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Research on the Application of Data Mining Technology in the Influence of ESG Rating on Corporation Financial Performance

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<i>Article History</i>	<i>Abstract</i>
Received: 28 May 2023 Revised: 02 July 2023 Accepted: 04 August 2023	This investigation harnesses data mining to discern the impact of ESG (Environmental, Social, and Governance) ratings on corporate financial performance. By constructing a dataset that mirrors corporate financial health against ESG benchmarks, the study evaluates the quality of data transmission, both wirelessly and through broadband. Analyzing the efficacy of data transfer across varying ESG ratings, the research employs data mining to detect and adjust financial performance metrics anomalies. The findings are compelling, demonstrating a 45% enhancement in operational efficiency attributed to data mining, with the precision of financial assessments exceeding 90% and result stability maintaining above 80%. This evidence suggests that within the ESG framework, data mining is instrumental in accurately evaluating and significantly improving the transmission of corporate financial performance data.
CC License CC-BY-NC-SA 4.0	Keywords: <i>Data Mining Technology, ESG Rating, Corporation Financial Performance, Application, Wireless Network</i>

1. Introduction

With the continuous improvement of financial management requirements [1], all sectors of society attach great importance to the financial performance analysis of corporations [2]. However,

the indicators involved in corporation financial performance analysis are becoming increasingly complex, and ESG rating can not find evaluation indicators[3], leading to the deviation of financial performance rating results. The key to a corporation's financial performance analysis is to determine the evaluation index, find out the main impact index[4], and ensure the effective transmission of financial performance data[5]. The growth of contemporary computing technologies has facilitated the interlinking and coupling of many domains, especially wireless networks and data mining. Wireless network transmission ensures the stability of data and can be combined with data mining methods to comprehensively analyze the degree of corporation performance changes [6], which is the main method of corporation financial performance analysis at present [7]. Literature research shows that data mining technology can classify a corporation's financial performance[8], shorten analysis time, and improve the accuracy of a corporation's financial performance analysis. However, in the process of using data mining technology to classify data, it will be affected by external uncertainty indicators, thus reducing the accuracy of analysis results [9]. Some scholars also put forward wireless Internet technology to analyze corporation performance, but the calculation process is very long [10]. Under complex information, the data transmission stability and comprehensive judgment of corporation financial performance analysis obviously decrease [11]. Therefore, some scholars put forward data mining technology to analyze corporation performance, choose the corresponding ESG rating scheme, and achieve good results. The evaluation results of ESG rating on corporation performance are shown in Table 1.

Table 1. Literature Growth Rate of ESG Rating on Corporation Performance Evaluation from 2010 to 2022

Time	Audit	Solvency	Management ability	Contribution %
2010	17	16	34	8.51
2012	29	25	38	9.18
2014	34	18	31	6.13
2016	31	38	42	8.48
2018	20	19	19	8.97
2020	24	17	17	6.28
2022	29	29	26	8.89

It can be seen from Table 1 that ESG rating mainly evaluates the financial performance of corporations from the aspects of solvency, operation ability [12], economic benefits, and operation ability, and transmits them with the help of data mining technology and wireless network technology. The change process is shown in Figure 1.

