial department, supervise and manage the enterprise's environmental accounting information disclosure, and the government should make good use of the power of public opinion supervision, open a reporting channel, and prompt steel enterprises to

consciously do a good job in environmental accounting information disclosure under multiple pressures.

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