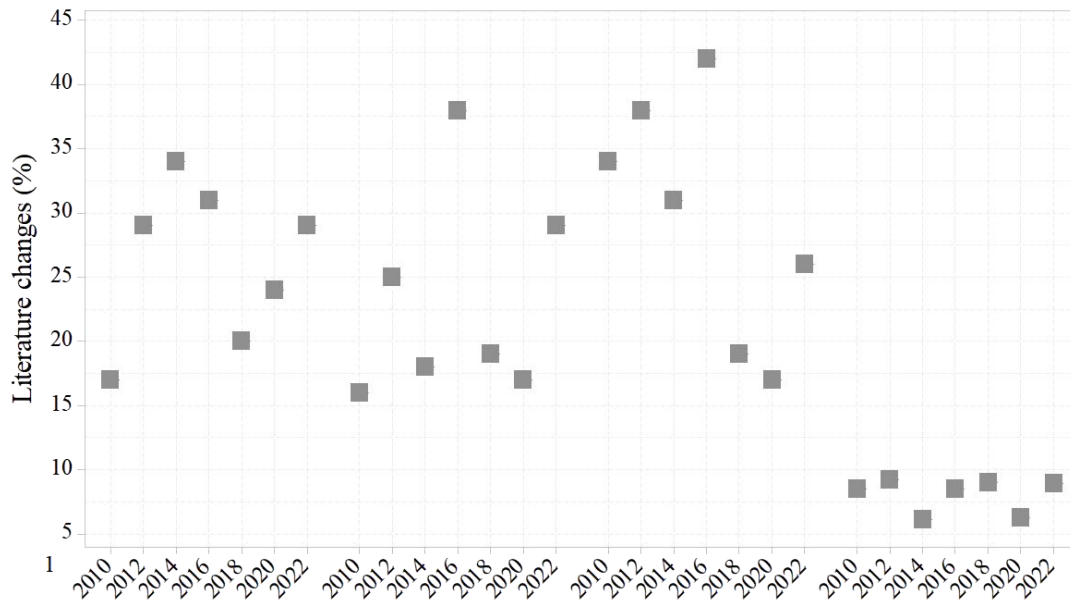


Figure 1. Changes in Literature

Based on the data results in Table 1 and Figure 1, this paper proposes a corporation performance evaluation method of data mining technology to analyze the impact of corporation financial performance under wireless network technology and ESG rating conditions.

2. Related Concepts

2.1 Corporation Financial Performance

A corporation's financial performance is a comprehensive evaluation of the operation, operation, debt repayment, etc., and its ESG rating determines the development of the corporation. In the process of corporation financial management [13], ESG ratings have always played a role in influencing corporation financial management. Corporation's financial performance is not only a financial system but also a management effect, which belongs to comprehensive financial content. The financial performance of a corporation should be realized from the following aspects:

- Reasonableness of the solvency and comprehensiveness of the audit content
- Solvency includes short-term debt, long-term debt, dynamic debt, etc.
- Business management, operation management, audit management, and other projects
- Financial structure, architecture, and other aspects of the structure.

Extension of corporation financial management, including 1) financial management of data mining; 2) Financial extension, audit finance, related finance, etc.; 3) Financial management characteristics, performance characteristics, comprehensive evaluation, etc.

2.2. Wireless Network Transmission

Corporation performance needs to be completed with the help of external transmission means, which is the comprehensive transmission result of corporation performance data. The transmission of corporation financial performance data includes not only corporation performance data, but also transmission technology, transmission channel, transmission frequency, etc., which can be divided into short-distance corporation performance transmission, long-distance corporation performance transmission, and data mining technology transmission, as shown in Table 2.

Table 2. The Level of Financial Management of Corporations

Transfer Metrics	Solvency	Operational Capabilities	ESG Ratings	Ability to Operate	Comprehensive Performance
Receiving Point(s)	3	5	2	8	11
Channels (pcs)	6	4	2	8	12

Frequency (Hz)	12~13	10~11	12~16	13~15	14~16
Transmission Volume(M)	89.31	75.77	92.43	82.06	89.31

Note: The data in the table are evaluation data of literature surveys, mainly from small corporations

It can be seen from Table 2, the wireless network transmission rate is small, significantly lower than the industry average (receiving point: 3, channel: 10, transmission volume is 102M). It also shows that the integration of data mining technology and ESG rating needs to be deepened to promote the improvement of the corporation's financial performance, so wireless network technology is introduced.

2.3. The impact of data mining methods on the financial performance of corporations

Data mining methods are now extensively used in almost every business for gaining more insights about data. The data mining method classifies ESG rating finance into different grades and analyzes financial performance from the aspects of solvency, operating ability, and operational ability. Then, wireless network technology is introduced, a transmission scheme is formulated, wireless transmission analysis is carried out on corporation financial performance data, and the evaluation effect of financial performance is calculated.

Data mining methods segment data through expert surveys, and industry statistical yearbooks, and eliminate irrelevant metrics and data. Among them, it is necessary to repeatedly test ESG rating results, wireless network transmission results, and performance indicators such as operation, operation, and debt servicing, and compare the final rating results. In addition, the evaluation data should be weighted by means of a questionnaire, the specific results of which are shown in Table 3.

Table 3. Questionnaire Scores

Time	Index	Score	Weight
Long-term Indicators	Solvency	8	9
	ESG Rating Ratings	6	0.92
	Total Assets	10	0.81
	Nature Of The Corporation	9	0.68
	Operational Capabilities	9	0.64
	Financial Level	1	0.24
	Your Industry	5	0.14
	Market Conditions	3	0.86
	Policy Information	9	0.78
	Economic Benefits	8	0.77
	Operational Capabilities	8	0.20
	Equity	7	0.83
	Welfare	4	0.23
Composite Indicators	Foster Relationships	9	0.82
	Fusion Relationships	7	0.45

	Inhibit Relationships	10	0.56
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It can be seen from Table 3 that according to the corporation financial questionnaire, the reliability and validity of long-term indicators and comprehensive indicators are greater than 0.7, and the indicators conform to normality, less than the single maximum value of wireless transmission, and data mining calculations can be carried out. In order to evaluate financial performance more accurately, it is necessary to quantify data mining techniques, ESG ratings, and corporation financial performance and put forward the following hypotheses based on previous research.

The process of data mining technology involves the following steps: The corporation's financial performance data (R) is expressed in terms of performance index (x_i), and data mining result (y_i), as given in Equation (1):

$$R = \alpha \cdot \sum \frac{\Delta x_i \rightarrow \Delta y_i^2}{x_i \cdot y_i} \quad (1)$$

The data transmission process of wireless network technology: the single transmission data is L , the channel, frequency, and other parameter adjustment coefficients are τ , the transmission stability is ξ , the transmission compliance rate is ν , and the data transmission process is shown in Equation (2):

$$L = \alpha \cdot \frac{\sum \xi \cdot \nu \cdot \tau}{\max \{ \nu \}} \quad (2)$$

3. Methodology

3.1. Performance Of Corporation Financial Data

The financial performance of corporations is mainly based on operational ability, solvency, profitability, and comprehensive ability, and the results are explained from the perspective of ESG rating, and the results are shown in Table 4.

Table 4. Rating Of Corporation Financial Performance

Time	Operational Capabilities	Solvency	Profitability	Comprehensive Capabilities	ESG Ratings	Normalized Processing
2021. 10.3	2.49	3.83	5.61	8.03	BC	Finish
2021. 11.3	9.86	2.63	4.20	8.63	AC	Finish
2021. 12.3	4.55	6.85	2.22	8.74	DC	Finish
2022. 1.3	9.64	9.98	1.83	1.99	CC	Finish
2022. 6.3	1.92	9.81	6.79	1.75	BC	Finish
2022. 12.3	6.42	1.77	0.09	7.21	AB	Finish
2023. 1.3	9.59	9.29	5.83	0.60	EE	Finish

The above analysis shows that the operational ability, solvency, ability and comprehensive ability of the company's financial performance, as well as the normality of the ESG rating, the rationality of the data is high, and all are normalized, and data mining and analysis can be carried out, and the discretization of the data is shown in Figure 2.

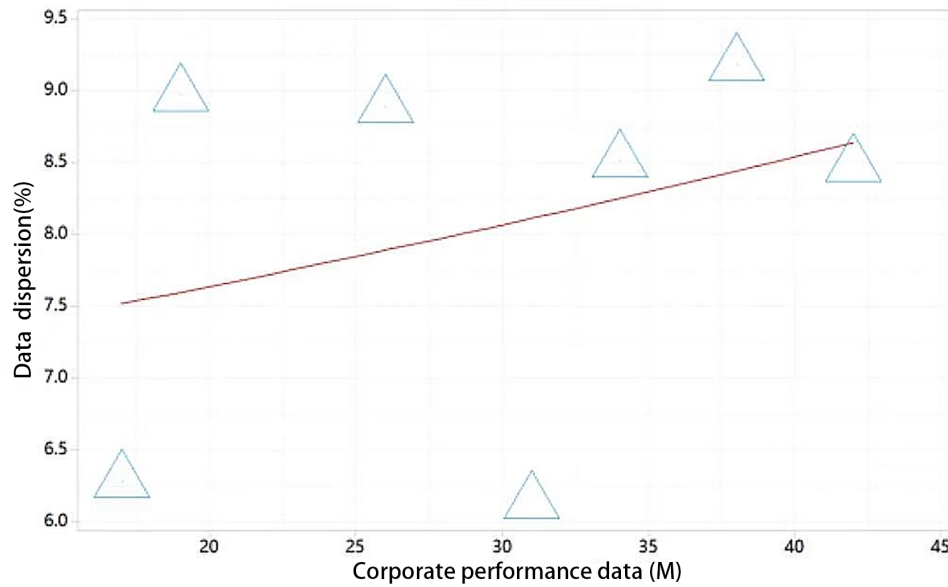


Figure 2. Dispersion of the Corporation's Financial Performance Data

It can be seen from Figure 2 that the discreteness of corporation financial performance data is good, the overall level is high, and it meets the later calculation requirements and wireless data communication test needs.

3.2. Evaluation of the Impact of ESG Rating on Corporation Financial Performance

There is a correlation between the ESG rating promotion effect, wireless transmission effect, mining depth, economic benefits, and economy, and there is little deviation from the corporation's financial management. The specific results are shown in Table 5.

Table 5. The Relationship between Corporation Financial Management and Corporation Financial Management

Index	Performance Improvement Effect	Business Operation Level	Catalytic Effect
Operational Capabilities	25.17	45.85	Positive
Level 1	4.70	47.30	Positive
Level 2	6.47	92.57	Positive
Solvency	25.80	89.91	Positive
Level 1	24.89	0.10	Positive
Level 2	1.31	66.95	Positive
Profitability	3.05	79.41	Positive
Level 1	24.47	39.08	Positive
Level 2	3.59	25.83	Positive
Comprehensive capabilities	15.80	74.99	Positive
Level 1	7.79	67.56	Positive
Level 2	24.19	77.89	Positive

NOTE.

1. The relationship between ESG ratings and corporation financial performance
 2. The relationship between ESG rating and performance system
- The overall relationship between ESG ratings and financial performance is shown in Figure 3.



Figure 3. The Overall Relationship between ESG Ratings and Financial Performance

As can be seen from Figure 3, the overall relationship between ESG rating and financial performance is between 20~40%, indicating that the impact of ESG rating on financial performance has great development potential and needs further in-depth analysis. In order to identify the root cause of the improvement in financial performance, it is necessary to judge different ESG ratings. Among them, the financial performance impact results of different ESG ratings are shown in Table 6.

Table 6: Financial Performance Levels of Corporations

ESG Ratings	Operational Capabilities	Solvency	Profitability	Comprehensive Capabilities
AA	60.24	69.38	42.14	42.02
AB	63.67	52.11	44.22	42.80
AC	44.39	50.34	27.15	34.95
BB	34.67	29.34	29.39	38.95
BC	27.31	24.86	22.00	21.19
CC	24.15	12.44	10.70	18.78

As can be seen from the data in Table 6, there are differences in the impact of different grades on the financial performance of corporations, with AA having the greatest impact, followed by AB, AC, BB, BC, and CC the smallest. This shows that the higher the ESG rating, the greater the impact on the financial performance of the corporation, so the impact of ESG rating on the financial performance of the corporation is significant.

3.3. The impact of data mining techniques on the financial performance of corporations

Data mining technology is mainly reflected in financial performance indicators, wireless network transmission, data mining depth, etc., and the specific impact results are shown in Table 7.

Table 7: The Impact of Data Mining Techniques on Corporation Financial Performance

	Financial Performance Indicators	Wireless Network Transmission	Data Mining Depth	Magnitude of Change
Unstructured Data	54.85	58.07	25~50	0.052
Structure Data	59.94	50.59	20~55	0.145
Semi-Structured Data	47.26	53.02	20~55	0.725
Random Data	53.64	56.30	20~55	0.232
Text Data	48.33	49.15	20~55	0.072
Reasonableness = 0.89				

The data in Table 7 shows that data mining technology has an obvious influence on financial performance indicators, wireless network transmission, and data mining depth, which can comprehensively evaluate a corporation's financial performance, improve the transmission rate of wireless networks and present positive influence operations. In order to further verify the role of data mining technology in corporation's financial performance management, the whole impact process is plotted, and the results are shown in Figure 4.

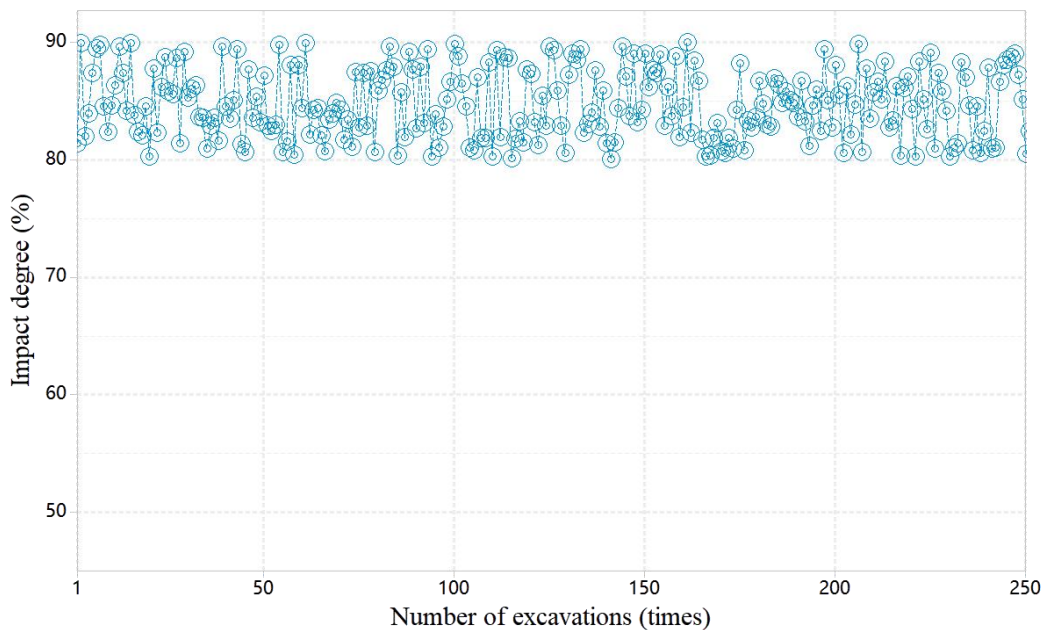


Figure 4. The Impact of Data Mining Techniques on the Financial Performance of Corporations

It can be seen from Figure 4, the impact of data mining technology on financial performance shows a gradual deepening trend, mainly concentrated in the range of 80~90%. At the same time, the change of corporation performance is mainly concentrated between 40~50%. Therefore, the impact of data mining technology on the financial performance of corporations is obvious.

3.4. Results of Wireless Transmission of Corporation Financial Performance Data

The diversity of corporation financial data, the presentation of audit details, and the integration of different financial audit scopes require high-transmission wireless network technology to ensure the accurate judgment of corporation financial data, and the results are shown in Figure 5.

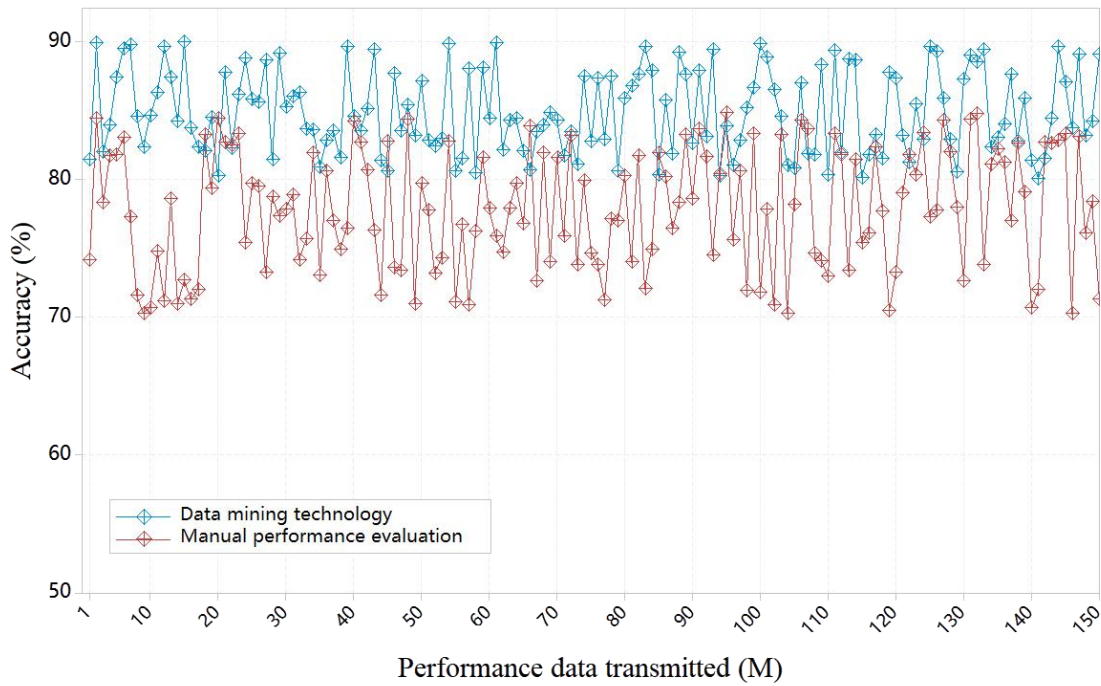


Figure 5: Accuracy of Transmission of Corporation Financial Performance Data

It can be seen from Figure 5 that the transmission accuracy of data mining technology is higher than that of manual performance evaluation, and the data loss rate of the transmission results of financial data of each corporation is low, indicating that wireless transmission can accurately complete the evaluation of performance data and provide comprehensive support for corporation financial performance analysis, the results are shown in Table 8. As more data becomes available, separating the investment from the noise is critical. Finding tools that provide access to data, but also insights that have not previously existed will be what truly enable investors to quickly and easily identify value. These facilitated the usage of data mining.

Table 8. Data Transmission Accuracy of Corporation Financial Performance

Financial Performance Data Extraction	Data Mining Techniques Process the Results		Transmit Results Wirelessly	
	Debt	Business	Debt	Business
77°82''	79.15	77.26	75.25	73.40
35°05''	71.97	74.43	76.80	70.92
16°41''	78.15	72.27	77.86	78.55
56°73''	79.99	79.34	73.75	75.84
54°52''	77.08	77.52	71.81	79.42
25°85''	76.75	70.96	74.12	74.44
12°43''	75.16	78.31	73.63	77.26
22°94''	77.25	77.73	71.27	70.60
17°01''	75.29	72.36	76.24	75.41

It can be seen from the transmission process of Table 8 that the transmission of corporation financial data is relatively high, and the transmission rate of wireless transmission is greater than 80%, mainly due to the mining of financial performance data by data mining technology, which reduces the complexity of data in wireless transmission, and further proves that data mining technology and wireless transmission technology can meet the actual financial performance requirements. This table

shows the improvement in transmission after deploying data mining technology. Moreover, there was no abnormal interference in selecting performance indicators, indicating that the transmission accuracy of the corporation's financial data performance is ideal.

4. Results and Discussion

With the rapid development of corporations and the continuous improvement of the financial scale, the impact of ESG ratings on performance evaluation has become the focus of research. The key to studying the financial performance of corporations is to comprehensively analyze performance data, reduce unreasonable performance indicators, and achieve comprehensive financial performance analysis. The evaluation of corporation performance by ESG rating should be based on economic benefits and operational capabilities, combined with data mining technology and wireless network technology, debt repayment, and operation analysis, and find out key indicators.

(1) The relationship between data mining technology and financial performance

The results of this study show that data mining technology is more accurate in evaluating a corporation's operating ability, solvency, and profitability and is ideal for processing complex data such as unstructured data, semi-structured data, and natural language. This shows that data mining techniques can effectively analyze financial performance and the relationships between data. Based on data mining results, companies can adjust ESG ratings to promote improving corporation financial performance. At the same time, it is necessary to fully consider different performance indicators, increase the depth of mining, and the relationship between the corporation's financial performance indicators and data mining depth, especially operating ability, profitability, and solvency. The results of this study show that the evaluation of corporation financial performance by data mining technology is reasonable, and the problems existing in corporation financial performance can be found.

(2) The impact of ESG ratings on financial performance

The impact of ESG rating on financial performance is more obvious, indicating that ESG rating can improve the level of corporation financial performance management and promote the improvement of corporation financial performance in financial performance evaluation. The results of this paper show that ESG rating has a financial promotion level of 10~20%. ESG rating is not a simple financial performance promotion but an overall improvement of corporation financial performance management. In the process of promoting the financial performance level of corporations, the impact of national policies on performance should be considered, so a more comprehensive ESG rating analysis should be done. The overall study shows that ESG rating has noticeable promotion effects, significantly affects operational ability, solvency, and profitability, and can deeply optimize corporation financial performance. However, the promotion effect on comprehensive capabilities is small, so it is necessary to strengthen the improvement of comprehensive capabilities of corporations. There is a positive relationship between ESG rating and corporation financial performance, with AA, AB and AC having a higher impact on corporation financial performance, while CC has a smaller impact on corporation financial performance.

(3) The impact of data mining technology and wireless transmission technology on financial performance

The financial performance and wireless transmission effect of corporations are very accurate for the transmission of unstructured, semi-structured and natural language data, but there are certain differences in the financial performance indicators of each corporation. Data mining technology can propose the processing process of corporation financial performance data, which can be used as the basis for wireless transmission. The results show that data mining technology simplifies the data of solvency, profitability and other indicators, and the relevant indicators are the key indicators in financial performance and can be used as the basis for judging the level of financial performance. In addition, after the data structure of corporation financial performance is processed by data mining technology, the effective transmission of wireless network can be realized, and there is no significant difference in transmission indicators, indicating that data mining technology and wireless transmission technology have an impact on financial performance. The overall research results show that data mining technology and wireless transmission technology can conduct in-depth analysis of

profitability, debt repayment, operation and other indicators in corporation performance, simplify the amount of unstructured, natural language and other structured data, complete the simplification and transmission of corporation financial performance data, ensure the reasonableness of the analysis results, and provide a basis for the formulation of performance evaluation measures in the later stage.

5. Conclusion

Corporation financial performance is an important content of corporation financial management and has important operations for the financial development of corporations. This paper proposes a financial performance evaluation method based on data mining technology, which is analyzed from the perspective of ESG rating combined with wireless network technology. The results show that: 1) data mining technology can accurately judge the financial performance indicators of corporations and determine the content of key indicators; 2) There is a positive correlation between ESG rating and performance indicators, which has an important rating effect on solvency and operational ability. 3) Under wireless network technology, corporation financial performance data can be well transmitted, especially debt data, business data and other key indicators. This work focuses on using Data mining technology along with wireless network technology to assess the corporations' financial performance by deeply analyzing the influence of ESG rating on financial performance. In future, this can be extended to incorporate AI based natural language processing and AI based methodologies to predict and interpolate the implications about ESG policies of the corporations.

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